DUISBURGER ARBEITSPAPIERE OSTASIENWISSENSCHAFTEN

DUISBURG WORKING PAPERS ON EAST ASIAN STUDIES

No. 71/2006

**Spatial Determinants of Japanese
Manufacturing Firms in the Czech Republic**

Norifumi Kawai

Institut für Ostasienwissenschaften (Institute for East Asian Studies)
Universität Duisburg-Essen
Campus Duisburg
D-47048 Duisburg, Germany
Tel.: +49-203-379-4191
Fax: +49-203-379-4157
e-mail:in-east@uni-duisburg-essen.de

Abstract/Zusammenfassung

This study casts light upon the locational distribution of industrial activites of Japanese multinational corporations (MNCs) in the Czech Republic at the regional level from 1999 through 2004. In our study, McFadden's conditional logit model is applied to trace the dynamic effects of a series of factors on locational choices of Japanese MNCs. We found evidence that the locational choice of Japanese MNCs is positively affected by industrial agglomeration effects resulting from potential interactions across and within existing Japanese and foreign firms owing to mitigation of various transaction costs. In addition, the presence of well-developed infrastructure systems and high wage level determine the location choice of Japanese MNCs, while distance matters. The empirical evaluation also contends that spatial determinants of MNCs vary by nationality in the Czech Republic. It is evident that agglomeration externalities and distance emerge as critical driving factors for Japanese MNCs and Asian MNCs. On the other hand, it has been verified that fiscal and financial incentives tend to highly motivate German MNCs, while local demand conditions have a great impact on Anglo-American MNCs.

Contents

1. Introduction

Recently, Japanese foreign direct investment (FDI) inflow into Central and Eastern European countries (CEECs) has been increasing. In particular, the Czech Republic gained a significant attention from Japanese multinational corporations (MNCs) in recent years as roughly 85% of the total Japanese FDI in that country until today occurred during the period 2000-04 (Minitsry of Finance, Japan). The main reason for this dramatic rise in Japanese FDI in the Czech Republic is derived from an official announcement of the Toyota and PSA Peugeot Citroën (TPCA) joint venture project in December 2001; the companies agreed to establish an assembly line in Central Bohemia. The plant facility is the largest greenfield investment ever experienced in the Czech Republic since the start of the country's transition process from a command economy toward a market-oriented economic development (World Investment Report 2002; JETRO 2005). Miura (2000: 15) states that "this investment generated waves of market entry by Toyota car-parts suppliers to Kolin and Northern Bohemia, which are situated near the border with the former East Germany". Other major Japanese manufactoring investors in the Czech Republic include Denso and Panasonic. Active localization by Japanese MNCs seems to empower indigenous firms in the Czech Republic to reap various benefits, such as technological spillover, managerial know-how, financial resources, and integration into global linkages of sales, logistics, marketing and product development.

However, geographical imbalance of Japanese FDI across regions in the Czech Republic appears more evident in recent years. The cumulative number of Japanese production start-ups from 1990 to 2004 with the exception of Praha ranges from 0 in Hradec Kralove to more than 10 in Central Bohemia, Plzen and Usti. The share of new establishments in the latter three regions accounts for more than 60% of the total. This implies that the the geographical distribution of Japanese FDI across regions is considerably skewed and unbalanced (See Graphic 1). Hence, a variety of fiscal and financial incentives, such as corporate tax relief, job creation grants, and vocational educational training grants, may be instrumental in alleviating regional economic disparities within the country. However, many view that the scale and domain of national policy autonomy, such as the provision of financial incentives set by the Czech government, will be constrained by the standardization of EU's regulatory framework, such as competition policy. Werner (2003: 15) states that "the various types of "zones" that have been used to attract investment to the region will need to be dismantled once Visegrad countries [the Czech Republic, Hungary, Poland and Slovakia] enter the EU regulations on the use of incentives in the automotive industry which suffer from overcapacity across the EU are even stricter".

On the other hand, depressed regions in the Czech Republic will be qualified to receive financial supports from the EU Structural and Cohesion Funds allocated by the European Commission. European Regional Policy leads to promoting economic convergence not merely across nations but across regions as well. These changes in the scope and depth of policy sovereignty and the role of supranational governing bodies at the EU level imply that the phenomenon of EU integration makes

economic borders obsolete and less important. The changing policy envrionment helps reshape the relations between the government and the markets. Considering the eroding role of the nations in the EU, it is inevitable for policy makers and FDI promotion agencies in the indigenous economies to shift an emphasis to FDI distribution at the regional level. Using Japanese MNCs as an example, we probe what attributes regions should possess in order to attract Japanese investors and the extent to which the spatial behavior of Japanese MNCs varies when the power of agglomeration externalities comes into effect.

This paper is organized as follows: In Section 2, FDI inflow in the Czech Republic is described in historical and aggregate macroeconomic terms. In Section 3, the theory of localization is briefly disucssed. Section 4 summarizes previous studies on the issue of locational patterns of MNCs abroad. Section 5 presents model specifications, data set and hypothesis formation. In Section 6, empirical findings on the spatial behavior of Japanese MNCs are explained and compared with that of German, Anglo-American, and Asian MNCs in the Czech Republic. Finally, the implications for future research are discussed with concluding remarks.

2. Analytic Narratives: FDI Inflow into the Czech Republic

2.1. FDI and Macroeconomic Fundamentals

As for the historical trend of general FDI inflow into the Czech Republic, the early and mid-1990s witness a gradual entry of foreign investors into the country. However, as Figure 1 reports, FDI inflow emerged steadily after 1998 and the unprecedented level of FDI was evidently marked in 2002.

Figure 1: FDI Inflow and Market Pressure Index (MPI) in the Czech Republic from 1993-2004 (Unit: Quarterly)
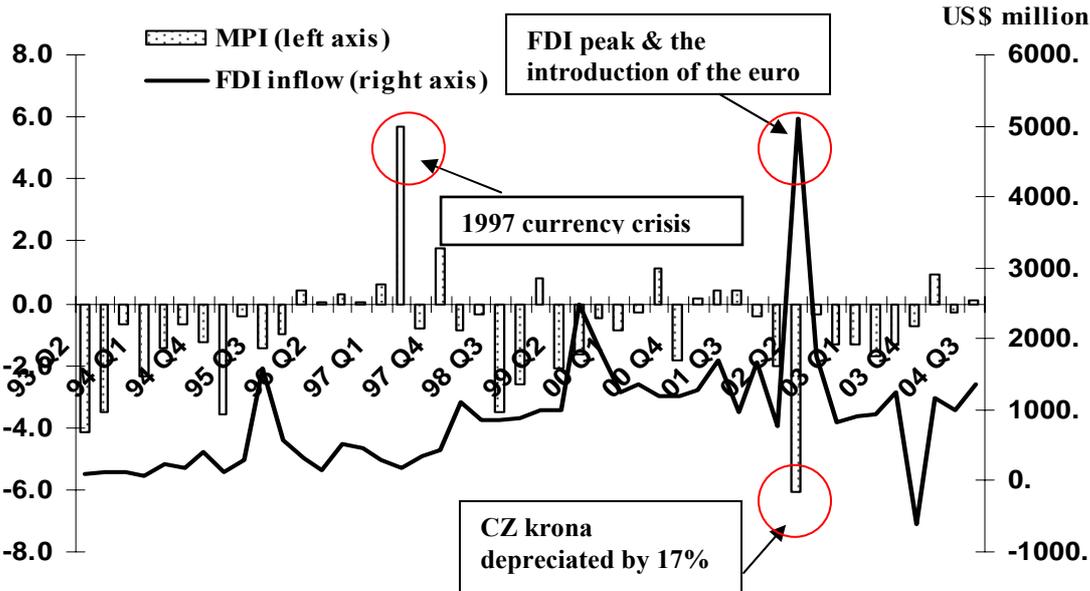
Source: International Financial Statistics, IMF
Note: Market Pressure Index (Weymark, 1998; Kaminsky, Lizondo and Reinhart, 1998 and 1999) is calculated by the author. The equation contains the variables, exchange rate, foreign reserve and interest rate. The equation is as follows: Market Pressure Index (MPI)= $\Delta\$/CKR/\sigma\Delta\$/CKR+\Delta r/\sigma\Delta r-\Delta FR/\sigma\Delta FR$ The higher MPI the higher probability that severes currency crisis took place.

A number of endogenous and exogenous factors that both hindered and triggered FDI inflow into the Czech Republic can be identified. Firstly, the reason for a marginal scale of FDI inflow in the early 1990s is evidently attributable to a failing process of privatization and to economic mismanagement. After the disintegration of Czechslovakia in 1993, the Czech central government guided a mistaken privatization through a voucher scheme and controlled large national banks in the absence of feasible legal settings. The increase in soft loans and the voucher scheme without sound fiscal discipline resulted in the emergence of a number of newly local privatized enterprises that possess poor managerial capacity, while the economy was excessively heating. Accordingly, this combination of the ill-structured privatization process and the lack of corporate governance retarded indigenous private firms from competing, generating profits and modernizing. Instead, this scenario ended up with an enormous size of non-performing loans and the weakening of investors' confidence. Moreover, following Figure 1, the Czech currency crisis in 1997 shattered the Czech economy, paired with persistent real exchange rate appreciation and high current account deficits. This exchange rate's unsustainability contributed to political uncertainty and instability.

Horváth (1999: 286) explains that "foreign investors became more sensitive to the risk of policy reversal, since a conservative government was likely replaced by a left-wing oriented government with rather excessive rhetoric and without previous governing experience". One could argue that the mistaken privatization schemes, a negative spiral of fragile macroeconomic fundamentals and political conflicts all discouraged foreign investors from entering the Czech market until the end of the 1990s.

In contrast, the dramatic rise in FDI inflow into the Czech Republic after the very late 1990s may be attributed to other factors. First, Drury (2000) argues that the social democratic government of Miloš Zeman, unlike the government of Václav Klaus, committed it to attract more FDI, suggesting foreign direct investment as the best vehicle for domestic companies to grow. Second, it is claimed that the increase in FDI into the Czech Republic may be derived from the increasing importance of a series of EU regionalization efforts, e.g., the Single Market Program, the launch of the euro, and the EU eastward enlargement. Third, the 2001 announcement of TPCA to set up a plant in Kolin, Central Bohemia, induced a large number of Toyota *keiretsu* companies to come together in integrated peripheral markets.[1] It is worth noting that the spike in Figure 1 is indicative of the TPCA investment with an amount of 850.2 million US dollars.

Finally, Ohmae (2005) argues that the role of the promotional agency, CzechInvest, acts as an informative channel and helps foreign firms to obtain sufficient information and professional consultation on FDI activities in the Czech Republic. The FDI promotional success of CzechInvest is connected with "the ability (1) to file applications for investment incentives at the ministerial offices and prepare draft offers to grant investment incentives, (2) to bridge common interests and deals between relevant ministries and new foreign investors and (3) to streamline administrative procedures

for new investments" (Ohmae 2005: 140-42).[2] Since its establishment in 1992, CzechInvest has been involved in more than 300 investment projects, which have generated more than 78,000 jobs across regions in the Czech Republic (CzechInvest).

2.2. Recent Trend of Japanese Foreign Investment in the Czech Republic

Figure 2: Evolution of Japanese FDI by sector in the Czech Republic
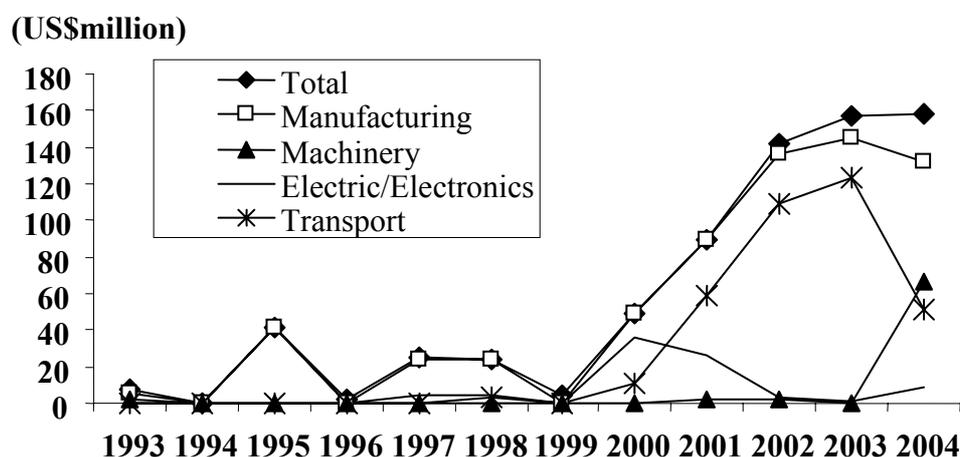
Source: Ministry of Finance, Japan
Note: Own calculation based on the exchange rate 117.37 Yen/US$ on 31/01/ 2006, Bank of Japan

Table 1: Total Amount of Japanese FDI in the Czech Republic (-2005)

	Country	Investment (mil. CZK)	%	Investment (mil. USD)	%
1	Germany	115705	27.9	3726	28.6
2	**Japan**	**83947**	**20.2**	**2536**	**19.5**
3	Czech Republic	44112	10.6	1386	10.6
4	USA	32228	7.8	1029	7.9
5	Netherland	28789	6.9	811	6.2
6	France	23016	5.6	675	5.2
7	Ireland and UK	16478	4.0	536	4.1
8	Italy, Cyprus, Spain, Portugal	15476	3.7	514	3.9
9	Canada and Mexico	13948	3.4	405	3.1
10	Austria, Switzerland	13308	3.2	465	3.6
11	Belgium, Luxemburg	11210	2.7	353	2.7
12	Denmark, Finland, Norway, Sweden	7731	1.9	289	2.2
13	Taiwan	5642	1.4	175	1.3
14	other	3061	0.7	134	1.0
	TOTAL	**414649**	**100.0**	**13034**	**100.0**

Source: CzechInvest

---

[1] Their investment aim underlines an attempt to minimize transportation, market information and (in)tangible costs and to expand the targeted EU markets through locating their production lines in the EU perpheral regions.
[2] See the CzechInvest Web site and Annual Report 2004.

As discussed in the preceeding section, the significant change in FDI has obtained a great deal of attention since the dynamic shift in Czech's FDI policy from a conservative to an open and welcome disposition in 1998. Japanese FDI inflow also started gaining in importance at around the same time. Figure 2 demonstrates that the unprecedented rise in Japanese FDI took place after 1999, while the level of Japanese FDI had remained relatively negligible in the early and mid-90s. After the Czech Republic was divorced from Czechslovakia in 1993, a few major Japanese MNCs took an initiative forengaging in manufacturing operations in the mid-90s. Alps Electric Czech was established to produce electric components in 1995. Panasonic AVC Networks Czech entered the local market to produce color television sets, wholly owned by Matsushita Electric since 1996 (Nikkei Sangyo Shimbun 12.03.2004).

There are two specific sectors appealing to Japanese multinationals. The majority of Japanese FDI was directed to the electronics/electric sector until the mid-90s. After 2000, Japanese FDI rapidly gravitated toward the automotive industry. This shift in the sectoral distribution of Japanese FDI since 2000 represents the impact of the joint veture project undertaken by Toyota and TPCA, which contributes to forging the nexus between FDI dynamism and economic development in the Czech Republic. Surprisingly, Table 1 reveals that Japanese FDI is ranked as second to Germany in value. Hence, this statistical data indicates that Japanese MNCs can be regarded as a catalyst for industrial modernization in the Czech Republic, while the myth that Western MNCs dominate over non-Western MNCs should be discarded. Equally important, this evidence offers strong counter-evidence to the argument that national borders are no longer an impediment to Japanese FDI under globalization. Rather, as mentioned previously, the characteristics of Japanese multinationals in an enlarged Europe hinge increasingly upon the role played by the state *per se* and governing bodies of the EU.

3.Theory of Localization

To learn more about the localization of Japanese FDI, it is helpful to reconsider Marshall's pioneering concept of positive agglomeration economies originating from the geographical concentration of specialized industries in particular localities:

> *"When an industry has chosen a locality for itself, it is likely to stay there long: so great are the advantages which people following the same skilled trade get from near neighbourhood to one another. If one man starts a new idea, it is taken up by others and combined with suggestions of their own; and thus it becomes the source of further new ideas. Every cheapening of the means of communication, every new facility for the free interchange of ideas between distance places alters the action of the forces which tend to localize industries".* (Marshall, A. 1920: 225-27)

These above statements suggest that the effect of clusterings of firms competing in a particular place may contribute to lowering (in)tangible production costs and obtaining higher productivity and return on investment. Agglomeration plays a role in bolstering business transactions and in gathering information on the dynamics and structure of indigenous markets. The information that firms have acquired and shared with other competitors in clusterings serves to reformulate a way of doing

business in new markets and improve product quality and production process within their internal settings.

Porter (1990) also argues that proximity stimulates the speed and scope of information flows on the attitudes, actions and strategies of competitors in yielding high returns. The possibility is greater that firms would rather cooperate than compete with prevailing local and foreign competitors. Tamayo (2000: 600) supports this view, suggesting that "a high density of interactions among specialized networks of firms encompass a diversity of forms of cooperation, such as shared support service facilities, marketing strategies, and development of labor pools with specialized skills".

In contrast, many economic geographers discuss that agglomeration economies stimulate firms, population and production across regions. While Marshall (1920) points out that agglomeration effects in a specific industry and region may provide firms with an opportunity to access sufficient human capital with specialized knowledge and skills, Head et al. (1995: 227) argue that "the location becomes less attracive as firms congregate since competition among users bids up the price of the input". The supply of pooled talented labor is not permanent but limited. As a result, the availability of labor inputs, especially, executive/professional talent, will diminish more rapidly in the East when 'brain drain' occurs within the EU common market, especially, after the year 2009 in which labor of 10 new EU members is permitted to move freely from the East to the West and vice versa. Puga (1999) also notes that there may be a strong upward pressure on wages in order to prevent larger migration flows. Werner (2003: 24) states that "these rising wage pressures need to be balanced with sustained improvements in productivity for the region to retain its significant competitive edge".

As a matter of fact, positive effects of spatial externalities will be offset by the upward trend of wage levels because of the growing intensity of competition for attracting talented labor. A limited supply of human endowments will be encountered by new investors and by additional R&D development projects. Consequently, they will suffer from the increasing job switchings of indigenous employees or the rise of wages in competitive labor markets in the coming future. JETRO (2005) mentions that Japanese companies operating in the Czech Republic have difficulties in recruiting labor at the management level since qualified labor tends to be promptly head-hunted by competitors.

From the demand side, agglomeration externalities serve as a conduit for spurring economic prosperity in a particular region, while the region failing to lure FDI becomes a loser and falls into a economic spiral. The development of agglomeration economies can be characterized by a widening gap between regions in resource allocation and economic prosperity. From a firm-level point of view, large and competent firms may not gain as many advantages from clusters of other foreign investors as small and medium-sized enterprises. This argument is put forward by Berderbos and Carree (2002). They (2002: 196) argue that "firms with the most innovative technologies and training programs contribute relatively more to spillovers within industry clusters, while SMEs take advantage of the clusters as a channel to acquire information on alternative locations and local authorities".

4. Literature Review

Systemic patterns of the locational choices of Japanese MNCs in the former Soviet satellite economies, such as Hungary and the Czech Republic, have rarely been studied empirically at the regional level, despite the fact that anecdotal accounts are provided in the public media. Furthermore, econometric analysis of FDI location across the regions is still marginal, while it is prominent researching FDI determinants across the nations.[3]

As Table 2 sums up, a great body of literature in the area of international economics and regional science focuses on the industrial location choice of MNCs in China, the EU and the United States. Previous empirical studies with focus on Japanese MNCs have been increasing since the dramatic appreciation of the yen in the mid-80s. Categorizing the previous studies based on the regional location patterns of Japanese FDI by country, Woodward (1992), Smith and Florida (1994) and Head et al. (1995) analyzed what factors induce the site selection of Japanese MNCs within the United States, while Head and Mayer (2003) investigated these issues for the EU. The nature of Japanese firms' spatial behavior in China is examined by Head et al. (1996) and Belderbos and Carree (2002). Most commonly, their studies found the locational patterns of Japanese manufacturing firms are affected by the number of existing Japanese MNCs in specific industries. McFadden's conditional logit was commonly applied in their studies.

Woodward (1992) provides a detailed account of the impact of strong market demand, low unionization, low unemployment rates and high quality of labor on the location choice of Japanese MNCs for 1980-89 in the United States. Of these significantly correlated variables, the impact of low unemployment rates is considerably high and suggests that a state with higher labor turnover draws successfully more attention from Japanese MNCs. Also, Japanese investors prefer a state with high manufacturing agglomeration. This propensity is particularly notable in the automotive sector.

Smith and Florida (1994) employ Tobit, Poisson and negative binominal estimation models in order to test the spatial behavior of 971 Japanese investors. They find that "the presence of industrial agglomerations with abundant human capital and greater labor force stability acts as a driving factor to encourage the undertaking of investment projects by Japanese automotive-oriented firms" (Smith and Florida, 1994: 39).

Head et al. (1995) examine the importance of agglomeration effects and other factor endowments on Japanese firms' location pattern in the 1980s through applying maximum likelihood techniques. Their empirical findings stress that both Japan-specific and *keiretsu*-specific clusters are a crucial incentive in attracting new establishments of Japanese manufacturing plants. They found that *keiretsu* agglomeration is more influential and pronounced than industry agglomeration and Japan

---

[3] Cross section and time series analysis is often a popular method used to explore the magnitude and existence of push, pull and stimulus factor endowments on the pattern of FDI inflow.

Table 2: Summary of Previous Research on Spatial Distribution of FDI at the Regional Level

Name of researcher	Year	FDI hosting location	Foreign Investors	Sector	No.of plants	Empirical findings
Carlton	1982	US	US (1967)	Fabricated plastic products etc.	290	electricity price(−), man-hours in production(+), firm size and economies of scale(+), unemployment rate(−)
Hansen	1987	Brazil	Domestic (1977-79)	Manufacturing	360	Distance(−), localization economies in traditional and intermediate sectors(+), urbanization economies in modern and engineering sectors(+)
Coughlin, et al.	1991	US	Foreign (1981-83)	Manufacturing	736	Land area(+), per capita income(+), wage(−), unemployment rate(+), infrastructure(+), unitary taxation(−), state expenditure to attract FDI(+), unionization(+)
Woodward	1992	US	Japanese (1980-89)	Manufacturing	540	Market(+), unionization(−), manufacuring agglomeration(+), unemployment(−), education(+), poverty rate(−), land area(+)
Smith and Florida	1994	US	Japanese	Automotive industry	3112	Agglomeration(+), proximity(−), wage(+), population(+), manufacturing density(+), minority concentration(+), education(+), highway access(+)
Head et al.	1999	US	Japanese (1980-92)	Manufacturing	760	Adjacent state income(+), manufacturing wage(+), labor subsidy (−), unitary tax(−), foreign trade zone(+), Japanese manufacturing agglomeration(+), Japan industry and keiretsu agglomeration(+),
Guimarães et al.	2000	Portugal	Foreign (1982-92)	Manufacturing and service	758	Manufacturing agglomeration(+), industry-specific agglomeration(+), service agglomeration(+), labor cost(+)
Belderbos and Carree	2002	China	Japanese (1990-95)	Electronics industry	229	Industry agglomeration(+), Japanese agglomeration(+), keiretsu agglomeration(+), GDP(+), GDP per capita(+), wage level(−), local sales ratio(−)
Head and Mayer	2003	EU	Japanese (1984-95)	Manufacturing	452	Market potential(+),agglomeration(+), social charge rate(−), corporate tax(−), regional area(+)
Blonigen, et al.	2005	9 major countries	Japanese (1985-91)	Manufacturing	1485	Vertical keiretsu agglomeration(+), horizontal keiretsu agglomeration(+)

specific agglomeration. This suggests that geographical considerations of Japanese MNCs are surbordinate to the importance of intra and inter-firm information transactions among Japanese MNCs, even when they start operating abroad. Hence, internalization plays a crucial role in the locational selection of Japanese firms abroad.

Belderbos and Carree (2002) investigate the location pattern of 229 Japanese electronics manufacturing firms in China over the period 1990-95. Their results are rather consistent with the previous empirical results found by Head et al. (1995). They found that *keiretsu* agglomeration has a significant impact on the plant selection in the electronics industry. Furthermore, most crucially, there are differences in locational decisions between *keiretsu* group firms and core *keiretsu* firms. *Keiretsu* group firms prefer a region where production lines by other *keiretsu* group firms are already in operation, whereas this is not the case for core *keiretsu*. According to Belderbos and Carree (2002: 204), "this diverging outcome lies in the important implication that core *keiretsu* firms take a leading role in searching for appropriate locations, while member firms are most likely to follow the 'core' firm's lead".

5. Methodology

5.1. Model Specification

The theory of business location suggests that a firm sets up production lines in regions and countries where earning and returns on investment are the highest.

Thus, the firm should take into account where to avoid high transportation costs, how to access a labor pool and how to form well-functioning vertical linkages with local suppliers in indigenous markets. The firm tends to choose cost-effective regions to take advantage of input attributes at a maximum. We employ a conditional logit model to assess crucial factors determining the location of new Japanese manufacturing start-ups in the Czech Republic. The reasoning for using this model follows Boudier-Bensebaa (2005: 613) in that "the conditional logit method is a more appropriate way of studying individual firms' decisions in that it allows the introduction of a qualitative endogenous variable". Assumed that firm **i (i=1,…,n)** in the year *t* selects one of *Y* alternatives to locate and firm *i* is rational to choose the profit maximizing area, the profit function that firm *i* chooses *y* in the year *t* is constructed as $\ln\Pi^{i}_{y,t}$ *.* using a natural logarithm and profit maximization means.

$$\ln\Pi^{i}_{y,t} = Max\ \{\Pi^{i}_{y,t};\ y=1,\ …Y\} \tag{1}$$

The above equation can be transformed into

$$\ln\Pi^{i}_{y,t} = \beta Z^{i}_{y,t} + \varepsilon_{y,t} \tag{2}$$

Z denotes region *y*'s attributes in the year *t,* while $\varepsilon_{y,t}$ corresponds to a function of unobservable or unmeasurable characteristics in the region y in the year *t*. *β* is the vector of parameters to be estimated. Our primary aim is to explore *β* to be the maximum likelihood in the estimation model. Following McFadden (1974: 110), the probability that firm **i** chooses *y* is obtained:
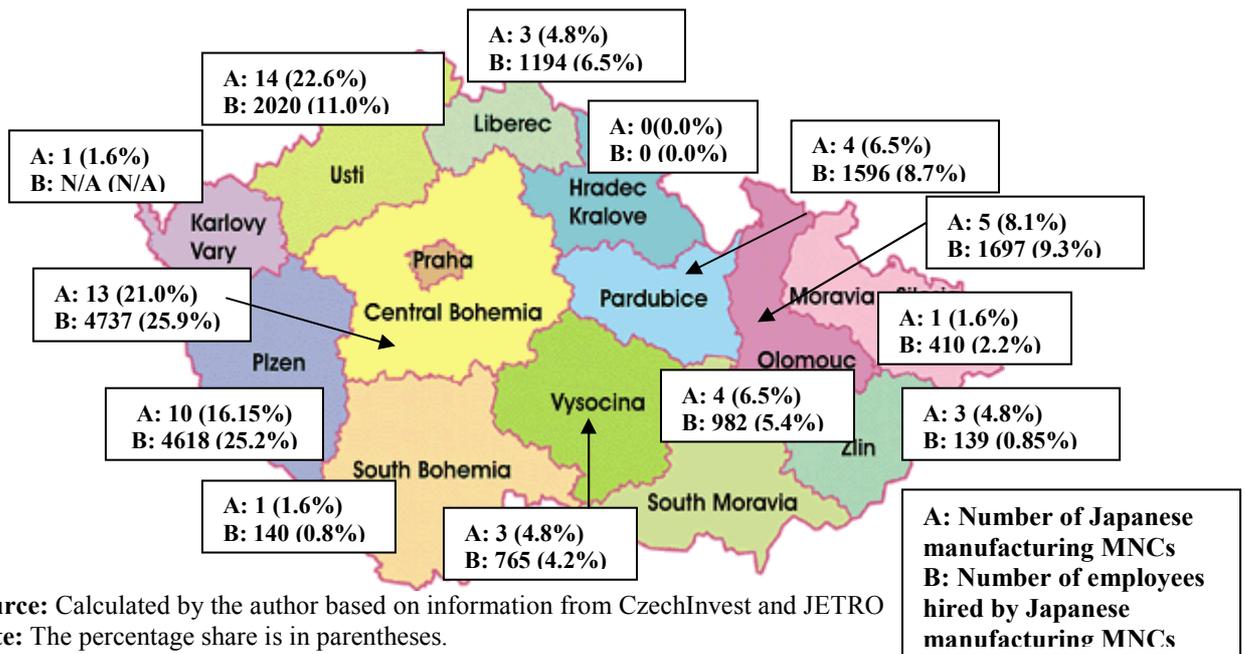
$$P^i_{y,t} = \exp(\beta Z^i_{y,t})/\Sigma^Y_{y=1}\exp(\beta Z^i_{y,t}) \qquad (3)$$

This estimation model is called as conditional logit model. Considering the maximum likelihood $P^i_{y,t}$ that firm *i* chooses y in the year t, the likelihood to observe a particular pattern will be obtained in the linear function by:

$$P^i_{y,t} = \ln \beta_1 Z^i_{y,t} + \ln \beta_2 Z^i_{y,t} + \ln \beta_3 Z^i_{y,t} + \ln \beta_4 Z^i_{y,t} + \ln \beta_5 Z^i_{y,t} + \varepsilon_{y,i,t} \qquad (4)$$

All the variables are measured in *t-1*, because the investment decision is normally determined by an assessment of endowment effects in an earlier year, at least *t-1*. Following Head et al. (1995: 230) and Belderbos and Carree (2002: 204), we use the same measurement for agglomeration that "one plus the number of plant set-ups the year prior to the investment in each region contribute to solve a problem to take the log of zero for regions with no prior investment". The dependent variable takes the value 1, if a given MNC *i* established a plant in a given region *y* in a given year *t*, and zero otherwise.

Figure 3: No. of Japanese MNCs and employment by region, 1990-2005

Source: Calculated by the author based on information from CzechInvest and JETRO
Note: The percentage share is in parentheses.

5.2. Data

Our empirical study looks for explicit links between the spatial behavior of Japanese investors and some key variables influencing their locational decision in the Czech Republic. We are focusing on the investment location choice made by Japanese MNCs across regions. Making use of the data set compiled by Czech Invest, 58 manufacturing investments between 1999 and 2004 are analyzed. There are 12 regions that a Japanese MNC can choose as a production site. The 12 regions are Usti, Plzen, Liberec, Central Bohemia, South Bohemia, Karlovy Vary, Pardubice, Vysocina, Olomouc, South Moravia, Moravia-Silesia, and Zlin. Praha and Haradec Kralove are excluded from this analysis due to reasons associated with the probability of biased estimation results. First, conventional wisdom stresses that greenfield investment requires the availability of a sufficient labor force, and cheap, large

industrial lands. However, the size of Praha accounts for less than 1% of the nation and the unemployment rate as a proxy for labor availability is only 3.3% in June 2005. Furthermore, the insufficient size of industrial lands in Praha is detrimental to the scale economy on which Japanese MNCs tend to capitalize.

Second, population density in Praha as a proxy for the level of urbanization is much higher than for the rest of the regions. As discussed previously, greater estimation bias may occurr if Praha is included in our empirical study. Hence, the exclusion of Praha in this study is essential in order to enhance the quality of estimation results.

In addition, Haradec Kralove is also eliminated. The reason for this elimination is that McFadden (1974: 126) emphasizes that "the maximum likelihood estimator exists if 0<S<N when the first alternative is chosen S times in N observations, and equals $\hat{\theta}1=\log[S/(N-S)]$". Put briefly, all alternatives are required to be chosen at least once (Head et al., 1995). However, Haradec Kralove attracted no Japanese investment project. As a result, this study examines 58 locational decisions made by Japanese MNCs from 1999 to 2004 across 12 location choices for investment. The total number of observations is 696. Accordingly, the likelihood that investor i chooses y in the year t is presented in the logit form by:

$$P^i_{y,t} = \exp(\beta Z^i_{y,t})/\Sigma^{12}_{y=1}\exp(\beta Z^i_{y,t}) \tag{5}$$

The empirical models are developed and tested, including five groups of competing variables : (1) agglomeration factor, (2) demand-driven factor, (3) supply-driven factor, (4) cost-effective factor and (5) stimuli factor, utilizing the concepts of agglomeration externalities (Marschall, 1920 and Porter, 1990), theory of locational advantages (Dunning, 1993) and theory of economic geography (Krugman, 1991). To operationalize the model (6) with the above determinants in a linear function, the probability of location choice made by a Japanese MNC is transformed into:

$$P^i_{y,t} = \ln\beta\, Z^i_{y,t\,(agglomeration\ effects)} + \ln\beta\, Z^i_{y,t\,(demand-driven)} + \ln\beta\, Z^i_{y,t\,(supply-driven)} + \ln\beta\, Z^i_{y,t\,(cost-effective)} + \ln\beta\, Z^i_{y,t\,(stimuli)} + \varepsilon_{y,i,t} \tag{6}$$

All variables used for this model appear in natural logarithm in order to make the range of the variable values more narrow and to allow the coefficients to function as elasticities. In addition, it will contribute to scaling down the variation and minimizing the probable impact of heteroskedasticity (Kumar 2002: 19).

Graphic 1: Geographical Location of Japanese MNCs in the Czech Republic

Source: CzechInvest

12

Table 3: Variables and Descriptive Statistics

	Variable	Description	Type	Expected signs	Max.	Min.	Mean	Standard deviation	Data source
	Choice	The dependent variable indicates the locational choice (Yes:1,No:0)	Discrete		1	0	0.0784	0.269	JETRO and Czech Invest
Agglomeration factor	**JAGGLO**	No.of Japanese MNCs	Logarithmic Discrete	+	14	1	3 336	2 829	Czech Invest
	AAGGLO	No.of Asian MNCs	Logarithmic Discrete	+	14	1	3 519	2 923	Czech Invest
	ASAGGLO	No.of Anglo-American MNCs	Logarithmic Discrete	+	12	1	4 162	2 775	Czech Invest
	GAGGLO	No.of German MNCs	Logarithmic Discrete	+	10	0	5 059	3 325	Czech Invest
	FORAGGLO	No.of foreign MNCs	Logarithmic Discrete	+	56	2	15.14	12 596	Czech Invest
Demand driven factor	**GDP**	GDP per capita (CZK)	Logarithmic Discrete	+	215 953	165 558	187 833	12 524	Czech Statistical Office
	DENSITY	Population density	Logarithmic Discrete	+	231.1	62.1	115.7	46.28	Czech Statistical Office
Supply-driven factor	**INFRA**	Highway access (Yes:1,No:0)	Dummy	+	1	0	0.615	0.487	Various information
	UNEMP	Unemployment rate (%)	Logarithmic Discrete	+	15.83	6.03	9 045	3 135	Czech Statistical Office
Cost-effective factor	**DISTANCE** (Transportation cost)	Distance from a main city in a region to Frankfurt	Logarithmic Discrete	+	900.92	381.6	629 935	147 108	Various information
	WAGE (Labor cost)	Average monthly gross wage (CZK)	Logarithmic Discrete	−	15 728	12 781	13 895	0.891	Czech Statistical Office
Stimuli factor	**SUPPORT**	Regional state aid	Logarithmic Discrete	+	50	46	48 308	1 202	Czech Invest

5.3. Hypothesis Formation

Table 3 summarizes explanatory variables, expected signs, descriptive statistics and data sources.

Agglomeration factors: Following Marshall (1920), a firm can benefit from the geographical concentration of indigenous and foreign firms in a specific sector. This notion is said to imply "the [enduring] effects of history on the core structures and strategies of multinational firms" (Doresmus 1998: 15) and "given increasing returns" (Arthur 1990: 235). Boudier-Bensebaa (2005: 619) also argues that "previous decisions taken by firms can be perceived as an attracting signal for a site, stressing that 'path dependence' matters significantly". From a sense of cost-savings, Japanese MNCs can reduce the cost of finished products through siting their manufacturing plants in regions which allow them to procure a variety of intermediate goods and locate them near assemblers. In other words, transaction costs and investment uncertainty, such as information sharing costs, transportation costs, supplier-searching costs, and coordination costs, will be minimized through the spatial concentration of business activities.

In contrast to European and Anglo-American MNCs, Japanese companies are inherently less familiar with consumer preference, tax procedures, attitudes and behaviors of local workers and political culture in the Czech Republic, due to the weak historical, political and economic ties between Japan and CEECs. Based on our interviews, Japanese MNCs are inevitably keen on sharing with other Japanese MNCs appropiate information about where to find available labor force qualified for their production, management methods and where to gain better access to highways in order to maintain just-in-time-delivery systems. Geographical proximity to the presence of existing plants set up by Japanese firms results in lower information barriers costs.

Furthermore, the performance of a follow-the-leader effect of Toyota *keiretsu* firms and their spatial position situated adjacent to Toyota in the Czech Republic is supported by Belderbos and Carree (2000: 198) who argue that "vertical *keiretsu* are characterized by intensive interfirm flows of information and the core firm may give active assistance to member firms in the process of overseas relocation". Considering supplier-searching costs, it is known from anecdotal accounts that the absence of local competing suppliers with the same quality of components as Japanese suppliers can be a major detrimental factor for Japanese manufacturing FDI. In particular, the automobile sector requires tight cooperation between a car assembler and suppliers for specialized supplies, while in the electric/electronics sector, products can be assembled in less complex production processes, involving standardization of technology and the use of relatively small parts. In addition, the recent phenomenon that Toyota *keiretsu* firms sequentially followed the Toyota investment in the Czech Republic implies that Toyota may have found it difficult to find indigenous suppliers despite the presence of a large supplier network serving Skoda Auto. In practice, Toyota benefits from the joint venture with PSA Peugeot Citroën, which is responsible for finding new suppliers and subcontractors for their production operation in the Czech Republic (Nikkei Sangyo Shimbun 25.11.2003).

There are several ways to measure the variable of agglomeration externalities by sector, nationality and core inter-firm linkages, such as *keiretsu* or Korean *chaebol*. Head and Ries (2002) and Blonigen et al. (2005) used the number of employees to proxy for agglomeration and information effects, while Head et al. (1995; 1999) applied the number of Japanese-owned greenfield investments in a state prior to the decision of a particular investor as a proxy for agglomeration effects. In addition, the value of production of firms as well as the starting year of producing operations can be taken as alternatives. Here, the number of Japanese and foreign plant facilities already set up in each region is employed in this study (**JAGGLO** and **FORAGGLO**), using Czech Invest data.

> **Hypothesis 1a:** Japanese MNCs tend to prefer a region where a greater population of existing Japanese firms is in operation since they can minimize internalization costs and unintended consequences, such as supplier searching costs, supplier switching costs, and information asymmetries.

> **Hypothesis 1b:** Japanese MNCs tend to prefer a region where a greater population of existing foreign firms is in operation since they can minimize internalization costs, such as supplier searching costs, supplier switching costs, and information asymmetries.

Market demand conditions: The impact of market demand on the spatial behavior of firms is frequently discussed in the business literature. We measure market potential across regions with two variables: (1) GDP per capita (**GDP**) and (2) density of populaton (**DENSITY**). Guimarães (2000: 125) argues that "population density captures certain urbanization economies, while it may also serve as a proxy for industrial land costs". Belderbos and Carree (2000: 199) state that "inclusion of GDP per capita ensures that the coefficients of the agglomeration variables are not biased upwards because the agglomeration counts are correlated with region's size".

> **Hypothesis 2:** Japanese MNCs tend to prefer a region where market demand is higher, if their investment is market-seeking.

Supply conditions: Taking into account the arguments of several authors (Friedman et al., 1992; Head et al., 1999), we use unemployment rate as a proxy for labor availability (**UNEMP**). Woodward (1992: 700) regards it as "an indicator to offer less-competitive industrial conditions and lower quality of life", whereas Coughlin (1991: 678) states that "the likely empirical association between unemployment rates and FDI is uncertain". In addition, Head et al. (1999: 203) suggest that "the high unemployment rate creates efforts to work hard because it increases the cost of being fired for shirking and it leads to higher productivity". This expected outcome contributes to reducing a risk of job-hopping, something that has caused anxiety in Japanese investors recently. In our hypothesis, a high unemployment rate can be positively correlated to the spatial behavior of Japanese MNCs in the Czech Republic.

A well developed transportation infrastructure reduces the costs of importing components and machinery and exporting or distributing output. If a Japanese MNC locates in a region that has access to a highway, delivery of intermediate and finished goods can be efficient and cost effective. A large body of literature on site selection for manufacturing (Friedman et al. 1992; Woodward 1992; Smith

and Florida 1994; Head and Ries 1996) provides evidence of the positive correlation between the presence of infrastructure and plant site. It is empirically recognized that the presence of efficient transportation infrastructure in the region affects preference for plant site since the implemention of just-in-time delivery inventory systems is one of the core elements in manufacturing products, especially, in the automobile sector.[4] The transportation cost variable (**INFRA**) used for this model is measured as a dummy variable which indicates that the value is 1 if the region has an interstate highway and 0 otherwise.

> **Hypothesis 3a:** Japanese MNCs tend to choose a region where labor availabiliy is higher since start-ups require abundant trainable human capital.

> **Hypothesis 3b:** Japanese MNCs tend to choose a region where infrastructure is well-organized since they benefit from cheap transportation costs.

Cost-effective factors: Average monthly gross wage (**WAGE**) measures labor market conditions. Labor cost factor may have two competing outcomes. Woodward (1992: 699) argues that "high wage level is considerably detrimental to site selection for manufacturing", while Head (1999: 206) suggests that "high skill intensity of Japanese manufacturing plants would result in the apparent preferences for high-wage regions".[5] Therefore, the expected sign of labor cost is either positive or negative in our econometric estimation.

Distance (**DISTANCE**) can be treated as a variable of transaction costs. According to a JETRO survey (2004), Japanese manufacturing firms are likely to procure parts through harnessing extensive supply networks formed by the existing European subsidiaries of Japanese firms, by European firms within and across the old EU15 or by importing from Southeast Asia or Japan. Japanese firms hesitate to outsource locally due to the technological and organizational underdevelopment of intermediate goods. According to our several interviews and to media coverage (Nihon Kogyo Shinbun 13.06.2003: 15; Nikkei Sangyo Shinbun 04.03.2004: 74; Nihon Keizai Shinbun 14.03.2004: 9), the strategic intention of Japanese manufacturing firms is to sell their products manufactured in the Czech Republic to core EU member states' markets, while Czech markets are considered just as a production site.[6] Therefore, it is likely that a firm may choose a region in small distance with core EU markets, such as Frankfurt, Paris and London in the EU15, as a result of larger market demands and substantial sources of component supplies. Distance to Frankfurt, Germany from the region is used as proxy for distance.

> **Hypothesis 4a:** Japanese MNCs tend to choose a region where the level of wages is high, since high labor costs are regarded as high quality of labor.

---

[4] See more detailed information in Smith and Florida (1994).

[5] Belderbos and Carree (2000) provide evidence that Japanese electronics firms prefer to locate in a region where labor costs are inexpensive in the case of China since most electronics assembly operations are characterized by labor-intensive.

[6] According to Nikkei Sangyo Shinbun (March 12, 2004), the notable exception is that Matsushita Electric has started targeting the Czech markets in terms of sales.

Graphic 2: Financial Incentives in the Czech Republic

Regional state aid map in the CR valid for the period 2002 – 2006

MAXIMUM PERMISSIBLE PUBLIC SUPPORT

Central Bohemia	5%
Central Moravia	4%
North-west	4%
North-east	4%
South-east	5%
Moravia-Silesia	5%
South-west	4%
Prague	20%
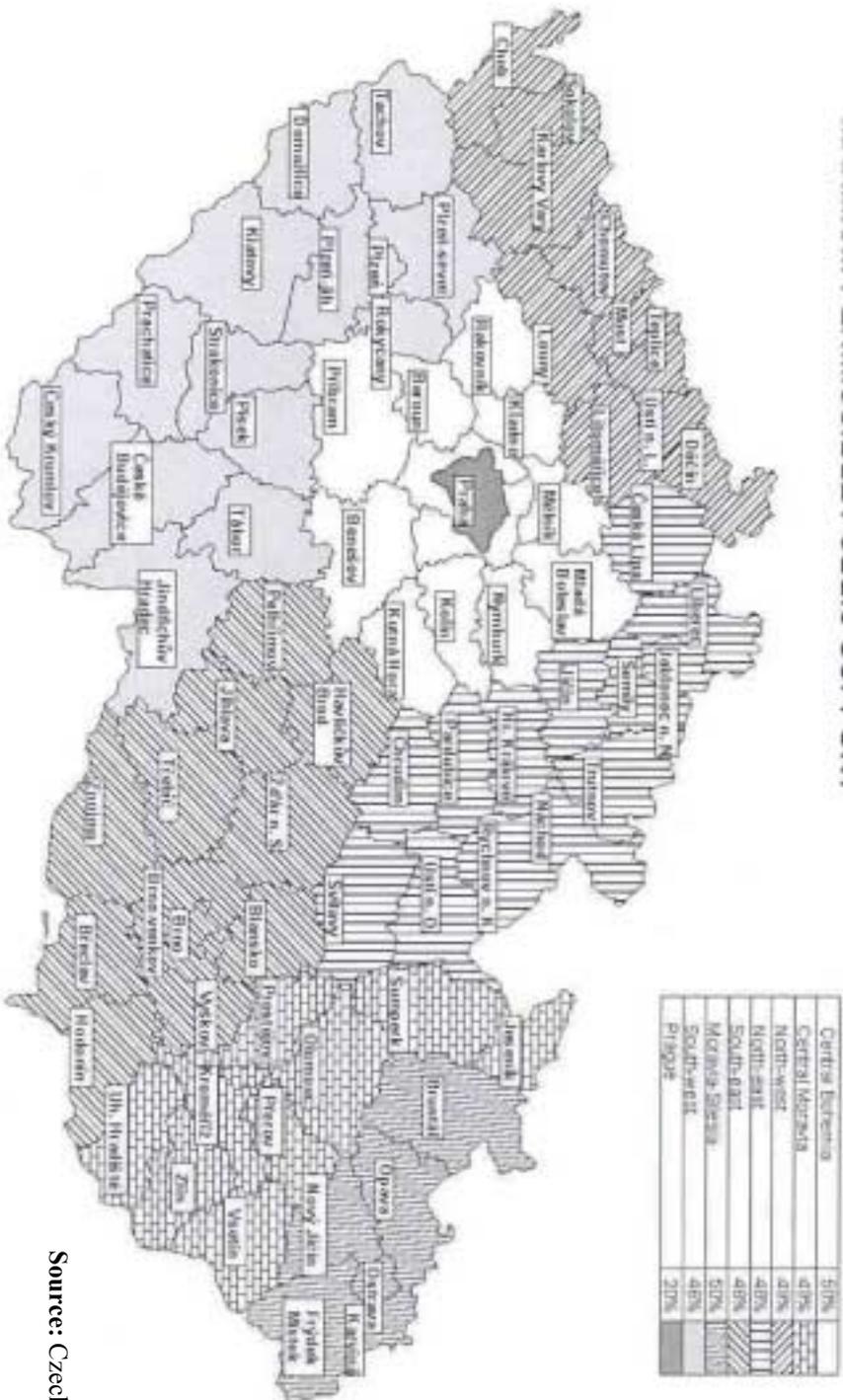
Source: CzechInvest

Hypothesis 4b: Japanese MNCs tend to choose a region which is located close to the German border, if they export their finished products to rich EU members, such as Germany and France.

Stimuli factor: A large amount of subsidization allocated for vocational training and new employment and low corporate tax induces MNCs to set up their facilities in a particular region. Lim (2005: 66) also states that "start-up firms prefer incentives that reduce their initial expenses, while expanding firms prefer tax-related incentives that affect profit. Manufacturing firms, requiring larger investment in fixed assets, are more likely to value incentives related to depreciable assets than service industries". In fact, the Czech Republic provides a variety of incentive measures to attract foreign investment. Graphic 2 demonstrates that an investor obtains incentives ranging from 20 to 50 of the investment amount in a given region in accordance with state aid rules in line with the EU.[7] Provided that a firm invests in a region with high unemployment rates, the government subsidises the firm with 0.2 million CZK (almost 6300 EUR) per capita for new employment and 35% of vocational training costs at a maximum.[8]

However, these FDI incentives may be abolished or revised due to the application of EU competition policy, while EU membership enables the Czech Republic to receive a great deal of benefits, such as simplification of customs clearance, lowering of tariffs and recipience of Structural and Cohesion Funds. As a result, it is essential for indigenous policy makers at the (sub)national government level to ascertain the scale and range of positive externalities resulting from the above FDI promotional measures. In our binary specification, maximum permissible public support of regional states valid for the period 2002-2006 is used as an incentive proxy (**SUPPORT**), since information on actual corporate tax, grants and loan guarantee at the subnational level is unfortunately not available.

Hypothesis 5: Japanese MNCs tend to prefer a region where fiscal and financial incentives are high, since input costs, such as labor training costs and environment standard costs, are diminished.

6. Empirical Results and Discussion

6.1. Locational Choices of Japanese MNCs

We employed the conditional logit model to assess the parameters of the explanatory variables, which maximize the probability of the regions to be selected by 58 Japanese MNCs from 1999 to 2004 in the Czech Republic. The number is 12. Table 4 summarizes the econometric findings for the locational choice of Japanese MNCs. The statistical significance of agglomeration effects, cost variables, stimuli factor, demand and supply conditions are measured by maximum likelihood estimations. The first and second rows correspond to the estimated coefficients and z-values, respectively. The econometric

---

[7] See, for more information, CzechInvest (2004) *Investment Incentives for the Manufacturing Sector in the Czech Republic*, p.4

[8] See JETRO home page for more detailed information.

testing, using the conditional logit model, analyzes the impact of agglomeration economies, demand-driven factors, supply-driven factors, cost-effective factors and stimuli factors.

JAGGLO and **FORAGGLO** are seperately tested as a result of multicollenearity problems. The coefficients of **JAGGLO** and **FORAGGLO** are both statistically significant and positive at the 1 percent significance level as anticipated. Using Model (1) and (3) as an example, the number of foreign firms appears to be roughly 1.5 times more influential than the number of Japanese firms. These results are interpreted to mean that one unit increase in **JAGGLO** leads to a 1.347 percent increase in the site selection of Japanese investors in a given region, while the impact of **FORAGGLO** corresponds to 2.049. The findings in this study are consistent with previous analyses (Woodward, 1992; Head et al., 1995; Head et al., 1999; Belderbos and Carree, 2002). It may be no exaggeration to say that Japanese firms attempt to lower transaction costs, due to a lack of information of an unknown market environment, supplier searching and/or switching costs through industrial concentration. Moreover, interview evidence supports the view that the larger the number of Japanese MNCs becomes in a given region, the more active information sharing among Japanese MNCs occurs as well as the less likely they are to rely on other informational sources, such as CzechInvest in order to obtain valuable information on market environments in greater detail.

While the coefficients of demand conditions, such as **DENSITY** and **GDP,** have the expected positive signs, they are not statistically significant. The level of demand conditions does not seem to attract MNCs. This result substantiates our interview outcome that the size of markets across regions plays a minor role in luring Japanese MNCs, since they are targeting potentially larger markets such as the EU and Russia.[9]

The coefficient for **INFRA** has a positive sign and is statistically significant at a 1 percent significance level. This outcome may imply that the availability of interstate highway access allows for the procurement of more efficient parts, as well as supporting the importance of just-in-time delivery systems. **UNEMP** does not exert an influence on the location decision, although the sign was positive as predicted. Despressed regions with high unemployment rates do not influence in explaining the preferred location of Japanese MNCs.

As hypothesized, the coefficient of **DISTANCE** from a given region to Frankfurt—regarded as one of the core EU markets—is statistically significant at a 10 percent significance level and has a negative sign as anticipated. The estimated finding implies that a 1 percent point rise in **DISTANCE** leads to a 2.5 percent decrease in the spatial behavior of Japanese MNCs. This statistical outcome indicates that Japanese firms strategically consider close geographical distance to the core markets of the EU, such as Germany, the UK and France.

---

[9] The interview with an area manager in a Japanese automotive firm was conducted on 8th of January in 2006.

Table 4: Econometric Estimates of the Location Selection for Japanese Firms from 1999 to 2004 in the Czech Republic

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
JAPAAGGLO	1.347*** (2.89)	1.592*** (3.36)				
FORAGGLO			2.049*** (2.91)	2.008*** (2.93)	2.021*** (3.89)	
GDP		6.180 (1.17)	5.789 (0.75)	5.524 (0.73)	6.093 (1.07)	−0.592 (−0.12)
DENSITY		−0.0779 (−0.06)	0.6456 (0.44)		0.6143 (0.44)	
INFRA						1.055*** (3.33)
UNEMP	0.775 (0.76)	1.087 (0.83)	0.468 (0.36)	0.838 (0.86)	0.489 (0.39)	0.913 (1.0)
DISTANCE	−2.504* (−1.8)		−2.916* (−1.72)	−2.862* (−1.73)	−2.958* (−1.92)	
WAGE						7.585* (1.72)
SUPPORT	9.479 (0.74)		−13.535 (−0.06)	2.1264 (0.1)		
Log likelihood	−135.879	−136.643	−130.972	−131.069	−130.974	−132.040
Pseudo R2	0.0572	0.0519	0.0913	0.0906	0.0912	0.0838
Number of choosers	58	58	58	58	58	58
No.of regions	12	12	12	12	12	12

Notes: z-rations are presented in parentheses. *** denotes significance at the 1 percent level; ** at the 5 percent level; *at the 10 percent level. Sample size is 58.

This picture becomes much clearer if coupled with the result that GDP per capita has no significant effect on the location decision across regions. As Head et al. (1999) hypothesized, the coefficient of **WAGE** is positively correlated in our study. One interpretation may be that Japanese MNCs pursue highly qualified labor with specialized skills required for the automobile and electronics/electric sector, which is technology-intensive oriented. At the same time, the high wage cost attracting current Japanese FDI implies that Japanese MNCs have to compete with foreign MNCs in search for better human capital, while the number of job hoppers is constantly rising.[10] Of the points raised by Hansen (1987), it is not surprising that the coefficients of wage are relatively higher than other explanatory variables since a high wage may indicate that (1) labor is more efficient, (2) labor has more years of job experience and (3) the seasonality of labor may be induced by higher wage rates. Hence it is not surprising that a very large and significant effect is estimated for **WAGE**.

Conversely, the variable that identifies **SUPPORT** is not significant, and the sign was mixed in the specifications. This result appears to be contradictory to perceived reality. Based on an interview with a Japanese regional executive in a sōgo shōsha , it is clear that the location decision of Japanese MNCs is indeed affected by the provision of fiscal and financial incentives, such as employment creation grants, job training subsidies, tax breaks and environmental regulation grants.[11] The provision of fiscal and financial incentives helps reduce the additional cost that Japanese MNCs have to pay for abiding by the high enviromental regulation standards of the EU and for implementing good job training. It is acknowledged that job training plays an important role in maintaining the quality of products and in improving the performance of employees. Following Kumon (2005), the negligence of thorough job training may contribute to the creation of defective merchandise, possibly leading to a recall. Hence, Japanese MNCs spend a great deal of time, energy and capital on educating indigenous employees.

6.2. Comparative Analysis of the Spatial Pattern of FDI by Nationality

Table 5 presents the estimation results for Japanese, Asian (incl. Japanese), Anglo-American and German MNCs. The outcome for the estimated likelihood is that the magnitude of agglomeration effects on the subnational determinants of FDI in the Czech Republic varies by country of origin. The empirical evaluation for four types of MNCs supports the hypothesis based on the Marshallian localization theory. The coefficients for agglomeration economies of national and foreign firms have a positive sign and are significantly correlated with the notable exception that the coefficient of German firms' agglomeration shows no statistical significance, while the expected positive sign was identified. The main reason for no effect of existing German MNCs on the plant site decisions may be related to the intimate historical, economic, and political ties between Germany

---

[10] The interview with an area manager in a car components firm was conducted on January 7th, 2006.
[11] The interview with a managing director in a a sōgo shōsha was conducted on January 8th, 2006.

21

Table 5: Econometric Estimates of Location Selection for Japanese, Asian Anglo-American and German Firms in the Czech Republic

	Japanese MNCs (1999-2004)			Asian MNCs (1999-2004)			Anglo-American MNCs (2000-2004)			German MNCs (2001-2004)		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
AAGGLO	1.347*** (2.89)			1.115** (2.44)			0.921* (1.83)			0.423 (0.79)		
FORAGGLO		2.049*** (2.91)			1.501** (2.59)			1.636** (2.06)			1.163** (2.01)	
GDP		5.789 (0.75)	−0.592 (−0.12)	6.551 (1.39)	10.086 (1.49)			17.675** (2.56)		16.838** (2.58)	12.191* (1.74)	
DENSITY		0.6456 (0.44)			0.282 (0.22)	−0.414 (−0.28)		0.856 (0.76)			−0.321 (−0.28)	
INFRA			1.055*** (3.33)			0.6205* (1.9)	0.707** (2.45)		0.5367** (2.03)			0.5* (1.71)
UNEMP	0.775 (0.76)	0.468 (0.36)	0.913 (1.0)	2.258** (2.35)	1.463 (1.34)	1.756 (1.46)	0.807 (0.82)	−0.084 (−0.08)	0.827 (0.94)	1.419 (1.48)	0.944 (0.92)	0.912 (1.09)
DISTANCE	−2.504* (−1.8)	−2.916* (−1.72)		−2.275* (−1.73)	−3.550** (−2.34)		1.847 (1.28)	0.751 (0.42)		−1.789 (−1.39)	−1.606 (−1.09)	0.927 (0.65)
WAGE			7.585* (1.72)			13.849*** (2.8)			7.555* (1.76)			14.904*** (3.88)
SUPPORT	9.479 (0.74)	−13.535 (−0.06)			19.376 (0.96)	−16.505 (−0.11)	14.361 (1.04)	23.468 (1.05)	12.49 (0.91)	54.646*** (3.18)	37.366* (1.92)	
Log likelihood	−135.879	−130.972	−132.040	−161.927	−157.280	−158.109	−177.042	−172.931	−178.563	−175.049	−172.511	−171.512
Pseudo R2	0.0572	0.0913	0.0838	0.0577	0.0848	0.08	0.0545	0.0764	0.0463	0.0521	0.0659	0.0713
Number of choosers	58	58	58	67	67	67	73	73	73	72	72	72
No. of regions	12	12	12	13	13	13	13	13	13	13	13	13

Notes: z-rations are presented in parentheses. *** denotes significance at the 1 percent level; ** at the 5 percent level; *at the 10 percent level. Sample size for Japanese MNCs is 58, for Asian MNCs 67, for Anglo-American MNCs 73 and for German MNCs 72, respectively.

and theCzech Republic. Wada (2005: 52-3) argues that "the business pattern of German MNCs often lies in non-capital tie-ups ranging from OEM to processing on commission other than FDI, through which German MNCs integrate many Czech small and medium-sized enterprises into their own vertical linkages, hence suggesting that close business networks may be preexisting throughout the Czech Republic". This picture is exemplified by Volkswagen's global strategy. Van Tulder and Ruigrok (1998: 27) found that "more than 40 joint ventures between Czech suppliers of Skoda and Volkswagen (VW) suppliers were established since 1991 supplying 44% of Skoda's purchase". PSA Peugeot Citroën Market Overview (April 2005) notes that VW exclusively dominates the Czech automobile market, accounting for 51.8 percent of total market share in 2004, followed by PSA (9.1%), Ford (7.2%) and Renault (6.0%) Accordingly, it can be inferred that the effect of German agglomeration externalities is not central to the nature and strategy of German local site preferences, since geographical closeness between the two nations and rich market-specific knowledge originating from the role of tight regional sourcing linkages contribute to minimizing investment risks and asymmetrical information costs. Overall, the locational pattern of Asian MNCs is relatively similar to Japanese MNCs. This result most plausibly reflects strong cultural affinity.

On the other hand, among the demand-driven variables, the coefficients of **GDP** for both Anglo-American and German MNCs remain significant and positive, while, as in the case of Japanese and Asian MNCs, both **GDP** and **DENSITY** are not significant at all. The significantly positive effect of **GDP** on the location choices of Western firms suggests that their primary motivations are to penetrate a given indigenous market and to acquire information from local customers. Following Dunning's definition (1993), Anglo-American and German MNCs are characterized as market seeking FDI. Among the supply-side factors, the coefficients of **INFRA** remain significant for four subgroups and have a consistent positive sign. In addition, the estimation results obtained in our specifications confirm that Japanese MNCs retain the highest elasticity level on the presence of infrastructure, suggesting that the just-in-time delivery systems seems crucial for their international production networks and strategies.

Nevertheless, the significantly positive coefficients on **INFRA** for all the MNC subgroups suggest that low transportation costs resulting from the exisience of well-developed infrastructure systems are commonly considered as a less decisive factor for the locational pattern of MNCs. There is no strong evidence to support the hypothesis that **UNEMP** leads to either positive or negative effects on the cross-regional pattern of MNCs.[1]

The magnitude of **WAGE** is consistently robust as hypothesized. In particular, the elasticity of **WAGE** for German and Asian MNCs is twice as large as that for Japanese and Anglo-American MNCs. In contrast to some findings (Bartik 1985; Coughlin 1991; Belderbos and Carree 2002) that high labor costs deter FDI, we found strong evidence to support the hypothesis that **WAGE** differentials are associated positively with the establishment of domestic production lines. The range

---

[1] The estimated coefficient for Asian MNCs is positive, suggesting that a one percent increase in unemployment rate causes a 2.258 percent increase at the 95% significance level.

Table 6: Typology of Location Choice Determinants by Country of Origin

Origin of MNCs Years	Japanese (1999-2004)	Asian (1999-2004)	Anglo-American (2000-2004)	German (2001-2004)
Domestic firms' Agglomeration (H1a)	Positive	Positive	Positive	No influence
Foreign firms' Agglomeration (H1b)	Positive	Positive	Positive	Positive
GDP per capita (H2)	No influence	No influence	Positive	Positive
Population density (H2)	No influence	No influence	No influence	No influence
Unemployment (H3a)	No influence	Positive	No influence	No influence
Dummy Infrastructure (H3b)	Positive	Positive	Positive	Positive
Distance (H4b)	Negative	Negative	No influence	No influence
Wage (H4a)	Positive	Positive	Positive	Positive
Support (H5)	No influence	No influence	No influence	Positive

of estimated coefficients from 7.555 to 14.904 confirms that MNCs are to a greater extent responsive to wage differentials across regions. The estimated coefficients of **DISTANCE** vary unambiguously across subgroups. **DISTANCE** has a negative impact on the location decision of both Japanese and Asian investors, while no significant impact was captured for both Anglo-American and German investors. These empirical results suggest that Japanese and Asian investors tend to prefer the region in the vicinity of the core EU markets and are not motivated to target indigenous markets in the Czech Republic. In other words, they are likely to take advantage of the Czech Republic as an export base. These propositions are supported by the previous outcome that **GDP** appears to have no explanatory power in the spatial behaviour of both subgroups. The estimated results for **SUPPORT** for German MNCs strongly reveal that the financial and fiscal incentives play a vital role in German MNCs' decisions about where to invest across regions, but **SUPPORT** is insignificant for other foreign counterparts.

7. Concluding Remarks

This paper has focused on the spatial pattern of Japanese MNCs in the Czech Republic by employing the conditional logit model and using newly constructed data set at the subnational level. We have tested diverse competing variables on the location decision of Japanese MNCs. The explanatory proxies tested are categorized into five groups, namely, agglomeration effects, demand-driven factors, supply-driven factors, cost-effective factors, and stimuli factors. In addition, this study has also attempted to examine investor nation similarities in terms of the driving factors.

The statistical investigation provides evidence that the likelihood of the location selection across regions is positively affected by agglomeration economies with regard to firms with the same nationality and other foreign firms, highway, and wages, while the coefficients of distance to Frankfurt are significantly in opposite. Especially, a high elasticity for the wage level seems to confirm that Japanese MNCs prefer to establish their plants in a region where the wage level is rather high since they seek to obtain more qualified labor with specific skills and knowledge in growing, competitive

environments. By taking into account our empirical results that Japanese MNCs are likely to locate in a region where the number of exisiting Japanese MNCs is large, we can reach the conclusion that Japanese MNCs view the geographical concentration of Japanese MNCs as the most effective tool for accumulating and sharing knowledge and information on local business environments. The positive role of infrastructure systems may reinforce the hypothesis that Japanese MNCs consistently rely on just-in-time delivery methods in the Czech Republic. It is inferred that local markets are not responsible for the spatial selection of Japanese MNCs across regions. However, by evaluating the empirical results for distance to Frankfurt, we can contend that Japanese MNCs seek to target the EU core markets, such as Germany, France and the UK and that this geographical closeness also helps them to procure intermediate goods from the West.

Table 6 portrays the typology of location choice determinants by nationality, namely Japanese, Asian (incl. Japanese), Anglo-American (incl. American and British) and German MNCs. It is found that the presence of positive agglomeration externalities for Japanese, Asian and Anglo-American MNCs are more important than for their German counterparts. We can attribute this significant difference to the legacy of MNCs from different nationalities in the case of the Czech Republic. The empirical findings also indicate that German MNCs are more motivated to establish plants in a region where financial and fiscal incentives, wage and local demand conditions are high and promising. These outcomes confirm that German MNCs are characterized by peripheral market- and cost-consciousness, while Japanese and Asian MNCs are core market conscious, suggesting that Anglo-American MNCs are defined somewhere in-between. According to our analysis, we can certainly challenge the frequently heard belief that globalization keeps MNCs homogenizing in terms of the spatial behavior. National distinctions in corporate strategies and networks have not become obsolescent yet, despite the fact that globalization is rhetorically growing in importance.

Of course, this empirical research has a number of shortcomings, which should be addressed by further research efforts. First, this empirical study cannot identify differences in Japanese MNCs' location decisions based on different sectors, for example, in the electric sector, the machinery sector, or the transportation equipment sector. This is due to the lack of data available and the limited number of observations. Second, it does not distinguish between the effects on small-medium-sized enterprises (SMEs) and large firms in the Czech Republic, although capital source, negotiation leverage, business networks and international experience which bear upon location decisions, vary by the size of firm and should be important. Finally, the constructed dataset with emphasis on macroeconomic factors does not include political variables influencing the location choice of Japanese FDI in the Czech Republic in our econometric specifications. The inclusion of political variables could be of consequence since the location choice may be to a greater extent influenced by FDI policy conducted by the government of the Czech Republic. It is still conceivable that the dominant role and commitment of CzechInvest plays a significant role in shaping Japanese MNCs' investing behavior. Political interactions between Japanese investors and individuals in the central and regional governments as well as CzechInvest should be scrutinized in more detail. A combination of quantitative and qualitative research, including interviews, could make projections more reliable and meaningful for future investors.

References

Arthur, B. (1990) _Silicon Valley locational clusters: When Do Increasing Returns Imply Monopoly?_ Mathematical Social Sciences, 19, p.235-251.

Basile, R., Castellani, D. and Zanfei, A. (2003) _Location Choices of Multinational Firms in Europe: the Role of National Boundaries and EU Policy._ Universita Degli Studi di Urbino Facolta di Economia Working Paper No.78, p.1-34.

Bartik, T. (1985) _Business Location Decisions in the United States: Estimates of the Effects of Urbanization, Taxes, and Other Characteristics of States._ Journal of Business and Economic Statistics 3. p.14-22.

Belderbos, R. and Sleuwaegen, L. (1996) _Japanese Firms and the Decision to Invest Abroad: Industrial Groups and Regional Core Networks._ The Review of Economics and Statistics 78, p.214-220.

Belderbos, R., Capannelli, G. and Fukao, K. (2001) _Backward Vertical Linkages of Foreign Manufacturing Affiliates: Evidence from Japanese Multinationals._ World Development Vol.29, No.1, p.189-208.

Belderbos, R. and Carree, M. (2002) _Tha Location of Japanese Investment in China: Agglomeration Effects, Keiretsu, and Firm Heterogeneity._ Journal of the Japanese and International Economics 16, p.196.

Blonigen, B., Ellis, C., and Fausten, D. (2005) _Industrial Groupings and Foreign Direct Investment._ Jounral of International Economics 65, p.75-91.

Boudier-Bensebaa, F. (2005) _Agglomeration economies and location choice: Foreign Direct Investment in Hungary._ Economies of Transition, Vol.13, No.4, p.605-628.

Carlton, D. (1983) _The Location and Employment Choices of New Firms: An Econometric Model with Discrete and Continuous Endogenous Variables._ The Review of Economics and Statistics 65, No.3, p.440-449.

Coughlin, C. and Arromdee, V. (1991) _State Characteristics and the Location of Foreign Direct Investment in the United States._ The Review of Economics and Statistics 73 (4), p.675-683.

Deichmann, J., Karidis, S. and Sayek, S. (2003) _Foreign Direct Investment in Turkey: Regional Determinants._ Applied Economics 35, p.1767-1778.

Drury, G. (May/June 2002) _Zemantics?_ Strategic Direct Investor.

Dunning, J. (1993) _Multinational Enterprises and the Global Economy._ Workingham, England and Reading, MA: Addison Wesley.

Friedman, J., Gerlowski, D. and Silberman, J. (1992) _What Attracts Foreign Multinational Corporations? Evidence from Branch Plant Location in the United States?_ Journal of Regional Science, Vol.32, No.4, p.403-418.

Guimarães, P., Figueiredo, O. and Woodward, D. (2000) _Agglomeration and the Location of Foreign Direct Investment in Portugal._ Journal of Urban Economics 47, p.115-135.

Hansen, E. (1987) _Industrial Location Choice in São Paulo, Brazil: A Nested Logit Model._ Regional Science and Urban Economics 17, p.89-108.

Head, K., Ries, J. and Swenson, D. (1995) _Agglomeration Benefits and Location Choice: Evidence from Japanese Manufacturing Investments in the United States._ Journal of International Economics 38, p.223.

Head, K., Ries, J., and Swenson, D. (1996) _Inter-City Competition for Foreign Investment: Static and Dynamic Effects of China's Incentive Araes._ Journal of Urban Economics 40. p.38-60.

Head, K., Ries, J., and Swenson, D. (1999) _Attracting Foreign Manufacturing: Investment Promotion and Agglomeration._ Regional Science and Urban Economics 29, p.197-218.

Head, K. and Ries, J. (2002) _Offshore Production and Skill Upgrading by Japanese Manufacturing Firms._ Journal of International Economics 58, p.81-105.

Head, K. and Mayer, T. (2003) _Market Potential and the Location of Japanese Investment in the European Union._ CEPR Discussion Paper Series n.3455.

Horváth, J. (1999) _The May 1997 Currency Crisis in the Czech Republic._ Post-Communist Economies, Vol.3, No.3, p.277-98.

JETRO (2004) _Zai Ōshū Toruko Nikkei Seizougyo no Keiei Jittai 2004 Nendo Chōsa._ Nihon Bōeki Shinkō Kikō Kaigai Chōsabu. p.1-232.

JETRO (2005) _Chūtouou seiji keizai gaiyo._ JETRO Wien Cenre. p.9

JETRO (2005) _Cheko Shinshutsu Nikkei Kigyo ni Kiku_ Euro Trend 2005 February Report 7. p.1-8.

Kaminsky, G., Lizondo, S., and Reinhart, C. (1998) _Leading Indicators of Currency Crises._ IMF Staff Paper, 45, 1 (March), p.1-48.

Kaminsky, G. and Reinhart, C. (1999) _The Twin Crises: The Causes of Banking and Balance-of-Payments Problems._ American Economic Review, 89, 3, p.473-500.

Krugman, P. (1991) _Increasing Returns and Economic Geography._ Journal of Political Economy. Vol. 99 Issue 3. p.483-500.

Kumar, N. (2002) _Globalization and the Quality of Foreign Direct Investment._ London: Oxford University Press.

Kumon, H. (2005) _Poland·Slovakia ni okeru hybrid kōjō no keiei jittai._, in Abo, T. and Wada, M., ed., _Chūtoou no nihongata keiei seisan shisutemu._, Bunshindō. p.142-85.

Lim, S. (2005) _Foreign Investment Impact and Incentive: A Strategic Approach to the Relationship Between the Objectives of Foreign Investment Policy and Their Promotion._ International Business Review 14, p.61-76.

Lowe, N. and Kenney, M. (1999) _Foreign Investment and the Global Geography of Production: Why the Mexican Consumer Electronics Industry Failed._ World Development Vo.27, No.8, p.1427-1443.

Marshall, A. (1920) _Principles of Economics_. Macmillan Press Ltd. p.222-31.

McFadden, D. (1974) _Conditional Logit Analysis of Qualitative Choice Behavior._, in Zarembka, P., ed., _Frontiers in Econometrics_, Academic Press, New York, p.105-142.

Milner, C., Reed, G. and Talerngsri, P. (2004) _Foreign Direct Investment and Vertical Integration of Production by Jpanese Multinationals in Thailand._ Journal of Comparative Economics 32, p.805-821.

Miura, K. (March 2004) _Business Strategy of Japanese Companies in Central and Eastern Europe_, JOI Bulletin, Japan Institute for Overseas Investment, p.15.

Nihon Keizai Shinbun (14 March 2002) unspecified member of the editorial staff: _Chū Tōō Muke Chokusetsu Tōshi Kōchō._ p.9.

Nihon Kōgyō Shinbun (13 June 2003) unspecified member of the editorial staff: _Shinku Tank no Me: Nikkei Maker Chū Tōou Shinshutsu ga Kappatsu._ P.15.

Nikkei Sangyo Shinbun (25 November 2003) unspecified member of the editorial staff: _Czech Tōshi Keikaku 6 Wari Zō._ p.14.

Nikkei Sangyo Shinbun (12 March 2004) unspecified member of the editorial staff: _Czech Meisan Purazuma TV._ p.227.

Porter, M. (1990) _The Competitive Advantage of Nations._ The MacMillan Press Ltd.

Smith, D. and Florida, R. (1994) _Agglomeration and Industrial Location: An Econometric Analysis of Japanese-Affiliated Manufacturing Establishments in Automotive-Related Industries._ Journal of Urban Economics 36, p.23-41.

Puga, D. (1999) _European Regional Policy in Light of Recent Location Theories_. Working Paper: University of Toronto.

Tamayo, F. (2000) _Location Factors and Spatial Deconcentration of Manufacturing Growth in Mexico: What Do We Know and How Do We Know It?_ Economia, Sociedad y Territorio, Vol.II, núm. 8, p.593-639.

UNCTAD (2002) _World Investment Report 2002: Transnational Corporations and Export Competitiveness._ Chapter III Regional Trend. p.68-71.

Werner, R. (2003) _Location, Cheap Labor and Government Incentives: A Case Study of Auomotive Investment in Central Europe Since 1989._ Chazen Web Journal of International Business Spring 2003. p.1-29.

Weymark, D. (1998) _A General Approach to Measuring Exchange Market Pressure._ Oxford Economic Papers 50, p.106-121.

Woodward, D. (1992) _Locational Determinants of Japanese Manufacturing Start-ups in the United States._ The Sourthern Economic Journal, Vol.58, No.3, p.699-708.