Markus Leibrecht and Aleksandra Riedl

Taxes and infrastructure as determinants of Foreign Direct Investment in Central and Eastern European Countries revisited: New evidence from a spatially augmented gravity model

www.sfb-itc.at

Discussion Paper Nr. 42

Taxes and infrastructure as determinants of Foreign Direct Investment in Central and Eastern European Countries revisited: New evidence from a spatially augmented gravity model

Markus Leibrecht
Aleksandra Riedl

Taxes and infrastructure as determinants of Foreign Direct Investment in Central and Eastern European Countries revisited: New evidence from a spatially augmented gravity model

September 9, 2010

Abstract

A bulk of empirical literature has emerged that explores the role of various location factors as determinants of Foreign Direct Investment (FDI) in Central and Eastern European Countries (CEECs). A notable feature of these studies is that their empirical approaches abstract from third-country (spatial) effects in FDI across the home and host country dimensions. Neglecting these effects could bias results concerning the role of location factors for attracting FDI. This in turn may lead to misguided economic policy conclusions. The current paper adds to the literature by applying the recently proposed spatial "origin-destination-flow model" of LeSage and Pace (2008) to FDI flows from 7 Western OECD home countries to 8 CEE host countries. Controlling for country-pair and time effects our results indicate that (a) spatial interactions across the host country dimension matter for FDI revealing that vertical complex FDI flows dominate total FDI flows to CEECs; (b) spatial autocorrelation in the home country dimension is absent; (c) results of previous studies remain valid as coefficient estimates on location factors change only slightly when spatial interdependencies are considered and (d) effective corporate income taxes and the endowment with production-related material infrastructure are statistically and economically significant determinants of FDI in CEECs.

Keywords: Foreign Direct Investment, Taxation, Spatial Econometrics

JEL classification: C32, C33, F21, F23, H25, H32, H54

1 Introduction

Central and Eastern European countries (CEECs) have received huge inflows of Foreign Direct Investment (FDI) since the fall of the iron curtain. This development is of particular interest to policy makers as FDI may exert a substantial economic impact on both, the host and the home country of FDI. Specifically, from the perspective of newly industrializing economies, like the CEECs, empirical evidence points to a positive impact of FDI on economic growth (see e.g., Ghosh and Wang, 2009; Yao and Wei, 2007). A bulk of papers has emerged which explore the role of various location factors for the success of CEECs in attracting FDI (e.g., Bevan and Estrin, 2004; Carstensen and Toubal, 2004; Bellak et al., 2009). Despite the considerable effort that has been put on analyzing determinants of FDI in CEECs, no emphasis has been placed on so called "third-country effects" in FDI. Third-country effects capture the possibility that FDI flows between two countries not only depend on uni- and bilateral factors but also on the amount of FDI neighboring countries invest or receive as well as on characteristics of proximate host countries.

From an econometric viewpoint neglecting third-country effects could seriously bias estimation results.[1] Hence, misguided policy conclusions concerning relevant attractors of FDI might be derived from studies excluding third-country effects.

So far only few studies consider third-country effects in their empirical models. These papers, by exploring the determinants of FDI in various advanced OECD host countries, stress the empirical relevance of third-country effects (Blonigen et al. 2007; Garretsen and Peeters, 2007; Baltagi et al., 2007). A notable feature of these studies is that they are based on FDI emerging from one home country of FDI (the United States and the Netherlands). Hence, the impact of spatial autocorrelation across the home country dimension in explaining bilateral FDI is still unexplored.

Against this background, the aim of the present article is to analyze the determinants of FDI in CEECs within an empirical model that allows to capture third-country effects in FDI. In particular, we examine bilateral investment flows from 7 Western OECD home countries to 8 CEE host countries over the period from 1995 to 2004. We apply the novel spatial econometric approach developed by LeSage and Pace (2008) which generalizes the widely applied gravity model to include spatial autocorrelation in FDI flows across origin (home) and across destination (host) countries of FDI. Moreover, we augment the basic gravity model by analyzing a broad selection of location factors. *Inter alia* we include in the empirical model a host country's surrounding market potential which captures a potentially important characteristic (market size) of proximate countries. We also pay particular attention to two location factors, taxes on the proceeds of FDI and production-related material infrastructure, like the road and railway network. These latter two variables are under immediate control of public officials and, as such, are important policy variables to attract FDI in the short- and the medium run (also see Demekas et

[1] As detailed below, including third-country effects usually changes the way unbiasedly estimated regression coefficients have to be interpreted (see LeSage and Pace, 2008, p. 34).

al., 2007). By embedding third-country effects into the analysis we are able to explore the robustness of previously derived results concerning the importance of location factors, taxes and infrastructure endowment in particular, as determinants of FDI in CEECs.

Besides revealing the impact of third-country effects on the role of various variables as location factors, modeling spatial interdependencies at the host country level leads to additional insights concerning the motives of FDI. For instance, modeling spatial autocorrelations across host countries informs whether aggregate FDI is dominated by "export-platform" FDI (Ekholm et al., 2007) or by "complex-vertical" FDI (Baltagi et al., 2007). Export-platform FDI is characterized by the fact that a multinational enterprise (MNE) invests only in one host country from where it supplies other foreign destinations via exports. In contrast, when an MNE sets up its vertical chain of production across multiple countries to exploit factor price differences, one refers to complex-vertical FDI (see e.g., Blonigen et al., 2007).

Likewise, modeling spatial interdependencies at the home country level leads to additional insights concerning MNE behavior. In particular, spatial autocorrelation across home countries of FDI may arise due to the presence of "spatial demonstration effects" (related to Barry et al., 2003) or of "competition effects" (related to e.g., Brakman et al., 2009, pp. 124). In the first case, a positive correlation in FDI across home countries is expected: FDI from one country is seen as a device to reduce uncertainty about the locational quality among investors from other countries leading them to also invest in the CEECs. In the second case, a negative correlation arises: An increase in a home country's FDI leads to a crowding out of competitors situated in neighboring home countries as these face lower opportunities to invest, a lower market share and higher competition in the goods, input or housing markets in the host country.

In order to estimate the empirical model, we follow LeSage and Pace (2008) who propose a Maximum likelihood approach to consistently estimate the embedded spatial interaction effects in a cross-sectional setting. As our analysis is based on a unbalanced panel data set, we follow Baltagi (2005, p. 169) to establish the corresponding likelihood function which also captures random country-pair as well as fixed time effects.

The most important findings of this study can be summarized as follows: (a) spatial interactions across the host country dimension matter for FDI revealing that vertical complex FDI flows dominate total FDI flows to CEECs; (b) however, spatial autocorrelation in the home country dimension is absent; (c) results of previous studies remain valid as coefficient estimates on location factors change only slightly when spatial interdependencies are considered; thus, (d) effective corporate income taxes and the endowment with production-related material infrastructure are statistically and economically significant determinants of FDI in CEECs.

The remainder of the paper is structured as follows: Section 2 presents the most important findings of related empirical literature concerning the relevance of taxes and the infrastructure endowment as determinants of FDI. Section 3 presents the spatially augmented gravity model ("origin-destination-flow model") of FDI. Section 4 contains a description and discussion of variables and data issues. Section 5 outlines the empirical methodology applied. Section 6 presents the most important results of our analysis while section 7 concludes the paper.

2 Taxes and infrastructure as determinants of FDI

In the academic and political debate corporate income taxes receive substantial interest as a location factor in the CEECs. In contrast, the relation between FDI and the infrastructure endowment, especially production-related material infrastructure, receives attention only to a minor extent even if its importance has been growing recently (see e.g., Bellak et al., 2009). One possible reason for this limited attention in the empirical literature is the lack of meaningful indicator variables for production-related material infrastructure (Mutti, 2004).

Theoretically, taxes on corporate income determine location decisions *inter alia* through their impact on the cost of capital and / or on the after tax profitability of an investment. In the former case marginal FDI, financing scale expansions of existing firms, may be altered and in the latter case infra-marginal investments, earning a positive economic rent, could be influenced. From an empirical viewpoint, corporate income taxes do indeed matter for investment location decisions of MNEs. For example, DeMooij and Ederveen (2008) carry out a meta-analysis of 35 empirical studies and find a median tax-rate elasticity (semi-elasticity) of FDI of about -2.9.[2] However, the typical tax-rate elasticity crucially depends on the tax measure used and the operationalization of FDI applied. Concerning tax rates, various measures are proposed in the literature (see e.g., Devereux, 2004). Among them forward-looking effective tax rates in the spirit of Devereux and Griffith (2003) are a proper measure when dealing with investment decisions of firms (see e.g., Devereux, 2004). For these measures DeMooij and Ederveen (2008) find a tax-rate elasticity of about -5.9.

The results derived by DeMooij and Ederveen (2008) pertain mainly to FDI between advanced OECD countries. Yet, Bellak et al. (2009) conclude that effective average tax rates on corporate income of the Devereux and Griffith type also matter for FDI in CEECs (semi-elasticity of about -5). This latter result is reinforced by the analysis of Overesch and Wamser (2010) based on firm level data.

From a theoretical viewpoint, production-related material infrastructure – if it is complementary to private capital – should determine the level of marginal FDI via its impact on productivity and production costs (Bénassy-Quéré et al., 2007). If this impact also alters the profitability of the investment then infrastructure could also influence infra-marginal FDI. Moreover, a certain endowment with infrastructure is in many instances a precondition for firms to generate rents from production (Richter et al., 1996). Empirical evidence for production-related material infrastructure as a determinant of FDI is sur-

[2]The relevance of corporate income taxes as a location factor is also shown by the meta-study of Feld and Heckemeyer (2009).

veyed for instance in Bellak et al. (2009) and Glass (2008). Based on a panel-gravity model approach the paper by Bellak et al. (2009) also includes evidence that FDI in CEECs is attracted by increases in the infrastructure endowment. Especially information- and telecommunication as well as transport infrastructure impact on FDI. These findings are consistent with Wheeler and Moody (1992) who study the importance of infrastructure for the location decision of US MNEs. They find that infrastructure, which they operationalize via a comprehensive index capturing various dimensions, is an important location factor, especially in less developed countries. Cheng and Kwan (2000) find support for favorable transport infrastructure being a relevant determinant of FDI into Chinese regions. Goodspeed et al. (2006) explain FDI in a broad range of countries and include the consumption of electric power, the number of mainline telephone connections and a composite infrastructure index in their regressions. For the latter two proxies they find a significant positive impact on FDI. In a related paper Goodspeed et al. (2009) find that a favorable infrastructure endowment attracts FDI to developed as well as less developed countries. Thereby the impact is larger in the latter country group. They use a composite infrastructure index comprising transport, telecommunication, energy and environmental infrastructures. Mollick et al. (2006) analyze the role of telecommunications and transport infrastructure for FDI to Mexico and find a positive impact of both types of infrastructure. Bénassy-Quéré et al. (2007) use data on net stock of public capital as a proxy for the quantity and quality of production-related infrastructure. They analyze FDI from the US to 18 EU countries and find a significant positive impact of the net stock of public capital on FDI.

Thus, corporate income taxes as well as production-related material infrastructure seem to be economically and statistically significant determinants of FDI. Infrastructure seems to matter especially in developing and in transition economies. However, as outlined above, a notable feature of the available studies is the neglect of third-country effects in FDI. This may bias the econometric results and may lead to misguided economic policy conclusions.

3 Origin-destination flow model

The departure of our analysis is the well known gravity model, which is a widely used framework for analyzing FDI flows between country-pairs (e.g., Petroulas, 2007; Bevan and Estrin, 2004). It rests on the assumption that FDI flows are larger between large economies and the more so if the countries are close neighbors. Hence, FDI flows are modeled as a function of the economic masses (usually measured by the countries' GDPs) of the home ($i = 1, \ldots, n^i$) and host ($j = 1, \ldots, n^j$) country as well as the geographical distance between them. In its log-linear form the gravity model is represented by equation (1):

$$lnFDI_{ijt} \quad = \quad \beta_0 + \beta_1 lnGDP_{it} + \beta_2 lnGDP_{jt} + \beta_3 lnDist_{ij} + \eta_{ijt} \qquad (1)$$

where the subscript $t = 1, \ldots, T$ denotes the time period. In order to account for unobservable country-pair and time specific effects not captured in the regression model, we include two-way error components disturbances, i.e.,

$$\eta_{ijt} = \mu_{ij} + \nu_t + u_{ijt} \tag{2}$$

Time effects are usually modeled as fixed parameters as they are correlated with $lnGDP_{it}$ and $lnGDP_{it}$. Including time fixed effects in the empirical model is one way to consider spatial autocorrelation in disturbances (see Elhorst, 2010, pp. 385). In order to explore the cross-sectional dimension of the panel we assume that the country-pair effects μ_{ij} are random and *i.i.d.* with $(0, \sigma_\mu^2)$. As this assumption requires the country-pair effects to be uncorrelated with the considered regressors we will verify the latter condition by means of a Hausman test. Finally, u_{ijt} denotes the stochastic remainder disturbance term which we allow to suffer from heteroskedasticity and serial correlation of unknown forms.

We augment the basic gravity model given in equations (1) and (2) in two directions. First, we extend the model by variables that are known to potentially impact on the volume of FDI a home country finances and a host country receives. These factors may vary over time and over the bilateral dimension (i.e., X_{ijt}), over time and host countries (M_{jt}) or over time and home countries (P_{it}).

Second, we augment the basic gravity model by three variables which capture spatial interdependencies in FDI between home as well as host countries (third-country effects). In doing so, we build on the recent work of LeSage and Pace (2008) who propose spatial weight structures for bidirectional flow models in cross-sectional data.[3] Accordingly, we consider two weight matrices W^i and W^j reflecting relations among home and host countries, respectively. Multiplying these matrices by our dependent variable results in the regressor vectors W^iFDI and W^jFDI.[4] Specifically, W^iFDI captures the possibility that FDI from one home country (i) to a particular host country (j) depends on the volume of FDI flowing from a home country's neighbors (-i) to the same host country (j). The vector W^jFDI represents the possibility that FDI flowing from a particular home country (i) to a particular host country (j) depends on the volume of FDI flowing from the same home country (i) to a host country's neighbors (-j). Besides W^jFDI and W^iFDI we consider a host country's surrounding market potential, $lnMpot_{jt}$. As noted above, this variable captures the market size of neighboring host countries.[5]

Concerning the definition of the weight matrices used, we follow the literature (see e.g., Anselin, 1988) and use weights based on spatial criteria. One important advantage of these weights is that they can be regarded as exogenous with respect to the endogenous variable. Denoting the identity matrix by I, the

[3] Note that unlike in LeSage and Pace (2008), our model is unidirectional as it considers only FDI flows from Western to Eastern European countries and not vice versa.

[4] Note that FDI denotes a vector containing log-values of FDI flows. Thus, W^iFDI contains $lnFDI_{-it}$ and W^jFDI includes $lnFDI_{-jt}$. Thereby $_{-i}$ stands for neighboring home countries and $_{-j}$ for neighboring host countries.

[5] A detailed discussion on the economic relevance of the various variables included in our empirical model is provided in the next subsection.

weight matrices can be defined as follows:

$$W^i = (\mathrm{w}^i \otimes I_{n^j}) \otimes I_T \quad (3)$$

$$W^j = (I_{n^i} \otimes \mathrm{w}^j) \otimes I_T \quad (4)$$

where w^i and w^j are row-standardized matrices with dimension $n^i \times n^i$ and $n^j \times n^j$, respectively.

In our baseline specification (cf. Table 4), the entries of w^i and w^j are constructed according to the k *nearest neighbors* concept with k equal to three (for this weight concept see, e.g., LeSage and Pace, 2009; Pinske and Slade, 1998). We rely on the k-nearest neighbors concept as it is quite similar to the widely applied contiguity concept[6] but rules out that islands, like the UK, are not considered in the construction of W^iFDI. Moreover, we decide to choose only a small number of neighbors ($k = 3$) because W^iFDI and W^jFDI then exhibit a higher variability due to the sparseness of the row-standardized weight matrix. In particular, we assign a weight of 1 for countries that are among the three nearest neighbors of home (host) country i (j) in terms of linear distances between the countries' capital cities. Formally, the entries of the matrix w^i are defined as follows:

$$\omega_{i,-i} = \begin{cases} 1, & \text{if } -i \text{ is among the 3 nearest neighbors of home country } i, \\ 0, & \text{otherwise.} \end{cases} \quad (5)$$

The entries of w^j are constructed analogously.[7] As the choice of the weighting concept must be determined in advance and might have an effect on coefficient estimates, we will present results for several alterations to our weighting scheme in the robustness analysis. First, we vary k in the interval [2,4]. Second, we will apply the well-known *distance decay* concept. In this case the entry of the matrix w^i is defined as shown in equation (6):

$$\omega_{i,-i} = \begin{cases} \frac{1}{Dist^a_{i,-i}}, & \text{for } i \neq -i \\ 0, & \text{otherwise} \end{cases} \quad (6)$$

Thereby $Dist_{i,-i}$ stands for the linear distance (in kilometers) between the capital cities of the home countries i and $-i$. Again, the weight matrix w^j is constructed analogously. In contrast to the k nearest neighbors concept the distance decay approach incorporates the amount of all neighboring countries' FDI in the weighting matrix. Yet, higher values are assigned to countries that are close neighbors. The extent nearby countries are weighted more heavily depends on the parameter a, which we will vary in the interval [1,2].

Finally, subsuming X_{ijt}, M_{jt}, P_{it} and the constant term ι_{NT} (vector of ones) in the matrix $\overline{Z}$ and extending the core model in equations (1) and (2) by the regressors introduced so far, the spatially

[6] A contiguity weighting concept assigns an entry of one to each country pair that shares a common border.

[7] Note that after row-standardizing the weight matrix all non-zero entries equal $\frac{1}{3}$.

augmented gravity model in its matrix form is displayed in equation (7):

$$FDI = \rho^i W^i FDI + \rho^j W^j FDI + \beta_1 GDP^i + \beta_2 GDP^j + \beta_3 Dist + \overline{Z}\beta_4 + Z_\nu \nu + \tilde{\epsilon} \tag{7}$$

FDI, GDP^j, GDP^i and $Dist$ denote vectors containing log-values of the core gravity variables included in equation (1). Time dummies are included in $Z_\nu = \iota_N \otimes I_T$ with $N = n^i * n^j$. Country-pair effects and the remainder term are subsumed in $\tilde{\epsilon}$, where the observations are stacked such that the slower index is over country-pairs and the faster index is over time, i.e., $\tilde{\epsilon}' = (\tilde{\epsilon}_{11,t}, \ldots, \tilde{\epsilon}_{11,T}, \tilde{\epsilon}_{12,t}, \ldots, \tilde{\epsilon}_{12,T}, \ldots, \tilde{\epsilon}_{n^i n^j,t}, \ldots, \tilde{\epsilon}_{n^i n^j,T})$.

4 Variables and data issue

4.1 Endogenous variable

We operationalize FDI flows by bilateral FDI outflows of seven major home countries (AUT, DEU, FRA, GBR, USA, NLD and ITA) to eight CEE (CEEC-8) host countries (CZE, HUN, POL, SVK, SVN, BGR, HVN and ROM) during the period from 1995 to 2004.[8] FDI data are denominated in millions of current Euro and have mainly been obtained from Eurostat's "New Cronos" database, the "OECD International Direct Investment Statistics Yearbook" and the "OECD Foreign Direct Investment" database. Missing values have been substituted using information from National Banks and National Statistical Offices which results in a balanced panel of 560 observations. However, as FDI flows can be negative or zero we loose 52 observations ($\approx 9\%$) due to taking the logarithm of the dependent variable. Moreover, most right-hand side regressors enter the empirical model with one year lagged values (also see section 5) which leaves us with 452 observations for estimation.

4.2 Core gravity variables and third-country effects

The GDP-related core gravity variables $lnGDP_{it}$ and $lnGDP_{jt}$ capture size effects: the larger the home country of FDI the more FDI should emerge from this country; the larger the market size of a host country the more FDI it should receive. Thus, for both variables we expect a positively signed coefficient. The third core gravity variable is the bilateral distance, $lnDist_{ij}$, between the home and host country of FDI. It is measured as the bilateral distance between capital cities and aims to proxy transport costs as well as the institutional and cultural distance between two countries. Conceptually the expected sign of its coefficient crucially hinges on the motive of FDI, efficiency- or market-seeking FDI. In the latter case FDI substitutes for exports. A larger bilateral distance is then expected to lead to an increase in horizontally motivated FDI. Thus, in this case a positive relationship is expected. In case of efficiency-seeking (vertical) FDI, which is exports generating in nature (exports from the host to the home country),

[8] These countries are by far the most important recipients of FDI in CEECs and also the most important home countries of FDI in CEECs (see Bellak et al., 2009 for details).

a negative relationship is likely to arise. The latter is also the case - independently of the motive of FDI - if geographically separated countries are culturally and institutionally distant as this may result in increased monitoring and investment costs. Thus, *a priori* the sign on the distance coefficient is ambiguous (see e.g., Carr et al., 2001).

We introduce three variables which capture third-country effects in FDI: W^iFDI, W^jFDI and $lnMpot_{jt}$. The latter variable is calculated for each host country as the sum of the distance weighted GDPs of Greece and Turkey as well as all Eastern European countries that share a common border with at least one of the CEEC-8.[9] Capturing a country's surrounding market potential in this way represents the view that a potential CEE host country of FDI, which is close to large Eastern European countries (or Greece and Turkey) may act as an export-platform ("export-platform" FDI; Ekholm et al., 2007) through which neighboring markets are serviced. Furthermore, the surrounding market potential intends to capture "agglomeration effects" (e.g., Garretsen and Peeters, 2009).[10] Both cases, export-platform FDI and agglomeration effects, are consistent with a positively signed coefficient for $lnMpot_{jt}$.

As outlined above, W^iFDI and W^jFDI are elementary parts of the "origin-destination-flow" model of LeSage and Pace (2008). These variables directly capture the interdependence in FDI flows across space. Thereby, a positively signed coefficient on W^iFDI signals that the more neighboring home countries of FDI (-i) invest in a particular host country (j) the more FDI also emerges from home country i. This might be seen as an indication for the presence of "spatial demonstration effects" (also see Barry et al., 2003): The choice of a host country by foreign investors is "interpreted as a positive signal of the attractiveness of a location" (Barba Navaretti and Venables, 2004, p. 148). In contrast, a negative signed coefficient is consistent with the view that "competition effects" are dominating which cause domestic investors not to invest in a host country where other foreign MNEs are establishing subsidiaries. Thus, this effect resembles the impact of deglomerative forces due to fiercer competition in goods and factor markets found in models of the New Economic Geography (see e.g., Brakman et al., 2009, pp. 124). It also captures the possibility of decreasing investment opportunities for country (i) MNEs if country (-i) MNEs invest in a particular host location.

A positively (negatively) signed coefficient on W^jFDI signals that a host country (j) receives more (less) FDI if its neighbors (-j) receive more FDI from a particular home country (i). As argued by Blonigen et al. (2007) and Garretsen and Peeters (2009) these signs should also be interpreted in conjunction with the coefficient on $lnMpot_{jt}$ as this may reveal further insights in the motives of FDI. Specifically, a negatively signed coefficient on W^jFDI paired with a positively signed coefficient on $lnMpot_{jt}$ implies

[9] Specifically, the following countries are included in the surrounding market potential: the CEEC-8, Serbia, Bosnia-Herzegovina, Macedonia, Moldavia, Lithuania, Ukraine, Belarus, Greece and Turkey. The latter two countries are included as they also share a common border with at least one of the CEEC-8.

[10] As our host countries of FDI essentially comprise the European periphery, agglomeration effects may be of minor importance. The analysis of Disdier and Mayer (2004) indicates weaker agglomeration effects in CEECs than in EU countries over the period 1991 to 1999. Yet, they also show that differences in the determinants of FDI between "old and new EU" are vanishing over time. Put differently, as our sample period ranges until 2004 non-negligible agglomeration effects may be present even in the case of the CEECs.

that total FDI is dominated by FDI of the export-platform type. Statistically insignificant coefficients on both W^jFDI and $lnMpot_{jt}$ are consistent with "pure" market-seeking FDI. A positive coefficient on W^jFDI paired with an insignificant or positive coefficient on $lnMpot_{jt}$ hints toward the presence of "complex vertical" FDI (fragmentation of the value chain). Finally, a negatively signed destination based spatial lag coefficient (ρ^j) and an insignificant surrounding market potential variable signal the presence of "pure" vertical FDI (see Garretsen and Peeters, 2009, Table 1).

4.3 Taxes and production-related material infrastructure

We proxy the corporate income tax burden of a host country by the effective average tax rate on a bilateral (country-pair) basis ($Beatr_{ijt}$). Tax rates are calculated following Devereux and Griffith (2003). Clearly, we expect a negative signed coefficient on $Beatr_{ijt}$ as a higher average tax rate leads to a lower after tax profitability of an investment. The latter should deter (infra-marginal) investments. Moreover, as the $Beatr_{ijt}$ is a weighted average of the (adjusted) statutory tax rate on corporate income and the effective marginal tax rate, a higher $Beatr_{ijt}$ might be due to an increase in the effective marginal tax rate. This implies *ceteris paribus* a lower scale of investments. Thus, the $Beatr_{ijt}$ might be considered as capturing the impact of corporate income taxes on both, marginal and infra-marginal investments.

To capture the endowment with production-related material infrastructure we use the index established by Bellak et al. (2009) via principal component analysis ($Infra_{jt}$). This indicator comprises telecommunication, electricity and transport production facilities, which are the most important components of a country's production-related material infrastructure (see Gramlich, 1994). We expect a positive relationship between FDI and $Infra_{jt}$: Increases in the infrastructure endowment lowers production costs and lead *ceteris paribus* to a higher profitability of the investment.

The CEEC-8 have undergone a considerable tax-reform process during the past decade, corporate income taxation being no exception. While the tax-reform process was not uniform across countries some common trends in corporate taxation over the 1995 to 2004 period are discernible: (a) Statutory tax rates and hence average effective tax rates on corporate income have been reduced considerably during this period; (b) tax bases have broadened; (c) the downward movement of statutory and effective average tax rates gained momentum around the year 2000 and (d) bilateral effective average tax rates are converging not least due to the adoption of the EU's parent subsidiary directive by the most advanced CEECs in 2004.

At the same time the CEEC-8 have substantially improved their endowment with production-related material infrastructure. Like in the case of the $Beatr_{ijt}$ some convergence in the infrastructure index is evident. This is consistent with the convergence in the per capita GDPs of the CEEC-8 (see Bellak et al., 2009 for further details on $Beatr_{ijt}$ and $Infra_{jt}$).

4.4 Control variables

Empirical studies exploring the determinants of FDI apply a wide variety of location factors. Our choice of control variables is led by FDI-theories (see e.g., Barba Navaretti and Venables, 2004, for an overview) and it is based on well established findings in the empirical literature. The control variables used and the expected sign of their impact on FDI in [] are as follows:[11], (a) wage-related labor costs, $lnWages_{jt}$ [-], and (b) labor productivity, $lnLabprod_{jt}$ [+], intend to capture labor market conditions. A rise in $lnWages_{jt}$ increases, *ceteris paribus*, unit production costs. We therefore expect a negatively signed coefficient. In contrast, via its favorable impact on unit production costs and thus on an investment's profitability an increase in $lnLabprod_{jt}$ should impact positively on FDI; (c) annual privatization revenues, $lnPriv_{jt}$ [+], capture the privatization process in CEECs. We expect a positive sign on the estimated coefficient as a higher degree of privatization implies more investment opportunities for foreign investors; (d) consumer price inflation, $Infl_{jt}$ [?], is used as a proxy for macroeconomic risk as a high inflation rate indicates macroeconomic uncertainty. Yet, as our dependent variable is measured in nominal terms higher inflation may imply larger FDI flows. Thus, the sign of this variable's coefficient is ambiguous *a priori*; (e) an indicator of forex and trade liberalization, $Forex_{jt}$ [+], is used to capture the *de jure* liberalization of trade and foreign exchange transactions. The less restrictions countries impose the higher will be the $Forex_{jt}$ score. Thus, a positively signed coefficient is expected; (f) the political risk level, $Risk_{jt}$ [+], which *inter alia* captures the likelihood of expropriation of assets and other forms of a weak institutional environment. Less political risk should lead to more FDI. Due to the particular definition of the measure of $Risk_{jt}$ used we expect a positively signed coefficient; (g) in addition to $lnDist_{ij}$ and $Forex_{jt}$ tariff revenues in percent of imports, Tar_{jt} [?], are used to proxy certain aspects of *de facto* trade costs. Conceptually the impact of high tariffs on the volume of FDI received by a country depends on the underlying motive for FDI. Vertically motivated FDI may be deterred by high tariffs, while high tariffs may spur market-seeking FDI ("tariff-jumping FDI"). Thus, *a priori* the sign of this variable is ambiguous; (h) the per capita GDP of the home countries of FDI, $lnGDPcap_{it}$ [+], is used as an indicator of the capital abundance of the home country of FDI. As more capital abundant countries should conduct higher outward FDI (see e.g., Egger and Pfaffermayer, 2004) we expect a positively signed coefficient.

To summarize the discussion of variable and data issues, Table 1 displays details of the variables used, Table 2 shows the correlation matrix of the various location factors and Table 3 includes the descriptive statistics for the variables included in the empirical study.

[Table 1 here]

[Table 2 here]

[Table 3 here]

[11] Note that all variables measured in units of Euro are log-transformed to cope with outliers.

5 Empirical methodology

As the embedded spatial lags (W^iFDI and W^jFDI) of our baseline model outlined in equation (7) are endogenous with respect to the error term, we follow Anselin (1988) and LeSage and Pace (2008) and obtain parameter estimates via Maximum Likelihood techniques. In order to derive the log-likelihood function we have to consider the unbalancedness of the panel data set (i.e., 52 missing data; cf. section 4.1). Hence, we follow Baltagi (2005, p. 167) and denote the variance-covariance matrix $E(\tilde{\epsilon}\tilde{\epsilon}') = \sigma_\nu^2\Sigma$ as follows:

$$\Sigma = I_{\tilde{N}} + \theta Z_\mu Z_\mu' \quad (8)$$

$$Z_\mu = diag\left\{\iota_{T_{ij}}\right\} \quad (9)$$

where $\tilde{N} = \sum_{ij=1}^{N} T_{ij}$ and $\theta = \sigma_\mu^2/\sigma_u^2$. This allows to account for missing data points as the matrix Z_μ contains the N country-pairs with varying time-period lengths T_{ij}.

Denoting the vector FDI by y and defining $Z \equiv [GDP^i, GDP^j, Dist, \overline{Z}, Z_\nu]$, $\delta \equiv (\beta_1, \beta_2, \beta_3, \beta_4', \nu')'$ and $A \equiv I - \rho^iW^i - \rho^jW^j$, the log-likelihood function can be written as

$$\mathcal{L} = -\frac{\tilde{N}}{2}log(2\pi) - \frac{\tilde{N}}{2}log\sigma_u^2 - \frac{1}{2}log\,|\Sigma| - (Ay - Z\delta)'\Sigma^{-1}(Ay - Z\delta)/2\sigma_u^2 + log\,|A| \quad (10)$$

where log $|A|$ represents the Jacobian obtained when deriving the joint distribution of y. Closed form solutions for $\hat{\delta}$ and $\hat{\sigma}_u^2$ can be obtained from first-order conditions and are given by

$$\hat{\delta} = (Z'\hat{\Sigma}^{-1}Z)^{-1}Z'\hat{\Sigma}^{-1}Ay \quad (11)$$

$$\hat{\sigma}_u^2 = (Ay - Z\delta)'\hat{\Sigma}^{-1}(Ay - Z\delta)/\tilde{N} \quad (12)$$

Yet, the relevant first-order conditions for ρ^i, ρ^j and θ are nonlinear in ρ^i, ρ^j and θ, respectively. Therefore, they have to be obtained numerically. This is accomplished by applying a gradient-based method implemented in the Optimization Toolbox of Matlab that attempts to find a minimum of the negative multivariate log-likelihood function. By optimizing the function, we impose a set of equality constraints. First, we set $\theta > 0$ as in the random effects case $0 < \sigma_\mu^2 < \infty$ and $0 < \sigma_u^2 < \infty$. Second, in order to assure that the asymptotic properties for the Maximum likelihood estimates hold (i.e., to ensure that A is non-explosive), we constrain ρ^i and ρ^j to be smaller than one in absolute values and set $-1 < \rho^i + \rho^j < 1$ (see e.g. LeSage and Pace, 2009, p. 221).

To derive standard errors for the Maximum Likelihood estimates we rely on bootstrapping techniques. In the present model setting, two issues need special consideration when re-sampling techniques are implemented. First, in a Maximum Likelihood setting the *paired* bootstrap is inconvenient as it destroys the spatial structure of the data (Anselin, 1988, pp. 94).[12] Second, the alternative *residual* bootstrap in its usual form requires *i.i.d.* errors which is quite restrictive. Therefore, we employ the *wild* bootstrap, which provides asymptotic refinement even in the case of heteroskedastic and serially correlated residuals (see e.g., Cameron and Trivedi, 2005, p. 378).[13]

When estimating the empirical model, we apply a general to specific approach (see e.g., Hendry, 1995) starting with the most general model containing all variables introduced above. We proceed by dropping the variables with the smallest t-value (in absolute values) one at a time until only variables that are significant in a statistical sense remain. Thereby, we start with dropping insignificant control variables first and we apply two-sided tests with a 10% significance level for all variables with an *a priori* ambigious sign (cf. Table 1). For variables which should enter the empirical model with a certain, theoretically motivated sign, we apply one-sided tests at the 5% significance level. The direction of the alternative hypothesis follows the expected sign as shown in Table 1.

The random effects assumption is tested by a bootstrapped Hausman test as developed in Cameron and Trivedi (2010). To consider that FDI flows may react to variation in location factors with a time lag (see e.g., Bevan and Estrin, 2004) we use all control variables as well as $lnMpot_{jt}$, $lnGDP^i_{it}$, $lnGDP^j_{jt}$, $Beatr_{ijt}$ and $Infra_{jt}$ with a one year lag in the econometric analysis. Using lagged values is also capable to mitigate problems arising from reverse causality (see e.g., Wooldridge, 2001). Finally, we conduct several robustness checks with respect to the estimation technique and the definition of the weight matrices applied.

6 Results

6.1 Baseline results

This section displays our baseline results which are based on equation (7) employing the weight matrix defined in (5). First we discuss the results concerning the core gravity variables and the control variables, followed by the results for the third-country effects and those for the variables of main interest ($Beatr_{ijt-1}$ and $Infra_{jt-1}$), respectively. Note that time dummies are included in each specification. Also note that the bootstrapped version of the Hausman test (see Cameron and Trivedi, 2010, p. 443) indicates that the random effects assumption cannot be rejected (see $HAUS$ in Tables 4 and 5).

[12]Unlike in an IV environment, spatial lags (e.g., $W^i y$) in the Maximum Likelihood case are not supplied as right-hand-side regressors with final entries but change when re-sampling from the vector y. Thus, the inherent characteristics of the data set are destroyed when drawing from $(y, W^i y, W^j y)$ equation-wise.

[13]A detailed description of the wild bootstrap is outlined in appendix 8.1. The Matlab code for the whole routine is available from the authors upon request.

6.1.1 Core gravity and control variables

Column (1) in Table 4 displays the estimation results for our full model, containing all variables. The core gravity variables $lnGDP_{it-1}$, $lnGDP_{jt-1}$ and $lnDist_{ij}$ are statistically significant with expected sign. Larger home countries invest more and *ceteris paribus* larger host countries receive more FDI. The negatively signed coefficient on $lnDist_{ij}$ is in line with the vast majority of empirical studies based on the gravity model. It may signal the dominance of vertically-motivated FDI in total FDI. However, as a larger bilateral distance also captures increases in cultural and institutional differences which also deter horizontal FDI, the negatively signed coefficient should not be seen as clear-cut evidence in favor of vertical FDI.

Out of the control variables, $lnGDPcap_{it-1}$, $lnWages_{jt-1}$, $lnPriv_{jt-1}$ and Tar_{jt-1} enter the empirical model significantly. The coefficients also carry the expected signs. Specifically, the positive coefficient on $lnGDPcap_{it-1}$ implies that more capital abundant countries undertake disproportionate more FDI. Moreover, in line with many other studies, high wage costs deter FDI while countries with a progressed privatization process receive more FDI (see e.g., Carstensen and Toubal, 2004 and Bevan and Estrin, 2004). The positive and significant coefficient on Tar_{jt-1} points toward the presence of "tariff-jumping" FDI. Yet, in contrast to other findings, the robustness checks contained in Table 5 will show that this result is not robust to changes in model specifications.

The coefficients of the remaining control variables $Risk_{jt-1}$, $Forex_{jt-1}$, $lnLabprod_{jt-1}$ and $Infl_{jt-1}$ are not statistically different from zero. The results for $Infl_{jt-1}$, $Risk_{jt-1}$ and $Forex_{jt-1}$ imply that our host countries are countries with already low levels of macroeconomic and political risks as well as low legal obstacles for trade and capital flows. These findings are not unexpected, as the host countries in our sample are the most economically and politically developed CEECs. Moreover, our estimation also suggests that FDI is not driven by differences and changes in labor productivity. Although this result is in line with Holland and Pain (1998) it is somewhat unexpected. However, it is consistent with the view that MNEs are able to transfer their home market productivity levels into the CEE host markets, which, in turn, is consistent with the evidence that "labour productivity in foreign subsidiaries of MNEs is higher than in domestic firms". (Barba Navaretti and Venables, 2004, p. 158).

For efficiency reasons and for exploring the robustness of the coefficient estimates the insignificant control variables are excluded stepwise starting with the variable with the lowest t-value (i.e., $lnLabprod_{jt-1}$). This leads us to the model shown in column (2) of Table 4.[14] A first look at the table reveals that the exclusion of variables does not impact on sign and significance of the remaining variables.

[Table 4 here]

[14] Details on the testing down procedure are available upon request.

6.1.2 Third-country effects, taxes and infrastructure

With regard to W^iFDI (and thus $lnFDI_{-it}$), columns (1) and (2) of Table 4 show that the average FDI flow of neighboring home countries to a particular host country has a small negative but statistically insignificant impact on the amount of FDI flows from a certain home country to the same CEEC. Thus, the results signal the absence of "spatial demonstration" and "competition effects" in FDI flows. Yet, the insignificant coefficient may also arise when the two effects cancel each other.

In contrast, we are able to establish evidence for the dependence of the volume of FDI a host country receives from a particular home country on the FDI flows from the same home country to neighboring host countries. The positive sign of ρ^j implies that a CEEC receives more FDI the more FDI a neighboring CEEC is able to attract. The substantive implications of this positive coefficient is best seen if one additionally considers the impact of a host country's surrounding market potential on FDI flows. As is evident from columns (1) and (2), $lnMpot_{jt-1}$ enters the empirical model significantly with a positive coefficient. Thus, our results point toward the dominance of complex vertical FDI in total FDI flows to CEECs paired with agglomeration effects (see Garretsen and Peeters, 2009, Table 1). This finding is in line with Garretsen and Peeters (2009) based on Dutch outbound FDI to a broad range of advanced OECD host countries.

It is important to note that the results established so far do not change when the insignificant $lnFDI_{-it}$ variable is excluded from the empirical model. Column (3) of Table 4 displays our "preferred model", where only variables with statistically significant coefficients are included.

The location factors of particular interest, i.e., $Beatr_{ijt-1}$ and $Infra_{jt-1}$, enter the empirical models highly significantly with the expected signs. Specifically, based on our preferred specification shown in column (3), the coefficient on the average effective tax rate implies that a one percentage-point drop in $Beatr_{ijt-1}$, *ceteris paribus*, leads to an immediate increase in FDI by about 5.0%. This result is in line with the meta-analysis of DeMooji and Everdeen (2008) and Bellak et al. (2009). Furthermore, the coefficient on $Infra_{jt-1}$ of about 0.55 is in line with Bellak et al. (2009) who find on the basis of the same infrastructure index a coefficient of 0.48. Thus, a one-point change in the infrastructure index results in an increase in FDI flows by about 55%. Note that, as the employed infrastructure index ranges between -2.5 and 2, a one-point change in this variable implies a quite substantial increase in the infrastructure endowment, which can only be achieved over a longer time span (also see Bellak et al., 2009, on this issue).

Thus, our estimations imply that the substantive results derived by prior studies, which do not include third-country effects in their empirical models, are rather robust to the inclusion of $lnFDI_{-it}$, $lnFDI_{-jt}$ and $lnMpot_{jt-1}$.[15] To stress this aspect, column (4) of Table 4 shows the result when the two statistically significant third-country variables, $lnMpot_{jt-1}$ and $lnFDI_{-jt}$, are dropped from our

[15] A similar result is established in Blonigen et al. (2007). In their case the inclusion of country fixed effects strongly reduces the statistical impact of their spatial interaction variable which is defined across host countries of US FDI.

preferred specification. The results displayed basically restate the findings derived by Bellak et al. (2009) in their model m4.[16]

However, when interpreting regression results based on models containing spatial interaction variables one has to keep in mind that the immediate effects of variables shown by the "normal" regressions coefficients neglect "feedback loops" arising from the presence of $lnFDI_{-it}$ and $lnFDI_{-jt}$ (see LeSage and Pace, 2009, p. 35). Average direct effects, which also capture these feedback loops, should be derived in addition. For the variables of main interest, $Beatr_{ijt-1}$ and $Infra_{jt-1}$, and based on our preferred specification in column (3) these average direct effects are -0.051 for $Beatr_{ijt-1}$ and 0.56 for $Infra_{jt-1}$. Thus, the average direct effects differ only slightly from the regression coefficients. This is not unexpected given the rather low coefficient of 0.20 on $lnFDI_{-jt}$.[17]

Finally note that comparing the results displayed in the various columns of Table 4 reveals that the magnitude and the statistical significance of the variables entering our preferred specification are rather robust across all specifications. Further robustness checks are summarized in the next subsection.

6.2 Robustness analysis

Table 5 summarizes these robustness checks. Note that we include $lnFDI_{-it}$ in most robustness checks as one may argue that the importance of this variable changes with the definition of the weight matrix and / or the econometric estimator applied.

The first two columns of Table 5 show the results when the models contained in columns (1) - (3) of Table 4 are estimated via Instrumental variables (IV) techniques with bootstrapped standard errors.[18] Thereby $lnFDI_{-jt}$ and $lnFDI_{-it}$ are instrumented by employing the variables suggested by Kelejian and Prucha, (1998). That is, we use spatial lags of all exogenous regressors contained in the various models as excluded instruments.

With respect to the size of the estimated coefficients the IV results are qualitatively similar to the Maximum likelihood estimates. However, the statistical significance of $lnGDP_{it-1}$, $lnMpot_{jt-1}$ and Tar_{jt-1} is reduced in the IV case. This may indicate the relative inefficiency of the IV estimator compared to the Maximum likelihood approach.

Note that the serial correlation and heteroskedasticity robust F tests for weak instruments (one for each endogenous variable) reject the null hypothesis of weak instruments. This result is reinforced by the Kleibergen and Paap weak identification test statistic. Moreover, the Hansen J statistic for over-identification does not reject the null hypothesis of joint validity of the employed exogenous instruments. Finally, a Wald-test shows that time dummies are jointly highly statistically significant.

[16]Note, that the results given in column (4) are derived based on the Maximum likelihood estimator. In contrast, Bellak et al. (2009) provide GLS-random effects estimates.

[17]Appendix 8.2 explicates how these direct effects are derived based on equation (2.43) given in LeSage and Pace (2009). The average direct effects for the remaining variables of the preferred model are: 2.14 ($lnGDPcap_{it-1}$), 1.21 ($lnGDP_{jt-1}$), -0.59 ($lnDist_{ij}$), -1.03 ($lnWages_{jt-1}$), 0.27 ($lnPriv_{jt-1}$), 0.27 ($lnMpot_{jt-1}$) and 0.20 ($lnGDP_{it-1}$).

[18]Estimations are carried out using the xtivreg command (with the vce(boot) option) of Stata 11.1.

The remaining columns of Table 5 display results when we alter the definition of the weight matrix W. Estimates are based on the Maximum likelihood estimator. In particular, columns (4) and (5) rely on the same weighting scheme (*k nearest neighbors*) but consider the 2 and 4 nearest countries to be neighbors. Results displayed in columns (6) and (7) are based on the distance decay weighting concept which leads to a full weight matrix. Column (6) sets a of equation (6) equal to 1 and column (7) sets $a = 2$.

Again, most results are robust to the definition of the weight matrices. Specifically, $lnFDI_{-it}$ remains statistically insignificant throughout. Moreover, Tar_{jt-1} is statistically insignificant in case of $k = 2$, $a = 1$ and $a = 2$. These results stress once more the absence of spatial interrelationships across the home country dimension (or the canceling of spatial demonstration and competition effects, respectively). The robustness checks also suggest that the empirical evidence in favor of tariff-jumping as motive for FDI in CEECs is rather weak.

[Table 5 here]

7 Summary and conclusion

This paper reanalyzes the determinants of FDI flows into CEECs. Thereby a specific focus is put on two location factors, corporate income taxes and a country's endowment with production-related material infrastructure. These variables are under immediate control of policy makers and range high in the policy related discussions concerning the determinants of FDI. Previous empirical studies find that corporate income taxes as well as production-related material infrastructure seem to be economically and statistically significant determinants of FDI especially in developing and in transition countries. However, a notable feature of the earlier studies is the neglect of third-country effects in FDI. Omitting third-country effects, when they actually are present, might bias the econometric results derived. The current study complements these prior analyzes by explicitly capturing third-country effects in FDI.

For this aim the empirical approach applied is based on the "origin-destination-flow" model recently proposed by LeSage and Pace (2008, 2009). This model basically extents the frequently used gravity model via the inclusion of spatial interaction effects across home countries of FDI as well as across host countries. Moreover, we consider a host country's surrounding market potential as a determinant of FDI flows. This variable captures the possibility that the market size of proximate countries may impact on the volume of FDI a particular host country receives.

We find significant evidence in favor of spatial interdependencies in FDI flows from 7 Western home countries to 8 CEECs. In particular the variable capturing interdependencies across host countries enters with a positively signed coefficient into the empirical model. The surrounding market potential variable also bears a positively signed coefficient. These results suggest the dominance of complex vertical FDI in total FDI to CEECs and the presence of agglomeration effects in CEECs. Yet, we find no evidence in favor of spatial autocorrelation across the home country dimension. This result may signal the entire absence of spatial demonstration and competition effects. But, the insignificance of the variable capturing interdependencies across home countries may also be caused by the two effects canceling each other. Yet, given that the surrounding market potential of a country enters the empirical models statistically significant with a positive coefficient and given the fact that the most important investor countries are close neighbors of the CEECs, which should reduce the extent of uncertainties concerning the quality of CEECs as host countries, the entire absence of spatial demonstration and competition effects is the likelier event.

Our analysis also implies that results of prior studies, which neglect third-country effects in FDI, are rather robust with respect to the inclusion of the latter. Specifically, in line with Bellak et al. (2009) we find that high effective average tax rates on corporate income deter FDI and that an increase in a country's endowment with production-related material infrastructure increases FDI flows (average total direct effects (semi-elasticities) of about -5.1 (effective taxes on corporate income) and 56.0 (infrastructure)). Nevertheless it has to be stressed that the exclusion of third-country effects leads to a loss of information concerning the predominant motive of FDI (pure vertical or horizontal, complex vertical or export-platform FDI). The latter information might itself be relevant for policy makers if different FDI leads to different spill-over effects in the home and host countries.

Finally, we want to stress that our analysis is based on a rather narrow set of home and host countries of FDI. A promising avenue for further research therefore would be to extend the analysis to capture a broader range of countries. Moreover, as recent empirical analyzes show, the determinants of FDI may crucially depend on the industrial sector (see e.g., Riedl, 2010; Garretsen and Peeters, 2009; Blonigen et al., 2007). Thus, applying the origin-destination-flow model considered here at a more disaggregated level seems to be another avenue for further research. However, at least for the CEECs, bilateral FDI data at the industry level are still lacking.

References

Anselin, L., 1988. Spatial Econometrics: Methods and Models. Kluwer, Dordrecht.

Baltagi, B., 2005. Econometric Analysis of Panel Data. John Wiley and Sons Ltd, England.

Baltagi, B., Egger, P., Pfaffermayr, M., 2007. Estimating models of complex FDI: Are there third-country effects? Journal of Econometrics 140 (1), 260–281.

Barry, F., Görg, H., Strobl, E., 2003. Foreign direct investment, agglomerations, and demonstration effects: An empirical investigation. Review of World Economics (Weltwirtschaftliches Archiv) 139 (4), 583–600.

Bellak, C., Leibrecht, M., Damijan, J., 2009. Infrastructure endowment and corporate income taxes as determinants of Foreign Direct Investment in Central and Eastern European Countries. The World Economy 32 (2), 267–290.

Bevan, A., Estrin, S., 2004. The determinants of foreign direct investment into European transition economies. Journal of Comparative Economics 32, 775–787.

Blonigen, B., Davies, R., Waddell, G., Naughton, H., 2007. FDI in space: Spatial autoregressive relationships in foreign direct investment. European Economic Review 51 (5), 1303–1325.

Bénassy-Quéré, A., Gobalraja, N., Trannoy, A., 2007. Tax and public input competition. Economic Policy 22, 385–430.

Brakman, S., Garretsen, H., van Marrewijk, C., 2009. The New Introduction to Geographical Economics. Cambridge University Press.

Cameron, A. C., Trivedi, P., 2005. Microeconometrics: Methods and Applications. Cambridge University Press.

Cameron, A. C., Trivedi, P., 2010. Microeconometrics with Stata. Stata Press.

Carr, D., Markusen, J., Maskus, K., 2001. Estimating the knowledge-capital model of the Multinational Enterprise. American Economic Review 91 (3), 693–708.

Carstensen, K., Toubal, F., 2004. Foreign direct investment in Central and Eastern European countries: a dynamic panel analysis. Journal of Comparative Economics 32 (1), 3–22.

Cheng, L., Kwan, Y., 2000. What are the determinants of the location of Foreign Direct Investment? The Chinese experience. Journal of International Economics 51 (2), 379 – 400.

De Mooij, R., Ederveen, S., 2008. Corporate tax elasticities: A reader's guide to empirical findings. Oxford Review of Economic Policy 24 (4), 680–697.

Demekas, D. G., Horvath, B., Ribakova, E., Wu, Y., 2007. Foreign direct investment in European transition economies: The role of policies. Journal of Comparative Economics 35, 369–386.

Devereux, M., 2004. Measuring taxes on Income from Capital. In: Sorensen, B. (Ed.), Measuring the tax burden on capital and labor. MIT Press, pp. 35–71.

Devereux, M. P., Griffith, R., 2003. Evaluating tax policy for location decisions. International Tax and Public Finance 10 (2), 107–26.

Disdier, A.-C., Mayer, T., 2004. How different is Eastern Europe? Structure and determinants of location choices by French firms in Eastern and Western Europe. Journal of Comparative Economics 32 (2), 280–296.

Egger, P., Pfaffermayr, M., 2004. Foreign Direct Investment and European integration in the 1990s. The World Economy 27 (1), 99–110.

Ekholm, K., Forslid, R., Markusen, J., 2007. Export-platform Foreign Direct Investment. Journal of the European Economic Association 5 (4), 776–795.

Elhorst, P. J., 2010. Spatial panel data models. In: Fischer, M., Getis, A. (Eds.), Handbook of Applied Spatial Analysis. Springer, pp. 377–406.

Feld, L., Heckemeyer, J., 2009. FDI and Taxation: A Meta-Study. CESifo Working Paper Series CESifo Working Paper No. 2540, CESifo Group Munich.

Ghosh, M., Wang, W., 2009. Does FDI accelerate economic growth? The OECD experience based on Panel Data estimates for the period 1980-2004. Global Economy Journal 9 (4), 1–21.

Glass, A., 2008. Infrastructure and FDI. In: Rajan, R., Reinert, K. (Eds.), Encyclopedia of the World Economy,. Princeton University Press, pp. 625–638.

Goodspeed, T., Martinez-Vazquez, J., Zhang, L., 2006. Are government policies more important than taxation in attracting FDI? International Studies Program Working Paper Series, at AYSPS, GSU paper0614, International Studies Program, Andrew Young School of Policy Studies, Georgia State University.

Goodspeed, T., Martinez-Vazquez, J., Zhang, L., 2010. Public policies and FDI location: Differences between developing and developed countries. International Studies Program Working Paper Series, at AYSPS, GSU paper1001, International Studies Program, Andrew Young School of Policy Studies, Georgia State University.

Gramlich, E. M., 1994. Infrastructure investment: A review essay. Journal of Economic Literature 32 (3), 1176–96.

Hendry, D. F., 1995. Dynamic Econometrics. Oxford University Press: New York.

Holland, D., Pain, N., 1998. The diffusion of innovations in Central and Eastern Europe: A study of the determinants and impact of foreign direct investment. NIESR Discussion Papers 137, National Institute of Economic and Social Research.

Kelejian, H., Prucha, I., 1998. A Generalized Spatial Two-Stage Least Squares procedure for estimating a Spatial Autoregressive Model with autoregressive disturbances. Journal of Real Estate Finance and Economics 17 (4), 99–121.

LeSage, J., Pace, K., 2008. Spatial econometric modeling of origin-destination flows. Journal of Regional Science 48 (5), 941–967.

LeSage, J., Pace, K., 2009. Introduction to Spatial Econometrics. Chapman & Hall/CRC.

Mollick, A. V., Ramos-Duran, R., Silva-Ochoa, E., 2006. Infrastructure and FDI inflows into Mexico: A Panel Data approach. Global Economy Journal 6 (1).

Mutti, J., 2004. Foreign Direct Investment and Tax Competition. Institute for International Economics.

Navaretti, G. B., Venables, A. J., 2004. Multinational firms in the world economy. Princeton University Press: NJ Princeton.

Overesch, M., Wamser, G., 2010. The effects of company taxation in EU accession countries on German FDI. The Economics of Transition DOI: 10.1111/j.1468-0351.2009.00385.x.

Petroulas, P., 2007. The effect of the Euro on Foreign Direct Investment. European Economic Review 51, 1468–1491.

Pinkse, J., Slade, M. E., 1998. Contracting in space: An application of spatial statistics to discrete-choice models. Journal of Econometrics 85 (1), 125–154.

Richter, W. F., Seitz, H., Wiegard, W., 1996. Steuern und unternehmensbezogene Staatsausgaben als Standortfaktoren. In: Siebert, H. (Ed.), Steuerpolitik und Standortqualität. Kiel: Institut für Weltwirtschaft, pp. 13–47.

Riedl, A., 2010. Location factors of FDI and the growing services economy: Evidence for transition countries. Economics of Transition forthcoming.

Wheeler, D., Mody, A., 1992. International investment location decisions : The case of U.S. firms. Journal of International Economics 33 (1-2), 57–76.

Wooldridge, J. M., 2001. Econometric Analysis of Cross Section and Panel Data. Vol. 1 of MIT Press Books. The MIT Press.

Yao, S., Wei, K., 2007. Economic growth in the presence of FDI: The perspective of newly industrialising economies. Journal of Comparative Economics 35, 211–234.

8 Appendix

8.1 The wild bootstrap

After maximizing the log-likelihood function outlined in equation (10) we obtain the estimated parameter vector $\hat{\phi} = (\hat{\rho}^i, \hat{\rho}^j, \hat{\theta}, \hat{\delta}')'$ and calculate the residuals $\hat{\tilde{\epsilon}} = \hat{A}y - X\hat{\delta}$ where $\hat{A} = I - \hat{\rho}^i W^i - \hat{\rho}^j W^j$. Note that, the residual vector $\hat{\tilde{\epsilon}}$ consists of the individual ($\hat{\mu}$) and the remainder error component ($\hat{u}$). Hence, in order to bootstrap the remainder error $\hat{u}$, we have to purge the error term $\hat{\tilde{\epsilon}}$ from the individual effects component $\hat{\mu}$. We do this by following Baltagi (2005, p. 20) and arrive with the expression for the remainder error $\hat{u} = (I_{\tilde{N}} - \hat{\theta} Z_\mu Z'_\mu \hat{\Sigma}^{-1})\hat{\tilde{\epsilon}}$ which accounts for the unbalancedness of our data set. The wild bootstrap replaces $\hat{u}_{ijt}$ by the following residual (see Cameron and Trivedi, 2005, p. 377):

$$\hat{u}^*_{ijt} = \begin{cases} \frac{1-\sqrt{5}}{2}\hat{u}_{ijt}, & \text{with probability: } \frac{1+\sqrt{5}}{2\sqrt{5}} \\ (1 - \frac{1-\sqrt{5}}{2})\hat{u}_{ijt}, & \text{with probability: } 1 - \frac{1+\sqrt{5}}{2\sqrt{5}} \end{cases} \tag{13}$$

which has zero conditional mean. From B bootstrap realizations of $\hat{u}^*_{ijt}$, one obtains B different realizations of $y^*_{ijt} = \hat{A}^{-1}(Z\hat{\delta} + \hat{\mu}_{ij} + \hat{u}^*_{ijt})$. Based on the new bootstrap sample, we proceed by estimating B different $\hat{\phi}^*$ from which we can calculate the standard errors as $\widehat{se} = \left\{\frac{1}{B-1}\sum(\hat{\phi}^*_b - \overline{\phi})^2\right\}^{1/2}$, where $\hat{\phi}^*_b$ is the calculated parameter vector of the bth bootstrap sample, B equals the number of replications and $\overline{\phi} = \frac{1}{B}\sum \hat{\phi}^*_b$.

8.2 Average direct effects

Due to the cross-section dependence implied by the model $y = \rho^i W^i y + \rho^j W^j y + Z\delta + \tilde{\epsilon}$, the impact of a change in Z on y is not δ as in standard OLS regressions but can be derived from the transformed model $y = A^{-1}(Z\delta + \tilde{\epsilon})$ with $A = I_{\tilde{N}} - \rho^i W^i - \rho^j W^j$. Specifically, the impact of a change in the rth variable of Z equals $A^{-1}(I_{\tilde{N}}\delta_r)$. Hence, the derivative of y with respect to Z_r results in a matrix with dimension $\tilde{N} \times \tilde{N}$. From this expression, one can calculate a summary measure proposed by LeSage and Pace (2009) to obtain the direct effect, i.e., the impact of changes in the ijt observation of Z_r (Z_{ijtr}) on y_{ijt}. This measure is given by $\delta^*_r = \tilde{N}^{-1}\text{trace}[A^{-1}(I_{\tilde{N}}\delta_r)]$ which is simply the average of the diagonal entries contained in $A^{-1}(I_{\tilde{N}}\delta_r)$. This value can then be interpreted like a usual regression coefficient in least-squares, namely, as the "average response of the dependent to independent variables over the sample of observations" (LeSage and Pace, 2009, p. 37).

Table 1: Definition of variables and expected signs

Abbreviation	Data Source	Variable	Expected Sign
$lnGDP_{it-1}$	New Cronos database	Home country size measured as GDP home country in mn. Euro	+
$lnGDP_{jt-1}$	New Cronos database	Host market size measured as GDP host country in mn. Euro	+
$lnGDPcap_{it-1}$	New Cronos database (GDP and Euro-PPP); Ameco database (population)	GDP of home country in Euro-PPP per capita	+
$lnDist_{ij}$	CEPII	Distance in kilometers	?
$lnWages_{jt-1}$	Ameco and WIIW databases	Labor costs per employee measured as labor compensation per employee in Euro	−
$lnProd_{jt-1}$	New Cronos (GDP) and WIIW (Euro-PPP) databases	Labor productivity measured as GDP in Euro-PPP over employment	+
$lnPriv_{jt-1}$	Own calculations; EBRD: Transition Reports	Annual privatization revenues in mn. Euro	+
$Risk_{it-1}$	Euromoney	Political risk index ranging from 0 (highest risk level) to 25	+
$Infl_{jt-1}$	EBRD: Transition Reports	Inflation measured as the percentage increase in consumer prices	?
Tar_{jt-1}	EBRD: Transition Reports	Ratio of taxes and duties on imports excluding VAT over imports of goods and services; in percent	?
$Forex_{jt-1}$	EBRD: Transition Reports	Indicator of the liberalization of trade and international monetary transactions and payments	+
$lnFDI_{-jt}$	Own calculations	Spatial lag in the host country dimension	?
$lnFDI_{-it}$	Own calculations	Spatial lag in the home country dimension	?
$Infra_{jt-1}$	Bellak et al. (2009)	Index for the endowment with production-related material infrastructure (transport, ICT- and electricity generation infrastructure)	+
$Beatr_{ijt-1}$	Bellak et al. (2009)	bilateral effective average tax rate on corporate income	−
$lnMpot_{jt-1}$	Own calculations	Surrounding market potential of host countries	+

Table 2: Correlation matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
$lnGDPcap_{it-1}$ (1)	1.00															
$lnGDP_{jt-1}$ (2)	0.19	1.00														
$lnDist_{ij}$ (3)	0.32	0.02	1.00													
$lnWages_{jt-1}$ (4)	0.23	0.27	-0.20	1.00												
$Beatr_{ijt-1}$ (5)	-0.18	0.09	0.06	-0.35	1.00											
$lnPriv_{jt-1}$ (6)	0.21	0.66	0.03	-0.01	0.05	1.00										
$Infra_{jt-1}$ (7)	0.41	0.15	-0.18	0.81	-0.30	0.04	1.00									
$lnGDP_{it-1}$ (8)	0.32	0.06	0.74	0.04	-0.04	0.04	0.08	1.00								
$lnMpot_{jt-1}$ (9)	0.67	0.32	-0.05	0.52	-0.24	0.28	0.70	0.14	1.00							
$Risk_{it-1}$ (10)	0.21	0.53	-0.16	0.70	-0.08	0.34	0.78	0.06	0.49	1.00						
$lnProd_{jt-1}$ (11)	0.32	0.26	-0.22	0.90	-0.31	0.09	0.88	0.06	0.61	0.79	1.00					
Tar_{jt-1} (12)	-0.32	-0.59	0.12	-0.51	-0.06	-0.39	-0.52	-0.07	-0.62	-0.66	-0.57	1.00				
$Infl_{jt-1}$ (13)	-0.13	-0.22	0.06	-0.37	0.11	-0.05	-0.23	-0.04	-0.32	-0.25	-0.30	0.29	1.00			
$Forex_{jt-1}$ (14)	0.36	0.27	-0.05	0.44	-0.21	0.28	0.52	0.08	0.53	0.39	0.36	-0.32	-0.20	1.00		
$lnFDI_{-jt}$ (15)	0.17	0.03	-0.34	-0.04	-0.21	-0.02	-0.04	-0.22	0.13	-0.06	-0.03	-0.08	0.00	0.01	1.00	
$lnFDI_{-it}$ (16)	-0.02	0.61	0.06	0.04	0.26	0.56	-0.03	0.07	0.06	0.28	0.03	-0.31	-0.10	0.18	-0.16	1.00

Table 3: Descriptive statistics

		Mean	Std.Dev	Min	Max
$lnFDI_{ijt}$	overall	4.24	1.73	-1.20	8.44
	between	1.42	1.64	7.22	
	within	1.05	0.49	7.75	
$lnGDPcap_{it-1}$	overall	10.06	0.15	9.75	10.41
	between	0.11	9.93	10.33	
	within	0.11	9.81	10.30	
$lnGDP_{jt-1}$	overall	24.25	0.81	22.80	26.08
	between	0.77	23.18	25.80	
	within	0.22	23.76	24.79	
$lnDist_{ij}$	overall	7.00	0.99	4.04	9.15
	between	1.00	4.04	9.15	
	within	0.00	7.00	7.00	
$lnWages_{jt-1}$	overall	8.58	0.60	7.18	9.76
	between	0.56	7.63	9.57	
	within	0.25	7.98	9.09	
$Beatr_{ijt-1}$	overall	33.51	8.15	5.19	56.20
	between	6.71	12.16	48.60	
	within	4.86	17.78	47.32	
$lnPriv_{jt-1}$	overall	20.32	1.26	17.87	22.85
	between	1.02	18.34	21.75	
	within	0.77	16.86	22.27	
$Infra_{jt-1}$	overall	-0.14	0.96	-2.27	1.90
	between	0.76	-1.44	1.18	
	within	0.58	-1.19	1.05	
$lnGDP_{it-1}$	overall	27.72	1.12	25.93	30.06
	between	1.13	26.01	29.88	
	within	0.15	27.29	28.04	
$lnMpot_{jt-1}$	overall	21.21	1.60	17.94	23.43
	between	0.57	20.02	22.27	
	within	1.50	18.35	23.99	
$Risk_{it-1}$	overall	13.86	3.37	5.32	19.82
	between	2.95	9.34	17.33	
	within	1.66	7.98	17.65	
$lnProd_{jt-1}$	overall	22.57	6.53	11.36	36.22
	between	5.56	13.29	30.62	
	within	3.49	15.07	30.44	
Tar_{jt-1}	overall	4.37	3.85	0.5	18.45
	between	3.16	1.06	12.13	
	within	2.27	-0.09	13.45	
$Infl_{jt-1}$	overall	27.24	112.41	-1.80	971.08
	between	44.18	1.36	170.81	
	within	103.66	-142.40	864.61	
$Forex_{jt-1}$	overall	4.21	0.20	3	4.3
	between	0.08	4.029	4.3	
	within	0.18	3.11	4.48	
$lnFDI_{-jt}$	overall	3.78	1.47	0	7.04
	between	1.06	1.70	5.89	
	within	1.03	-1.54	5.99	
$lnFDI_{-it}$	overall	4.08	1.37	0.54	7.37
	between	1.01	2.17	6.22	
	within	0.92	0.31	6.45	
Obs = 452	n = 56	T=8.07			

Table 4: Baseline results

	FULL MLE	CV-EX MLE	PREF MLE	PLAIN MLE
$lnFDI_{-jt}$	0.203***	0.199***	0.203***	
	(0.035)	(0.035)	(0.036)	
$lnFDI_{-it}$	-0.0478	-0.042		
	(0.035)	(0.034)		
$lnGDPcap_{it-1}$	2.021***	2.085***	2.124***	2.950***
	(0.516)	(0.497)	(0.499)	(0.895)
$lnGDP_{jt-1}$	1.331***	1.236***	1.199***	1.171***
	(0.127)	(0.111)	(0.103)	(0.147)
$lnDist_{ij}$	-0.574***	-0.585***	-0.589***	-0.822***
	(0.074)	(0.069)	(0.070)	(0.156)
$lnWages_{jt-1}$	-1.146***	-1.033***	-1.019***	-1.017***
	(0.201)	(0.149)	(0.146)	(0.263)
$Beatr_{ijt-1}$	-0.049***	-0.050***	-0.050***	-0.054***
	(0.007)	(0.007)	(0.007)	(0.010)
$lnPriv_{jt-1}$	0.295***	0.282***	0.270***	0.270***
	(0.061)	(0.060)	(0.058)	(0.062)
$Infra_{jt-1}$	0.751***	0.555***	0.551***	0.469**
	(0.146)	(0.098)	(0.096)	(0.188)
$lnGDP_{it-1}$	0.198***	0.202***	0.201***	0.272**
	(0.053)	(0.053)	(0.053)	(0.128)
$lnMpot_{jt-1}$	0.317**	0.292**	0.269**	
	(0.150)	(0.147)	(0.142)	
$Risk_{it-1}$	-0.052			
	(0.036)			
Tar_{jt-1}	0.038*	0.039*	0.036*	
	(0.022)	(0.021)	(0.021)	
$Infl_{jt-1}$	-0.000			
	(0.001)			
$Forex_{jt-1}$	0.076			
	(0.208)			
$lnProd_{jt-1}$	0.066			
	(0.418)			
$cons$	-52.983	-51.572***	-44.994***	-49.979***
	(6.215)	(6.251)	(5.167)	(9.446)
σ_u^2	0.88	0.89	0.89	0.95
TD (χ^2 (8))	28.55***	29.49***	29.01***	33.39***
$LogL$	-654.78	-655.57	-655.96	-669.43
$HAUS$ (χ^2 in ())	(23): 17.16	(19): 17.76	(18): 15.44	

Notes: estimation period 1995-2004; MLE = Maximum likelihood estimator; FULL = model including all discussed variables; PREF= preferred model; CV-EX = Full model less insignificant control variables; PLAIN = model without third-country effects as in Bellak et al. (2009); fully robust (bootstrapped with 1000 replications) standard errors in parenthesis (except for column (4) where analytic standard errors are given); σ_u^2 = variance of remainder error term; TD = test on joint significance of time dummies; LogL = Log Likelihood value; HAUS = bootstrapped version of Hausman test based on the IV-estimator and 1000 replications; *** / ** / * = statistical significance at 1 / 5 / 10% significance level; the 10% significance level is relevant only for two-sided tests which are conducted for variables with *a priori* ambigous sign (cf. Table 1); one-sided tests are conducted on 1% and 5% significance levels.

Table 5: Robustness checks

	FULL IV	CV-EX IV	PREF IV	K2 MLE	K4 MLE	$dist^{-1}$ MLE	$dist^{-2}$ MLE
$lnFDI_{-jt}$	0.250***	0.247***	0.250***	0.167***	0.224***	0.253***	0.218***
	(0.065)	(0.062)	(0.062)	(0.030)	(0.040)	(0.046)	(0.040)
$lnFDI_{-it}$	-0.0489	-0.055		-0.023	-0.047	-0.052	-0.026
	(0.071)	(0.066)		(0.028)	(0.042)	(0.047)	(0.037)
$lnGDPcap_{it-1}$	1.772**	1.815**	1.893**	2.123***	2.080***	2.148***	2.128***
	(1.065)	(1.038)	(1.025)	(0.492)	(0.502)	(0.497)	(0.498)
$lnGDP_{jt-1}$	1.360***	1.252***	1.202***	1.208***	1.254***	1.250***	1.198***
	(0.120)	(0.186)	(0.181)	(0.108)	(0.112)	(0.120)	(0.114)
$lnDist_{ij}$	-0.516***	-0.529***	-0.534***	-0.634***	-0.575***	-0.566***	-0.577***
	(0.166)	(0.165)	(0.163)	(0.068)	(0.069)	(0.071)	(0.071)
$lnWages_{jt-1}$	-1.208***	-1.023***	-1.002***	-0.938***	-1.103***	-0.993***	-0.942***
	(0.310)	(0.259)	(0.254)	(0.149)	(0.151)	(0.153)	(0.151)
$Beatr_{ijt-1}$	-0.045***	-0.046***	-0.046***	-0.052***	-0.047***	-0.047***	-0.048***
	(0.012)	(0.011)	(0.011)	(0.007)	(0.007)	(0.007)	(0.007)
$lnPriv_{jt-1}$	0.300***	0.285***	0.270***	0.269***	0.274***	0.278***	0.267***
	(0.093)	(0.088)	(0.088)	(0.060)	(0.064)	(0.063)	(0.059)
$Infra_{jt-1}$	0.806***	0.597***	0.585***	0.464**	0.545***	0.481***	0.459***
	(0.287)	(0.199)	(0.195)	(0.095)	(0.099)	(0.096)	(0.096)
$lnGDP_{it-1}$	0.180	0.187	0.188	0.218***	0.194***	0.196***	0.197***
	(0.115)	(0.118)	(0.117)	(0.030)	(0.052)	(0.053)	(0.053)
$lnMpot_{jt-1}$	0.357	0.322	0.288	0.263**	0.323**	0.276**	0.243**
	(0.279)	(0.278)	(0.278)	(0.146)	(0.148)	(0.149)	(0.148)
$Risk_{it-1}$	-0.066						
	(0.049)						
Tar_{jt-1}	0.046	0.046	0.042	0.030	0.038*	0.033	0.029
	(0.034)	(0.033)	(0.034)	(0.021)	(0.022)	(0.022)	(0.021)
$Infl_{jt-1}$	-0.000						
	(0.001)						
$Forex_{jt-1}$	0.118						
	(0.288)						
$lnProd_{jt-1}$	0.014						
	(0.037)						
cons	-49.316***	-48.047***	-47.000***	-51.091***	-45.390***	-46.862***	-50.423***
	(10.286)	(10.130)	(10.457)	(6.349)	(5.332)	(5.288)	(6.543)
σ_u^2	0.92	0.96	0.96	0.89	0.89	0.88	0.88
TD (χ^2 (8))	37.5***	42.29***	44.57***	28.77***	28.19***	25.05***	24.82***
$LogL$				-657.40	-655.48	-655.13	-654.75
$HAUS$ (χ^2 in ())	(23): 17.16	(19): 17.76	(18): 15.44				
$HANS$ (χ^2 in ())	(25): 18.69	(18): 12.33	(9): 9.214				
$KLEP$	45.36	47.05	142.30				
CD	20.79	20.48	20.74				
F1 ($lnFDI_{-jt}$)	105.99***	97.95***	142.32***				
F2 ($lnFDI_{-it}$)	50.93***	49.95***					

Notes: estimation period 1995-2004; fully robust (bootstrapped with 1000 replications) standard errors in parenthesis; IV = Instrumental variable estimator; MLE = Maximum likelihood estimator; FULL = model including all discussed variables; CV-EX = Full model less insignificant control variables; PREF= preferred model; $K = 2$ (4) = weight matrix based on 2 (4) nearest neighbors; $dist^{-1}$ and $dist^{-2}$ = weight matrix based on distance decay concept; σ_u^2 = variance of remainder error term; TD = test on joint significance of time dummies; LogL = Log Likelihood value; HAUS = bootstrapped version of Hausman test based on the IV-estimator and 1000 replications (same values as in Table 4); HANS = Hansen-J-test for over-identification; KLEP = Kleibergen-Paap test statistic for weak identification; CD = Cragg-Donald 5% critical value; F1 (F2): test on joint significance of Kelijian and Prucha type instruments in first stage regression; IV-estimates are based on Stata's xtivreg command (with the vce(boot) option); *** / ** / * = statistical significance at 1 / 5 / 10% significance level; the 10% significance level is relevant only for two-sided tests which are conducted for variables with *a priori* ambigous sign (cf. Table 1); one-sided tests are conducted on 1% and 5% significance levels.

List of SFB Discussion Papers:

	Author	Title
1	Carlos Reyes	European Portability Rules for Social Security Benefits and their Effects on the National Social Security Systems
2	Christian Bellak Markus Leibrecht Roman Römisch	New evidence on the tax burden of MNC activities in Central- and East-European New Member States
3	Minna Väre Christoph R. Weiss Kyösti Pietola	On the Intention-Behaviour Discrepancy: Empirical Evidence from Succession on Farms in Finland
4	Timo Fischer	European Co-ordination of Long-term Care Benefits: The individual Costs of Migration between Bismarck and Beveridge Systems *Illustrative Case Studies*
5	Michael Lang	Internationale Kapitaleinkommensbesteuerung nach dem Wohnsitzprinzip oder dem Quellenprinzip *Eine kritische rechtswissenschaftliche Analyse des in den DBA enthaltenen Quellenprinzips*
6	Martin Zagler	Distributional Consequences of Capital Tax Coordination
7	Christian Bellak Markus Leibrecht	Effective tax rates as a determinant of Foreign Direct Investment in Central- and East European Countries A Panel Analysis
8	Lars Gläser	EU-Zinsenbesteuerung Vermeidung der Doppelbesteuerung
9	Dietmar Aigner Lars Gläser	Die Zahlstelle im Anwendungsbereich des EU-Quellensteuergesetzes
10	Sandra Diwisch Peter Voithofer Christoph R. Weiss	The “Shadow of Succession” in Family Firms
11	Christina Gruber	Die internationale Besteuerung von Aktienanleihen aus österreichischer Sicht – laufende Besteuerung
12	Thomas Rixen	Internationale Kooperation im asymmetrischen Gefangenendilemma - Das OECD Projekt gegen schädlichen Steuerwettbewerb
13	Sandra Diwisch Peter Voithofer	The “Shadow of Succession” in Family Firms – A Non-Parametric Matching Approach

	Christoph R. Weiss	
14	Angelika Jettmar	Europäisches Sozialrecht
15	Eva Eberhartinger Erich Pummerer	Die steuerliche Vorteilhaftigkeit der Verwertung ausländischer Verluste in Österreich – ein Rechtsformvergleich
16	Eva Eberhartinger Martin Six	National Tax Policy, the Directives and Hybrid Finance
17	Silvia Rocha-Akis	Labour tax policies and strategic offshoring under unionised oligopoly
18	Klaus Vondra	Between Tax Competition and Harmonisation: A Survey on Tax Competition
19	Nadine Wiedermann-Ondrej	Hybrid Instruments and the Indirect Credit Method – Does it work?
20	Nadine Wiedermann-Ondrej	Tax Treatment of Revenue Based Payments
21	Martin Six	Hybrid Finance in the Double Tax Treaties
22	Margret Klostermann	Tax Consequences of Hybrid Finance in Thin Capitalization Situations
23	Pirmin Fessler	Home country effects of Offshoring - A Critical Survey on empirical literature
24	Martin Zagler	Capital Taxation and Economic Performance
25	Pasquale Commedatore Ingrid Kubin	Source versus Residence A comparison from a New Economic Geography perspective
26	Katrin Rabitsch	Eastern European Integration and Tax Competition
27	Eva Eberhartinger Martin Six	Taxation of Cross border Hybrid Finance – A legal Analysis
28	Sandra Diwisch Christoph R.Weiss	Motive und Konsequenzen einer Familiennachfolge: theoretische Überlegungen und empirische Ergebnisse für Österreich
29	Aleksandra Riedl Silvia Rocha-Akis	Testing the tax competition theory: How elastic are national tax bases in western Europe
30	Michael Klien Markus Leibrecht Özlem Onaran	Globalization, welfare regimes and social protection expenditures in Western and Eastern European countries

31	Martin Zagler	The EU CCCTB Proposal: A Critical Appraisal
32	Claudia Hochgatterer Markus Leibrecht	Tax Competition as a cause of falling corporate income taxes: A literature survey
33	Eva Eberhartinger Erich Pummerer Andreas Göritzer	Cross-border Intra-group Hybrid Finance and International Taxation
34	Lívia Antalová	Contemporary Flat-Tax Reforms in Eastern Europe: Causes of Diverse Approaches A comparison of Slovakia, Czech Republic and Germany
35	Özlem Onaran Valerie Bösch Markus Leibrecht	How does globalization affect the tax burden on labour income, capital income and consumption in different welfare regimes? The case of Western and Eastern EU Member States
36	Anil Duman	Flux or Fixed: Tax Reforms, Informal Economy and Foreign Investment in New EU Member States
37	Thomas Baldauf Erich Pummerer Alexandra Wittmann	Zinsschranke und EBITDA-Vortrag - Wirkungsanalyse unter Unsicherheit
38	Matthias Petutschnig	Common Consolidated Corporate Tax Base: Effects of Formulary Apportionment on Corporate Group Entities
39	Eva Eberhartinger Gerlinde Fellner	Why don’t they minimize their tax? An experimental approach to cross border hybrid finance
40	Özlem Onaran Valerie Bösch	The effect of globalization on the distribution of taxes and social expenditures in Europe: Do welfare state regimes matter?
41	Andreas Göritzer	Thin Capitalization Rule vs Interest Barrier
42	Markus Leibrecht Aleksandra Riedl	Taxes and infrastructure as determinants of Foreign Direct Investment in Central and Eastern European Countries revisited: New evidence from a spatially augmented gravity model