

The Effects of Economic Factors in Determining the Transition Process in Europe and Central Asia

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ABSTRACT

This paper examines how economic determinants affect foreign direct investment into a sample of Western European and transition countries from 1990 to 2003. The observed differences in the flow of foreign investment into the transition countries, relative to those in Western Europe, provokes the question of whether this phenomenon was determined by the economic factors present in those countries. Using a conceptual model constructed from economic factors that affect FDI inflows, this study considers the sample set for two sub-periods in the transition process, namely the early period from 1990 to 1998 and the later period from 1998 to 2003. In the first period, economic factors do not account for comparatively higher rates of capital inflows into the Central European and former Soviet economies. This result is reconciled with the obvious difference observed in reality, by suggesting that the higher than expected FDI flows into the transition countries of Central Europe specifically were due to the transition process. In the second period, the rates of capital inflow remain relatively similar between Western and Central European economies, though the former Soviet economies were shown to experience different rates of FDI inflows based on the economic factors specified. The lack of difference between Central European and Western European FDI flows proves that the transition period had come to an end by 2003 for Poland, Hungary and the Czech Republic.

1. Introduction

The fall of the Soviet Union in 1991 was a historic event that resulted in many significant political and economic implications for the countries that had been under the Iron Curtain. The economic liberalization that arose from this brought a considerable inflow of foreign capital into countries that previously had zero or negligible levels of investment (Deichmann *et al.*, 2003), starting many of them on a ‘transition’ path towards Western standards of economic development. The transition effect resulted in relatively higher capital inflows into the Central European and Baltic countries and lower foreign direct investment (FDI) inflows initially into the Central Asian and Balkan regions. This dual effect of the transition process on FDI can be explained by two main determinants, as specified in the literature, which are the economic factors and the transition specific conditions of the former Eastern bloc countries in question.

The purpose of this paper is twofold. Firstly, this study will consider whether the observed disparity between the inflow of foreign direct investment into Western Europe, Central Europe and the former Soviet countries can be explained by the general economic conditions of the countries itself, without accounting for any transition determinants. The second part will then consist of comparing the predicted inflows of FDI that are obtained from the economic model to the actual capital flows, to observe if those ratios differed significantly between Western and transition economies. The results from the Central European region¹ suggest that the ratio of actual-to-estimated FDI inflows differed significantly from 1990 to 1998 before then converging by 2003. Based on this, the transition period for Poland, Hungary and the Czech Republic was estimated to have ended by 2003.

¹ The Central European region was used for this purpose in this study, primarily due to a lack of available data that resulted in fewer predicted values for FDI in other regions.

The rest of the paper is arranged as follows. Section 2 will provide a brief overview of the theoretical and empirical literature that explains the governing theory of foreign investment and the general determinants of FDI in transition countries. Section 3 will consider the conceptual model used to estimate the economic determinants of FDI. Sections 4 and 5 will provide an explanation of the ideal data for the study, the measurement issues present with the data and the modifications made to the actual data. Section 6 will present the econometric analysis of the data obtained and explain the results while Section 7 concludes with a summary of the study.

2. Literature Review

2.1 Basic Theories of Foreign Direct Investment

A number of theoretical approaches have been taken to analyze the factors that govern the level of foreign direct investment in a particular country. The early approach centers on the seminal work proposed by Dunning (1981). This theory focuses on the OLI paradigm, which states that foreign direct investment into a country is motivated by three main components – ownership (O), location (L) and internalization (I) advantages. Resmini (2000) and Jun and Singh (1995) summarize these three components succinctly; for instance ownership advantages revolve around how firms are able to offset the cost of relocating to another country, through ownership of certain assets, products, technologies and intangible assets that improve their production there (Bevan & Estrin, 2004). The internalization advantage shows that firms investing in foreign countries find it more advantageous to transfer assets to operations within the firm that are located in other countries. Finally, the location advantage considers country-specific factors (such as lower wage rates, trade openness, stability and risk) that would motivate multi-national enterprises (MNEs) to relocate their production to another country.

Building on Dunning's approach, Carstensen and Toubal (2004) summarize the theory of 'vertical' and 'horizontal' approaches to foreign direct investment¹. In the former, firms concentrate a greater portion of their production in locations with higher factor endowments while in the latter, firms replicate enterprises of similar sizes in many countries to gain proximity advantages. Campos and Kinoshita (2003) confirm this approach and also summarize two other relevant theories in the literature. In the factor endowment-based trade theory, they posit that foreign investment will be attracted to countries that have cheaper factors of production or greater natural resource endowments. Their second theory concentrates on how economies of scale and agglomeration effects are important in explaining different foreign direct investment levels.

To summarize, the theoretical approach in the literature provides a strong overall emphasis on the importance of economic (mainly locational and factor endowment based) advantages in attracting foreign direct investment.

2.2 Empirical Research on the Main Determinants of FDI

The empirical literature on foreign direct investment into transition economies identifies two main categories that determine the variations in FDI inflows in those economies, namely the traditional economic factors and the transition specific factors. The importance of economic conditions is confirmed by various studies (summarized in Table A), and these provide the foundation for the conceptual model proposed in Section 3.

Early research on the topic of foreign direct investment into the Central and Eastern European region shows some significance for the impact of both types of variables in accounting

¹ This is based on the works of Hortsmann and Markusen (1992), Brainard (1993) and Markusen and Venables (1998, 2000), which the author did not consider specifically when researching the topic.

for increased FDI inflows. Jun and Singh (1995) use a pooled data set to show that exports play a significant role in attracting larger amounts of foreign investment, suggesting that a greater openness to trade in the transition process is beneficial. Holland and Pain (1998) meanwhile conduct a more specific analysis of eleven transition countries over a five year period. Their study uses a panel data set to show the significance of both economic conditions and transition variables in accounting for FDI into the transitions economies, with the method of privatization, distance to Western markets and trade links being the most significant factors.

More recent studies on how the transition process has affected foreign investment in the former Eastern bloc countries provide differing results on the importance of economic and transition determinants. Using the factor-endowment approach, Deichmann *et al.* (2003) analyze the European and Central Asian transition economies by considering a set of determinants for foreign investment into those countries. Their study narrows down a set of twenty six possible explanatory variables for foreign investment increases using a principal component analysis¹. The results of this research confirm the importance of general economic conditions of a country, such as the skill in a country's labor force and a country's natural resource endowment, over more transition based variables, such as financial market reform for instance.

In another study of interest, Campos and Kinoshita (2003) expand the category of economic determinants of FDI to include agglomeration effects and institutional variables. Their study builds on previous research by considering another type of variable for determining FDI inflows, as opposed to the more commonly analyzed economic variables like proximity and labor costs. In determining the effect of agglomeration on FDI, the authors focus their research question on the locational and factor endowment determinants that drove foreign firms to invest in countries that had once been a part of the Iron Curtian. Like Deichmann *et al.* (2003), their

¹ The author is unfamiliar with this technique.

study considers both countries from both the Central-Eastern European and the Central Asian regions. Their results show that agglomerations effects and institutions are key explanatory variables, while also confirming the importance of previously specified variables in the literature, such as labor costs and natural resource endowments.

Bevan and Estrin's (2004) work differs slightly from the previous literature by considering a dual approach to foreign direct investment using bilateral flows of foreign investment between the transition countries as the dependent variable. Their research utilizes a random effects model of foreign direct investment that controls for the size of the countries receiving and giving the investments, the labor costs, trade openness and risk factors to investment. The authors show that market size, proximity to Western Europe and labor costs are important explanatory factors for investment, which further confirms the importance of economic specific variables in explaining FDI inflows. This study also discounts the importance of risk, which captures a portion of the transition effect, on capital flows into Central and Eastern European countries.

Carstensen and Toubal (2004) conduct a similar study to the one specified by Campos and Kinoshita (2003), though their methodology differs from much of the literature due to their use of dynamic panel data methods¹ in their analysis. Their data set is more consistent with the approach of this paper, in that it considers both a number of high income Western European countries and some of the former Eastern bloc countries in explaining FDI variations. Building on that, they consider a broad range of traditional and transitional variables in their FDI model and the empirical results confirm the importance of both economic factors and transition determinants. The significant independent variables from their study include the market

¹ The author is unfamiliar with this technique.

potential, low labor costs and the labor-capital endowments between countries, which is consistent with some of the results obtained by Bevan and Estrin (2004).

Based on the key findings of the literature, it can be seen that economic factors play a key role in determining the inflows of foreign investment into transition economies. These findings will be used to construct and explain a conceptual model for this study in the following section.

3. Conceptual Model

In considering the effects of economic factors on capital inflows into transition economies and Western Europe, this paper uses a model constructed from key determinants of foreign investment¹ from that category, as specified in the literature. The model is specified as follows with L denoting the natural logarithm, i denoting the country and t denoting the year in question:

$$L(FDI_{it}) = \beta_0 + \beta_1 L(DIST_{it}) + \beta_2 L(NATRES_{it}) + \beta_3 L(GDP_{it}) + \beta_4 L(GDPPC_{it}) + \beta_5 L(TRADE_{it}) + \beta_6 L(EDU_{it})$$

Before moving further onto an analysis of the data and results, it is important to explain the variables specified above and the expected signs for the coefficients. The first traditional determinant of FDI considered is a measure of distance and proximity to Western markets, which is modeled by $DIST_{it}$. This variable is taken as a proxy for the closeness to Western European markets, with larger distances expected to incur greater trade costs and thus *negatively* affect FDI. The second variable taken is $NATRES_{it}$ and it represents the natural resource endowment of

¹ A detailed description of the variables used is provided in Table B in the appendix section.

a country. This variable is proxied by the area of the country (Brada *et al.*, 2004¹) and is expected to have a *positive* coefficient, as proposed by the factor endowment theory.

The third variable specified in the model is GDP_{it} . This variable represents the GDP, in current US dollars, of a country and is taken as a proxy for the market size as suggested by Campos and Kinoshita (2003). This variable is a key determinant for FDI inflows, as theory would predict that countries with significant market sizes to *positively* affect a firm's decision to set up operations there. The $GDPPC_{it}$ variable measures per capita income levels and is taken as a proxy for the purchasing power of consumers in local markets as well as the level of development, as specified by Brada *et al.* (2004). More developed markets, where consumers have higher per capita income levels, would be expected to *positively* influence the market seeking behavior of foreign investors.

The fifth variable considered is $TRADE_{it}$, and its inclusion is consistent with the idea that a country with fewer barriers to trade would be more conducive to foreign direct investment inflows, giving a *positive* coefficient (Bevan & Estrin, 2004; Brada *et al.*, 2004). The final independent variable used, EDU_{it} , is specified as a measure of skill for the labor force in the country, as it would be expected that a highly skilled labor force would impact FDI inflows *positively*, with firms seeking to invest in countries with better trained laborers. Finally, two dummy variables were also considered in this study. The first one separates the Central European states in the sample set, while the second dummy variable separates the former Soviet republics from the other countries. Both dummy variables are expected to have *positive* coefficients, given that theory suggests that the transition process resulted in higher than expected FDI inflows, relative to Western countries.

¹ Brada *et al.* (2004) take this assumption from a study conducted by Lau and Lin (1999), who find that a country's area serves as a good proxy for representing its natural resource endowment

4. Ideal Data

An ideal measure of the data would have encompassed a comprehensive number of economic factors that determine the flow of FDI into a country, including the unaccounted for ownership and internalization factors from the OLI-paradigm. Additionally, a better data set would have taken into account a number of measurement issues present. These issues center on the selection of the different types of proxy measures for the independent variables in the conceptual model. For instance, although GDP is taken as a measure for market size in this study, numerous other variables could have proxied this factor too, such as the population of the country. Also, the use of GDP per capita values, as a measure of development and purchasing power may be slightly inaccurate, given that it does not capture the distribution of income levels in a country. However, this variable is a generally accepted measure in economic theory and so is considered for the purpose of this research. The use of these proxies could have resulted in some unaccounted factors that other measures may have encompassed in explaining the flow of foreign investment between countries. Finally, one other significant problem that an ideal data set would have corrected for was the unbalanced nature of the data set, due to a number of missing data points for Serbia, Bosnia and some of the Central Asian countries.

5. Actual Data

This study uses a panel data set to examine the impact of economic factors in forty one European and Central Asia countries on the inflow of FDI into those regions. The data is taken from 1990 to 2003, and the 14 year period was chosen because it captures the main transition

period for many of these former centrally planned economies¹. The World Development Indicators, compiled by the World Bank, provide information for most of the variables specified in the above specified model, with the exception of the $NATRES_{it}$ and $PROX_{it}$ variables that were obtained from other sources². The explanatory variables used were based on a number of proxies that closely matched the independent variable specifications as key economic determinants of FDI into the transition economies, based on theory and previous work in the literature. The dependent and independent variables for the model were transformed with a natural logarithm, both for the ease of interpretation and to shorten the range of the dependent variable.

In correcting for other problems in the data, this study considered a larger set of almost all the transition countries in Europe and Central Asia to avoid a possible sampling bias in the data and to ensure sufficient degrees of freedom for accurate results, even with the missing data points. The 14 year time period taken also helped avoid any inaccurate measures of the variables, since the long time period would account for any possible fluctuations in macroeconomic variables in a particular year.

6. Analysis of Results

6.1 Regression Results for Initial Transition Period (1990 – 1998)

The empirical analysis of this study divided the sample into two time periods; the first one was taken from 1990 to 1998 and represents the initial transition period while the latter period is taken from 1998 to 2003. The results for the regressions run for the initial period are

¹ The 14 year period was chosen because it captures the main transition period for the former Eastern bloc countries. The fall of communism in the early 1990s makes 1990 as a logical starting point, and 2003 provides an accurate end to the transition period since the three Baltic nations, Hungary, Poland, Czech Republic, Slovenia and Slovakia gained European Union membership in 2004.

² The former variable was taken from the United Nations Statistics Division (2007) and the latter variable was obtained from <http://www.timeanddate.com>

presented in the Table E, with the logarithm of foreign direct investment taken as the dependent variable. Column 1 specifies a basic OLS regression on the conceptual model, and an examination of the results show correctly specified signs on the coefficients. It can also be seen that the GDP_{it} , $TRADE_{it}$ and EDU_{it} variables are the most significant, suggesting the importance of market size, trade openness and the skill level of the labor force in determining FDI into European and Central Asian markets. The point elasticity values show that a 1% increase on those three variables would result in 0.895%, 0.887% and 1.946% increases in FDI inflows respectively. The coefficients for $PROX_i$, $NATRES_{it}$ and $GDPPC_{it}$ are all statistically insignificant, suggesting that the distance to Western markets, the resource endowment of the country and the wage level are all unimportant determinants of FDI inflows into both Western European and transition economies in the 1990s.

Given that a panel data set was used, this study also conducted a fixed effects regression (based on the results of the Hausman test) as a robustness check for the previous results and to account for any possible country specific determinants in the data. Column 3 presents the results of the fixed effects regression, which show that the $TRADE_{it}$ variable still remains statistically significant in accounting for FDI inflows, although GDP_{it} and EDU_{it} have declined in significance. Additionally, the sign on the $GDPPC_{it}$ does not match the theoretical specifications, though the insignificant T-statistic negates its importance. In addition, a test for multicollinearity¹ was performed, and all the variables appeared to be unrelated, with the exception of GDP_{it} and $GDPPC_{it}$. Serial correlation was present in the fixed effects regression, as shown by the low P-value of the Wooldridge test for autocorrelation. To correct for this, a fixed effects regression was run with a first order autoregressive term on the data, and the results

¹ This was done by conducting a VIF test and observing values in the correlation table.

are presented in Column 4. The coefficients all turn out to be consistent with the initial fixed effects regression, though the GDP_{it} coefficient becomes significant to the 5% level.

The basic OLS results in Column 1 do not present any indication of whether FDI levels differed between the transition economies and Western Europe. As such, two dummy variables¹ were added to the OLS regression and the results are presented in Column 2. The regression results suggest that the inflows of foreign investment did not differ greatly from the average amount received by Western European nations at that time, when controlling for economic determinants, as shown by the insignificant coefficients for the dummy variables. An F-Test was conducted between the models in Column 1 and Column 2 and this gave a value of 0.583, which is below the critical value needed to accept the statistical significance of the two dummy terms added.

To further test to see if the rates of FDI among each independent variable differed between the regions, another OLS regression was run² with the interaction terms for the independent and dummy variables. This regression shows that none of the interaction terms in the model are statistically significant, due to their low values of the T-statistics and this was further confirmed by an F-Test value of 1.408, which confirms the use of the regression in Column 1.

The significance of the basic OLS model in Column 1, over the model in Column 2, which accounted for variations between the different European regions, suggests economic factors were not responsible for causing different rates of FDI inflows into transition countries. Given that the literature specifies both economic and transition-specific determinants as being

¹ The CEEC dummy represents the Central and Eastern European countries (including the Baltic countries) that were under the Iron Curtain but not a part of the Soviet Union while the FSU dummy considers all the former Soviet republics in Europe and Central Asia.

² The interaction terms are presented in Table G.

important in explaining FDI inflows into these countries, the observed differences in FDI inflows must then be due to transition variables that are not controlled for in this model. To further confirm this, Table L presents a ratio of actual FDI inflow to FDI values predicted by the model, for selected countries in the Central European region¹. Since the interaction terms were not significant in this regression, we would expect the ratios to be somewhat similar for all the countries. However, the observed actual to estimated values turn out to be greater for Poland, Hungary and the Czech Republic, which confirms the conclusion that transition factors must have resulted in higher FDI inflows into these countries, relative to Western European economies, once economic factors were accounted for. These results confirm that countries in the Central European region at least, underwent a transition process from centrally planned systems to free market ones in this period and this resulted in larger than expected FDI inflows into those countries.

6.2 Regression Results for the Latter Period of Transition (1998 – 2003)

An analysis of the second half of the transition period, from 1998 to 2003, was then conducted, based on the methods specified above. As Column 1 in Table F shows, a basic OLS regression, on the independent variables specified in the conceptual model, confirms that the market size and trade openness indicators still remain important explanatory factors for FDI inflows, while the skill level of the labor force loses its significance. The coefficients are also consistent with the expected signs hypothesized in the Section 3, with the exception of the $NATRES_{it}$ variable. However, the T-statistic for that coefficient is lower than the value obtained for the variable in the 1990 – 1998 sample specified in Table E, which confirms that the effect of

¹ Only the Central European region was considered for this analysis, due to the lack of predicted FDI values for other transition economies in Eastern Europe and Central Asia.

this variable on FDI inflows is insignificant. To test these results against a panel data regression, the fixed and random effects models¹ were run on the data, and the signs on the coefficients all match the OLS results, with the exception of the $GDPPC_{it}$ term on the fixed effects regression. As observed previously, multicollinearity remained for the GDP_{it} and $GDPPC_{it}$ variables and the residual plots indicated a lack of heteroskedasticity. A Wooldridge test showed that serial correlation was not present in the regression variables too.

The CEEC and FSU dummy variables were again added to the OLS regression to examine the changes to the average capital flows between well developed Western economies, moderately developed Central European and Baltic countries and the relatively less developed Central Asian and Eastern European states that were formerly a part of the Soviet Union. The coefficients for the GDP_{it} and $TRADE_{it}$ variables remain significant, and confirm the results from the initial OLS regression from Column 1. The difference in the impact of average investment into these different regions is negligible, due to the low T-statistics on the dummy variables. An F-test was conducted on the two models in Column 1 and Column 2 and an F-value of 1.268 (that is lower than the critical value of 3.00) confirms the insignificance of the dummy variables.

A further model with the interaction terms was run using the OLS model to test for significant variations in FDI flows among the three regions for the different explanatory factors. The results for the coefficients on the interaction terms are shown in Table H. The values for the interaction terms of the CEEC dummy and the economic determinants of FDI are all insignificant, showing that FDI flowed into the CEEC and Western European regions at similar rates for each independent variable. A different result was obtained for the former Soviet republics, as the interaction terms in that category all appear to be significant, with the exception of the trade openness interaction variable. An F- Test of this model and the basic OLS regression

¹ The Hausman test confirmed the use of the random effects model.

yielded a value of 3.032, which confirms the significance of the unrestricted model and shows that the rate of FDI inflows into former Soviet republics differed from the rest of the sample, for each independent variable considered.

The lack of significance of the interaction terms for the CEEC region show that economic factors should result in similar FDI inflows, as compared to similar Western European nations. The values from Table I confirm that by 2003, the selected countries from the Central European region all had ratios of actual to expected FDI inflows of less than 1, which confirms that no significant differences in FDI inflows were observed in the transition economies, when compared to the Western European countries. This suggests that the uncontrolled transition factors had become negligible in attracting FDI and confirms that the transition process had more or less ended for Poland, Hungary and the Czech Republic by 2003. By contrast, the significance of the interaction terms for FDI for the former Soviet countries show that the economic factors had now become significant in allowing for different rates of FDI inflows into those countries. Although this does not allow us to make any conclusions on the transitional determinants, it can still be observed that the rates of FDI flows would have still differed significantly from Central and Western European countries, as transition progressed into the 21st century for the former Soviet countries.

7. Conclusion

In conclusion, this study utilized a panel data set of 41 European and Central Asian countries from 1990 to 2003 to study two main questions of interest. The first one involved assessing the impact of economic factors in attracting FDI among Western European and transition countries to see if the rates of FDI for economic determinants of FDI were higher in

the latter. The results from the initial period of transition, up until 1998, show that economic factors were expected to bring in similar rates of FDI inflows into both sets of countries, while in the period after 1998, it can be seen that economic factors were expected to cause differing rates of capital inflows into former Soviet countries, in comparison to Western European and CEEC countries. The second question of interest revolved around reconciling the observed higher than expected FDI inflows into some of these countries with the insignificance of the CEEC interaction terms in the initial and latter period regressions. Since the model used in this study did not account for transition factors, the resulting disparity must have resulted from transition effects in the first period. Comparisons of actual to expected FDI ratios between transition and developed countries, notably in the Central European region, confirmed that these former Eastern bloc countries underwent a period of transition in 1990 to 1998, as shown by the greater amounts of FDI into these countries. However, the transition process had effectively come to an end by 2003 for countries in Central Europe as the ratios for the transition countries converged to those of Western European countries. The result is less certain for former Soviet republics, due to a lack of data, and further research on this topic could focus on estimating how the transition period has progressed for countries in that region.

Appendix A. Summary of Relevant Literature

TABLE A

Summary of the Relevant Literature on the Determinants of Foreign Direct Investment

Paper	Sample	Years	Dependent Variable	Significant FDI Determinants
Holland & Pain (1998)	Eleven transition countries	1992 - 1996	Per capita FDI flow	Method of privatization, trade linkages & proximity to Western European markets
Campos & Kinoshita (2003)	Twenty five transition economies (both European and Central Asian)	1990 - 1998	Per capita FDI stock	Institutions, agglomeration effects & trade openness
Deichmann <i>et al.</i> (2003)	Transition economies in Europe and Central Asia (excluding Serbia & Bosnia)	1993 - 1998	Logarithm of cumulative FDI	Human and social capital, labor force skills (Central Europe), natural resources (Central Asia) & reform policies
Bevan & Estrin (2004)	14 EU countries, Korea, Japan, Switzerland, US and selected Central and Eastern European countries (excluding Russia and most CIS countries)	1994 - 2000	FDI Inflows	Low unit labor costs, gravity factors, market size & proximity to Western markets
Carstensen & Toubal (2004)	10 OECD countries and 7 CEEC countries	1993 - 1999	Net Annual Outward Bilateral FDI	Market potential, low relative unit labor costs & the level of privatization

Appendix B. Description of Variables for Model 1

TABLE B
Description of Variables

Label	Description & Source
FDI	Inflow of FDI into country i in year j in current US\$ (World Development Indicators, 2009)
DIST	The distance between the capital city of country i and Brussels (in km) as a proxy of distance to Western markets (http://www.timeanddate.com)
NATRES	The area of country i (in km ²) as a proxy for the level of natural resources in a country (UN Statistics Division, 2007)
GDP	GDP of country i in year j in current US\$ as a measure of the size of the economy and market size (World Development Indicators, 2009)
GDPPC	GDP of country i in year j in current US\$ as a proxy of the purchasing power and level of development in country i (World Development Indicators, 2009)
TRADE	Net exports of country i in year j (% of GDP) as a proxy of trade openness (World Development Indicators, 2009)
EDU	Secondary school enrollment of country i in year j (% of gross school enrollment) as a proxy for the skill level of the country's labor force (World Development Indicators, 2009)
CEEC Dummy	Dummy variable that assigns a value of 1 for former Soviet satellite countries in Central and Eastern Europe, including the Baltic states
FSU Dummy	Dummy variable that assigns a value of 1 for former Soviet republics in Eastern Europe and Central Asia

Appendix C. Summary of Statistics for Variables in 1990 – 1998 Sample

TABLE C
Summary Statistics for the Log of the Dependent and Independent Variables from 1990 - 1998

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
FDI_{it}	322	19.817	2.849	6.908	24.351
$DIST_{it}$	369	7.110	1.343	0	8.584
$NATRES_{it}$	369	11.776	1.372	9.917	16.654
GDP_{it}	357	24.230	2.073	20.380	28.556
$GDPPC_{it}$	357	8.228	1.537	5.045	10.712
$TRADE_{it}$	350	4.342	0.409	3.101	5.199
EDU_{it}	276	4.453	0.218	3.625	5.076

Appendix D. Summary of Statistics for Variables in 1998 – 2003 Sample

TABLE D

Summary Statistics for the Log of the Dependent and Independent Variables from 1998 - 2003

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
FDI_{it}	246	20.854	2.619	0	26.094
$DIST_{it}$	246	7.110	1.344	0	8.584
$NATRES_{it}$	246	11.776	1.373	9.917	16.654
GDP_{it}	246	24.332	2.036	20.573	28.523
$GDPPC_{it}$	246	8.340	1.560	4.937	10.806
$TRADE_{it}$	246	4.483	0.362	3.599	5.297
EDU_{it}	246	4.570	0.171	4.240	5.077

Appendix E. Regression Results for 1990-1998 Sample

TABLE E

Explaining Variations in FDI for Western European & Transition Economies from 1990 - 1998

Variable	OLS Regression (1)	OLS Regression (2)	Fixed Effects Regression (3)	Fixed Effects with AR (4)
Distance	-0.081 (-0.69)	-0.103 (-0.86)	-	-
Natural Resources	0.162 (0.93)	0.174 (0.97)	-	-
GDP	0.895 (4.81)***	0.868 (4.61)***	5.998 (1.01)	0.911 (2.04)**
GDP Per Capita	0.096 (0.43)	0.325 (1.02)	-3.859 (-0.65)	-0.731 (-0.91)
Trade	0.887 (1.97)**	0.736 (1.55)	2.068 (3.46)***	0.058 (0.11)
Education	1.946 (2.25)**	1.942 (2.20)**	0.224 (0.21)	-0.178 (-0.17)
CEEC Dummy	-	0.615 (1.08)	-	-
FSU Dummy	-	0.760 (0.83)	-	-
Constant	-16.776 (-3.61)***	-17.754 (-3.69)***	-104.611 (-1.10)	5.97 (7.74)***
Adjusted R-squared	0.6210	0.6197	0.4854	0.4166
F-Statistic	65.73	49.27	8.95	13.19
Sample Size	238	238	238	200

Note. The dependent variable used is the log of FDI inflows into a country in US\$

Log values are taken for the explanatory values, with the exception of the two dummy variables

The T-statistics are given in parentheses

* Significant at the 10% level

** Significant at the 5% level

*** Significant at the 1% level

Appendix F. Regression Results for 1998-2003 Sample

TABLE F

Explaining Variations in FDI for Western European & Transition Economies from 1998 - 2003

Variable	OLS Regression (1)	OLS Regression (2)	Fixed Effects Regression (3)	Random Effects Regression (4)	Random Effects Regression (5)
Distance	-0.149 (-1.14)	-0.158 (-1.21)	-	-0.148 (-0.79)	-0.154 (-0.81)
Natural Resources	-0.056 (-0.36)	-0.063 (-0.40)	-	0.072 (-0.32)	-0.075 (-0.32)
GDP	1.011 (5.91)***	1.038 (6.01)***	4.776 (0.63)	1.033 (3.99)**	1.060 (4.02)***
GDP Per Capita	0.074 (0.36)	0.236 (0.87)	-4.114 (-0.54)	0.043 (0.14)	0.131 (0.34)
Trade	1.013 (2.94)***	0.874 (2.46)**	1.052 (1.00)	1.012 (2.09)**	0.926 (1.83)*
Education	0.623 (0.60)	0.894 (0.82)	1.992 (0.62)	0.753 (0.52)	1.025 (0.67)
CEEC Dummy	-	0.717 (1.55)	-	-	0.564 (0.85)
FSU Dummy	-	0.879 (1.14)	-	-	0.581 (0.54)
Constant	-10.047 (-1.80)*	-13.001 (-2.18)**	-74.675 (-0.61)	-10.726 (-1.37)	-13.281 (-1.58)
Adjusted R-squared	0.6936	0.6943	0.3753	0.7019	0.7051
F-Statistic (Wald Chi-Squared for (3) & (4)	84.37	63.75	1.04	223.92	219.91
Sample Size	222	222	222	222	222

Note. The dependent variable used is the log of FDI inflows into a country in US\$

Log values are taken for the explanatory values, with the exception of the two dummy variables

The T-statistics are given in parentheses

* Significant at the 10% level

** Significant at the 5% level

*** Significant at the 1% level

Appendix G. Interaction Terms for OLS Regression on 1990-1998 Sample

TABLE G

Summary of Interaction Terms for OLS Regression (1990 - 1998)

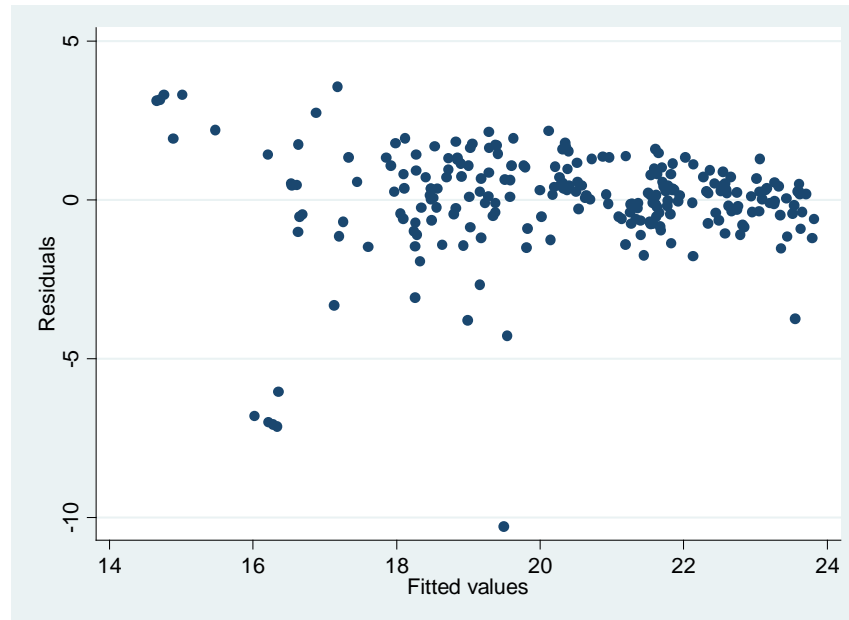
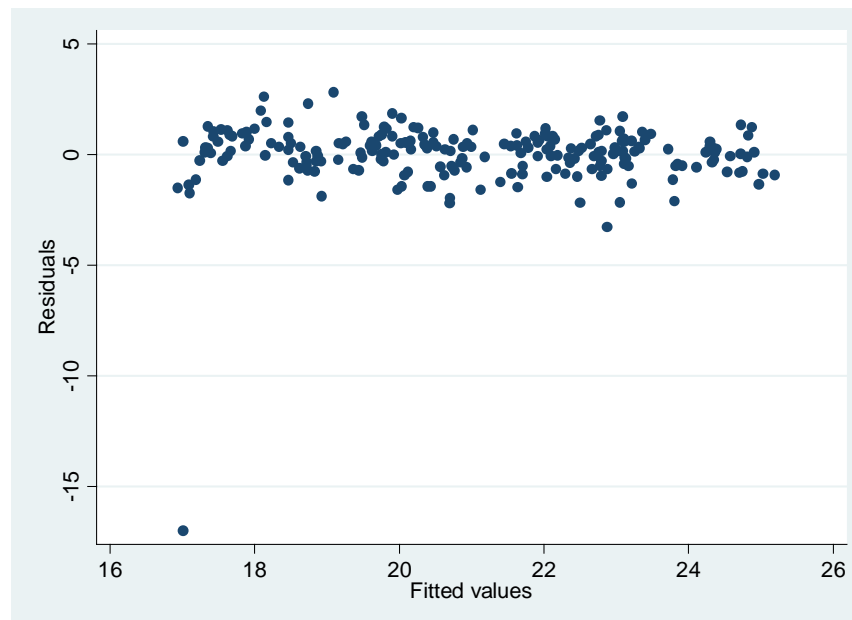
Dummy Variable	Independent Variable	Coefficients
CEEC Dummy	Distance	-0.700 (-0.66)
	Natural Resources	0.671 (0.98)
	GDP	-0.013 (-0.02)
	GDP Per Capita	1.265 (1.44)
	Trade	0.119 (0.11)
	Education	-2.939 (-1.42)
FSU Dummy	Distance	-0.108 (-0.06)
	Natural Resources	0.708 (0.93)
	GDP	-1.116 (-0.82)
	GDP Per Capita	0.152 (0.09)
	Trade	-2.249 (-0.93)
	Education	-6.824 (-0.92)

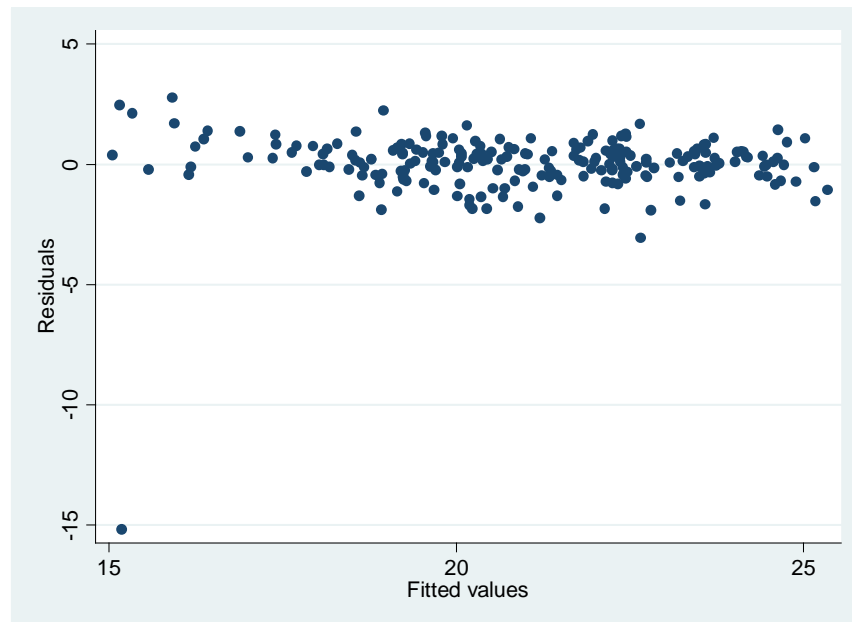
Appendix H. Interaction Terms for OLS Regression on 1998-2003 Sample

TABLE H

Summary of Interaction Terms for OLS Regression (1998 - 2003)

Dummy Variable	Independent Variable	Coefficients
CEEC Dummy	Distance	0.842 (0.72)
	Natural Resources	-0.239 (-0.40)
	GDP	0.247 (0.46)
	GDP Per Capita	0.224 (0.24)
	Trade	-0.824 (-0.86)
	Education	-3.526 (-1.22)
FSU Dummy	Distance	2.687 (2.98)***
	Natural Resources	-1.547 (-3.30)***
	GDP	1.474 (2.46)**
	GDP Per Capita	1.502 (2.00)**
	Trade	0.221 (0.20)
	Education	-7.627 (-1.97)**

Appendix I. Residual Plot for Basic OLS Regression for 1990-1998 Sample**Appendix J. Residual Plot for Basic OLS Regression for 1998-2003 Sample**

Appendix K. Residual Plot for OLS Regression with Interaction Terms for 1998-2003 Sample

Appendix L. Comparison of Predicted & Actual FDI Inflows (in billions US\$) for Central Europe from 1990-1998

TABLE I

Comparison of Predicted and Actual FDI Inflows for Selected Central European Countries from 1990 to 1998

Country	FDI	1990	1991	1992	1993	1994	1995	1996	1997	1998
Austria	Actual	0.65322	0.360072	1.442438	1.129076	2.116582	1.900907	4.484977	2.624383	4.660677
	Pred.	1.982055	2.067426	2.456099	2.245042	2.445829	2.998566	2.889907	2.375444	2.686809
	Ratio	0.329567	0.174164	0.587288	0.50292	0.865384	0.633939	1.551945	1.104797	1.734652
Czech Republic	Actual	0.165	0.604	1.103	0.654278	0.878232	2.567565	1.435279	1.286493	3.700169
	Pred.	0.409718	0.323209	0.396553	0.484831	0.591404	0.811756	0.818423	0.636338	0.702397
	Ratio	0.402716	1.868759	2.78147	1.349499	1.484994	3.162977	1.753713	2.021714	5.267914
Germany	Actual	3.003919	4.748284	-2.11717	0.401341	7.290396	11.98548	6.429189	12.79641	23.63584
	Pred.	13.96807	15.28977	18.86832	17.024	18.38866	22.16521	21.60888	18.77778	19.76147
	Ratio	0.215056	0.310553	-0.11221	0.023575	0.396462	0.540734	0.297525	0.681465	1.196057
Hungary	Actual	0.553809	1.462141	1.479165	2.349715	1.144084	4.804151	3.288936	4.154801	3.343001
	Pred.	0.237652	0.261747	0.267918	0.335647	0.388172	0.550089	0.667233	0.688489	0.725158
	Ratio	2.330331	5.58608	5.520972	7.000558	2.947361	8.733413	4.929217	6.034666	4.610032
Poland	Actual	0.089	0.291	0.678	1.715	1.875	3.659	4.498	4.908	6.365
	Pred.	0.401633	0.494556	0.581261	0.60015	0.714798	1.004434	1.170141	1.278713	1.614175
	Ratio	0.221595	0.588407	1.16643	2.857619	2.62312	3.642848	3.843982	3.838234	3.94319

Appendix M. Comparison of Predicted & Actual FDI Inflows (in billions US\$) for Central Europe from 1998-2003

TABLE M

Comparison of Predicted and Actual FDI Inflows for Selected Central European Countries from 1998 to 2003

Country	FDI	1998	1999	2000	2001	2002	2003
Austria	Actual	4.6607	3.0090	8.5254	5.9059	0.3181	7.0983
	Pred.	5.3480	5.5521	5.9855	6.4981	6.8953	8.4075
	Ratio	0.8715	0.5420	1.4243	0.9089	0.0461	0.8443
Czech Republic	Actual	3.7002	6.3126	4.9871	5.6407	8.4966	2.0213
	Pred.	2.6573	2.6439	2.7557	2.8860	3.2385	4.2080
	Ratio	1.3924	2.3876	1.8098	1.9545	2.6236	0.4803
Germany	Actual	23.6358	55.9067	210.0854	26.1712	53.6053	30.9340
	Pred.	38.3036	40.2848	49.9007	52.1787	54.7214	64.7151
	Ratio	0.6171	1.3878	4.2101	0.5016	0.9796	0.4780
Hungary	Actual	3.3430	3.3077	2.7705	3.9439	3.0129	2.1772
	Pred.	2.8618	3.0204	3.3978	3.5736	3.9316	4.9912
	Ratio	1.1682	1.0951	0.8154	1.1036	0.7663	0.4362
Poland	Actual	6.3650	7.2700	9.3430	5.7140	4.1310	4.5890
	Pred.	4.6471	4.1844	4.9211	5.1727	5.6879	7.4299
	Ratio	1.3697	1.7374	1.8986	1.1046	0.7263	0.6176

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