THE LAST ENLARGEMENT OF THE EU AND THE EFFECTS OF INWARD FOREIGN DIRECT INVESTMENT: A DYNAMIC PANEL DATA APPROACH

by

Vicente Orts*, Maite Alguacil, and Ana Cuadros
Department of Economics and Institute of International Economics, University Jaume I of Castellon, SPAIN

July 2005

* Corresponding author. Mail Address: Departamento de Economía, Universidad Jaume I, Campus Riu Sec, 12071, Castellón (Spain). Tel.: +34-964-727177; fax: + 34-964-728591. E-mail address: ort@eco.uji.es (Vicente Orts).
THE LAST ENLARGEMENT OF THE EU AND THE EFFECTS OF INWARD FOREIGN DIRECT INVESTMENT: A DYNAMIC PANEL DATA APPROACH

Abstract

This paper represents an attempt to highlight the effects of the recent surge of FDI in the enlargement states over domestic investment and growth. A similar analysis will be carried out for the EU-15 in order to ascertain if this type of capital inflows has a differential impact in these two regions of the European Union. Empirical analysis, based on dynamic panel data models, suggests the existence of a positive contribution of FDI to higher domestic investment and economic growth in the new member states. The evidence obtained for the EU-15 old member countries confirmed the FDI-growth nexus but does not suggest a positive impact of FDI on domestic investment, what would be consistent with a different nature of these capital inflows for this more advanced economies.
1. INTRODUCTION

The fifth enlargement of the European Union (EU) in May 2004 is the major and more ambitious until now. It involves eight of the Central and Eastern European countries (CEECs) (the five Visegrad countries -Czech Republic, Hungary, Poland, Slovak Republic and Slovenia-, and the three Baltic States -Estonia, Latvia and Lithuania-) and the Mediterranean Islands of Malta and Chipre.

The above transition economies have been previously isolated from international markets. However, over the past decade, they have liberalised their trade regimes and have opened up for foreign capital, embarking on comprehensive privatisation processes. Most of them have also improved their regulatory framework, adapting their laws and regulations to the standards prevailing internationally and have made significant efforts to improve their macroeconomic performance.

One of the key components of the increased integration of the new EU member states into the world economy has been international capital flows and especially foreign direct investment (FDI)\(^1\). As one can see in Figure 1, a dramatic change in the pattern of FDI inflows has taken place in these economies over the past decade. These countries have become increasingly the destination for FDI coming from EU partner countries as well as by overseas multinationals, benefiting from the world-wide surge in FDI flows that characterised the period 1990-98. Several factors have contributed to these FDI inflows: relatively low labour costs, increased institutional and political stability in some of the CEECs, and the general expectation that the more advanced countries in the region will become members of the EU, improving their access to the core European markets. In fact, from mid-nineties, the prospect of EU membership may have caused anticipatory investment in the region as investors seek to gain footholds in potentially profitable future markets (Buch et al., 2003; Egger and Pfaffermayer, 2004).

(Insert Figure 1)

\(^1\) See Brenton et al. (1995).
It has been argued that the anticipation of the enlargement of the European Union in
May 2004 might be related with a FDI redirection from relatively similar markets in
Southern Europe towards the new accession countries.\(^2\) This phenomenon could be the
result of the activity of the multinationals, which are restructuring their activity by
shifting part of their production activity to Central Europe to take advantage of the
lower labour costs of the new members and their better geographical location.\(^3\)
However, the existing evidence does not reveal an obvious phenomenon of FDI
diversion from the South to the East.\(^4\) The non-diversion result has been found in
Brenton et al. (1999), Galego et al. (2004) and Buch et al. (2003), among others. In fact,
as can be seen in Table 1, the eight CEECs that joined the EU on 1 May 2004 have not
improved their FDI position significantly relative to the older members.

(Insert Table 1)

In spite of the fact that FDI into transition economies has been rising during all the
analysed period, its magnitude and importance remain highly unequal among them.
Four of the CEECs (Czech Republic, Hungary, Poland and Slovakia) account for three
quarters or more of the FDI inflows coming into the ten countries acceding to the EU in
May 2004 (see Table 1).

This surge of FDI flows in the enlargement states has made arise the following
question: What have been its main effects on recipient countries? As we will discuss in
Section II, this is a controversial issue. From the theoretical point of view, quite a few
benefits are likely to accrue to the host economy from FDI. This is particularly the case
for technology and management expertise, as multinational enterprises seem to be one
of the principal vehicles for the international transfer of technology. Moreover, FDI
appears to have highly beneficial effects on domestic investment. However, empirical
evidence about the positive effect of FDI seems to be dependent upon the analytical
framework adopted, the analysed period, the considered countries, as well as upon a set
of conditions in the host country economy.

---

\(^2\) Baldwin et al. (1999) suggest that the adhesion of the new member countries to the EU could be related
with a process of “investment diversion”.

\(^3\) Kinoshita and Campos (2003).

\(^4\) Even, some papers are arising the question of whether FDI from the South may be diverted not to the
EU new members but to the current northern and central EU members (see Galego et al., 2004).
Transition economies are suitable objects for an analysis of FDI spillovers because, in addition to the improvements in economic liberalisation and macroeconomic stabilization, most countries of Central and Eastern Europe are equipped with well-trained workforces, and possess relatively high-quality human capital stock, which makes them particularly likely locations for productivity spillovers. Furthermore, the physical capital stock of these countries, in general, had been relatively obsolete since the mid-1980s and needed to be modernised through new investment. Thus, the major challenge facing the transition economies was how to escape the poverty trap by acquiring advanced technology and accumulating capital stock more effectively (Lee and Tcha, 2004).

It is this combination of potential gains and favourable conditions to realise these gains that makes the transition experience an excellent testing ground for the impacts of FDI on growth (Campos and Kinoshita, 2002). Thus, this paper represents an attempt to highlight the effects of the recent surge of FDI on domestic investment and growth in the enlargement states. A similar analysis will be carried out for the EU-15 in order to ascertain if there exists a differential impact of FDI in these two regions of the European Union.

The rest of the paper is organised as follow. In the next section, we discuss the theoretical and empirical evidence about the main mechanisms through which FDI may affect economic performance in the host country. Section 3 contains a description of the estimation procedure and data used in the empirical analysis. Section 4 presents the main results. Section 5 concludes.

2. OVERVIEW OF THE FOREIGN DIRECT INVESTMENT-GROWTH NEXUS

Theoretically, economic integration could either encouraging or dampening FDI (Neary, 2002). Thus, there are no obvious prescriptions about the impact of economic integration on these capital flows. However and, as it has been shown in the previous section, FDI seems to have played a prominent role in the economic integration of the new member states of the European Union into the world markets.
The impact of FDI on growth is expected to operate through two mechanisms. Firstly, the FDI-growth nexus involves the impact of FDI on capital accumulation, as these capital flows seem to encourage the incorporation of new inputs and foreign technologies in the production function. Secondly, FDI is expected to be growth-enhancing by promoting the technological upgrading of the recipient economy as well as by augmenting the existing stock of knowledge through labour training, skill acquisition, and the introduction of alternative management practices. As a result, FDI may increase productivity in the host country.

Nevertheless, whether FDI can be a catalyst for output growth, capital accumulation, and technological progress seems to be a less controversial hypothesis in theory than in practice. Firstly, as de Mello (1999) has recently shown, the extent to which FDI is growth-enhancing depends on the degree of complementarity and substitution between FDI and domestic investment. If FDI is expected to affect growth positively, it may be argued that it requires some degree of complementarity with domestic investment, at least in the short run. The results obtained in this paper indicate that complementarity between old and new technologies holds for developing countries. On the contrary, the degree of substitutability between capital stocks embodying old (domestic) and new (FDI-related) technologies seems to be higher in technologically advanced countries.

Quite a few empirical studies focusing on developing countries have found that FDI appears to have highly beneficial effects on domestic investment, giving support to the complementarity effect between FDI and domestic investment. The findings of Bosworth and Collins (1999) suggest a near one-for one relationship. In contrast, portfolio capital inflows appear to have no discernible impact on investment, and the effect of loans lies between the two. Similar results has been found by Razin (2002, 2003), Hecht et al. (2004) and, more recently, by Mody and Murshid (2005)\(^5\).

The impact of private capital flows on domestic investment may also depend on the objective of investors. With greater level of development (and thus greater financial integration) foreign investors are also motivated by diversification objectives rather than by investment needs. Thus, inflows can be increasingly channelled through portfolio

\(^5\) A similar analysis conducted by this last paper for a sample of industrialised countries showed no relationship between foreign capital flows and domestic investment.
flows or through FDI with the characteristics of portfolio capital. But, in this case, there can be no presumption that foreign capital inflows will boost domestic investment (Mody y Mushid, 2005).

As was previously indicated, FDI may also accelerate growth through the transfer of managerial and technological know-how. Spillovers may take place when local firms improve their efficiency by copying technologies of foreign affiliates operating in the local market either through observation or by hiring workers trained by the affiliates. Another kind of spillovers occurs if multinational entry leads to more severe competition in the host country market and forces local firms to use their existing resources more efficiently or to search for new technologies (Blomström and Kokko, 1998).

Although theory equates FDI to technology transferred, Campos and Kinoshita (2002) have highlighted that in most countries FDI encompasses an array of arrangements that goes well beyond pure technology transfer. According to these authors, the technology gap could be the main aspect that may condition the positive effect of FDI on growth. Thus, the transition economies may be the right context to analyse this question because of their long distance away from the world technological frontier.

The scope for technology transfers between foreign investors and the recipient economy seems to be dependent upon a set of conditions in the host country. Many empirical studies view human capital as the main conduit for achieving spillovers. That is the case of Blomström et al. (2001), who argue that FDI contributes to economic growth only when a sufficient absorptive capability of the advanced technologies is available in the host economy. These results are in line with the ones obtained by Borensztein et al. (1998), Balasubramanyam et al. (1999) and de Mello (1999). However, Campos and Kinoshita (2002) find that the effect of FDI is not necessarily conditional on a minimum threshold level of human capital for transition economies, probably because most of these countries lie above the threshold level of human capital.

Other empirical works consider that the more general stimulus for spillovers from FDI are not necessarily related to the level of human capital but to a higher institutional capability (see Mody and Murshid, 2005); an environment characterised by liberalized
markets and macroeconomic stability and the existence of adequate infrastructures (Easterly, 2001 and Li and Liu, 2004).6

As we have tried to point out throughout this section, the extent to which FDI is expected to be growth enhancing seems to be dependent on the local conditions of the recipient countries. Therefore, to assess the effects of FDI on economic performance we should take into account several factors such as the degree of complementarity or substitutability between FDI and domestic investment, the level of human capital, the infrastructure endowment, the degree of uncertainty, and so on.

3. ECONOMETRIC METHODOLOGY

In this section, we describe the econometric approach and definition of series. As above mentioned, the aim of this paper is to test the influence of inward foreign direct investment, $FDI_{it}$ (measured here as a fraction of GDP), on domestic investment, $DI_{it}$ (also measured as a fraction of GDP) and economic growth, $g_{it}$ in the EU recent member states. We try also to determine if relevant differences exist between this region and the rest of European Union countries. Accordingly, we have two sub-samples consisting in, on the one hand, of the 15 pre-May 1, 2004 EU Member States7 and, on the other hand, of the May 1, 2004 New Acceding Member States.8 The data source for this paper is the World Bank’s *World Development Indicators* (WDI 2003, cd-rom version). In the Appendix A, we show a detailed description of variables.

As the empirical literature recognises, two main difficulties emerge in the analysis for transition economies.9 Firstly, the available data from these economies covers a very short period of time. Secondly, the economic figures in these countries are difficult to compare over time due to the break that transition produces in the way the economy is organised. To deal with these issues, we opted for panel data instead of the more traditional cross-sectional or time-series approaches. Moreover, the use of a panel data technique has the advantage of allowing us to control for country-specific differences in

---

6 In addition to infrastructures, these last authors also considered the role played by the level of human capital and the technological gap in determining the advantageous effects of FDI.
7 Luxemburg has been excluded from this sub-sample due to the lack of data.
8 Particularly, we include Cyprus, Czech Republic, Hungary, Malta, Poland and Slovak Republic. The other countries from the last enlargement have been omitted for the lack of data of inward foreign direct investment.
9 See, for instance, Campos and Kinoshita (2002).
technology, production and socioeconomic factors. This attribute enables to avoid the misspecification problems that individual heterogeneity involves.\textsuperscript{10} Finally, panel data provide more degrees of freedom, less colinearity and therefore more efficiency.

Another distinction of our work from other empirical studies refers to the use of dynamic equations. The lagged values of investment and growth have been introduced as a determinant of $D_{it}$ and $g_{it}$, respectively, what allows us to capture the potential persistence behaviour of the endogenous variables in the short run.\textsuperscript{11} It permits also to avoid the nonstationary of the residuals. Although the possibility that the series used in regressions may be stationary around a trend has been taken into account by including time dummy variables in all of them. The dynamic equations are given by:

\begin{equation}
D_{it} = \alpha_1 FDI_{it} + \beta_1' X_{it} + \gamma_1 D_{it-1} + \mu_1 + \epsilon_{1it}
\end{equation}

\begin{equation}
g_{it} = \alpha_2 FDI_{it} + \beta_2' X_{it} + \gamma_2 g_{it-1} + \mu_2 + \epsilon_{2it}
\end{equation}

where $i$ refers to each of the countries considered in our sample and $t$ refers to the time period 1990-2001.\textsuperscript{12} $\mu_i$ represents the individual effect which is taken to be constant over time and specific to each country.

To ensure the robustness of our results, two versions of the equations have been estimated. In one version, only inward FDI flows appear as an exogenous determinant of growth and investment. In the other version, a set of control variables, $X_{it}$, which have been selected from standard specifications of domestic investment and growth are further considered. We eliminate thus the possibility of biased generated by omitted variables.

In the investment equation, the control variables are the following: on the one hand, the per capita GDP (in log terms) represents the level of technological development ($\ln YPC_{it}$). We would expect a positive impact of this variable on domestic investment. On the other hand, the discouraging effect of greater uncertainty and higher cost of

\textsuperscript{10} See Hsiao (1986).
\textsuperscript{11} Such as Mody and Murshid (2005) mention, a dynamic equation is a direct approach of addressing the issue of serial correlation.
\textsuperscript{12} The availability of data for all the considered variables has determined the election of the period.
capital on investment is measured here by the annual growth rate of the GDP deflator \((INFL_t)\) and the real interest rate \((IR_t)\)\(^{13}\), respectively.\(^{14}\)

In the growth equation, we include a set of explanatory variables commonly recognised in the literature for modelling growth, such as domestic investment \((DI_t)\), population growth \((POP_t)\) and per capita GDP \((\text{InYPC}_t)\).\(^{15}\) The predictions are that the effects of population growth are negative, while those of domestic and foreign investment and human capital or the level of development are positive. We have also considered the influence of a couple of policy variables frequently included as determinants of growth that are especially relevant in a short-run analysis as it is the case of this paper. These series are the real interest rates and the inflation rates. Both of them would exert a negative influence on growth.\(^{16}\) Finally, following the model postulated by Easterly (2001), we include a proxy for the quality of the infrastructure in the host economy \((INFR_t)\).\(^{17}\)

Since we analyse a selected set of countries, a fixed-effects model seems to be the most appropriate specification for these equations. Accordingly, in a first-stage regression, we estimate the model using its traditional within-group estimator. However, we cannot omit that the presence of the lagged dependent variable on the right-hand side might bias this estimation due to the likely correlation between the regressors and the disturbance terms.\(^{18}\) To solve this question, in a second-stage regression, we employ the instrumental variable (IV) estimator suggested by Anderson and Hsiao (1982). They propose to eliminate this correlation by using lagged observations of the regressors as instruments.\(^{19}\) The main advantage of this method is that it reduces the expected sensitivity of the results to the instruments chosen.

\(^{13}\) Following Mody and Murshid (2005), we have also considered the effect of the availability of capital (proxied by the series money and quasi money (M2) as % of GDP) in the transition economies. However, this variable does not appear significant in the investment equation. These results are available on request from the authors.

\(^{14}\) In line with Bosworth and Collins (1999), we have also estimated the model with the change in the terms of trade as an additional regressor. But the impact of this variable in the investment decision appears insignificant.

\(^{15}\) We have modified the original formulation from Mankiw et al. (1992) by specifying technological change as a function of FDI. The same modification is done by Campos and Kinoshita (2002).

\(^{16}\) The impact of country-specific variables as the initial GDP is comprised in the fixed-effect parameters.

\(^{17}\) The quality of infrastructure has been proxied by the number of telephone mainlines per employee. Similar variable is used in Easterly (2001) and Campos and Kinoshita (2002).

\(^{18}\) See Arellano (2003) for more information about dynamic panel data models.

\(^{19}\) Specifically, the dependent variable lagged twice is used as an instrument for the first difference of the lagged dependent variable, while a lagged value of the regressors is employed as an instrument for the first difference of the regressors.
Another question to take into account when analysing the influence of FDI in domestic economy performance is the possibility of a reverse causality. Just as FDI may have a positive effect on domestic investment and growth, so too greater domestic investment and growth may attract further capital inflows (Bosworth and Collins, 1999). This two-way relationship would create an endogeneity that might produce biased estimators.\footnote{A full discussion about endogeneity is found in Nickell (1981).} In this paper, we examine directly this problem by testing for Granger non- causality. We check thus the gain in the explanatory power of domestic investment and growth due to the addition of the lagged FDI (Sims, 1980). Since this is a short panel, we use a one- year lag to carry out this test. As can be seen in Table B.1 from the Appendix B, the statistical insignificance of the lagged valued of domestic investment and growth in the explanation of inward foreign direct permits to conclude that $DI$ and $g$ does not Granger-cause FDI in either of the two set of countries considered. Therefore, our concern about an endogeneity problem caused by the fact that fast growing and greater investor countries might attract more FDI disappears.

4. ASSESSMENT OF THE EFFECTS ON THE FDI-GROWTH NEXUS. MAIN RESULTS.

The results of the estimations of equations (1) and (2) are reported in Tables 2 and 3, respectively. Columns 1 to 3 show the outcomes obtained from the sub-sample of the New Accessing Member States while columns 4 to 6 present those obtained from the EU-15 Member States.

As one can see, the estimations show a clear positive influence of capital inflows on domestic investment in the transition economies (Table 2). In both, the within-group and instrumental variable estimations (columns 1 and 2, respectively), the coefficient on this variable appears to be statistically significant and with a positive sign. This result holds even in the simplest model (column 3) where the impact of any other control variable has been omitted. Therefore, the obtained evidence confirms the theoretical prediction that FDI has a beneficial impact on capital accumulation, giving support to the complementary relationship between those two variables in this group of emerging economies. As mentioned in Section 2, this positive effect of capital inflows on
domestic investment for developing economies has been also found by Bosworth and Collins (1999), Razin (2002, 2003), Hecht et al. (2004) and Mody and Murshid (2005).

(Insert Table 2)

Besides, in line with the expectations, the negative and statistically coefficients on IR and INFL indicate that lower relative capital cost and institutional and political stability have contributed to an increase in capital accumulation. Similarly, a greater level of technological development seems to positively affect domestic investment. In the IV regression (column 2), the variable InYPC carries a positive sign, although it is significant only at 10 per cent. The lack of variation in this series may be a reason for its poor significance. Finally, a significant coefficient on the lagged domestic investment confirms the expected persistent behavior of the dependent variable.

Things are rather different when we look at the rest of the EU countries (columns 4 to 6). In this case, the significant effect of FDI on domestic investment disappears as far as we take into account both the influence of other external factors and the possibility of correlations between the error term and investment (column 5). This outcome may be an evidence of the fact that, in the economies with a higher level of development, the role played by foreign capital inflows changes. As was mentioned in Section 2, in the more developed economies, FDI does not necessarily respond to investment needs but rather to diversification objectives. In this case, there can be no presumption that foreign capital inflows may affect domestic investment. This evidence agrees with the results found by Mody and Murshid (2005).\(^\text{21}\)

In Table 3, we present the outcomes obtained for economic growth. Aside the within-group regression (column 1), results for the enlargement European economies indicate the existence of a positive impact of foreign direct investment in economic growth; evidence that is robust to the inclusion of additional explanatory variables (columns 2 and 3). This would lend support to the claims of a growth-enhancing effect of FDI through the transfer of technology and management expertise. Previous empirical works confirm this outcome in transition economies (see, among others, de Mello, 1999; Blomström et al., 2000; Campos and Kinoshita, 2002; and Lee and Tcha, 2004).

\(^{21}\) According to these authors, this responds to the fact that the relationship between foreign capital inflows and domestic investment declines as economic and financial integration with the rest of the world increases.
Note that, such as we mentioned above, the difference between the within-group and the IV estimates may reflect an endogeneity problem. As the lagged dependent variable is correlated with the error term, the fixed-effects estimator tends to be biased and inconsistent. Although these discrepancies might be also a result of extreme values in capital inflows that are not related to domestic investment and act like measurement errors.22

Another variable that is found to enhance economic growth in the enlargement states is higher domestic capital accumulation, as reflected by the positive value of the parameter on DI. This coefficient is significant at 5 per cent in the within-group estimation and at 10 per cent in the IV estimation. The importance of this variable for economic growth in transition economies is also denoted by Campos and Kinoshita (2002). Besides, the negative coefficient on the inflation rate is probably picking up the harmful character of the macroeconomic uncertainty on growth, especially remarkable in those less developed economies. Concerning to the quality of infrastructure, despite this variable is negative and significant in the within-group estimation, it becomes insignificant in the instrumental variable estimation. Finally, the significant coefficient on the lagged valued of growth verifies the expected serial correlation. Indeed, the high value of its coefficient implies that the long-run impact of FDI (and of the rest of exogenous determinants) on growth is appreciably greater.

In the EU-15 countries, capital inflows seem to be also a key factor for economic growth (columns 4 to 6). Irrespective of the method of estimation, there is strong evidence of a positive influence of FDI in growth (columns 4 and 5). Moreover, this result remains even after excluding additional regressors (column 6). But the amount of this effect is lower than in the enlargement countries.

However, the inflation and the interest rates appear to be insignificant for growth in these economies. The low variation in prices that has been forced by the process of convergence during last years in the European Union may be an explanation of their poor significance. Additionally, the positive and statistical significance of the quality of infrastructure and the endowments of human capital or technological level reveal their

22 Bosworth and Collins (1999).
importance for stimulating growth in this more developed economies. We found the same persistence for growth than in the enlargement countries. The lag value of this series appears to be strongly significant in all regressions (although with a considerably smaller impact than in the previous case).

Finally, similar to other empirical works, the coefficient on population growth is insignificant in both sub-samples. This lack of significance might be however caused by the small change of this series along time.

In short, the evidence obtained in this paper confirms the predictions of a FDI encouraging higher capital assets and growth in the enlargement countries. Moreover, this result is robust to the estimation method as well as to the inclusion of additional explanatory variables.

5. CONCLUSIONS

The process of economic liberalisation in the new accession countries, as well as the anticipation of the effects of their adhesion to the European Union, have promoted a considerable increase in inward foreign direct investment flows into these economies during the nineties. This phenomenon has made arise two main questions. The first is: Has the restructuring in the activity of multinationals provoked a FDI redirection from the South to the East of Europe? The second, and the one where this paper is focused on, is the following: What are the main implications of these changes in capital flows on investment and growth in the recipient countries?

The available evidence does not seem to confirm the first of the above questions, that is, an evident process of FDI diversion from EU peripheral countries. With respect to the second, the empirical assessment of the impact of FDI on economic performance carried out in this paper suggests that, in transition economies, FDI has the positive and significant impact on economic growth that theory predicts.

On the one hand, our results give support to the existence of a complementary relationship between FDI and domestic investment in the enlargement countries but not

---

in the EU-15 old member states. This outcome would suggest a differential impact of FDI between these two regions of the European Union, what would confirm a different nature of these capital inflows in the more advanced economies. In these economies, foreign investors are motivated mainly by diversification objectives rather than by investment needs.

On the other hand and, as has been pointed out thorough the paper, FDI goes beyond pure capital accumulation. It involves also technological upgrading, labour training, skill acquisition and the introduction of alternative management practices. With this respect, our findings confirm a growth-enhancing effect of FDI in the two analysed areas. However, as was expected, this effect is higher for the enlargement states given the different nature of the capital inflows coming into these two areas.

Finally, the results confirm that the impact of FDI on economic performance is highly dependent upon the local conditions in the recipient economy. The significant FDI–growth link for the new accession countries seems to indicate that these economies satisfy the favourable conditions to realize gains from FDI. These conditions seem to be also a necessary requirement to stimulate domestic investment. Therefore, to guaranty the adequate economic environment should be a political demand in these transition economies if they seek to modernise their physical capital stock.
References


Figure 1: Total foreign direct investment in the enlargement countries, net inflows, (BoP, current US)
Table 1: FDI inflows into CEE countries acceding to the EU in 2004, compared with the EU-15, 1995-2003 (Billions of dollars)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CEE countries acceding to the EU</td>
<td>12.2</td>
<td>16.7</td>
<td>18.6</td>
<td>20.3</td>
<td>18.4</td>
<td>22.6</td>
<td>11.5</td>
</tr>
<tr>
<td>Of which:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Czech Republic</td>
<td>2.6</td>
<td>3.7</td>
<td>6.3</td>
<td>5.0</td>
<td>5.6</td>
<td>8.5</td>
<td>2.6</td>
</tr>
<tr>
<td>Hungary</td>
<td>5.1</td>
<td>3.8</td>
<td>3.3</td>
<td>2.8</td>
<td>3.9</td>
<td>2.8</td>
<td>2.5</td>
</tr>
<tr>
<td>Poland</td>
<td>3.7</td>
<td>6.4</td>
<td>7.3</td>
<td>9.3</td>
<td>5.7</td>
<td>4.1</td>
<td>4.2</td>
</tr>
<tr>
<td>Slovakia</td>
<td>0.3</td>
<td>0.7</td>
<td>0.4</td>
<td>1.9</td>
<td>1.6</td>
<td>4.1</td>
<td>0.6</td>
</tr>
<tr>
<td>World</td>
<td>335.7</td>
<td>690.9</td>
<td>1086.8</td>
<td>1388.0</td>
<td>817.6</td>
<td>678.8</td>
<td>559.6</td>
</tr>
<tr>
<td>EU-15</td>
<td>114.6</td>
<td>249.9</td>
<td>479.4</td>
<td>671.4</td>
<td>357.4</td>
<td>374.0</td>
<td>295.2</td>
</tr>
<tr>
<td>Of which:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>23.7</td>
<td>31.0</td>
<td>46.5</td>
<td>43.3</td>
<td>50.5</td>
<td>48.9</td>
<td>47.0</td>
</tr>
<tr>
<td>Germany</td>
<td>12.0</td>
<td>24.6</td>
<td>56.1</td>
<td>198.3</td>
<td>21.1</td>
<td>36.0</td>
<td>12.9</td>
</tr>
<tr>
<td>Ireland</td>
<td>1.4</td>
<td>8.6</td>
<td>18.2</td>
<td>25.8</td>
<td>9.7</td>
<td>24.5</td>
<td>25.5</td>
</tr>
<tr>
<td>Spain</td>
<td>6.3</td>
<td>11.8</td>
<td>15.8</td>
<td>37.5</td>
<td>28.0</td>
<td>35.9</td>
<td>25.6</td>
</tr>
<tr>
<td>Share of FDI into CEE countries acceding to the EU in total inward FDI of EU-15 (%)</td>
<td>10.6</td>
<td>6.7</td>
<td>3.9</td>
<td>3.0</td>
<td>5.1</td>
<td>6.0</td>
<td>3.9</td>
</tr>
</tbody>
</table>

Source: UNCTAD (2004), FDI/TNC database (www.unctad.org/fdistatistics)
Table 2: Econometric results for the time period: 1990-2001. Dependent variable: domestic investment

<table>
<thead>
<tr>
<th></th>
<th>New Member States</th>
<th>EU15</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Within-group</td>
<td>IV estimation</td>
</tr>
<tr>
<td></td>
<td>estimation (1)</td>
<td>(2) (3)</td>
</tr>
<tr>
<td>FDIₜ₋₁</td>
<td>0.10*</td>
<td>0.19**</td>
</tr>
<tr>
<td></td>
<td>(2.38)</td>
<td>(2.61)</td>
</tr>
<tr>
<td>DIₜ₋₁</td>
<td>0.61**</td>
<td>1.01**</td>
</tr>
<tr>
<td></td>
<td>(7.02)</td>
<td>(4.96)</td>
</tr>
<tr>
<td>lnYPCₜ₋₁</td>
<td>3.96</td>
<td>39.0</td>
</tr>
<tr>
<td></td>
<td>(0.30)</td>
<td>(1.83)</td>
</tr>
<tr>
<td>IRₜ₋₁</td>
<td>-0.19</td>
<td>-0.50**</td>
</tr>
<tr>
<td></td>
<td>(-1.56)</td>
<td>(-2.86)</td>
</tr>
<tr>
<td>INFLₜ₋₁</td>
<td>-0.28**</td>
<td>-0.35*</td>
</tr>
<tr>
<td></td>
<td>(-4.87)</td>
<td>(-2.13)</td>
</tr>
</tbody>
</table>

Wald (time)  7.13  17.42  20.04*  516.1**  201.6**  177.4**

No. obs  60  54  58  139  125  137

Notes: The notations **, *, and * represent statistical significance at the 1, and 5 percent levels, respectively. The t-statistics are reported in brackets. Regressions were estimated using the instrumental variable approach pioneered by Anderson-Hsiao employing DPD for GiveWin²⁴. The coefficients and t-statistics are robust to heteroscedasticity. Dummy variables for years are not reported.


<table>
<thead>
<tr>
<th></th>
<th>New Member States</th>
<th>EU15</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Within-group estimation</td>
<td>IV estimation</td>
</tr>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>$FDI_{it}$</td>
<td>0.02</td>
<td>0.16**</td>
</tr>
<tr>
<td></td>
<td>(0.25)</td>
<td>(3.57)</td>
</tr>
<tr>
<td>$g_{it-1}$</td>
<td>0.14</td>
<td>0.44*</td>
</tr>
<tr>
<td></td>
<td>(1.13)</td>
<td>(2.55)</td>
</tr>
<tr>
<td>$DI_{it}$</td>
<td>0.30*</td>
<td>0.27</td>
</tr>
<tr>
<td></td>
<td>(2.21)</td>
<td>(1.65)</td>
</tr>
<tr>
<td>$POP_{it}$</td>
<td>0.86</td>
<td>-0.59</td>
</tr>
<tr>
<td></td>
<td>(0.87)</td>
<td>(-0.74)</td>
</tr>
<tr>
<td>$\ln YPC_{it}$</td>
<td>-31.6*</td>
<td>12.2</td>
</tr>
<tr>
<td></td>
<td>(-2.39)</td>
<td>(0.52)</td>
</tr>
<tr>
<td>$IR_{it}$</td>
<td>-0.20</td>
<td>-0.27</td>
</tr>
<tr>
<td></td>
<td>(-1.38)</td>
<td>(-1.52)</td>
</tr>
<tr>
<td>$INFL_{it}$</td>
<td>-0.27**</td>
<td>-0.45*</td>
</tr>
<tr>
<td></td>
<td>(-2.87)</td>
<td>(-4.04)</td>
</tr>
<tr>
<td>$INFR_{it}$</td>
<td>-0.06*</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>(-2.85)</td>
<td>(0.55)</td>
</tr>
<tr>
<td>Wald (time)</td>
<td>33.28**</td>
<td>25.5**</td>
</tr>
<tr>
<td>No. obs</td>
<td>58</td>
<td>52</td>
</tr>
</tbody>
</table>

Notes: The notations **, *, and † represent statistical significance at the 1, 5 percent levels, respectively. The $t$-statistics are reported in brackets. Regressions were estimated using the instrumental variable approach pioneered by Anderson-Hsiao employing DPD for GiveWin. The coefficients and $t$-statistics are robust to heteroscedasticity. Dummy variables for years are not reported.
APPENDIX A: DESCRIPTION OF DATA


- GROSS CAPITAL FORMATION (FORMELY GROSS DOMESTIC INVESTMENT) (% of GDP). Gross capital formation (formerly gross domestic investment) consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Source: World Bank national accounts data, and OECD National Accounts data files.

- GDP PER CAPITA GROWTH (annual %). Annual percentage growth rate of GDP per capita based on constant local currency. Source: World Bank national accounts data, and OECD National Accounts data files.


- GDP PER CAPITA, PPP (current international $). GDP per capita based on purchasing power parity (PPP). PPP GDP is gross domestic product converted to international dollars using purchasing power parity rates. Data are in current international dollars. For the estimation we used the logarithm of this series. Source: World Bank, International Comparison Programme database.

- INFLATION, GDP DEFLATOR (annual %). Inflation as measured by the annual growth rate of the GDP implicit deflator shows the rate of price change in the economy as a whole. The GDP implicit deflator is the ratio of GDP in current local currency to GDP in constant local currency. Source: World Bank national accounts data, and OECD National Accounts data files.
o REAL INTEREST RATE (%). Real interest rate is the lending interest rate adjusted for inflation as measured by the GDP deflator. Source: International Monetary Fund, International Financial Statistics and data files using World Bank data on the GDP deflator.

o QUALITY OF THE INFRAESTRUCTURE. This series is measured as the number of telephone mainlines per employee. Source: International Telecommunication Union, World Telecommunication Development Report and database.
## APPENDIX B: GRANGER CAUSALITY TEST

Table B.1: Granger causality evidence. Dependent variable: inward foreign direct investment

<table>
<thead>
<tr>
<th></th>
<th>New Member States</th>
<th>EU15</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$FDI_{t-1}$</td>
<td>0.38** 0.31* 0.35** 0.52** 0.53**</td>
<td>0.53**</td>
</tr>
<tr>
<td></td>
<td>(6.54) (2.30) (4.06) (16.0) (15.7)</td>
<td>(15.9)</td>
</tr>
<tr>
<td>$DI_{t-1}$</td>
<td>- -0.21 - 0.01 0.16</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(-1.42) (-0.01)</td>
<td></td>
</tr>
<tr>
<td>$GROWTH_{t-1}$</td>
<td>- -0.21 - 0.16</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-1.77) (-0.57)</td>
<td></td>
</tr>
<tr>
<td>$\chi^2(1)$</td>
<td>2.025 3.126 0.005 0.320</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N. obs.</td>
<td>66 65 64 152 152 152</td>
<td></td>
</tr>
</tbody>
</table>

Notes: The notations ** and * represent statistical significance at the 1, and 5 percent levels, respectively. The $t$-statistics are reported in brackets. Regressions were estimated using within-group estimation. The $\chi^2$-statistics test the significance of the lag value of the exogenous regressor (Wald test). The coefficients and statistics are robust to heteroscedasticity. Dummy variables for years are not reported.