



THE REGIONAL LOCATION DECISION OF FOREIGN DIRECT INVESTMENTS IN ROMANIA

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ABSTRACT

The regional attraction of foreign direct investments is expected to evolve into an enhancement of local advantages. In this paper we identified the most important benefits which brought the most significant impact on the number of newly established companies with foreign capital at regional level in Romania. Using a nested logit model we described a two stage decision process where the investor first chooses a group of regions with common characteristics, such as the closeness to the capital or to the main transportation routes, and then chooses the specific region from within this group. The main factors of attractiveness are identified in order to be used for stimulating a more equal regional development. Reducing disparities in this way can help to a more advanced economic development of the foreign direct investments' host country.

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I. INTRODUCTION

FDI has been an important development factor in Romania, maybe not so much through the amount of capital that was invested, but mainly through the spillovers they created in terms of knowledge, technology and commercial relations. From the regional perspective, some well known agglomerations were formed around the main cities, especially around the capital. Noticing these benefits, it becomes clear that a good way of enhancing competitiveness in lagging regions is to boost FDI taking advantage on the information we can obtain about the location determinants.

There has been a lot of preoccupation in the academic world about the location choice of foreign direct investment companies, trying to establish how a proper decision can be taken, considering the main determinants.

The usual perspective is that of the investor and of the country of origin. The purpose of such analysis is to stress the benefits and the losses of location decision into a certain place with special characteristics. The focus of this article is headed towards the country which receives FDI and struggles to obtain most of the possible advantages. The strategy is constructed on creating an attractive environment for the investors. This should be mainly correlated with the needs of each region, in order to reduce disparities through regional development, and to the general development strategy of the country. The purpose of this article is to identify through what kind of determinants we can attract more investors at regional level in Romania.

We use a two stage nested logit model (McFadden, 1974¹) to estimate the foreign direct investment location patterns of the eight development regions of Romania (NUTS II) and the process of location decision. Our sample includes all the companies that were established in each development region between 2003 and 2010. Our findings prove that foreign companies are more likely to invest in areas with high income, comparing to other regions, targeting markets with high potential demand.

In the remainder of the paper we included the following: part 2 contains a short summary of the related literature, part 3 is a presentation of the methodology, part 4 clearly describes the data and regional determinants of FDI stating the theoretical hypothesis, part 5 exposes the estimated results and part 6 consists in the conclusions of the empirical analysis.

II. RELATED LITERATURE

The literature regarding the location of FDI is divided in two basic categories: a classification and detailed description of the local and the firm level determinants, which is a more theoretical part, and the domain of the spatial econometric analysis of the decision process, which has been less explored.

According to theoreticians, the strongest determinants of foreign direct investments are those which allow the profit maximization. Within the neo-classic theory, this objective can be attained either through satisfying the demand and ignoring the costs (Krugman, 1991²), either through minimizing the costs and ignoring the demand (McCann, 2002³). The new directions of this theory evolved in what is called 'evolutionary economic geography', which affirms that on the real market, economic agents look for profit maximization by the means of satisfying the

¹McFadden, D., "Conditional logit analysis of qualitative choice behaviour". In: *Frontiers in econometrics* Academic edited by Zarembka P, New York, pp. 105–142, (1974)

²P. Krugman, „Increasing returns and economic geography”. *J Polit Econ* 99, 3 (1991): 484–499.

³P. McCann, „Classical and neoclassical location-production models”. In *Industrial location economics*, edited by McCann P. (Cheltenham: Edward Elgar, 2002).

demand and minimizing the costs in the same time, taking most of the advantages of the permanently evolving characteristics of the markets (Jovanovic, 2010⁴; Boschma and Martin, 2010⁵).

The literature about the empirical explorations of such theoretical regional factors of attractiveness for foreign direct investments uses mainly the discrete choice methodology based on the random utility maximization framework, initiated by McFadden (1974)⁶. Carlton (1983)⁷ adapted this methodology to the location choice model, which has met a few versions (Train, 2003⁸).

The nested logit model allows the description of the decision process based on several levels of grouping (nesting) the alternatives according to some arbitrary characteristics which are not found among the explanatory variables. This model was used in several studies to describe the location decision process at different regional level, in different countries or across countries and in different periods of time. But the most important difference between these studies relies in the choice of the set of determinants.

In a discrete choice model, the company chooses the location where the highest utility or profit can be obtained. The utility is influenced by several factors according to the specific activity of each company. Mainly, if the company wants a horizontal development, it will try to find a location which brings the highest market potential (Yeaple, 2009⁹). If the company looks for a vertical development, it will try to minimize the costs (Bloningen et al, 2007)¹⁰.

Last but not least, the existent literature is written mainly from the perspective of the investor, explaining how the location decision should be based on the most effective existent regional benefits: Pusterla and Resmini (2007)¹¹ – Italian investments in Central and Eastern Europe, Disdier and Mayer (2003)¹² – French investments in Central and Eastern Europe, Hayakawa and Tsubota (2011)¹³ – Japanese investments in developing countries. In this article, we want to emphasize the poles of competitiveness in Romania and the main local advantages that attract foreign direct investments in order to improve regional development reducing disparities.

⁴Miroslav Jovanovic, *Evolutionary Economic Geography. Location of production and the European Union* (New York: Routledge Studies in Global Competition, 2010).

⁵R. Boschma and R. Martin, R. "The aims and scope of evolutionary economic geography". In *The Handbook of Evolutionary Economic Geography* edited by R. Boschma and R. Martin. (Cheltenham: Edward Elgar, 2010).

⁶McFadden, D., "Conditional logit analysis of qualitative choice behaviour". In: *Frontiers in econometrics Academic* edited by Zarembka P, New York, pp. 105–142, (1974)

⁷D. Carlton, "The location and employment choices of new firms: an econometric model with discrete and continuous endogenous variables", *Rev Econ Stat* 65 (1983): 440–449.

⁸Train (2003) used a mixed logit model obtaining a correlations across the location options.

K. Train, *Discrete choice methods with simulation* (Cambridge: Cambridge University Press, 2003).

⁹S. Yeaple, "Firm Heterogeneity and the Structure of U.S. Multinational Activity". *Journal of International Economics* 78, 2 (2009): 206-215.

¹⁰B. Bloningen and others, "FDI in space: Spatial Autoregressive Relationships in Foreign Direct Investments". *European Economic Review*, 51, no. 5 (2007): 1303-1325.

¹¹F. Pusterla and L. Resmini, "Where do foreign firms locate in transition countries? An Empirical Investigation", *The Annals of Regional Science* 41, 4 (2007): 835-856.

¹²A.C. Disdier, A.C and T. Mayer, T. "How different is Eastern Europe? Structure and determinants of location choices by French firms in Eastern and Western Europe", *J Comp Econ* 32,2 (2003): 280–296.

¹³K. Hayakawa and K. Tsubota, "Location Choice in Low-income Countries: Evidence from Japanese Investments in East Asia". Institute of Developing Economies, Japan External Trade Organization (JETRO) in its series IDE Discussion Papers with number 301, Chiba, Japan, pp. 1-30, (2011).

III. THE NESTED LOGIT MODEL

We estimate using the discrete choice model of foreign companies at subnational level in Romania, the indicators which are expected to have a significant influence over the location choice. We evaluate the factors that determine the attraction of the investors for certain geographical areas in Romania. These are actually competitive advantages of these regions.

The nested logit model (McFadden, 1974)¹⁴ shows the way in which the particularities of a region affect the company's profitability comparing to other regions.

According to this model, the choice made by the investor takes place on the grounds of a profit function, as an expression of utility. So, the investor follows the profit maximization analyzing the regional indicators and the company's strengths and weaknesses:

$$\pi_{ij} = x_{ij} \beta + \varepsilon_{ij},$$

where $\pi_{ij} > \pi_{il} \forall l \neq j, l = 1, 2, \dots, J$ and ε_{ij} is the random part.

The probability that a certain location is chosen from the set of available alternatives j by the investor i is given by the relation:

$$P_j = \frac{\exp^{bX_j}}{\sum_{i=1}^n \exp^{bX_i}} \quad (1)$$

The set of alternatives j are grouped into k non-overlapping subsets, called nests, according to similar unobserved characteristics. The investor chooses a specific location for implantation, which is part of a nest; therefore the decision is taken at once. Nevertheless, this is called a two stage nested logit model, but usually a nested logit model can be used for several levels of decision. It is named according to the number of levels of the nesting structure due to the fact that the nest specific characteristics are also important in the decision process, not only the characteristics of the alternatives. It is worth mentioning that the decision maker compares the attributes of the alternatives before taken its decision. Because of the hierarchical structure, the utility that the investor assumes for its choice depends of the characteristics of each level.

The vector of characteristics x_{ij} describes the advantages of the location j (ex. market potential) and of each firm i (ex. firm size). $x_{ij} \beta$ is the nonstochastic profit and takes different values for each company that locates in an alternative within the nests. Within this function, ε is the random variable, which follows the generalized extreme value (GEV) distribution, having a cumulative distribution as follows:

$$\exp \left[- \sum_{k=1}^K \left(\sum_{j \in G_k} \exp \left(\frac{-\varepsilon_{ij}}{IV_k} \right) \right)^{IV_k} \right] \quad (2)$$

IV is the inclusive value parameter, also called the dissimilarity parameter and it measures the degree of independence among the alternatives within the group G_k .

The problem of heteroscedasticity is partially solved because the inclusive values parameters are included in the nested logit model. The IV parameters must belong to the (0,1) interval for the consistency with the random utility model, the condition being sufficient.

In the case that the J alternatives are grouped in K nests, the probability that a company decides to establish in region j , included in the group k , is given by the relation:

¹⁴McFadden, D., "Conditional logit analysis of qualitative choice behaviour". In: Frontiers in econometrics Academic edited by Zarembka P, New York, pp. 105–142, (1974)

$$P_{kj} = P_{j/k} * P_k = \frac{\exp^{x_{jk}\beta}}{\sum_{j \in k} \exp^{x_{jk}\beta}} * \frac{\exp^{(z_k\gamma + \sigma_k IV_k)}}{\sum_k \exp^{(z_k\gamma + \sigma_k IV_k)}} \quad (3)$$

Where x_{jk} is the vector of characteristics specific to the region j from the nest k and z_k is the vector of characteristics of the nest k .

The inclusive value:

$$IV_k = \ln \sum_{j \in k} \exp^{x_{jk}\beta} \quad (4)$$

denotes the average utility that the investor can expect from the region within each nest k . The parameter of the inclusive value belongs to the (0,1) interval if the nested logit model is the correct model, and it represents the degree of independence between the unobserved parameters. It is also a necessary condition to obtain the profit maximization. If $\sigma_k = 1$, there is no correlation between the elements of a nest, the nesting structure is not plausible and the model becomes a conditional logit.

The model is tested through the log-likelihood function, which should be maximised in order for the nesting structure to hold:

$$LL(\beta) = \sum_{i=1}^I \sum_{k=1}^K \sum_{j \in G_k} y_{ij} \ln P_{kj} \quad (5)$$

y_{ij} represents a binary variable which indicates the choice made by the investor i taking the value 1 for the chosen region and 0 for all the others.

The final location alternatives are grouped in accordance to their level of similarity. The possible choices are grouped in a manner that allows maximum correlation within a single group and minimum correlation between groups. The investor chooses firstly the nest and afterwards, in a second step, the region.

In order to test the model, Mc Fadden (1974) used a likelihood ratio index, similar to the R^2 from the linear regression model. This index belongs to the $[0, 1]$ interval. Estrella (1998)¹⁵ suggested that the goodness-of-fit-measures can be established through the following formula:

$$R_{E1}^2 = 1 - \left(\frac{\ln L}{\ln L_0} \right)^{\frac{2}{N} * \ln L_0} \quad (6)$$

This measure should also belong to the unit interval and if it is 0, there is no fit, while if it equals 1, there is perfect fit. It is interpreted in relation to the level of significance of the estimated coefficients.

Because the choice of the nesting structure is in somehow random (Louv¹⁶iere et al. 2000), we tried several combinations according to the know similarities between the regions: the level of economic development, the existence of traditional industries, the closeness to the Western borders (borders with EU members), to the capital and to important Black Sea and Danube ports.

IV. DATA

The data will be at NUTS II level (Eurostat) corresponding to the eight regional development regions. The determined variable of this model is the location decision of the companies with

¹⁵Estrella, A. „A New Measure of Fit for Equations with Dichotomous Dependent Variables”, Journal of Business & Economic Statistics, American Statistical Association 16, 2 (1998): 198-205.

¹⁶J. Louviere, D. Henscher and J. Swait, Stated choice method. Cambridge: Cambridge University Press, 2000.

foreign capital which established in each region of development from Romania, between 2003 and 2010¹⁷. This variable takes the value 1 for the host region and 0 for all the others. The total number of companies which were registered within this period of time is 81708.

The regional characteristics that we included in the study are the explanatory variables and it was lagged one year because we consider that the investor finds its decision on the data from the previous year. Explanatory variables have been expressed in log form to be able to set a relation of proportionality between a one percent change in the explanatory variable and the location decision in one region.

Due to the data availability and the connection that we are waiting to obtain between several indicators and the location decision of foreign direct investments, we chose a series of explanatory variables under the following categories: (1) the market potential – *the regional GDP*¹⁸ (Disdier and Mayer, 2003)¹⁹; (2) the labor market²⁰ (quality and availability of work force, labor costs); *the number of employees* (Hilber and Voicu, 2007²¹), *the average net wage* (Traistaru, 2001²²; Goschin, 2008²³; Pusterla and Resmini, 2007)²⁴, *the number of students from universities* (Hilber and Voicu, 2007²⁵), *the number of employees and total expenditures from the research and development* (Trăistaru, 2001²⁶); (3) Agglomerations: *the stock of FDI*²⁷, *the turnover* and *the gross investments* of the foreign and local companies together²⁸ (Hilber and Voicu, 2007; Trăistaru, 2001²⁹); (4) The political dimension - indicators of accessibility: *the road density*³⁰ (Hilber and Voicu, 2007³¹; Trăistaru, 2001; Pusterla and Resmini, 2007³²).

Based on the literature review, there were identified certain hypotheses that shall be tested within this model regarding the factors' impact. The average wage might have a different impact on the location decision. If it has a significantly positive impact, it means that it is perceived as an indicator for a higher quality of labour (which is better paid to be stimulated or rewarded) advantage which is sought by the investor. If the impact is negative, the investors are looking for a location which offers the possibility of obtaining small labour costs. The level of skills for the work force is also measured by the number of students in universities, which should be

¹⁷ Source: The National Trade Register Office

¹⁸ Source: The National Institute of Statistics

¹⁹ A.C. Disdier, A.C and T. Mayer, T. „How different is Eastern Europe? Structure and determinants of location choices by French firms in Eastern and Western Europe”, J Comp Econ 32,2 (2003): 280–296.

²⁰ Source: The National Institute of Statistics

²¹ C. Hilber and I. Voicu, „Agglomeration Economies and the Location of Foreign Direct Investment: Empirical Evidence from Romania”, Munich Personal RePEc Archive, Paper No. 5137, 2007.

²² I. Trăistaru, „Regional Patterns of Private Enterprise Development in Romania”, European Regional Science Association, ERSA Conference Papers, ersa01p198, Vienna, 2001.

²³ Z. Goschin, D. Constantin, M. Roman and B. Ileanu, „The Current State and Dynamics of Regional Disparities in Romania”, Romanian Journal of Regional Science 1, 2 (2008): 80-105.

²⁴ F. Pusterla and L. Resmini „Where do foreign firms locate in transition countries? An Empirical Investigation”, The Annals of Regional Science 41, 4 (2007): 835-856.

²⁵ C. Hilber and I. Voicu, „Agglomeration Economies and the Location of Foreign Direct Investment: Empirical Evidence from Romania”, Munich Personal RePEc Archive, Paper No. 5137, 2007.

²⁶ I. Trăistaru, „Regional Patterns of Private Enterprise Development in Romania”, European Regional Science Association, ERSA Conference Papers, ersa01p198, Vienna, 2001.

²⁷ Source: The National Trade Register Office

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²⁹ I. Trăistaru, „Regional Patterns of Private Enterprise Development in Romania”, European Regional Science Association, ERSA Conference Papers, ersa01p198, Vienna, 2001.

³⁰ Source: The Eurostat database

³¹ C. Hilber and I. Voicu, „Agglomeration Economies and the Location of Foreign Direct Investment: Empirical Evidence from Romania”, Munich Personal RePEc Archive, Paper No. 5137, 2007.

³² F. Pusterla and L. Resmini „Where do foreign firms locate in transition countries? An Empirical Investigation”, The Annals of Regional Science 41, 4 (2007): 835-856.

directly proportional to the regional attractiveness. An intensive research and development activity suggests that innovative companies could find this type of services in the region, as well as specialized personnel. If companies want locate in regions where technological spillovers exist, they will also choose a region with many employees and high expenditures in research and development (Dunning and Lundan, 2008³³). Another advantage would be an increased possibility of setting connections with other companies which offer high quality goods and services (Hilber and Voicu, 2007³⁴).

The general availability of labor is expressed through the number of employees, which generally is a minimum condition for location (Jovanovic, 2010³⁵). We did not choose, like other authors, the unemployment rate (Disdier and Mayer, 2003³⁶ and Hilber and Voicu, 2007³⁷) because we want to avoid the interpretation that a high unemployment might signal low level of skills and of competitiveness. The number of employees shows the willingness to work. Also, newly established companies would rather attract personnel which has already been employed because it is easier to benefit from the information that they have about the market and the technology avoiding some qualification and market research costs.

The importance of agglomeration forces is widely discussed and accepted as a major determinant of FDI (Guimarães et al., 2000³⁸; Head et al., 1995³⁹) and we expect this to have an important influence on the location decision.

The regional GDP is a good indicator for the market size and the local demand, more precisely. It is expected to have a significant positive influence on the attractiveness of firms which seek to sell the products in the region where they invest.

The road density should be directly proportional to the political interest of developing a certain region, while expanding the infrastructure is one the first steps to be taken by public authorities, increasing in this way the level of regional investments, regardless of the industrial branch. The road density could also be a proxy for the trade costs (Hayakawa and Tsubota, 2011)⁴⁰ or for accessibility (Jovanovic, 2010⁴¹).

Regarding the grouping structure of the eight development regions according to their attractiveness to FDI, one of the hypothesis which is tested is whether the capital region (Bucharest-Ilfov) could form a group with any other regions or the disparities between this region and others are too high. The main purpose is to identify a relevant nesting structure that shows which are the main unquantifiable characteristics that stay on the base of the location decision in

³³J.H. Dunning and S. M. Lundan, „The geographical sources of competitiveness of multinational enterprises: an econometric analysis”, *International Business Review* 7 (1998): 115-133.

³⁴C. Hilber and I. Voicu, „Agglomeration Economies and the Location of Foreign Direct Investment: Empirical Evidence from Romania”, Munich Personal RePEc Archive, Paper No. 5137, 2007.

³⁵Miroslav Jovanovic, *Evolutionary Economic Geography. Location of production and the European Union* (New York: Routledge Studies in Global Competition, 2010).

³⁶A.C. Disdier, A.C and T. Mayer, T. „How different is Eastern Europe? Structure and determinants of location choices by French firms in Eastern and Western Europe”, *J Comp Econ* 32,2 (2003): 280–296.

³⁷C. Hilber and I. Voicu, „Agglomeration Economies and the Location of Foreign Direct Investment: Empirical Evidence from Romania”, Munich Personal RePEc Archive, Paper No. 5137, 2007.

³⁸P. Guimarães, Figueiredo and D. Woodward, „Agglomeration and the Location of Foreign Direct Investment in Portugal”, *Journal of Urban Economics* 47, 1 (2000): 115-135.

³⁹K. C. Head, J.C. Ries and D.L. Swenson, „Agglomeration Benefits and Location Choice: Evidence from Japanese Manufacturing Investments in the United States”, *Journal of International Economics* 38 (1995): 223-247.

⁴⁰K. Hayakawa and K. Tsubota, „Location Choice in Low-income Countries: Evidence from Japanese Investments in East Asia”. Institute of Developing Economies, Japan External Trade Organization (JETRO) in its series IDE Discussion Papers with number 301, Chiba, Japan, pp. 1-30, (2011).

⁴¹Miroslav Jovanovic, *Evolutionary Economic Geography. Location of production and the European Union* (New York: Routledge Studies in Global Competition, 2010).

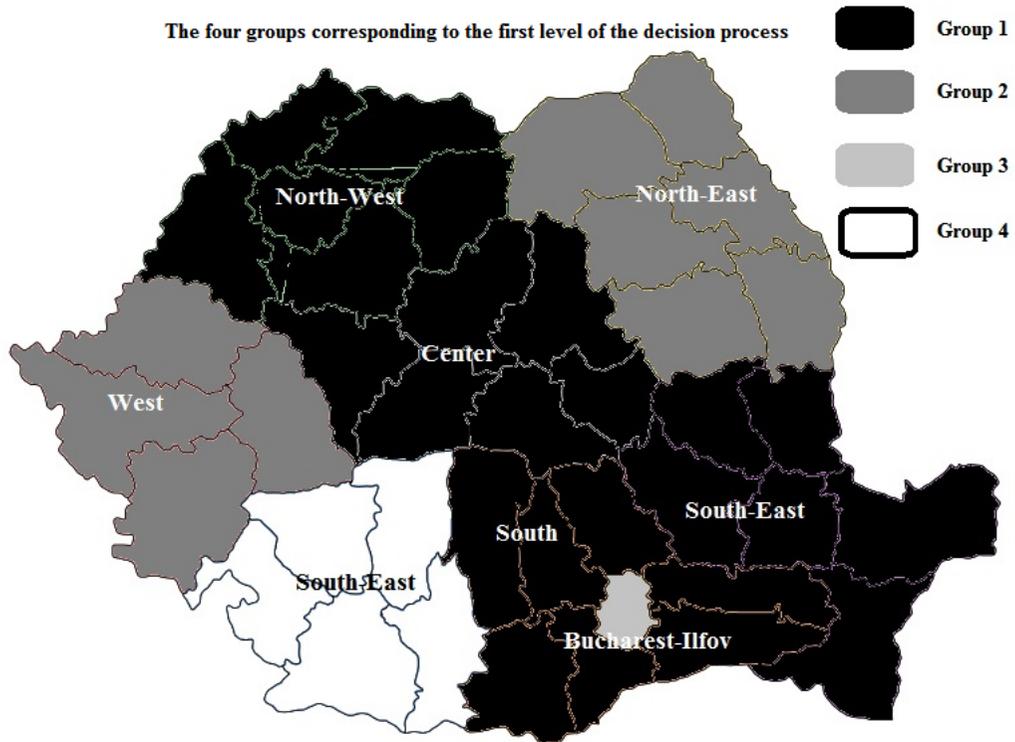
Romania. Is it important for the investor to operate closer the Western border, to the capital region or to the sea ports benefitting from a better accessibility to major markets outside Romania, or is it important that they locate in isolated regions benefitting from smaller costs?

V. EMPIRICAL RESULTS

Testing several combinations of regional grouping, the only structure which held was the one in which we used the following groups: (South East - SE, South - S, North-West - NW, Centre - C); (North-East - NE, West - W); (South-West - SW); (Bucharest Ilfov - BI). This was confirmed by the Likelihood Ratio (LR) test of homoscedasticity that allows us to reject the hypothesis of regions equally substituting across the chosen nests. It is also confirmed by the Estrella coefficient, which is over 50%. Therefore, the model does not collapse into the conditional logit model and the nesting structure is relevant. The inclusive value parameters also belong to the (0,1) interval and have a high level of significance of over 99%, which means that foreign companies are strongly influenced by the certain common characteristics of region, which allowed us to draw these grouping patterns. The value of the inclusive parameter shows the relevance of the group: when the parameter is closer to 0, the group has more inner similarities and more dissimilarities with the other groups. The group formed of the Bucharest-Ilfov region is very different from the others, while the South-West region could be more easily included into other groups. (Table 1)

According to this structure, the Bucharest-Ilfov region and the South-West region form different groups individually. Bucharest-Ilfov (Group 3) benefits from the most important factors of competitiveness (as it noticed from the level of the exogenous variables, which is the highest in the case of this regions) and it attracted most of the foreign investors (41.03% from the total). The South-West (Group 4) attracted only 3.64%, holding the smallest share of the total number of foreign direct investment companies. The fact that two of the eight development regions could not be included in any region indicates a high level of inequalities. Nevertheless, the nested logit model does not show the distance between the groups. Group 1 consists of two southern regions, which are close to the capital city and have a good accessibility from the sea and river ports (South-East and South) and other two neighboring regions (North-West and Centre), all four forming a transport corridor between Bulgaria and Hungary. Group 2 is formed of two regions which lie in opposite corners of the country (West and North-East). (Figure 1)

Figure 1: The four groups corresponding to the first level of the decision process.



Source: author's

The North-East has been traditionally a less developed area, mainly agricultural and where urbanization and industrialization has taken place scarcely and relatively late. It is also very isolated from both the capital region and the western border. It forms a group together with the West, which is situated in the most western corner of the country. The benefits that the West region has, with more cultural similarities to the older members of the European Union, eases the adaptability of the investors coming from these countries. In the last years, this region has met a very rapid development due to its long industrial, commercial and cultural activities. Regardless the differences, the North-East and the West form the same group due to a proportional attraction of new foreign companies according to their various assets. The important differences, as it results from the significant parametres in Table 1, that determine the preference for the West region consist in the presence of other foreign direct investment companies, smaller road density and higher average wage, while the North-East compensates through a higher number of students and an increased level of expenses in research and development.

The group formed by the North-West, Centre, South-East and South shows the importance of: the closeness to the capital, such as in the case of the Centre and the South, the closeness to the Western border, as already explained, and the belonging of the only sea ports. These ports offer an important connection of Europe with Russia and the Middle East because of the meeting point of the river Danube with the Black Sea. The four regions draw an axe between the north-western and south-eastern part of the country, crossing the capital region and overlapping the most developed part of the transport infrastructure, such as it is obtained by the

mapping of the counties (NUTS III) function to an index of competitiveness potential (Cojanu et. al. 2011⁴²).

Group 1 contains several well known agglomeration economies. But the existence of such poles of competitiveness does not necessarily appear accordingly in the number of attracted foreign direct investment companies. The main reason is, as Cojanu et. al. (2011)⁴³ observed analyzing the differences between the component counties, especially in the case of the South and South-East regions, that the intraregional disparities are sometimes very high. As a consequence, even though counties like Argeş, Prahova (South) and Constanţa (South-East) contain important industrial agglomerations, the development regions where they are included, do not attract the highest number of foreign companies⁴⁴ due to the mainly agricultural counties (Călăraşi, Dâmboviţa, Brăila, etc.). It is interesting that, even though the South has a relatively small number of investors, the stock of FDI in 2010, according to the National Trade Register Office exceeds the one from the North-West and South-East (Appendix 1). The most important investments that took place in the South are in the car building industry, in the Argeş county, where there were created important positive externalities through the stimulation of the car components production companies, creating a quite profound regional specialization (Cojanu and Pîslaru, 2011)⁴⁵. Typically, in the high-tech or medium-high technology sectors, there are a few companies, but with a high level of investments. Indeed, the South region, after the capital region, reaches the highest values for the following indicators used as exogenous variables: turnover, gross investments and GDP.

Referring to the regional determinants of FDI, not all of them are relevant and two of them have the unexpected sign: the road density, which has a negative impact on the location decision (Table 1). Even if the road density does not bring large disparities between the regions, the high significance of its negative coefficient might suggest the fact that investors want to avoid congestion, the size and the quality of the roads being also poor, especially in the first analyzed years. We consider that this result is according the economic reality because most of the foreign investors come from western European countries, and, even though the regions from the eastern side of the country benefit from a higher road density, the investors have chosen the regions that are closer to them. Congestion is also associated with a high cost of land (Hayakawa and Tsubota, 2011)⁴⁶, but since we did not take into consideration the cost of land in this econometric analysis we cannot establish its significance.

⁴²V. Cojanu, I. Stupariu and R. Dobre. „An Exploratory Study Of The Regional Context Of Competitive Development In Romania”, *Transylvanian Review of Administrative Sciences*, 33 (2011): 67-89.

⁴³V. Cojanu, I. Stupariu and R. Dobre. „An Exploratory Study Of The Regional Context Of Competitive Development In Romania”, *Transylvanian Review of Administrative Sciences*, 33 (2011): 67-89.

⁴⁴The South and the South-East account together 11.68% of the number of FDI companies established between 2003-2010.

⁴⁵Cojanu, V., and Pîslaru, D. „How important are agglomeration economies? A Case Study of the Romanian Industrial Clusters”, *Review of Economics & Business Studies* 4, 1 (2011): 35-58

⁴⁶ K. Hayakawa and K. Tsubota, „Location Choice in Low-income Countries: Evidence from Japanese Investments in East Asia”. Institute of Developing Economies, Japan External Trade Organization (JETRO) in its series IDE Discussion Papers with number 301, Chiba, Japan, pp. 1-30, (2011).

TABLE 1. THE NESTED LOGIT ESTIMATES

Parametre	Estimate	Standard Error	T stud	P-value
FDI Stock	0,3202	0,1047	3,06	0,0022
Number of employees	-0,1407	0,3808	-0,37	0,7117
Average net wage	1,3965	0,5178	2,7	0,0070
Number of students	1,8171	0,8590	21,17	<0,0001
Number of employees in R&D	-0,6586	0,1145	-5,75	<0,0001
Total expenses in R&D	0,7583	0,0923	8,21	<0,0001
Regional GDP	0,1606	0,7253	0,22	0,8248
Turnover	-0,3837	0,3992	-0,96	0,3364
Gross Investments	0,1781	0,1379	1,29	0,1965
Road density	-2,1481	0,5385	-3,99	<0,0001
IV_L2G1 ⁴⁷	0,8123	0,1167	6,96	<0,0001
IV_L2G2	0,6240	0,1397	4,46	<0,0001
IV_L2G3	0,5016	0,0868	5,78	<0,0001
IV_L2G4	0,9806	0,1881	6,81	<0,0001

Source: author's calculations

The agglomerations of foreign companies have a significant positive influence of the location choice of foreign companies in Romania. They assure the investors that the success of doing business in that region is possible. The fact that we proxied the agglomerations through the stock of foreign invested capital allows the interpretation that when the existent companies increase their capital, they intend to enhance their activity on the basis of previous achievements. The importance of the agglomerations effects has been empirically proved by a multitude of authors, such as: Disdier and Mayer (2003)⁴⁸, Devereux and Griffith (1998)⁴⁹, Head et. al (1995)⁵⁰, Guimarães et al. (2000)⁵¹, Hilber and Voicu (2007)⁵². On the other hand the turnover and the gross investments have an unexpected insignificant influence on the location decision. This might reside in the fact that the investors perceive the local companies very different from their own and their activity (successful or not) has very little in common with what they are waiting from their own activity to achieve. Another suggestion is that the new investors do not intend to use suppliers among the domestic producers. Indeed, Romania has been for a long time a favorite

⁴⁷ Inclusive value for decision level 2, for nest 1.

⁴⁸ A.C. Disdier, A.C and T. Mayer, T. „How different is Eastern Europe? Structure and determinants of location choices by French firms in Eastern and Western Europe”, *J Comp Econ* 32,2 (2003): 280–296.

⁴⁹ M. P. Devereux and R. Griffith, „Taxes and the location of production: Evidence from a panel of US multinationals”, *Journal of Public Economics* 68 (1998): 335-367.

⁵⁰ K. C. Head, J.C. Ries and D.L. Swenson, „Agglomeration Benefits and Location Choice: Evidence from Japanese Manufacturing Investments in the United States”, *Journal of International Economics* 38 (1995): 223-247.

⁵¹ P. Guimarães, Figueiredo and D. Woodward, „Agglomeration and the Location of Foreign Direct Investment in Portugal”, *Journal of Urban Economics* 47, 1 (2000): 115-135.

⁵² C. Hilber and I. Voicu, „Agglomeration Economies and the Location of Foreign Direct Investment: Empirical Evidence from Romania”, Munich Personal RePEc Archive, Paper No. 5137, 2007.

destination for 'lohn' companies, which use their own inputs and the cheap labor from the host country. Additionally, Romanian companies are not considered possible rivals for their products. It is also a hint that not all the products that are made locally by foreign companies are destined to the domestic market. Competition is not yet sharp in any region of Romania, which explains again why investors perceive the existent agglomerations as a possibility for creating linkages and as a great source of potential that has not been explored.

An increase in the average net wage, actually positively and strongly influences the number of the newly established foreign companies, which contradicts previous studies on the location in Eastern European countries (Disdier and Mayer, 2003⁵³; Pusterla and Resmini, 2007⁵⁴) or in other parts of the world (Head et al., 1995⁵⁵). Hilber and Voicu (2007)⁵⁶, on the other hand, find that the influence of wages is insignificant for the location choice of FDI in Romania between 1990 and 1997. Our results are consistent with those of certain studies which identify a positive effect of the average wage (Guimarães et al., 2000⁵⁷; Hilber and Voicu, 2007⁵⁸). The quality of the labor is an asset of the regions which want to draw foreign capital in Romania, because higher wages indicate the fact that employees are well motivated to make a more qualified work of good quality. Supporting this idea, the number of students in universities has a positive important influence for the attraction of FDI, as well as the expenses in research and development. The existence of a higher number of students together with higher wages represents advantages which override the agglomeration forces as it is indicated by the estimated coefficients of these parameters. A suggestion for regional policy would be that stimulating the increase of these regional assets in lagging areas could further reduce disparities by attracting new foreign direct investments.

The result which proves that investors are attracted to Romania for low labor costs are therefore in contradiction with the results of this study. It is generally believed that Eastern European countries attract companies with labor intensive activities (Pusterla and Resmini, 2007⁵⁹). Our results show a preference for regions with better paid and qualified personnel, which is generally important in most of the industries, regardless of the complexity of production. But there are also economic activities which reside mostly on intensive cheap labor, such as the garment industry, where the general trend of growing wages in Romania, determined the relocation of many companies in other countries (Cojanu and Pîslaru, 2011)⁶⁰. This was the result of an inadequate specialization based on intensive production, without a sufficient share of innovation, which allows increased value added. A more concentration of the local demand is necessary to identify some niches and obtain profit from the local market. The adaptation of production to luxury products, as it is the case of the shoe industry from the Centre, West and

⁵³ A.C. Disdier, A.C. and T. Mayer, T. „How different is Eastern Europe? Structure and determinants of location choices by French firms in Eastern and Western Europe”, *J Comp Econ* 32,2 (2003): 280–296.

⁵⁴ F. Pusterla and L. Resmini „Where do foreign firms locate in transition countries? An Empirical Investigation”, *The Annals of Regional Science* 41, 4 (2007): 835-856.

⁵⁵ K. C. Head, J.C. Ries and D.L. Swenson, „Agglomeration Benefits and Location Choice: Evidence from Japanese Manufacturing Investments in the United States”, *Journal of International Economics* 38 (1995): 223-247.

⁵⁶ C. Hilber and I. Voicu, „Agglomeration Economies and the Location of Foreign Direct Investment: Empirical Evidence from Romania”, Munich Personal RePEc Archive, Paper No. 5137, 2007.

⁵⁷ P. Guimarães, Figueiredo and D. Woodward, „Agglomeration and the Location of Foreign Direct Investment in Portugal”, *Journal of Urban Economics* 47, 1 (2000): 115-135.

⁵⁸ C. Hilber and I. Voicu, „Agglomeration Economies and the Location of Foreign Direct Investment: Empirical Evidence from Romania”, Munich Personal RePEc Archive, Paper No. 5137, 2007.

⁵⁹ F. Pusterla and L. Resmini „Where do foreign firms locate in transition countries? An Empirical Investigation”, *The Annals of Regional Science* 41, 4 (2007): 835-856.

⁶⁰ Cojanu, V., and Pîslaru, D. „How important are agglomeration economies? A Case Study of the Romanian Industrial Clusters”, *Review of Economics & Business Studies* 4, 1 (2011): 35-58

North-West (Cojanu și Pîslaru, 2011), left place for the increased wages and maintained the foreign direct investments companies in this sector. Around these companies, by the positive externalities, there were established numerous Romanian plants in the same field.

The number of employees in research and development is perceived as a negative aspect of regions. So the expenditures in R&D per employee are preferred to be high, suggesting that a small number of people manage high R&D budgets. This is a sign of competitiveness in the field if the work is productive.

Investors which look for a new market to sell their products will usually locate in central areas from where they can reach most of their potential customers (Disdier and Mayer, 2003⁶¹; Pusterla and Resmini, 2007⁶²). This could be an important reason why most of the companies located in Bucharest. From the estimations of the present model, the GDP has an insignificant influence on the location decision. Even though a tremendous percent of the foreign companies activating in Romania come from the European Union, and the expectation that the enlargement of this entity would bring the possibility of expanding the market, is not confirmed through this empirical analysis. The fact that 72.4% of the exports (according to the National Bank of Romania) are held by the foreign companies indicates that a high share of their products is destined to the external market, but because the data regarding the exports of these companies is not available, we cannot establish the exact measure. Nevertheless, the lack of significance for this parameter means that there is no preference for regions with higher GDP, but the country as a whole, could have been chosen for a satisfying potential demand.

VI. CONCLUDING REMARKS

In this paper we led an original analysis of a large scale of determinants of FDI in Romania, explaining which of them stand at the basis of the location choice. In the scarcely explored field of spatial econometrics over the regional characteristics of Romania, we tried to sketch a brief portrait of the foreign investor using a two stage nested logit analysis, emphasizing the most significant regional factors of attractiveness (NUTS II).

The results of our study confirm the importance of the agglomeration forces on the attractiveness of FDI. Foreign companies locate mostly in regions where other successful foreign businesses take place, but not necessarily were all the companies (foreign or domestic) have the most developed activities.

Investors prefer regions with relatively high average net wages, which was used as a proxy for costs as well as for the purchasing power. Therefore, we obtained that local demand is a more important factor than the low costs. In fact, the investors would rather support higher costs for a better quality of labor and research activities. Nevertheless, the idea that investors look to identify regions with a higher market potential is not confirmed by the GDP parameter, which has an insignificant influence. The political efforts of increasing the regional attractiveness are not based on the development of infrastructure.

In order to obtain most of the regional benefits from the inward FDI Romania should attract foreign companies which use highly skilled personnel and innovation, stimulating in this way the increase in wages, demand and GDP and overriding in the same time the powerful agglomeration forces.

⁶¹ A.C. Disdier, A.C. and T. Mayer, T. „How different is Eastern Europe? Structure and determinants of location choices by French firms in Eastern and Western Europe”, *J Comp Econ* 32,2 (2003): 280–296.

⁶² F. Pusterla and L. Resmini „Where do foreign firms locate in transition countries? An Empirical Investigation”, *The Annals of Regional Science* 41, 4 (2007): 835-856.

The empirical results of the location decision process of the whole sample of foreign direct investment companies gives a few suggestions about the investor's profile, which activates in industries where workers do rather complex operations (due to the need for qualified and well paid work). The limited data availability did not allow computing the analysis separately on different technological levels of the manufacturing sectors, but further research could complete the interpretation of the results through a series of study cases.

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Appendix 1 – Table A1. FDI location in Romania

Development region	Number of new FDI companies (2003-2010)	FDI stock in 2009 (million Lei)
North-East	4010	4408.4
South-East	4880	5289.6
South	4662	6205.6
South-West	2308	3292.7
West	10715	6315.2
North-West	11625	5673.4
Centre	9941	6989.4
Bucharest-Ilfov	33536	50937.1

Source: Author calculation

ODABIR REGIONALNE LOKACIJE ZA IZRAVNA STRANA ULAGANJA U RUMUNJSKOJ

Sažetak: Očekuje se da se regionalno privlačenje izravnih stranih ulaganja razvije u poboljšanje lokalnih prednosti. U ovom radu smo ustvrdili koji su najvažniji pozitivni učinci koji su najviše utjecali na broj novoosnovanih tvrtki sa stranim kapitalom na regionalnom nivou u Rumunjskoj. Koristeći „nested logit“ model, opisali smo dvostepeni proces donošenja odluka pri kojem investitor prvo odabire skupinu regija sličnih karakteristika, kao što je blizina glavnog grada ili glavnih prometnih pravaca, a zatim odabire specifičnu regiju iz te skupine. Glavni faktori privlačnosti se određuju kako bi se iskoristili za poticanje ujednačenijeg regionalnog razvoja. Smanjenje razlika na ovaj način može pomoći boljem ekonomskom razvoju zemlje koja prihvaća izravna strana ulaganja.

Ključne riječi: Izravna strana ulaganja, odrednice regionalnog ulaganja, odabir lokacije