E C O N O M I C S B U L L E T I N

Foreign direct investment and transition economies: empirical evidence from a panel data estimator

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Abstract

This paper identifies the factors that determine FDI inflows in the former socialist countries of Eastern and Central Europe. In our analysis, FDI inflows are modeled as a function of the market size (i.e., real GDP), inflation, the current account balance, the real exchange rate, openness and government regulation -- for the host country. Using data from 1995 to 2004, a panel data estimator suggests that the real exchange rate, openness of the economy and deregulation are the primary factors determining FDI inflows in these countries.

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Foreign Direct Investment and Transition Economies: Empirical Evidence from a Panel Data Estimator

I. Introduction

After the collapse of Soviet Union, Central and the Eastern European countries went through a major reform in their economic system. These reforms involved some major restructuring of their economies, which required large amounts of financing. Although the industrialized nations were quick to siphon some of their foreign aid from the developing countries of Asia and Africa in order to augment the reform efforts of these European countries, the foreign aid diverted to them was inadequate to sustain the reform. In addition to foreign aid, these countries have also been recipients of direct lending programs as well as portfolio investments. But the effectiveness of these programs has been limited because they have not generated sufficient spillover benefits, such as technology transmission and managerial know-how, partly due to the reversible nature of the programs. On the other hand, foreign direct investment (FDI) is less reversible and at the same time it acts as a channel for the transmission of technology and managerial skills (Merlevedes and Schoors, 2004). In addition, FDI augments the level of knowledge in the host country through labor training and skill acquisition (see Trevino and Upadhyaya, 2003). Sinn and Weichenrieder (1997) argue that FDI is an indispensable ingredient in a successful strategy for economic growth and prosperity.

Realizing the significance of FDI on economic performance, many researchers have focused their attention on the determinants of FDI inflows. These include Root and Ahmed (1979), Schneider and Frey (1985), Trevino, *et al.* (1999), and Trevino *et al.* (2002), although none of these studies has focused on transition economies. Recently, a few studies have emerged on the issue of FDI in transition economies. These include Campos and Kinoshita (2002), Garibaldi *et al.* (2001), Konings (2001), Reshmini (2000), and Sinn and Weichenrieder (1997). Most of these studies have focused either on firm level productivity or economic growth, while very few of them have discussed the determinants of FDI inflows into transition economies. The purpose of this paper, therefore, will be to analyze the factors that determine the inflow of FDI in the transition economies of Eastern and Central European Countries. This study uses data from the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia. The organization of the paper is as follows. Section two outlines the theoretical background of the study. The third section presents the methodology and data, and is followed by a discussion of the empirical findings. Concluding comments are offered in the final section.

II. Theoretical Background

There are a number of factors that attract foreign direct investment (FDI) in a country. An important one among them is the market size of the host country. The market size hypothesis suggests that investment will go primarily to markets large enough to support the scale economies needed for production. The reasoning has been pervasive, given that most investment has been market seeking, and it helps to explain why most FDI goes into developed countries rather than into emerging economies (Grosse and Trevino, 1996; Ajami and BarNiv, 1984). However, evidence from studies comparing FDI flows to

different emerging economies has been mixed. On the one hand, Root and Ahmed (1979) and Tuman and Emmert (1999) used gross domestic product as a proxy for market size and found it to be insignificant in explaining FDI in Latin American countries. On the other hand, Daniels and Quigley (1980) found that gross domestic product not only was significant, but was the most important variable in explaining FDI inflows among Latin American countries.

In addition, foreign direct investment may be directed away from a country which is either not growing on or is not expected to grow. Newly emerging economies' per capita income growth rates are usually high, and oftentimes they are expected to continue growing for some time. This attracts market seeking investors. For this reason, real GDP growth is usually expected to have a positive effect on FDI inflows.

Although the effect of host country's inflation on FDI inflows is not apparent, it can be argued that a high rate of inflation indicates internal economic instability. This implies that the host country's government is unable to maintain an expedient monetary policy. In a high inflationary episode, firms face uncertainty in terms of product and input pricing. Therefore, under such circumstances multinational companies may avoid or reduce investments in such countries. Indeed, Schneider and Frey (1998) found that multinational firms invest less in emerging economies with high inflation, and Apergis and Katrakilios (1998) found inflation uncertainty in the host country is negatively associated with FDI inflows.

The current account balance of the host country is an indicator of the strength of its currency. A deteriorating current account balance leads to a depreciation of the host country's currency. It is possible that potential multinational investors view current account deficits negatively, because such deficits may lead to inflation and exchange rate variations. If this is the case, then an increase in the current account deficit may lead to a reduction in FDI inflows. In contrast, if multinational companies take advantage of the current account deficits of the host country by negotiating more favorable operative terms, then the current account deficits may increase FDI inflows.

Foreign investors may gain or lose from a depreciating exchange rate. For instance, with a depreciating exchange rate they can export more easily and gain from resource-seeking FDI. Foreign investors, however, may lose as well, because they must incur costs to prevent transaction and translation losses when currencies depreciate. If they believe that depreciation will continue after they enter a country, they may conclude that the costs will be too high to justify their investments. In fact, Grosse and Trevino (1996), Froot and Stein (1991), Klein and Rosengren (1994), and Tuman and Emmert (1999) found mixed investor reactions to exchange rate depreciation. Leiderman and Thorne (1996) reported that FDI into Mexico changed very little after the Mexican currency crisis and devaluation of 1994. Further, in spite of the high value of the U.S. dollar during much of the 1980s, the United States was a net recipient of FDI. Therefore, the impact of exchange rate depreciation on FDI inflows is ambiguous.

The relationship between foreign trade and FDI is also not entirely clear. On the one hand, protectionist policies in the host country encourage FDI. Conversely, firms' ability to successfully export may justify their making more permanent investment in that country. Nevertheless, many countries have imposed import substitution policies to successfully attract FDI, a fact that helps to explain why most FDI historically has been market seeking rather than resource seeking. Under this scenario, one would expect a

country's high import restrictions and low levels of trade to correlate with high FDI entry.

The case of Central and Eastern European countries, however, is different. These countries are undergoing major economic reforms, one of which is de-emphasizing import substitution policies because they have fostered and protected inefficient industries. Therefore, these countries have made some major economics reforms that permit a freer movement of international trade. Transnational corporations (TNCs) look for more trade and more open economies for resource-seeking operations, especially as they integrate their global production with vertical and horizontal value-chain linkages. For a country to be a part of this integration process, it must allow TNCs to easily import and export. This integration is particularly important when TNCs seek a base to serve regional markets (Chudnovsky, Lopez, and Porta, 1995). In order to capture this phenomenon, our model includes openness of the host country as a determinant of FDI inflows, and it is expected that this variable will positively associated with FDI inflows.

Excessive government regulations are thought to be counterproductive to business activity, given that they involve additional costs to the firms. Therefore, multinational corporations usually avoid investment in countries where there is heavy governmental regulation. It is important to note here that multinationals react to the host countries' government regulations after they are enacted. Therefore, this variable will exhibit a lagged effect on FDI inflows.

III. Methodology and Data

In order to analyze the impact of the different variables discussed above on FDI inflows, the following model is developed, wherein all of the variables except *CAB* and *INFL* are in log form:

$$\log FDI = b_0 + b_1 \log y + b_2 INFL + b_3 CAB + b_4 \log RER + b_5 \log OPEN + b_6 \log REG_{-1} + e \quad (1)$$

Where, *FDI* = foreign direct investment inflows in U.S. dollars
y = real gross domestic product in U.S. dollars
INFL = inflation rate
CAB = current account balance
RER = real exchange rate defined as nominal exchange rate times the ratio of the world price index to domestic CPI
OPEN = openness, defined as the ratio of total trade to GDP
REG_{-1} = government regulation
and *e* is the random error term. As discussed above, b_1 and b_5 are expected to be positive, b_2, and b_6 are expected to be negative, and b_3, b_4 and b_5 are uncertain.

For this study, annual time-series data from 1995 to 2004 are collected for each of the following countries: the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia. Thus, a panel data set (i.e., time-series *and* cross-sectional) is constructed. Real GDP, inflation rate exchange rate, openness data are derived from the *World Development Indicators* published by World Bank, *FDI* is derived from the *World Investment Report* published by UNCTAD, the CAB data is derived from

International Financial Statistics (IMF), and the REG data is taken from the *Economic Freedom Index,* Heritage Foundation . All the data are in real U.S. dollars.

IV. Empirical Findings

Nelson and Plosser (1982), show that the macroeconomic time series data often exhibit a unit root process and are not stationary. The use of regression results that are based on nonstationary data produces spurious results. Therefore, the time series data are tested for stationarity. Because we use panel data, panel unit root tests developed by Levin, Lin and Chu (2002) and Breitung (2000) are employed to ensure the stationarity of the data series. The test results are reported in Table 1.

As indicated in Table 1, all of the data series are stationary in first difference form. The unit root tests conducted on the error term (ER) derived from equation (1) suggest that no unit root exists. As such, the variables in the model are not cointegrated. Because the data series are found to be stationary in first difference form, and the null hypothesis of no cointgration could not be rejected, we did not employ an error correction model. Instead, equation (1) above is transformed into the following first-difference equation:

$$\Delta FDI = c_0 + c_1 \Delta \log y + c_2 \Delta \log INFL + c_3 \Delta CAB + c_4 \Delta \log RER + c_5 \Delta \log OPEN + c_6 \Delta \log REG_{-1} + v \qquad (2)$$

Because we use panel data, equation (2) above is estimated using a fixed-effects estimator. GLS estimation is also used in order to account for potential cross-section heteroskedasticity. The estimation of equation (2) is as follows:

$$\Delta FDI = \underset{(0.03)}{0.005} + \underset{(0.11)}{0.47} \Delta \log y - \underset{(1.11)}{0.02} \Delta INFL - \underset{(053)}{1.57E\text{-}05} \Delta CAB - \underset{(1.74)*}{1.15} \Delta RER + \underset{(2.64)**}{2.72} \Delta \log OPEN - \underset{(2.33)**}{0.62} \log \Delta REG_{-1} \qquad (3)$$

$R^2 = 0.36$ $\quad$ D.W. = 2.16 $\quad$ s.e. = 0.68 $\quad$ n = 56

Note: The figures in the parentheses are the t values of the corresponding coefficients. **, * indicate significance at 5 % and 10 % level, respectively.

Overall, the estimation results seem satisfactory in terms of goodness of fit and the sign of the coefficients. As discussed in the theoretical section of the paper, the market size is proxied by real GDP. Though the coefficient for real GDP in (3) is positive, it is not statistically significant at the usual levels. At the same time, the coefficients for *INFL* and *CAB* are also correctly signed and statistically significant.

The three remaining variables in our model are *RER, OPEN*, and *REG*. As discussed in the theoretical section of the paper, the coefficient of *RER* can be positive (because of the increased buying power) or negative (because of transaction or translation costs). We found that real exchange rate depreciation *(RER)* exerts a negative effect on FDI inflows -- a finding that is consistent with Scheinder and Frey (1985) and Apergis and Katrakilios (1998).

Equation (3) above also points out that another important variable in explaining FDI inflows is *OPEN*. This variable is both positive and statistically significant, supporting the hypothesis that the multinational corporations prefer to move their production bases to countries where it is relatively easy to (1) import intermediate products/inputs and (2) distribute (export) output to foreign markets. Given that labor and other raw materials are relatively cheap in the European transition economies and the proximity of the Western European markets with the relative ease of export/import generates significantly larger FDI inflows.

Another variable in our model is the lag of *REG* . *REG* includes government intervention in the economy, such as wages and price controls, banking and financial market regulations, FDI regulations, etc. It is an index for which 1 represents "least regulation" and 5 represents "most regulation." The coefficient of this variable is negative and statistically significant at conventional levels, a result that is consistent with the idea that a regulated economy leads to a reduction in FDI inflows, *ceteris paribus*.

V. Concluding Comments

This paper identifies the factors that determine the FDI inflows in Central and Eastern European countries. In this study, FDI inflows are modeled as a function of real GDP, the inflation rate, the current account balance, the real exchange rate, openness and government regulation, all for the host country. Annual time series data from 1995 to 2004 are collected for a group of countries, including the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia. As a result, a panel data set is employed. Results from a fixed-effects estimator suggest that openness and deregulation in the host country are positively to FDI inflows in these economies. Changes in the real exchange rate negatively affect FDI inflows in this region of the world. On the other hand, market size (defined by real GDP) does not have a significant effect on FDI inflows.

Table 1: Unit Root Tests

Variable	Levi, Lin, Chu Test		Breitung Test	
	Level	FD	Level	FD
log FDI	*0.12*	*-2.94****	*-1.24*	*-3.11****
log y	*-1.31*	*-3.63****	*-0.96*	*-1.63***
INFL	*-3.10****	*-5.37****	*-0.31*	*-3.36****
CAB	*-1.23*	*-3.19****	*-0.43*	*-1.73***
log RER	*-0.48*	*-3.66****	*0.25*	*-1.43**
log OPEN	*-1.19*	*-3.62****	*-0.72*	*-2.14***
log REG	*-3.82****	*-6.47****	*0.76*	*-4.14****
ER	*-0.27*		*-0.56*	

Note: ER = error term (*e*)derived from the estimation of equation (1),
***, **, and * note significance at 1%, 5%, and 10% levels, respectively.

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