

What are the regional determinants that attract FDI in Poland?

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Abstract

In this paper we examine the location determinants of the inflow of Foreign Direct Investment (FDI) into Poland, at a regional level. Using survey data from an online questionnaire in February 2005 and a multinomial logit model incorporating the investor's specific characteristics, we show that knowledge-seeking factors alongside market and agglomeration factors, act as the main drivers for the inflow of FDI to the Mazowieckie region (including Warsaw), while efficiency and geographical factors encourage FDI to the other areas of Poland. Some implications are drawn for FDI attraction policy in Poland.

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Introduction

Following the collapse of communism, the countries of Central and Eastern Europe (CEE), have been forging strategies to attract foreign capital as a way of achieving sustained economic growth (Martin and Velázquez, 2000). Foreign direct investment by multinational corporations (MNCs) plays an important role in the transformation of former centrally planned economies into vibrant market systems, since it provides an inflow of capital, management skills, and jobs, alongside increasing exports and transfer of technology. It is also perceived as one of the conditions paving the way for improving the competitiveness of the economy and enhancing the provision of goods and services for the domestic market.

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With the implementation of global and regional strategies by MNCs, the choice of location is becoming increasingly important, hence requiring a better understanding of the internationalization process and of the factors influencing the spatial distribution of FDI.

There have been numerous empirical studies that have focused on the location choices of MNCs and FDI flows in developed countries (Shaver, 1998; Head *et al.*, 1995; Friedman *et al.*, 1992; Culem, 1988; Nachum and Wymbs, 2005)¹. Since early-2000s these studies have also started to concentrate on the transition economies within the CEE region (Campos and Kinoshita, 2003; Deichmann, 2001; Resmini, 2003, 2007; Boudier-Bensebaa, 2005; Cieřlik and Ryan, 2005). According to Slay (2003, p.1) "... relative to the rest of the world, this region has been an excellent bet".

Despite the growing interest in the subject, to our knowledge, there is still no satisfactory empirical work which can explain the determinants of the spatial distribution of FDI flows into the separate regions of Poland², the largest new EU-member state. Thus, this research attempts to fill this gap by using a primary data from an on-line questionnaire that covers the entire transition period.

Following the administrative decentralization introduced by the government in January 1999, a new territorial organization of Poland was introduced. The system replaced 49 voivodships with just 16 (Figure 1). The new structure of sizeable regions with their statutory combination of central government and self-government functions was created in order to achieve more effective regional policies. This was based on the assumption that by decreasing the number of voivodships, the disparities at the level of territorial division among them can be reduced (Czyř, 2002). As claimed by Górzalak (2002) in the old system a steady and comparatively high growth rate was only recorded in big metropolitan regions such as Warsaw and Poznań, while the remaining regions registered a decline in their economic situation to a greater or lesser degree. The establishment of bigger voivodships with new territorial shapes have been a crucial step in Poland's adjustment to EU regulations (Churski, 2005).

¹ For a summary of recent research on location choices of FDI in developed countries see Boudier-Bensebaa (2005).

² Altomonte and Resmini (2001) investigate whether MNCs generate backward and forward linkages with domestic firms given their regional location in Poland, rather than the determinants of FDI.

Figure 1 (map of Polish regions and SEZs) here

Despite the new decentralized territorial system of Polish regions, the quality and allocation of FDI into those regions is still uneven. For example, the areas in the west, north, south and center of Poland, are the most prosperous and have been the most successful in attracting foreign capital, while the districts further to the east continue to suffer from lower investment, lower income and higher unemployment (The Economist Intelligence Unit, 2004).

Based on a regional-level dataset obtained from an on-line questionnaire conducted in February 2005, this paper provides an empirical contribution in two ways. First, it addresses the motives for the initial inflow of foreign capital into a particular Polish region. Second, it presents an investor's individual dataset at a regional level for Poland – both the largest recipient of FDI in CEECs and the largest country of the new EU members.

The remainder of the paper is structured as follows. Section one presents the underlying streams of literature and hypothesis formulation. Section two explains the method of data collection, the specification of the model and the variables used. Section three presents the econometric results that are then discussed. The conclusions and policy implications are finally presented in section four.

Section 1. Underlying literature and hypothesis formulation

It has been recognized by scholars that different motives lie behind the investment decisions of firms in foreign countries. It is argued that "...there are substantial differences in economic performance across regions in virtually every nation. This suggests that many of the essential determinants of economic performance are to be found at the regional level" (Porter, 2003, p.550). In order to examine the rationale in one of the transitional economies, the theoretical framework of this paper addresses three branches of the literature.

The first branch emphasizes the new economic geography (NEG) initiated by Krugman (1991a, 1993, 1995) and later synthesized by Fujita *et al.*, (1999) which according to Brakman and Garretsen (2003) "... is the only theory within mainstream economics that takes the economics of location seriously..." (p. 638). Drawing upon Marshall (1920), Krugman proposes a model where the trade-off between increasing returns in production and transportation costs is fundamental to the understanding of agglomeration economies and the emergence of the centre-periphery pattern. In

contrast to location theory (Weber, 1909; Lösch, 1940), Krugman's model insists on full general-equilibrium conditions where the spatial structure emerges from imperfect competition. Krugman (1996, 1998) also demonstrates that the location of economic activity is determined by two groups of factors. First, those that include traditional natural advantages of particular locations such as central location, market size, and external economies that relate to supply linkages or others such as knowledge spillovers. Second, those that consist of market forces including all kinds of input costs and non-market factors such as pollution.

While all the above forces play some role in the choice of location, empirical studies suggest that their importance may vary depending on a region, country or industry. For example, Levinson (1996) and Coughlin and Segev (2000), analysing the establishment of new plants in US, show that agglomeration is the principal motive for the explanation of the attractiveness of the South-East region for new plants. Barrios *et al.*, (2002), looking at the location choice of MNCs in Ireland, find that agglomeration forces contribute substantially to location choices as well as the proximity to major ports and airports. Disdier and Mayer (2004) find that agglomerations effects are key location determinants of French investment in Western and Eastern Europe. In respect of transition economies, Campos and Kinoshita (2003) and Pusterla and Resmini (2005) find that agglomerations are one of the principal determinants of the spatial distribution of FDI. Martin and Velázquez, (2000) find a significantly negative effect of distance on FDI in the OECD countries, and a positive significant effect if the host and source countries share a common border. Drawing on the above empirical literature which states that geographical proximity and agglomeration positively encourage the inflow of FDI, we establish our first two hypotheses as follows:

Hypothesis 1: *Agglomeration* factors are a significant motive for MNC internationalization: hence the stronger agglomeration factors are represented in a given region, the more likely a MNC will engage in FDI in that region.

Hypothesis 2: *Geographical* factors are an important motive for MNC internationalization: hence the stronger geographical factors are represented in a given region, the more likely a MNC will engage in FDI in that region.

The second branch of the literature derives from the knowledge-based view of the firm (Cantwell, 1989; Cantwell and Janne, 1999; Cantwell and Piscitello, 2002, 2005). Cantwell (1989) states that knowledge-seeking investments vary across locations because they depend on location-

specific factors, such as the number of scientists and educated people in the area, previously established innovations, R&D intensity, the education system, and good linkages between educational institutions and firms. As a result, firms may supplement their existing technologies by expanding internationally to access new knowledge. This expansion may suggest two types of knowledge-seeking behavior between firms originating from leading versus lagging technical centers (Cantwell and Janne, 1999). Firms from lagging technical locations need to catch up and locate their research centers abroad in order to improve their existing technology. However, while firms from leading locations do not need to catch up, they may also locate their research centers abroad to source more diverse knowledge, since "... the acquisition of new skills, and the generation of new technological capacity, partially embodied in new plant and equipment, must be a goal of every firm" (Cantwell, 1989, p.8). Due to the fact that knowledge is partially tacit and its transfer needs frequent interactions, knowledge-seeking investment requires physical proximity (Kogut and Zander, 1992). Moreover, efforts to search for knowledge-seeking investment are not carried out in isolation, but are strongly supported by various external organizations such as, for example, public research centers, universities or industry associations (Cantwell and Piscitello, 2005). The educational level of a country's citizens, alongside the existence of universities, research centers, science bases and other institutions that create knowledge in a region, has become increasingly important for the internationalization process, not only at the national level but also at the regional level (Cantwell and Iammarino, 2001, 2005; Acs *et al.*, 2002; Chung and Alcácer, 2002). Kuemmerle (1999) shows empirically that firms in technology-intensive industries by establishing R&D facilities abroad can expand their technological capabilities. Florida (1997) finds that accessing new indigenous technology is more important than customizing existing technology for new markets. Bartlett and Ghoshal (1999) show that as firms establish their facilities abroad and allocate heterogeneous products to them, R&D sites in close proximity to factories are needed. This is due to the fact that these sites support the transfer of knowledge, which is an attractive factor for the location of multinational companies (Cantwell and Piscitello, 2002). In addition, specific regions within nations might be particularly attractive locations for knowledge-seeking investment (Jensen, 2004). Acknowledging the fact that there is insufficient empirical evidence relating to the importance of knowledge-seeking motives in the spatial distribution of FDI at a regional level (Cantwell and Piscitello, 2005; Cantwell and Iammarino, 2003) we present our next hypothesis:

Hypothesis 3: *Knowledge-seeking* factors are a central motive for MNC internationalization: hence the stronger knowledge factors are represented in a given region, the more likely a MNC will engage in FDI in that region.

The last branch addresses the literature on the determinants of FDI in transition economies (Lansbury *et al.*, 1996a; Holland and Pain, 1998; Mayer, 2001; Estrin *et al.*, 2001; Rasmini, 2000; Lankes and Venables, 1996; Garibaldi *et al.*, 2001; Brenton *et al.*, 1999; Cieřlik and Ryan, 2005). For instance, Garibaldi *et al.*, (2001) find that the pattern of inward direct investment in transition economies can be well explained in terms of a standard set of economic fundamentals such as those reflecting macroeconomic stability, the level of economic reforms, trade liberalization, natural resource endowments and the privatization method. Lansbury *et al.*, (1996a) demonstrate that labour costs and research intensity have a significant influence on the pattern of inward investment. The evidence is consistent with the notion that some investors have been attracted to CEECs by a combination of relatively low labour costs and the availability of skilled workers in particular sectors and countries. Holland and Pain (1998) support and extend the findings of Lansbury *et al.*, (1996a) by showing that the extent of trade linkages with the advanced economies and proximity to the EU have significant effects on the level of investment. The availability of low cost production inputs are traditionally the most obvious reasons for setting up production facilities in foreign countries (Dunning, 1983, 1993a). Estrin *et al.*, (2001) find that the search for resources is an important determinant of FDI inflows in Eastern European countries and Galego *et al.*, (2004) confirmed these results for CEECs. Przybylska and Malina (2000) and Ghemawat and Kennedy (1999) find that market-seeking positively influence FDI flows to Poland. For this reason, it is possible to hypothesize a positive relationship between resource-seeking investment and the regional location of FDI. Following on from this, our final two hypotheses state:

Hypothesis 4: *Market-seeking* factors are a significant motive for MNC internationalization: hence the stronger market factors are represented in a given region, the more likely a MNC will engage in FDI in that region.

Hypothesis 5: *Efficiency-seeking* factors are a valuable motive for MNC internationalization: hence the stronger efficiency-seeking factors are represented in a given region, the more likely a MNC will engage in FDI in that region.

Section 2. The dataset description and methodology

2.1. Data collection

The data for the present study derives from an on-line questionnaire, which was designed to examine the locational determinants of FDI in the Polish regions. The data collection was undertaken in February 2005. The list of 1243 MNCs was obtained from Polish Information and Foreign Investment Agency (PAIiIZ) and it included names and addresses of foreign companies that have already established their presence on the Polish market, in the form of FDI, before 2003.

Due to the fact that the given data set was two years old, we examined its validity by checking the contact details of each investor using the internet and phone. We found that 147 companies were no longer reachable and 96 were double-counted. In addition, 148 companies were used for the pilot study. Hence, this left us with 852 companies in the dataset for the final analysis.

The final questionnaire was developed following a pilot study conducted in November 2004 in order to make sure that the questions of the questionnaire were clear to understand and follow by participants. Following Dillman (2000), a sample of 148 randomly selected respondents was drawn for the pilot. 65% of participants in the pilot study were of European origin and 35% non-European; the response rate was 8.5%. Judging by the response rate it was clear that a self-administered electronic survey would be an appropriate technique for this study (Kanuk and Berenson, 1975).

The structure of the final questionnaire covered topics ranging from general information about the MNC (e.g. year of establishment, origins, employment, sales and turnover) to specific information about the Polish location (e.g. entry mode, region, motive for investing) and characteristics relating to the post-entry development of the Polish subsidiary (e.g. competition, future plans).

In order to encourage participation in the survey, a system of four compatible contacts, using the internet, were established with potential respondents (Dillman, 2000; Heberlein and Baumgartner, 1978). First, a brief prenotice e-mail was sent out to the senior management of all the companies for which the contact details had been verified, prior to sending the questionnaire. The aim of the letter was to explain the objectives and importance of the study, and to request their participation in it. Second, a link to the on-line questionnaire was sent out to the respondents who had expressed interest in participating in the study. It is worth noting that 237 contact e-mails were deleted by the respondents before they were even read. So, 615 contacts read the initial e-mail. 195

e-mail responses were received with the note "will not participate in the study". 329 contacts did not respond at all. As a result, the number of respondents amounted to 91, representing approximately 15% of those initially contacted (see Appendix for some sample characteristics). Third, a reminder letter was sent out one week after the link to the questionnaire was delivered. The purpose of this letter was to express appreciation for willingness to fill out the questionnaire, and at the same time to indicate that if the respondent has not yet completed the questionnaire to encourage response. Finally, a thank you letter was sent to all respondents after the collection of the results.

The regional data, for this investigation, is in line with the Nomenclature of Territorial Units for Statistics (NUTS)³ level 2. However, after its the examination foreign firms were grouped in five regions (Figure 2 in Appendix): North-West (28% of the firms in the sample) including the Zachodnio-pomorskie, Pomorskie, Lubuskie and Wielkopolskie voivodships; North-East (11%) containing the Warmińsko-mazurskie, Podlaskie and Kujawsko-pomorskie voivodships; the Mazowieckie voivodship (25%) containing Warsaw, the capital; South-East (11%) including the Lubelskie, Podkarpackie, Świętokrzyskie and Małopolskie voivodships; and South-West (25%) containing the Łódzkie, Dolnośląskie, Śląskie and Opolskie voivodships. This classification represents NUTS-1 level.

The regional breakdown was based on a small village, Piątek (i.e. Friday) in the Łódzkie voivodship, which represents the geographical middle point of Poland and Europe as well (Kondracki, 1994). This separation was done for two reasons. First, "...from a methodological point of view categories (such as regions) should include a minimum number of cases in order to conduct a meaningful statistical analysis..." (Oerlemans and Meeus, 2005, p.96). This is important in our case, because the spatial level among 16 Polish regions was uneven in the sample. Second, several notable structural economic differences can be seen between those five regions such as, for example, the level of unemployment, telephone lines, and the consumer price index (Table 1).

³ The NUTS classification was adopted on May 2003 by the European Parliament and the Council of the European Union in order to manage changes on the availability and comparability of regional statistics of Member States.

Table 1 (Data on Polish regions) here

2.2. A model of a choice region

Following Levinson (1996), Louri *et al.*, (2000) and Crozet *et al.*, (2002) we assume that foreign investors have a latent (i.e. unobserved) profit function once they have decided to establish their physical presence, for the first time, in one of the Polish regions. The profit function is dependent on the characteristics of the individual investor, and the random component that is arising from other unobserved characteristics of choices. Thus, the utility function of locating in region j for the n -th investor faced with J choices of regions can be written in the following form:

$$U_{nj} = x'_n \beta_j + \varepsilon_{nj}. \quad (1)$$

where there are J error terms ε_{nj} for any investor n . The exogenous variables x'_n describe only the investor and are identical across alternatives. However, the parameter β_j differs across alternatives.

If the investor chooses region j in particular, then we assume that U_{nj} is the maximum among the J utilities. Hence, the statistical model is driven by the probability that region j is chosen, which is

$$\Pr(U_{nj} > U_{nk}) \text{ for all other } k \neq j \quad (2)$$

Assuming that the error terms in Eq. (1) follow independently and identically an extreme value distribution⁴ (Manski and Lerman, 1977; McFadden, 1984; Maddala, 1977) of the following form:

$$F(\varepsilon_{nj}) = \exp(-e^{-\varepsilon_{nj}}) . \quad (3)$$

the probability that an investor n chooses region j is a simple expression of

⁴ Also known as a Weibull distribution

$$\Pr_{nj} = \Pr(Y_n = j | x_n) = \frac{e^{x_n' b_j}}{\sum_{i=1}^J e^{x_n' b_i}}, \quad (4)$$

Eq. (4) forms the basis for the multinomial logit model (MNL) (Greene, 2002). An interesting feature of this model is that the odds ratio (\Pr_{nj}/\Pr_{ni}) depends log-linearly on x_n . Hence J log-odds ratios can be computed based on:

$$\ln \Omega_{ji}(x_n) = \ln \left[\frac{\Pr(y = j | x_n)}{\Pr(y = i | x_n)} \right] = x_n' b_{j|i} \quad \text{for } j = 1, \dots, J \quad (5)$$

where i is the base category. As $\ln \Omega_{ii}(x_n) = \ln 1 = 0$, it must be hold that $\beta_{ii} = 0$. That is, the log odds of an outcome compared with itself are always 0, and thus the effects of an independent variable must also be 0. Hence we will only estimate $J - 1$ outcomes, due to the redundant information (Long and Freese, 2003).

The independence of the error term across alternatives in Eq. (1) is a strong assumption, and it implies that an investor's unobserved preference for a certain alternative is independent of its stochastic preference for other alternatives. This imposes the independence of irrelevant alternatives (IIA) restriction on the predicted probabilities, which means that the choice of the regions must be equally substitutable to investors (Hausman and McFadden, 1984).

The results are discussed in Section 3.

2.3. Dependent variable

Our dependent variable represents the probability of either investing or not in any given region mentioned above, with the Mazowieckie region being the comparison group. There are three reasons for selecting this particular region as the base category. First, the region includes Warsaw, the capital and at the same time the largest city in the country with its population of 1.6 million people (General Statistical Office, 2004). Second, this is the leading area for finance, real estate and business services. Finally, it has benefited most from the transition to a market economy, consistently reporting the highest average income, lowest unemployment and largest share of inward investment of any Polish voivodship (The Economist Intelligence Unit, 2003).

2.3. Independent variables

In line with our theoretical discussion, thirteen motives measuring the importance of investing in a given Polish region, were extracted from the literature for the study. They formed a separate question in the questionnaire with the heading: *What were the reasons to invest in that particular voivodship?* The question was close-ended where, following Willits and Saltiel (1995), the degrees of importance were based upon a six-point scale ranged from "not sure" (coded 0)⁵ to "extremely important" (coded 5). Based on the underlying literature the motives were then classified into five groups of explanatory variables. In order to examine the inter-relationship and confirm both the relevance and significance of those variables for the analysis, a confirmatory factor analysis was performed (Table 2).

Table 2 (Confirmatory factor analysis) here

The factor analysis confirmed the variable structure that we identified. More specifically, we obtained five meaningful factors, according to the criteria for the eigenvalues to be greater than unity (Kim and Mueller, 1978b). For the explanatory variables, we use the extracted factor scores for *fdistance*, *fagglom*, *fefficien*, *fwisdom* and *fmarket* (Table 2), as the general measures of the location determinants for the inflow of FDI.

2.4. Control variables

Altomonte (2000) shows that the time dummies have a significant effect on the number of investment undertaken by an MNC in the CEE region. Thus, time dummies were included in the model in order to control for time variation arising from the economic changes common to all CEECs. Pusterla and Resmini (2005) and Resmini (2007) state in their work that sector specific factors affect the choice of final location of MNCs in CEECs. Hence, the dummy variable for the industry in which a specific firm operates (high-tech or low-tech) was also introduced. The

⁵ By using a 6-point scale with the option "not sure", the researcher can allow respondents a way out of answering a question, when he or she feels threatened by admitting that the answer to that question is not important. As a result, the researcher can still quantify the response (Sounders *et al.*, 2000; Willits and Saltiel, 1995).

classification of manufacturing industries was based on the NACE Rev. 1 codes and is presented in Table 3.

Table 3 here

Using the explanatory and control variables discussed above, the probability of either investing or not in any given region based on Eq. (4) and Eq. (5) of MNLM has the following form:

$$\begin{aligned} \text{choice}_{n,ji} = & \beta_{0,ji} + \beta_{1,ji} fdistance_n + \beta_{2,ji} fagglom_n + \beta_{3,ji} fefficien_n \\ & + \beta_{4,ji} fwisdom_n + \beta_{5,ji} fmarket_n + \beta_{6,ji} \text{DUM93-96}_n + \beta_{7,ji} \text{DUM97-00}_n \\ & + \beta_{8,ji} \text{DUM01-04}_n + \beta_{9,ji} \text{DUMht}_n \end{aligned} \quad (6)$$

where $j = 1, \dots, 5$ (i.e. 1 for the North-West region, 2 for the North-East region; 3 for the Mazowieckie region; 4 for the South-East region; and 5 for the South-West region); $i = 3$ as the comparison category and $n = 1, \dots, 91$. The time dummies consider the period from before 1992 to 2004 inclusive, with the exclusion of the period before 1992 in the set of time dummies in order to avoid collinearity. The industry dummy represents 1 for high-tech industry and 0 otherwise. Moreover all the explanatory variables in the model are investor's specific. Table 4 summarises the variables used in the model, their measurement and summary statistics.

Table 4 here

Section 3: Empirical results

Section 3: Empirical results

Based on the multinomial logit model with investor's specific characteristics and the variables discussed above, two separate models for the location choice of the inflow of FDI in Polish regions were estimated. The results are presented in Table 5.

Table 5 (Results) here

Model 1 shows the results of the estimation of the explanatory variables and time dummies used in Eq. 6 above, and it refers to the whole sample of companies. In regression 1 of that model the findings for the comparison of the choice of location between the North-West region *versus* the Mazowieckie region indicate that only one variable *fefficien* is positively significant at 1% level. This means that the North-West area, in contrast to the Mazowieckie region, is more attractive for foreign investors if low input costs as well as the availability of labour and resources are considered to be important motives for investing in Poland (*hypothesis 5*). The results also show that *fwisdom* and *fmarket* are statistically significant but negative at 1% and 10% level respectively. This suggests that the North-West region is less attractive than the Mazowieckie area for foreign investors for whom market-seeking and knowledge-seeking are important motives for establishing their business (*hypotheses 3 and 4*).

Further, the findings for the comparison of the choice between the North-East region *versus* the Mazowieckie region, in regression 2, show that only three of the variables used in the model turned out to be positive and statistically significant. The first two are the explanatory variables, *fefficien* and *fdistance* which are significant at 5% and 10% level respectively. This suggests that the probability of the inflow of FDI into the North-East area is higher than to the Mazowieckie region, if transportation costs, quality of the infrastructure, distance between the home and host country and the availability of labour at low costs are considered important motives by foreign investors (*hypotheses 5 and 3*). The last one is the time dummy variable DUM01-04, significant at 10% level. This can point out that in the years closes to join the European Union (EU), the probability of investing in the North-East region is much higher then in the Mazowieckie region because this is the region which shares its borders with other countries that are going to join the EU. Similar to the above regression the results indicate that *fwisdom* and *fmarket* are statistically significant but negative. Here the significance level is different to above findings, because the former variable is significant at 5% while the latter at 1% level respectively. This may indicate that the Mazowieckie area is more attractive for FDI if market size and knowledge-seeking investment are of particular importance to investors (*hypotheses 3 and 4*).

In addition, the results in regression 3 for the comparison of the choice between the South-East region *versus* the Mazowieckie region are in a way similar to those in regression 1. The variable *fefficien* turned out to be positive and statistically significant at the 1% level. This shows that the South-East region, like the North-West, is a more attractive location for FDI than the Mazowieckie area, when labour costs and the availability of both resources and labour are important factors for investing in Poland (*hypothesis 5*). Conversely, the variable *fmarket* appeared to be statistically negative at the 10% level, indicating once again that if market factors are important motives for investing in Poland, then the Mazowieckie region is the most attractive area for the inflow of foreign capital (*hypothesis 4*).

Finally, the results in regression 4 for the comparison of the choice between the South-West region and the Mazowieckie region reveal that once again the predictor *fefficien* is positive and statistically significant at the 1% level. This demonstrates that the South-West area, like the South-East and North-West areas, is most desirable region to invest in compared the Mazowieckie region (*hypothesis 5*). In addition, out of the four available regions to investors, the South-West area seems to have the highest probability for investment associated with low input costs and the availability of resources⁶. The results for the variables *fagglom* and *fwisdom* are statistically significant but negative at 10% and 5% level respectively, suggesting that the South West region is less attractive than the Mazowieckie area when agglomeration and knowledge-seeking factors are important investment motives (*hypotheses 1 and 3*).

In contrast to previous model, model 2 demonstrates the results of the estimation of the explanatory variables and the industry dummy used in Eq. 6 above. As shown in Table 5, this model is regressed on only 51 observations, because only this number of foreign investors in the whole sample was operating in the manufacturing sector in Poland.

In regression 1 of this model the results for the comparison of the choice of location between the North-West region *versus* the Mazowieckie region show that only two variables are significant. The first variable is *fefficien* and it is positively significant at the 1% level, indicating that the North-West area, in contrast to the Mazowieckie region, is more attractive for foreign investors from the manufacturing sector for whom labour costs and the availability of both resources and labour are important factors (*hypothesis 5*). The second variable is *fwisdom* and it is negatively significant at

⁶ In order to obtain the odds, the coefficients ($\beta_{j|i}$) from Table 5 needs to be $\exp(\beta_{j|i})$.

the 10% level indicating that in this case the Mazowiecie region is most preferable for those investors in manufacturing sector than the North-West area (*hypothesis 3*).

Additional, in regression 2 the results for the comparison of the choice between the North-East region *versus* the Mazowieckie region point out that only one variable *fmarket* is statistically significant at the 10% level and it has a negative sign. This indicates that foreign investors from the manufacturing sector prefer the Mazowieckie area as opposed to the North-East region (*hypothesis 4*).

Moreover, the findings in regression 3 for the comparison of the choice of location between the South-East region *versus* the Mazowieckie region reveal that only the variable *fefficien* is positively significant at 1% level. This means, that the South-East area, like the South- West and North-West areas, is more attractive place to invest in compared the Mazowiecie region (*hypothesis 5*). What is more, out of the three regions, the South-East area appears to have the highest probability for investors from the manufacturing sectors for whom low input costs and the availability of resources are important.

To finish, in regression 4 which compares the choice between the South-West region and the Mazowieckie region, the results demonstrate that only two variables are statistically significant and positive. The first variables is *fefficien* and it is significant at the 1% level, indicating that the South-West region is more attractive then the Mazowieckie area for manufacturing investment (*hypothesis 5*). The second one is the industry dummy DUN_{it} which is significant at the 5% level. This might indicate that the South-West region in relation to the Mazowieckie region is the most preferable location for foreign investors from high-tech industries. The results in this regression also show that *fwisdom* is negative and statistically significant at the 10% level. This shows once again that the Mazowieckie area is more attractive than the South-West region if knowledge-seeking investment even in the manufacturing sector are important factors for investing in Polish market (*hypothesis 3*).

The overall explanatory ability of those two models are satisfactory, as the model's statistics shows in Table 6.

3.1. Discussion

The results indicate that that there are substantial differences in the attractiveness of Polish regions, when the initial inflows of FDI are evaluated.

It is shown that if input costs and the availability of labour and resources are seen by investors as important factors for investing in Poland, then all regions are more favourable for the inflow of foreign capital than the Mazowieckie area. However, the South-West region is the most preferable area for those kinds of motives. A possible explanation can be the fact that this particular region has the highest unemployment rate within the country and is rich in natural resources. The high unemployment level makes people place a higher value on their current job, with the result that they are willing to work for lower wages and perhaps show greater commitment. This could explain why Friedman *et al.*, (1992) and Billington (1999) find that high unemployment increases FDI inflows. The availability of resources acts as an encouragement for the inflow of FDI in that region due to the fact that during the communist regime this area was "the heart" of the economy; the majority of the textile industries (the Łódź voivodship) as well as all mining production (both the Dolnośląskie and Śląskie voivodships) was based there (Churski, 2002; Dornisch, 2002).

Only one area, the North-East region, seems to be the preferable location (in comparison to the Mazowieckie area) for the inflow of FDI when geographical factors are important motives for investors. Access to the Baltic Sea and to new members of the EU, make this area very attractive for foreign capital (Nandakumar and Wagué, 2001; Górzelać, 2002). Geographical proximity and local infrastructure imply lower communication costs and fewer difficulties in managing business activities (Woodward, 1992; Hadgkinson *et al.*, 2001; Louri *et al.*, 2000).

If agglomeration is an important factor for investing in Poland, then the Mazowieckie area is the most attractive location for foreign investment, and more highly ranked than the North-East and South-West regions which are also considered by investors. This result is not surprising, because the centre of this region, Warsaw, is the leading area for finance, business services and real estate in Poland. As stated by Maskell and Malmberg (1999) "agglomeration of firms within a given business sector in a region will make the area especially suited to meet the specific location requirements. Even assuming that a new firm is completely free in its choice of location, the optimal location would usually be a region with a long track record of servicing firms" (p.175). Indeed, the seminal work of Wheeler and Mody (1992) makes a strong empirical case for agglomeration and market size in US investors' location decision; while Resmini and Altomonte (2001), using panel data for the period 1995-1998 to analyse the determinants of FDI inflow to Poland, find that the presence of agglomerations stimulated foreign investment into Poland. Similar conclusions were obtained by

Cieřlik and Ryan (2005) when using a Poisson model for the estimation of location determinants of Japanese multinationals within Poland during the period 1991-2001.

In addition to agglomeration, the strong cultural and R&D centres of the Mazowieckie region, place this particular area as the most favourable location even if three other regions (the North-West, North-East and South-West) are also considered for the initial inflow of FDI. The justification can be the fact that this voivodship has the highest number of R&D institutions and universities as well as the largest amount of expenditure devoted to R&D by the government (Table 1).

Furthermore, the Mazowieckie region is the most attractive location for FDI when market factors are viewed as important motives, even if other regions such as the North-West, North-East and South-East are also taken into consideration by investors. This finding is hardly surprising, because the Warsaw metropolitan area is the largest market within the country (Table 1). As Vernon (1974b, 1979), Dunning (1993a), Agarwal (1980) and others have pointed out, large market size has a positive impact on the inflow of FDI.

Section 4: Conclusion and policy implications

In this paper we examined the motives for the initial inflow of foreign capital in Poland at the regional level.

We found that those investors, for whom agglomeration, knowledge and market factors are the main motives for investing in Poland, tended to choose the Mazowieckie region despite the fact that other regions were also considered. However, investors for whom low input costs, availability of labour and resources and geographical factors are significant motives for setting up a business activity in Poland, favour other regions than the Mazowieckie area. These findings confirm that Polish regions do indeed differ substantially in attracting foreign capital and that regional characteristics matter in the selection of primary location choice in Poland.

This research contributes to the literature on the determinants of spatial location of FDI in developed countries (Carlton, 1983; Friedman *et al.*, 1992; Head *et al.*, 1995; Coughlin *et al.*, 1991; Louri *et al.*, 2000; Crozet *et al.*, 2002; Dunning, 1998); the growing literature in the same field focusing upon transition economies (Campos and Kinoshita, 2003; Mayer, 2001; Galego *et al.*, 2004; Bevan *et al.*, 2004). Additionally, another contribution of this research stems from the fact that this study represents one of the first attempts to test the motives of the initial inflow of foreign capital into Polish regions, using a multinomial logit model incorporating investor's specific

characteristics. A final contribution of this research stems from the quantitative and cross-sectional nature of the study.

The paper's findings suggest that the relative autonomy of Polish regions have led to differences in their attractiveness for inward foreign investment, the exploitation of regional potential, and economic development. While generally outside the scope of this paper, there are potentially significant public policy implications derived from the spatial distribution of FDI in Poland. Indeed these implications extend beyond Poland to other countries where the capital city / region is dominant in respect of levels of economic activity.

Regional policies in Poland are focused upon the creation and management of 14 Special Economic Zones (SEZs) designed to address regional imbalances. As Figure 1 shows, these SEZs are located in the regions where, for instance, efficiency-seeking FDI motives are prevalent. Hence the SEZs appear to be correctly targeted to areas of economic need. While the SEZ incentives emphasize employment creation as well as capital investment outlays through investment grants, investment incentives have been criticized as "a crude, discriminatory and expensive tool for the attraction of inward FDI" (Tavares and Young, 2005, p.4). Authors have argued instead that governments should focus upon short- and long-term measures designed to strengthen economic fundamentals and the institutional system. The local governments of those Polish regions that are least attractive to FDI would be well advised to emphasize improvements in the investment climate through political, economic and institutional reforms.

The evidence in the paper relates to FDI determinants as opposed to FDI quality. Nevertheless, there may be an assumption, for example, that where low input costs and labour availability are important motives for investment, FDI may be dominated by labour-intensive, assembly-type operations. Conversely, the importance of agglomeration and knowledge-seeking factors (as in the Mazowieckie region in Poland) may suggest higher-value added and integrated MNC operations, which in turn could further exacerbate regional inequalities in Poland. The results in this paper do not permit more refined comment on this important topic, and further research is clearly required to test the implicit hypotheses derived from the above observations.

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Figure 1. The new territorial system of Poland in comparison with the old one



Table 1. Characteristics of Polish regions

	North – West				North –East		Mazowieckie	
	<i>Zachodnio-pomorskie</i>	<i>Pomorskie</i>	<i>Lubuskie</i>	<i>Wielkopolskie</i>	<i>Kujawsko-pomorskie</i>	<i>Warmińsko-mazurskie</i>	<i>Podlaskie</i>	<i>Warsaw</i>
Total area (<i>in km²</i>) ¹	22.9	18.3	13.9	29.8	17.9	24.2	20.2	35.6
- of which towns	61	42	42	109	52	49	36	84
- of which villages	3172	2994	1508	5504	3581	3865	3945	9084
Population (<i>in million</i>) ¹	1.7	21.8	1.0	3.4	2.1	1.4	1.2	5.1
Employment (<i>in thousands</i>) ^{1,2}	513.4	698.8	304.2	1296.1	713.9	429.8	478.7	2275.8
Unemployment rate (<i>in %</i>) ¹	26.4	21.2	26.0	16.1	22.5	28.8	15.2	13.9
GDP ³	33423.9	42498.7	17675.8	69397.1	36884.7	20659.8	17976.2	153702.2
Gross Domestic Expenditure on R&D ³	90.6	227.2	138.5	324.7	110.4	56.4	38.0	1994.3
Researchers employed in R&D ⁴	2.1	5.5	2.2	2.7	2.2	1.5	1.4	7.3
Graduates of higher education (<i>in thousands</i>) ¹	19,4	16,0	6,4	28,2	16,6	10,4	10,8	72,7
Hard surface public roads ^{1,5}	56,8	62,3	55,9	88,6	77,9	53,5	53,5	72,5
Railway lines ^{1,5}	5,6	7,6	6,5	6,8	7,1	5,5	3,9	4,8
Telephone line (<i>per 1000 population</i>) ¹	325,5	302	322,2	259,7	298,5	310,4	356,6	359,1
Budget of voivodship – expenditure (<i>in million zlotys</i>) ¹	200,7	249,8	172,1	389,4	237,5	168,3	146,8	494,3

¹ As of 31. 12. 2002.² In percentage of the national average.³ In current prices. GUS (2003).⁴ Employed full time; per 1000 economically active persons.⁵ Per 100 km² of total area in km

Source: GUS (2003, 2004); PAIHIZ (2003, 2004) and authors' own calculations.

Table 1. Characteristics of Polish regions (continued)

	South – West				South – East			
	<i>Łódzkie</i>	<i>Dolnośląskie</i>	<i>Opolskie</i>	<i>Śląskie</i>	<i>Lubelskie</i>	<i>Podkarpackie</i>	<i>Świętokrzyskie</i>	<i>Młopolskie</i>
Total area (<i>in km²</i>) ¹	18.2	19.9	9.4	12.3	25.1	17.9	11.7	15.1
- of which towns	42	90	34	71	41	45	30	55
- of which villages	5167	2903	1555	1511	4173	2163	2831	2631
Population (<i>in million</i>) ¹	2.6	2.9	1.1	4.7	2.2	2.1	1.3	3.2
Employment (<i>in thousands</i>) ^{1,2}	1017.5	950.1	342.3	1647.3	947.7	916.7	570.4	1278.8
Unemployment rate (<i>in %</i>) ¹	18.4	22.4	19.3	16.5	15.7	16.9	18.5	13.9
GDP ³	33423.9	42498.7	17675.8	69397.1	36884.7	20659.8	17976.2	153702.2
Gross Domestic Expenditure on R&D ³	298.6	276.5	30.2	342.5	25.2	119.0	14.1	496.5
Researchers employed in R&D ⁴	2.2	3.7	3.0	4.1	2.6	1.1	1.1	5.5
Graduates of higher education (<i>in thousands</i>) ¹	20,8	26,9	7,9	37,9	18,2	15,4	14,3	25,6
Hard surface public roads ^{1,5}	88,3	92,2	87,7	163	71,2	78,6	95,8	144,0
Railway lines ^{1,5}	6,0	9,3	9,3	18,9	4,2	5,3	6,2	7,7
Telephone line (<i>per 1000 population</i>) ¹	316,2	351,5	250,7	318,4	353,6	215,0	237,9	291,4
Budget of voivodship – expenditure (<i>in million zlotys</i>) ¹	223,4	320,1	112,7	605,1	244,4	242,0	162,1	365,0

¹ As of 31. 12. 2002.² In percentage of the national average.³ In current prices. General Statistical Office (2003).⁴ Employed full time; per 1000 economically active persons.⁵ Per 100 km² of total area in km

Source: General Statistical Office (2003, 2004); PAIiZ (2003, 2004) and authors' own calculations.

Table 2. Confirmatory factor analysis on motives for investing in the Polish regions

Motives*	Factors**				
	“fdistance”	“fagglom”	“fefficien”	“fwisdom”	“fmarket”
<i>I. Geographical factors</i>					
1) Lower transportation costs (e.g. shipping)	0.79308				
2) Geographic conditions favourable for physical distribution (i.e. geographical distance)	0.82489				
3) Good quality of local infrastructure (i.e. the quality and availability of roads and highways)	0.74006				
<i>II. Agglomeration factors</i>					
1) Supporting industries already exist for supply of parts and components		0.60849			
2) A number of other companies from the same country were already operating there		0.69263			
3) A number of other companies in the same industry were already operating there		0.82432			
<i>III. Efficiency-seeking factors</i>					
1) Availability of labour			0.81811		
2) Low labour cost			0.82708		
3) Availability of raw materials at low cost			0.48402		
<i>IV. Knowledge-seeking factors</i>					
1) Educational level in the region (e.g. foreign languages)				0.75631	
2) Local universities and research centers				0.75761	
<i>V. Market-seeking factors</i>					
1) Economies of scale					0.77321
2) Consumers' demand					0.77205
<i>Observations No.</i>	91	91	91	91	91
<i>Eigenvalue</i>	1.85710	1.52951	1.58763	1.14794	1.19214
<i>Proportion of Variance explained</i>	.6190	.5098	.5292	.5740	.5961

* After the motives were coded they were grouped into five factors, based on the literature, priori to the confirmatory factor analysis.

** Name of the explanatory variables used in the analysis

Source: Authors' calculations using Stata 9

Table 3. Explanatory variables, their measurement and summary statistics

HIGH-TECH / LOW-TECH	INDUSTRY CLASSIFICATION		
		FREQ.(%)	NACE REV.1.1
HIGH-TECH	Radio TV and communication equipment	4 (4.40)	32
HIGH-TECH	Medical precision and optical instruments	1 (1.10)	33
HIGH-TECH	Pharmaceutics	1 (1.10)	24.1
HIGH-TECH	Chemicals (excluding Pharmaceuticals)	4 (4.40)	24
HIGH-TECH	Motor vehicles trailers and semi-trailers	11(12.07)	34
LOW-TECH	Food products	4(4.40)	15
LOW-TECH	Tobacco products	2 (2.20)	16
LOW-TECH	Leather products	2 (2.20)	18
LOW-TECH	Paper products	3 (3.30)	21
LOW-TECH	Cole refined petroleum products and nuclear fuel	2 (2.20)	23
LOW-TECH	Rubber and plastic products	4 (4.40)	25
LOW-TECH	Metal products	1 (1.10)	27
LOW-TECH	Other non-metallic products	8 (8.77)	26
LOW-TECH	Furniture products	2 (2.20)	36
LOW-TECH	Recycling	2 (2.20)	37
TOTAL		51 (56.04)	

Source: General Statistical Office (2006, 2005) and authors' own calculations.

Table 4. Explanatory variables, their measurement and summary statistics

EXPLANATORY VARIABLES		
VARIABLES	DEFINITION	MEAN(ST. DEV.)
<i>fdistance</i>	Factor score for 1990-2004 (see Table 2)	-4.77e-09(1)
<i>fagglom</i>	Factor score for 1990-2004 (see Table 2)	8.11e-09(1)
<i>fefficien</i>	Factor score for 1990-2004 (see Table 2)	-4.30e-09(1)
<i>fwisdom</i>	Factor score for 1990-2004 (see Table 2)	4.58e-09(1)
<i>fmarket</i>	Factor score for 1990-2004 (see Table 2)	-1.49e-08(1)
<i>DUM93-96</i>	Dummy: 1 if MNC invested in Poland between 1993-1996; 0 otherwise	0.407(0.494)
<i>DUM97-00</i>	Dummy: 1 if MNC invested in Poland between 1997-2000; 0 otherwise	0.198(0.401)
<i>DUM01-04</i>	Dummy: 1 if MNC invested in Poland between 2001-2004; 0 otherwise	0.110(0.314)
<i>DUM_{ht}</i>	Dummy: 1 if MNC invested in high-tech industry; 0 otherwise	0.231(0.424)

Source: Authors' own calculations.

Table 5: The choice of Polish region : the multinomial logit model¹

Choice of a region	Model 1	Model 2	Choice of a region	Model 1	Model 2
1) $P_1 \hat{P}_3$			3) $P_4 \hat{P}_3$		
constant	0.806 (0.730)	0.929 (0.803)	constant	-1.572 (1.257)	-1.382 (1.356)
fdistance	0.435 (0.484)	0.425 (0.824)	fdistance	0.760 (0.666)	1.329 (1.118)
fagglom	-0.734 (0.528)	-0.663 (0.792)	fagglom	-0.682 (0.620)	-0.679 (0.966)
fefficien	2.348* (0.633)	2.885* (1.125)	fefficien	2.205* (0.859)	3.053** (1.461)
fwisdom	-1.434* (0.509)	-1.883*** (1.043)	fwisdom	-0.340 (0.614)	-1.505 (1.237)
fmarket	-0.726*** (0.433)	-0.645 (0.756)	fmarket	-0.973*** (0.546)	-0.701 (0.926)
DUM93-96	0.255 (0.917)		DUM93-96	0.842 (1.468)	
DUM97-00	-0.240 (1.292)		DUM97-00	2.395 (1.567)	
DUM01-04	0.897 (1.678)		DUM01-04	1.990 (2.081)	
DUMht		1.961 (1.728)	DUMht		2.944 (2.074)
2) $P_2 \hat{P}_3$			4) $P_5 \hat{P}_3$		
constant	-1.190 (1.171)	0.862 (0.982)	constant	0.997 (0.829)	0.068 (0.916)
fdistance	1.313*** (0.711)	1.333 (0.976)	fdistance	0.239 (0.501)	0.701 (0.862)
fagglom	-0.756 (0.661)	-1.017 (0.881)	fagglom	-0.892*** (0.538)	-0.769 (0.818)
fefficien	2.354** (0.933)	1.141 (1.292)	fefficien	2.585* (0.663)	2.885* (1.150)
fwisdom	-2.056** (0.742)	-1.562 (1.157)	fwisdom	-1.142** (0.513)	-1.674*** (1.061)
fmarket	-2.141* (0.810)	-1.862*** (1.022)	fmarket	-0.594 (0.443)	-0.343 (0.773)
DUM93-96	-1.283 (1.477)		DUM93-96	0.863 (1.001)	
DUM97-00	0.408 (1.497)		DUM97-00	1.001 (1.304)	
DUM01-04	3.274*** (1.916)		DUM01-04	1.423 (1.715)	
DUMht		-0.124 (2.035)	DUMht		3.440** (1.781)

¹ Standard errors in parentheses P_3 - Mazowieckie region is the comparison group $P_1 \hat{P}_3$ - North-West region vs. Mazowieckie region $P_2 \hat{P}_3$ - North-East region vs. Mazowieckie region $P_4 \hat{P}_3$ - South-East region vs. Mazowieckie region $P_5 \hat{P}_3$ - South-West region vs. Mazowieckie region`

*p≤.01 **p<.05 ***p<.10

Source: Authors' calculations using Stata 9

Table 6. The multinomial logit models statistics.

Models statistics	Model 1	Model 2
Log-Likelihood	-98.263	-58.088
Model LR χ^2	82.938(32)*	39.695(24)**
Observations	91	51
Pseudo R ²	0.297	0.261

Source: Authors' calculations using Stata 9.

Appendix

Table 7: Sample characteristics

	USA	EU	OTHES	TOTAL
Investment type	Freq. (%)	Freq. (%)	Freq. (%)	Freq. (%)
<i>Greenfield</i>	4 (33.33)	18 (25.35)	3 (37.50)	25 (27.47)
<i>Joint Ventures</i>	4 (33.33)	28 (39.44)	5 (62.50)	37 (40.66)
<i>M&A</i>	4 (33.33)	25 (35.21)	0 (0.00)	29 (31.87)
Sector of economic activity				
<i>Industry</i>	7 (58.33)	41 (57.75)	3 (37.50)	51 (56.04)
<i>Agriculture, hunting and forestry</i>	1 (8.33)	2 (2.82)	0 (0.00)	3 (3.30)
<i>Construction</i>	1 (8.33)	11 (15.49)	1 (12.50)	13 (14.29)
<i>Trade and repair</i>	0 (0.00)	2 (2.82)	1 (12.50)	3 (3.30)
<i>Hotels and restaurants</i>	0 (0.00)	2 (2.82)	1 (12.50)	3 (3.30)
<i>Transport, storage intermediation</i>	0 (0.00)	3 (4.23)	0 (0.00)	3 (3.30)
<i>Other services</i>	3 (25.00)	10 (14.08)	2 (25.00)	15 (16.48)
TOTAL	12 (100)	71 (100)	8 (100)	91 (100)

Source: Authors calculations using STATA.

Figure 2 Distribution of foreign investors in the data sample.

