WARSAW SCHOOL OF ECONOMICS
COLLEGIUM OF WORLD ECONOMY

DETERMINANTS OF U.S. FOREIGN DIRECT INVESTMENT IN CENTRAL EUROPEAN COUNTRIES FROM 1996 TO 2010

Doctoral dissertation summary
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Justification for the topic selection

The topic of foreign direct invest (FDI) is most certainly not absent from the scientific filed of studies, especially after it has been distinguished from international trade. Just like any topic, this one is very vast and very deep, which creates a lot of gaps in the existing literature. One such significant gap is in the topic of the determinants of U.S. FDI located in the Central European economies and this work aims to fill it.

Starting from the beginning, in an article by R.E. Lipsey we can read that FDI has been a significant contributor to the economic development since 2500 B.C. (Lipsey, 2001, p. 17). With World War I being the tipping point, the U.S. has moved from being the net biggest recipient (1897) to being the biggest FDI investor as its FDI position (i.e., stock) abroad (as reported by the Bureau of Economic Analysis, on historical-cost basis) has increased from the $795,195 million (1996) to $3,908,231 million (2010). In the same time frame, U.S. FDI in Europe has shifted from $389,378 million to $2,185,898 million; hence, suggesting an increase in European countries as attractive targets of capital. The Central European Countries (CECs, i.e.: Poland, Hungary, Slovakia, the Czech Republic, Romania and Bulgaria)[1] received 0.4408% of total U.S. FDI by the end of 1996[2], this share was over twice that much in 2007 (0.9535%) and falling slightly in 2010[3] (0.6736%). In none of these economies is the U.S. the number one investor as most of inward FDI in the said CECs comes from the European Union (EU); however, U.S. inward FDI in CECs accounts for a significant part of non-EU inward FDI. For example, in Poland in 2012, 37% on non-EU FDI stock comes from the U.S. (National Bank of Poland database, 2014).

As it has been mentioned at the begining, it is unfortunate that the studies have not shared a parallel growing interest in the topic of U.S. investments in CECs; especially their determinants. There have been some works that deal with overall FDI (11 investors) to the region (Carstensen, Toubal, 2003) and some looking at the U.S. as an investor (to other

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[1] The selection of researched economies has been dictated by their geographical location and their economic conditions as well as by previous works on the topic of FDI in Central Europe (e.g., Carstensen, Toubal, 2003).
[2] The analysis begins with the year 1996, which has been decided on as the beginning of the analyzed timeframe as it is a year in which the biggest (economy-wise) members of the examined group have been in the OECD (the Czech Republic since December 21, 1995, Hungary since May 7, 1996 and Poland since November 22, 1996).The reason why OECD membership has been picked as a starting point is that joining such an organization sends a message of political and economic stability to all outside investors as well as provides the investors with a promise of equal treatment (National Treatment Rule).
[3] The analyzed period ends with the year 2010, as (at the moment of conducting research) it was the last year for which the data on the dependent and on the independent variables was available and did not, at the time being, require further adjustment – which is an often procedure when it comes to data on FDI.

industrialized countries some of which are European, e.g. France – for instance: Narula, Wakelin, 1997), but there have been no works that specifically looked at the factors determining FDI coming from the U.S. to the listed CECs.

Resulting from the fact that CECs are increasing in importance for the U.S. (which is their biggest non-EU investor) as attractive places to allocate its capital (both in levels and in percentages of total U.S. FDI) and that the determinants of those investments have not yet been researched (excluding the report created by the KMPG and the U.S. Chamber of Commerce in Poland, 2010), it is found to be an interesting topic to cover and the resulting implications can prove to be advantageous for the academic community and policy makers alike.

The value added of this research in the literature on FDI determinants is as follows. It is the first research that focuses solely on U.S. FDI in the CECs; hence, it will not only fill a significant gap in the literature, as well as provide a solid base for further research of American investments in the Central European region, but will also contribute to the general idea of hub-investing hypothesis, which has been mentioned in some previous works, but never to this extent, especially in regards to CECs. This is particularly true given the combined approach of econometrics and comparative analysis.

The main objectives of the dissertation

The literature on FDI is filled with possible determinants of the phenomenon and more often than not there are issues when looking at the chosen explanatory variables across conducted studies. Some works generalize, or group, certain aspects (e.g., J.H. Dunning's OLI model), while other works go into much more detail (i.e., conduct a study of specific determinants). B.A. Blonigen and J. Piger (2011) have tackled the issue of poor cross-study referencing and came up with over 50 possible determinants of FDI (the study naturally does not cover all of the possible variables and their permutations).

This shows the key problem that this dissertation solves; that is, what are the most important factors that determine FDI from U.S. to CECs in 1996-2010. The solution of this problem is provided by an extensive study of FDI from the theoretical as well as practical (i.e., previous works on the determinants of FDI) perspectives. The literature-based selection of the appropriate determinants leads to the second research problem; that is, how should this choice be validated with the use of econometrics. This research problem is comprised of a set of sub-problems; for example, which determinants to choose, which model to choose (static or

dynamic), what is the appropriate method of estimating model's coefficients (Ordinary Least Squares or General Method of Moments), what should be the form in which the variables are used (level, log-linear), etc. The solution to this problem is found via an in-depth study of the methods, models and determinants used by other researchers in the field of determinants of FDI.

The dissertation's hypotheses

The Main Hypothesis:

U.S. foreign direct investments in Central European Countries have not been focused on the host countries' demand for the products and services (i.e. being market-seeking) of industries invested in, but rather on using Central European Countries as production centers (i.e. resource-seeking) and distribution hubs (i.e. efficiency-seeking).

Supporting Hypotheses:
1. Increasing number of workers in the host country required to produce one unit of its GDP has had a negative impact on U.S. FDI to researched CECs.
2. Increases in host country's export and the improvement in its price competitiveness have had a positive impact on U.S. FDI to researched CECs.
3. Increases in the lending rate, i.e. cost of borrowing of additional money, and the extent of the existing domestic credit, i.e., the ease, probability of obtaining additional money, in the host country have had negative and positive respective impacts on U.S. FDI to researched CECs.

The structure of the dissertation

In total the work is comprised of an introduction, four chapters and a conclusion. The first two chapters of the dissertation are devoted to the analysis of theory and previous empirical research that focused on factors determining the inflow of FDI from abroad. The third chapter focuses on the analysis of the magnitude as well as on the dynamics of FDI as a global phenomenon and on U.S. FDI directed at the selected industries in the researched countries. In the fourth chapter an econometric model based on macroeconomic panel data is introduced. The conclusion of the dissertation provide an overview of tasks and results shown in this work as well as give some policy implications and thoughts for further research.

Findings and results

The first finding, necessary to proceed with the analysis is the establishment that the definition of FDI provided by the Bureau of Economic Analysis (2012) parallels the definition provided by the World Bank (2012), which is agreed upon by the researchers and institutions alike. This leads to the acceptance of the data on FDI in the researched economies as provided by the Bureau.

Based on the extensive literature review of the topic of the determinants of FDI, the next finding is that outside of the three staple determinants of FDI, which are present in almost all of the studied works, the remaining factors are case-specific – in this case they are derived from the supporting hypotheses and supported by the literature on the topic.

As a result of the above, the first four independent variables correspond to the three most commonly cross-quoted economic determinants of FDI; that is, the size of the host market (here represented by *GDP* – see: Bevan, Estrin, 2000, p. 7; $H_0 : \hat{\beta}_n \leq 0$), openness to trade (the import component of trade is represented with exports from the U.S. to the host country, *XTOHOST*, $H_0 : \hat{\beta}_n \leq 0$, and the export component with the exports of the host as a percentage of its GDP, *(X/GDP)*100*, $H_0 : \hat{\beta}_n \leq 0$, which is also one of the variables used to control for the hub idea and part of the second supporting hypothesis – see: Beer, Corry, 1996, p. 45) and the cost of labor (expressed as the cost of labor in the host country in relation to the cost present in the U.S.; hence, putting changes seen in *ULC* in the host country in reference, $H_0 : \hat{\beta}_n \geq 0$ – see: Carstensen, Toubal, 2003, p. 8). The fifth explanatory variable is the ratio of host's labor force to its GDP (*LFORCE/GDP;* $H_0 : \hat{\beta}_n \geq 0$), which corresponds to the first supporting hypothesis. The sixth term (amount of U.S. dollars one can purchase with one unit of host's currency, *FOREX*, $H_0 : \hat{\beta}_n \geq 0$, similar to what is used by Narula, Wakelin, 1997, p. 12), represents the second supporting hypothesis and tests the competitiveness of host exports, while the last two terms (*LENDINGRATE;* $H_0 : \hat{\beta}_n \geq 0$ and *DOMESTICCREDIT*; $H_0 : \hat{\beta}_n \leq 0$) represent the last supporting hypothesis (the prior representing the cost of obtaining a loan and the latter the ease with which the loan can be obtained; following the hypothesis that the higher the domestic credit the easier it is to obtain a loan).

This leads to the following structural equation:

$$USFDI_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 XTOHOST_{it} + \beta_3 \left[\left(\frac{X}{GDP}\right) * 100\right]_{it} + \beta_4 \left(\frac{ULC_{it}}{ULCUS_t}\right)$$

$$+ \beta_5 \left(\frac{LFORCE}{GDP}\right)_{it} + \beta_6 FOREX_{it} + \beta_7 LENDINGRATE_{it}$$

$$+ \beta_8 DOMESTICCREDIT_{it} + \varepsilon_{it} + \alpha_i + \Omega_t$$

Where:

$USFDI_{it}$ – U.S. FDI stock in CEC i at time t

β_0 – Constant term

β_n – Coefficient of the nth independent variable; n = 1, 2, … 7

GDP_{it} – GDP of CEC i at time t

$XTOHOST_{it}$ – Export from the U.S. to CEC i at time t

$[(X/GDP)*100]_{it}$ – Export as a percentage of GDP of CEC i at time t

$ULC_{it}/ULCUS_t$ – Ratio of unit labor cost present in CEC i at time t to unit labor cost present in the U.S. at time t

$(LFORCE/GDP)_{it}$ – Ratio of labor force to GDO in CEC i at time t

$FOREX_{it}$ – Exchange rate between the currency of CEC i and the U.S. dollar at time t

$LENDINGRATE_{it}$ – Lending rate in CEC i at time t

$DOMESTICCREDIT_{it}$ – Domestic credit as a percentage of GDP in CEC i at time t

Source: Author's own equation.

The next finding is the establishment of the econometric approach, which is appropriate in this situation. Since a choice has been made to use a static model, Ordinary Least Squares (Leitão, 2010) with fixed cross-section and time effect (Razin, Rubinstein and Sadka, 2004, p. 17; confirmed with the Redundant Fixed Effects-Likelihood Ratio test – see: Blecker, Razim, 2008, p.99) is the correct method of estimating the values of the coefficients in the model. Additionally, cross-section panel corrected standard errors method was used as the coefficient covariance method (Reed, 2009). The data has been checked for multicolinearity (with Pearson linear correlation coefficients) and used a set of Pedroni statistics (Pedroni, 1999) to confirm the presence of cointergration between the variables.

The model explains 94.22% of the variation in the dependent variable (R-squared = 0.9422) and is statistically better than the use of means (Prob.(F-stat.) = 0.000). As for the statistical significance of the coefficients of the used explanatory variables, all signs fall in line with the set hypotheses, and all but the ratio of labor force-to-GDP (p-value = 0.1572) have p-values less than 0.1.

Results of the model, *ceteris paribus*, allow for the following interpretation of the estimated coefficients:

- An increase in host's GDP by one million U.S. dollars (in constant 2000 prices) in the selected group of countries would result in U.S. FDI in CECs increasing $95,800.

- An increase in imports from the home to the host country by one million U.S. dollars would result in U.S. FDI in CECs increasing by $1.33 million.

- An increase in exports of the host country as expressed by a percentage of its GDP by one percentage point would result in U.S. FDI in CECs increasing by $68.09 million.

- An increase by one unit in the unit labor cost in the host country relative to the unit labor cost at the U.S. (both measured with the OECD index 2005 = 100) would result in a decrease in U.S. FDI in CECs by $4,712.60 million.

- Appreciation of host's currency (i.e., the value of the host's currency increases making its exports less price competitive), would result in a decrease in U.S. FDI in CECs by $592.68 million.

- An increase by one percentage point in the lending rate in the host country would result in a decrease in U.S. FDI in CECs by $5.81 million.

- An increase by one unit in the size of the domestic credit in the host country (measured as a percentage of host country's GDP) would result in U.S. FDI in CECs increasing by $17.05 million.

Summing up, the results of the model, all of which fall well in line with the literature on the topic of FDI determinants, show that all, except for the first supporting hypothesis, have been confirmed (the coefficient of the labor force to GDP ratio has the correct sign, but was statistically insignificant), which led to the acceptance of the main research hypothesis. Low labor costs were proven to be the key factor in attracting U.S. FDI to the CECs in 1996-2010, followed by the price competitiveness and the size of exports and the ease and the cost of obtaining a loan in the host country. Coefficients of the two staple economic concepts (GDP and exports from the U.S. to host economies) have been shown to be statistically significant, but values of their coefficients suggest that they play a minor role in attracting U.S. FDI.

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