THE REGIONAL LOCATION OF FOREIGN DIRECT INVESTMENTS: A REVIEW OF THE EVIDENCE

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Abstract:
The question where to locate a company at regional level remains a very challenging issue because the regional attractiveness patterns for investments are very complex and dynamic. The paper gathers and analyses several studies that use quantitative methods to describe the mechanism of the regional location of foreign companies. The focus is on the nested logit models that identify the highest probability of a location for being chosen from several groups of alternatives according to a set of determinants of various types. By resuming studies on different countries, periods of time and factors of local attractiveness, we can conclude the efficiency of this type of quantitative methods in describing the grounds of choosing the geographical area for implantation. Nevertheless, the most important contribution of the paper is synthesizing the regional determinants of the location of FDI and the efficiency of regional policies.

Key words: *investments, regional investment determinants, location choice.*

JEL classification*: F21, F2, R11*

INTRODUCTION

In spite the fact that the European Union in the past years has been facing problems that endanger its unity, some facets of the convergence process, including the newest members, have been fulfilled in a satisfactory way. This is why, for many economic agents the national borders have become less important than regions, when they establish their business relations. The latest comply certain common economic, social, cultural or natural characteristics and these entities are sometimes more relevant than countries. They have more diverse features often contrasting, while the level of development or the direction of specialization can be very different from one side of the country to another.

Permanent changes on the map of economic activities are taking place; companies locate and relocate their facilities according to the changing economic environment. Instead of fighting this dynamic and complex phenomenon, the newest theories recommend using and adapting to the advantages. In the permanent struggle of the regions to attain competitiveness, the investors group up around the winners, while the spatial distribution of the benefits generated by foreign direct investments changes continuously.

Consequently to this regional approach from the investors' side, econometrists have also tried to identify the best models that describe the regional investment behavior. The methodology used on the widest scale to identify the location decision is based on the discrete choice methodology constructed by McFadden (1974). The present article will focus on this type of models, trying to appreciate their efficiency in describing the investor's behavior regarding the location choice.

The paper is structured as follows. In the second section we explain the most recent theories in the field of regional location emphasizing the strategy that the investors should follow, the third section briefly presents the how the set of analyzed location has been settled in the existent literature, while the fourth section describes

more detailed a few models on the location choice and the results and conclusions that were obtained by the authors mentioning their policy recommendations. The article ends in a few relevant conclusions.

REGIONAL LOCATION IN THE CONTEXT OF THE LATEST THEORETICAL CONCEPTS

The most recent tendency in the European Union is to gradually replace the regional policy with the one of macroeconomic stability and the enterprise policy. In the old policy, which actually encourages big companies and the small ones are simply tolerated, the companies have a rigid structure. In the new concept, these should be replaced with structures that are open to relations based on affinity and the common perception on the advantages of the win-win business relations. Jovanovic (2010) synthesized the main measures proposed to be taken within this new European theory: sustaining the innovation, reducing the regional and traditional financial aid, sustaining small companies and the services for producers, environment and innovation support and so on.

New theoreticians have observed and showed the importance of the dynamics of regional development patterns and regional comparative advantages. These characteristics change the attractiveness of all the locations, while each new company implantation (foreign or domestic) is followed by further changes. Jovanovic (2010) describes in his book the main vectors of evolutionary economic geography, a theory that states the fact that the economic dynamics is a phenomenon that should be permanently speculated by the investors when they choose a new location or relocation, taking into consideration the local competitive advantages of each alternative. The strategy to profit from the change is opposed to the neoclassic concept which searches to reach the economic equilibrium, considered optimum to both the producers and the consumers.

The new models that determine the location decision of international actors surpass the neoclassical constraints according to which the economic actors are looking either to minimize costs (ignoring the demand's characteristics), either to maximize the profit (the company satisfies the demand and ignores the other aspects). Within the evolutionary economic geography there are taken into consideration both types of variables because in reality they are both important and they actually both assure the best level of profit on the long term.

The evolutionary economic geography takes into consideration a very large scale of determinants that influence location. They are seen in a very dynamic environment, influencing each over, drawn by competition, changes in the consumers' preferences, migratory phenomena and scientific progress. For example, Pusterla and Resmini (2007) consider that in order to achieve a higher profit, the location must be able to provide low specific costs (ex: labour and land costs) and low relative costs (ex: transportation costs as related to the spatial distance from the suppliers and/or customers).

Mc Cann (1998, pg. 32) believes that the location decision is mainly a consequence of the industrial aglommeration concentrated in the the vertical and horizontal relations with other companies; all the other factors derive from these.

The concept of agglomeration economies explains the causes of the development gap that lays in the concentration of the economic activity in certain areas, which brings an easy access to customers and suppliers and offers the opportunities arisen from intense competition, qualified labor force, intense research and development activities etc. The innovation of the new location theory consists in the fact it recommends all the stakeholders of the agglomeration economies to take advantage of imperfect

competition and develop their business according to the asymmetric information that each entity can access (Fujita and Thisse, 2002).

Storper and Chen (2000) sustain that the agglomeration economies adapt relatively fast to a modified economic context, fact that allows them to survive on open markets. Actually this type of market approach is now recommended within the evolutionary economic geography philosophy.

THE METHODOLOGY FOR THE ANALYSIS OF THE REGIONAL LOCATION OF FDI IN THE LITERATURE

The models used to analyze the location decision of multinational companies in a certain location within a set of alternatives are usually based on regression models upon which are raised different constraints, such as the profit maximization. The most popular ones are the logit models because they are very flexible, many types of determinants can be included and the offered results are very exhaustive.

The various types of logit models, including the nested logit, derive from McFadden (1974) who developed the random utility maximization framework. After McFadden (1974) the first who adapted the random utility maximization framework to the location choice theory was Carlton (1983).

Authors who use logit models are challenged to relax the hypothesis of the Independence of the Irrelevant Alternatives (IIA). This is a theory of individual choice and it stipulates that if the subject chooses a new alternative from a certain set, then we should introduce a new alternative, which does not change the preference of choosing from the first set of alternatives. So the introduction of a new alternative has no influence on the subject's preference for the other alternatives. The logit models do not normally satisfy this condition; therefore some steps should be taken first in the analyses to lead the choice in the correct way.

Several methods to eliminate a part of the correlation across different locations include using dummy variables for locations which are larger (Bartik, 1985 and Head at al. 1999). Using a two stage conditional logit represents an alternative method, but the most efficient way is to run a nested logit analyses. This is actually a different way of seeing the two stage process, because, within the model, the subject chooses firstly from a nest of alternatives (which is formed according to common characteristics: region, size, etc.) and then the alternative itself. Other authors like Train (2003) followed a more complex approach. He used different types of logit models to analyze the same set of alternatives, which can be inter-correlated in this way.

The main logit models are: conditional logit and nested logit. Differing from other logit models, the nested logit has the advantage that it relaxes the IIA hypothesis because it firstly splits the set of alternatives into smaller sets which share common characteristic (according to a specified criteria). Relevant studies that used nested logit models are: (Hansen 1987; Disdier and Mayer 2003; Basile et al. 2003; Guimarães et al. 2000; Bekes 2004; Barrios et al. 2003; Mucchielli and Puech 2004).

Using the nested logit model in the description of the location choice starts with the assumption that firms choose the location for implantation according to the best expected level of profit. The idea is based on the microeconomic theory about the purpose of the companies to maximise their profits, which are the expression of the utility of their activity. This means that best location is the one where the firm has the best chances to achieve the highest profit. This is why usually the economists who used the nested logit model take the profit as the determined variable, while the explanatory variables are the determinants of the location choice which have the highest impact on the profit.

CHOOSING THE SET OF ALTERNATIVE LOCATIONS

One of the core issues in preparing an analysis in the field of spatial economic geography is choosing the set of analyzed locations. Train (2003) mentions the fact the set should include as many alternatives as possible and the locations should be very well delimited and precise. Therefore the number of choices is finite but is very comprehensive.

The most homogenous areas are obviously the small ones. This is why the studies over the location choice for FDI usually deal with small administrative division: regions (NUTS II level) or counties (NUTS III). Some authors believe that the size of a region is important for the location because it shows its potential. Therefore, they calculate the internal distance of a region (Head and Mayer 2004). There are also several studies dealing with the national level (Devereux and Griffith, 1998, Smarzynska7, 1999), while sub-national level examples are: Head et al., 1995 and 1999, Hansen, 1987, Head and Ries, 1996, Guimarães et al., 2000, Crozet et al., 2003.

Appart from that there are many firm-level studies, including Haddad and Harrison (1993) on Morocco, Aitken and Harrison (1999) on Venezuela, Djankov and Hoekman (2000) on the Czech Republic, Konings (2001) on Bulgaria, Poland and Romania, Javorcik (2004) on Lithuania. This type of analysis offers the opportunity of studying if there are any spillover effects from the foreign companies to the domestic ones and whether these are stronger in industrial agglomeration or not. Most of the times, agglomeration economies have good effects on innovation activities and on the general economic development of the companies.

As we can see, the research developed so far has covered a wide range of countries with different specificities and FDI and regional policies. For instance, the region of Eastern and Central Europe has started to be studied only recently because of the lack of data especially about foreign direct investments. After the fall of the communist regime, these countries begun a wide campaign of promotion for attracting FDI and databases were therefore compulsory. Examples of studies regarding FDI location in Central and Eastern Europe can be found at: Disdier and Mayer (2003) – the location of French companies. Location decisions of Japanese firms in Europe were studied at a national and regional level by Mayer and Mucchielli, 1999.

RESULTS OFFERED BY THE ANALYSES OF LOCATION DECISIONS OF MULTINATIONAL COMPANIES

This section gathers a few studies that use logit models on very different sets of locations using some different and some similar factors of local attractiveness used as explanatory variables. Results are therefore different according to the interest of the investors.

Pusterla and Resmini (2007) studied through a nested logit model the location choice of companies in the manufacturing industry in Romania, Bulgaria, Hungary and Poland between 1995 and 2001 on firm level data. The explanatory variables chosen by them belong to a series of indicators that are expected to significantly influence the profit's maximization, which is solicited by the investors when they choose their location (the development region – NUTS II level). The profit function also includes a random part formed of the unobserved characteristics of each location.

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

Where π is the profit, x are the local advantages, i is the foreign investor, and l is the location.

The authors further calculate the location probability of a company in a certain region that belong to a certain nest. The following explanatory variables were used to describe the advantages of location in each alternative: demand side variables (market potential), agglomeration variables (Hoover location index), supply side variables (wage

per capita normalized by the country average and the share of occupied population in manufacturing industry) and the policy variables (country risk rating[1]).

The results prove the fact that the foreign investors perceive the EU membership as being very similar and preferable in the detriment of non-EU member countries. Concerning the explanatory variables, they all have a significant influence over the profit (1%). Their recommendation is that the FDI promotion at the level of policy makers should take into consideration the specific level and need for development of each region.

Also using logit models, Disdier and Mayer (2003) identified the determinations of the location decision of the French companies in Eastern and Western Europe separately in order to compare the results. Transnational companies with French origins are located in nineteen countries that are included in the study (annual series 1980-1999). The conditional logit model, adapted from McFadden (1984), is used by Disdier and Mayer (2003) to describe the location choice according to the profit maximization purpose, similarly to Pusterla and Resmini's (2007) nested logit model.

$$\pi_j = bX_j + \epsilon_j$$

π is the profit, X consist in the observable characteristics of location j, b is the vector of coefficients and ϵ_j represents the unobservable advantage of location j.

The dependent variable is the country of destination of each French foreign direct investment. The regression above is conditioned by the following function:

$$P_j \equiv Prob\left(\pi_j > \pi_k\right) = Prob\left(\epsilon_k < \epsilon_j + b\left(X_j - X_k\right)\right), \forall\, k \neq j$$

This is the probability that a certain location j is chosen from a set of alternative. If the standard error terms are identically and independently distributed, the probability of choosing the location j is:

$$P_j = \frac{e^{bX_j}}{\sum_{i=1}^{n} e^{bX_i}}$$

The explanatory variables are classified in different categories indicating the level of concentration (the number of French companies in the same industry) or the demand (the GDP of the host economy). Another set of independent variables indicate the level of development of each country (GDP per capita), physical distance between France and the host country, the labour market (nominal wage and unemployment), the exchange rate volatility and the level of corruption.

The results show an important influence from the local demand, the existence of other French companies in the region and the geographical distance has a significant negative effect, as well as the exchange rate volatility and the level of corruption. Insignificant has proved to be the unemployment rate. The distance has a significant negative influence in the conditional logit model. Similar results were found by Devereux and Griffith (1998) studying the location decision of American companies and for the Japanese firms, Mayer and Mucchielli (1999). Opposed to the expectations, the GDP/capita has a negative influence.

Disdier and Mayer (2003) found that there is a direct correlation between the number of existent firms in a certain area and the further FDI that is attracted in the same place. However, their recommendation is that the state should adopt measures to reduce the agglomeration effects to obtain a more equal development among the several regions of a country.

The importance of geographical distances is often analyzed through gravitational models. Henriot (2003) wants to determine the importance of GDP over the sales of foreign companies from several OECD states. The model is actually a multiple regression where the determined variable is the turnover and the explanatory variables

[1] An indicator that is composed of 22 variables from 3 risc categories: political, financial and economic.

show if the company decides a vertical or a horizontal localization of the activities. If the commercial barriers and the transportation costs are high, it is possible that company opens a subsidiary that makes the whole product in one location. So, the relative size of the country is the main determinant of the horizontal integration. If there are many subsidiaries in many countries, it means that each of them is specialized on a certain stage of production.

Hilber şi Voicu (2007) analyzed the role of agglomeration economies in attracting FDI in the Romanian manufacturing industry between 1990 and 1997. The authors used a conditional logit model applied at the NUTS III level depending on several advantages generated by the agglomeration economies. These benefits are obtained from scale economies and economies from services and diversification. For the specific characteristics of each county, which are unobserved, constant and unable to affect the location decision, the authors used dummy variables. Their secondary role is to determine the existence of unobservable correlations among choices, fact that relaxes the IIA hypothesis.

Among the independent variables we find the Herfindhal index, also used by Storper şi Chen (2000), to analyse the location's distribution equilibrium:

$$HE_{i,R} = \frac{1}{\sum_j \left(\frac{Y_{ij}}{Y_{i,R}}\right)^2}$$

Where Y represent the outputs, i is the economic sector, j is the country and R the region.

The only insignificant variable that resulted is the diversification, explained through the maturity of the manufacturing industry. The statistically significant variables were: the specific industry, the agglomeration of services and labour conflicts (with a negative sign).

CONCLUSIONS

There is a wide range of studies that cover many countries that have many specific and local benefits that can be very attractive for foreign investors. This is why it is extremely hard to compare such diverse results. In some areas there are certain benefits that are very important for multinational companies that invested there, while in other areas these are not even considered. On the other hand, the origin of the investor matters a lot, not to mention the specific industries. Some local benefits, in some cases, turn out to be disarming disadvantages, like unemployment. Nevertheless, there are catalysts that in most cases are very efficient, like the industrial agglomerations. These should be very closely supervised by governments, which should be careful not to let them turn into congestion. For that a good infrastructure and good regulations are needed. Apart from that, the development of the lagging regions should not be forgotten. Perhaps new specializations in order raise competitiveness would be a solution. In their case infrastructure is crucial too because these areas should be easily accessed by potential investors and business partners.

The effectiveness of the logit type of analysis is good and it should be used for each case separately. Results that were obtained in a certain country cannot be applied to another. A shortcoming could be for some countries the lack of detailed regional statistical data, but it is not an impediment for the preoccupation for regional development because there are multiple possibilities of identifying the spatial distribution of benefits and needs.

The cited authors are generally characterized by a balanced view. The conclusion regarding the regional development is that the agglomeration forces should be allowed to do their job in raising excellent poles of competitiveness, but in order to

develop the more disadvantaged regions, for the general welfare of the country, a certain level of state intervention is needed.

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