Location Determinants of Foreign Firms in Poland:

The Role of Special Economic Zones

By

Otabek Saydikaharov

Submitted to

Central European University

Department of Economics

In partial fulfillment of the requirements for the degree of Master of Arts in Economic Policy in Global Markets

Supervisor: Professor Gábor Békés

Budapest, Hungary
2012

Abstract

This work analyzes the factors that may affect the location determinants of firms with foreign capital participation in Poland based on the county (*powiat*) level data from 2002 to 2007. The main focus factor is Special Economic Zones (SEZs), which have been established by the Polish government to attract investors and ultimately develop targeted regions' economy. The findings show that there is no significant role of SEZs in attracting foreign capital into a location as SEZs variable loses statistical significance when a number of other regional variables are included into the estimation. It is found that instead of investment incentives offered through SEZs, foreign investors care more about market related factors such as population, income level and proximity to particular country borders which might capture location's market size, market demand and market potential respectively.

Key words: Special Economic Zones, Poland, FDI, location determinants.

Acknowledgments

First of all, I would like to express deep gratitude to my supervisor Gábor Békés for his valuable advice and support throughout the thesis writing period.

I also want to thank my family for their great support and endless care during my study time at CEU, especially my mother without her *duas* I would not be able to reach these achievements.

Special thanks to my friends Manlaibaatar Zagdbazar, Gergely Istvan Hajdu, Martyna Panczak, Timur Ganiev and Hurshid Obiev for their support, help and friendship.

Table of Contents

List of Tables and Figures

Tables

Figures

INTRODUCTION

After the collapse of communism, independent socialist countries imposed various policies in order to find a way for economic development, in general economic and political reform. In the transition period this requires governments to make a hard effort and cautiously establish such policies so that the country passes the transition period in a shorter time period with less economic hardship. Attracting foreign direct investment (FDI) is always one of the most important objectives on the government's agenda, especially in transition. Because FDI helps economic development by creating new work places, increasing foreign trade, production volume and diversity, and generating technology and knowledge spillovers.

However, making investors invest in a transition country is not an easy task. Therefore, we can see some transition countries try to set up special policies in order to attract FDI. A clear example for these kinds of policies could be establishment of Special Economic Zones (SEZs), mostly by transition economies in a transition period[1]. One can find several sources particularly state about the success of Polish SEZs and country's great achievements in terms of attracting FDI.

Poland is nowadays considered to be one of the most attractive FDI destinations. If we look back to recent history which is the early transition period in the 1990s, FDI inflow into the country was one of the main factors to help its industrial transformation and ultimately enhance economic development *(Domanski, 2000)*. Official statistics show that the overall trend of FDI inflow into Poland has been increasing since 1995 even though it has been fluctuating in some years. For instance, in 1995 the FDI inflow into the country was 2,831 EUR million while in 2007 this amount increased about 6 times to 17,242 EUR million (PAIiIZ, 2011). The global position of the country in terms of attracting FDI is increasing rapidly. According to UNCDAT's (United Nations Conference on Trade and Development) World Investment Report (2011), Poland is mentioned to be the 6th top

[1] CEE counties: Poland (1995), Belarus (1996) http://www.fez.brest.by , Lithuania (2002) http://www.fez.lt, Latvia(1996) http://www.ifc.org, Hungary (in the late 1980s) http://www.ifc.org, Moldova (1995) http://www.miepo.md, Russia(2005) http://invest.gov.ru, Serbia(1996) http://www.usz.gov.rs, Ukraine (1998) http://www.kac.com.ua and Czech Republic(1990s) http://www.ifc.org
Central Asian countries: Uzbekistan(2008) http://www.gov.uz, Kyrgyzstan(2000) http://www.unescap.org and Kazakhstan (2001) http://www.invest.gov.kz

FDI host country globally for 2011-2013 years, surprisingly before Germany and the UK. Ernst and Young's European Attractiveness Survey (EAS) report (2011) shows that Poland is the leader among CEE countries and the 7th in Europe in terms of attracting FDI. These show how Poland is becoming a more and more attractive location for foreign investors. Since a considerable amount of FDI inflow contributes to decreasing the unemployment rate in a country we can see that Poland is achieving very good result on that. Ernst and Young's 2010 report shows that Poland is the 3rd country in Europe after the UK and France in terms of creating new work places through FDI. One of the interesting facts about Poland can be found in Eurostat's statistics which show that Poland was the only EU country who showed the positive GDP growth during the recent global crisis (1.6 real GDP growth rate in 2009[2]).

These kinds of facts make Poland interesting and motivated further analysis to find out what factors play a role in foreign capital inflow into Polish locations and among other possible factors, specifically, if there is a significant role for Polish Special Economic Zones. One of the reasons for choosing Poland is data availability in smaller regions (powiats-counties, NUTS4) which enables us to estimate the role of SEZs more precisely. Although there is little existing literature on foreign firms' location determinants within Poland which include SEZs into their estimations, there is no study yet using dataset for recent years (after 2002) at lower level regions-powiats. Cieślik (2005a) used regional dataset (NUTS 2) for the period of 1993-1998 including SEZ into his estimation and found that Polish SEZs do not play a significant role in attracting foreign investors into Polish regions. Another study which includes SEZs in the empirical estimation has been done by Cieślik and Ryan (2005) who analyzed Japanese multinationals' location determinants in Poland using the regional (NUTS 2) dataset for 1991-2001. Their findings show the same result as the previous study of Cieślik (2005a) that SEZs do not have a significant effect on Japanese investors' location decision within Polish regions. So, unlike these empirical studies I use county level (NUTS 4) dataset for the periods of 2002-2007 for my analyses. In general, this study contributes to existing literature on FDI location determinants in two ways. First, investigation is carried out on smaller administrative divisions of

[2] Eurostat : http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&plugin=1&language=en&pcode=tsieb020

Poland – powiats. Second, the results will give an answer if SEZs were effective in attracting FDI after Poland's early transition period (1990s).

One can see that FDI spatial distribution within Polish powiats is uneven. This might raise the question of what factors are behind foreign investors' location decision. To find out an answer to this question I include such variables known as traditional variables in existing literature like market demand, input costs, market potential, infrastructure measuring variables and my focus variable SEZ into my estimation. The estimation will be carried out for two types of time periods, short run and long run, in order to capture short run effect and long run effect, and the results will be compared.

The paper is structured as follows. Chapter 1 describes FDI and SEZs in Poland. Chapter 2 discusses the basic theories and related literature. Chapter 3 shows the estimation strategy, data description and hypothesis formation, and finally estimation results. The final section discusses the concluding remarks and provides the policy conclusion based on the findings and analysis.

CHAPTER 1. Overview of FDI and SEZs in Poland

1.1 Foreign Direct Investment

Due to globalization the interest in attracting foreign capital increased substantially because multinational companies' role became crucially important in development. Inflow of foreign direct investment into the country is theoretically is expected to assist economic development increasing investment volume, employment rate through created new work places, growing foreign trade and total production.

There are many empirical studies showing different results on FDI and its impact on economic growth. The majority of them found a positive correlation between FDI and economic growth *(Borensztein, De Gregorio, & Lee, 1998; Li & Liu, 2005; Sadik & Bolbol, 2001)*. The influence of foreign direct investment on the economy of the host country can be direct through providing new jobs for local inhabitants and increasing export volume of the country or indirect through generating positive externalities such as technology and knowledge spillovers. Branstetter (2006) used firm-level panel data on Japanese investment into US and analyzed if knowledge spillovers are generated due to FDI. The results showed that FDI generates and raises knowledge spillovers both from and to Japanese companies. In Poland's case Weresa (2004) found strong positive influence of FDI on technological development of domestic Polish industry.

At the same time, foreign investors themselves want to benefit from these kind positive externalities as well. Not only can they be superior and generate spillovers for domestic firms but this can be visa versa. If the hosting country's economy is relatively well developed and technologically superior, foreign firms might get advantages from spillovers generated by the domestic firms and learn from domestic firms' experiences. Driffield and Love (2003) found this reverse spillover generated by UK manufacturers to foreign multinational companies. Chung and Alcácer found that

the US states with higher R&D intensity are most probably chosen by foreign firms to invest in because they might benefit from knowledge spillovers in the area.

It could be asked what if foreign investors are not investing in one area rather they are dispersed, whether they still contribute to economic development through spillovers at the same rate. Thompson (2002) found an answer to this question examining geographically dispersed FDI and clustered FDI in China, and found that clustered FDI shows better results in transferring technology and knowledge spillovers than dispersed FDI. Thus, one can say that it is much better for both foreign firms and domestic ones to localize in order to benefit from generated positive externalities.

Although the relations between FDI and economic growth is expected to be positive, as found in previously stated studies, the extent to which FDI influence the country's development depends on the conditions in the host country. The country could be an attractive investment place for investors based on its specific characteristics which are preferred by foreign investors and under these favorable conditions FDI's positive effect on economic development could be stronger. If a country has a stable macroeconomic policy and liberalized trade policy, a high level of education which gives high level of human capital and supportive policy for export-oriented foreign direct investment, then FDI's influence on economic growth would be more efficient *(Borensztein et al., 1998; Zhang, 2007)*.

Based on several empirical findings, we have seen the importance and several benefits of FDI for the host country. Moreover, except small spillover advantages there must be certain significant advantages for foreign investing companies in host country, as they are ready to move their businesses to abroad ignoring certain costs attached. Theoretically there could be two main reasons for firms to invest abroad.

The first reason might be related to costs a firm encounters in the business cycle. Decreasing overall cost and increasing profit is obviously any business's core target. Firms invest in a foreign country in order to lower their total production costs. A clear example could be labor cost differences between two countries. If a firm needs large amounts of cheaper (unskilled) labor forces for its business and can find it in another country it would be much profitable for it to invest in that country.

A firm may produce certain types of products which are different from their home products. For example, it may split its production into stages and produce certain production parts which require unskilled labor in a country with cheap labor. This kind of foreign direct investment is called *vertical foreign direct investment*.

Secondly, firms move their production to foreign countries in order to get better access to other larger markets abroad with lower transportation costs. The areas with or close to larger markets are undoubtedly desired locations for foreign firms to operate in. A firm may produce the same type of products and services in a foreign country as their home products and services and serve foreign market avoiding transportation costs. This type of foreign direct investment is called *horizontal foreign direct investment.* Firms make their investment location decisions based on their types (vertical or horizontal) and purposes of investment; therefore, during location choice process they take into account each location's fundamental characteristics attentively such as market access, market demand, market potential, input costs and its quality etc.

In addition to firms' aim of lowering cost and being close to potential markets, there are other factors affecting their investment location decisions. For example, in many empirical studies agglomeration economies have been found to be one of the leading factors to attract foreign investors *(Belderbos & Carree, 2002; Boudier-Bensebaa, 2005; Chen, 2009; Chidlow, Salciuviene, & Young, 2009; Cieślik, 2005a; Donald F. & Florida, 1994; Friedman, Gerlowski, & Silberman, 2006; Guimarães, Figueiredo, & Woodward, 2000; C. K. Head, Ries, & Swenson, 1999; K. Head, Ries, & Swenson, 1995).* As I have already stated earlier, firms get more benefit from positive externalities in clusters therefore many empirical studies support that investors tend to invest in locations where many industries already exist.

We will see in this study which regional characteristics play a role in foreign investors' location choice in Poland; as theories say input costs, proximity to central (Warsaw) market or neighboring market, agglomeration effect are significant or other factors such as government's

investment incentives policy through special economic zones also influence investment location decision.

1.2 FDI and Special Economic Zones in Poland

Poland is the sixth largest country in EU after France, Spain, Sweden, Germany and Finland, with a population of 38 million mostly living in urban areas. According to European standards Poland is a young society with half of its population between 30-50 years old. According to 2011 statistics, about 8 million are employed in the service sector, 4 million are active in industry and construction sector, while about 2 million people are busy in agriculture and forestry sectors of the society. Like in other transition countries, foreign direct investment has played huge role in Poland's transition period in 1990s. Knowing the importance of FDI the Polish government has been imposing several policies and trying to attract as much FDI as possible, and from the statistical figures we can see that in this sense Poland is doing much better comparing to other CEE countries.

The data provided by the Polish Central Statistical Office (CSO) shows that although FDI inflow has been fluctuating by years the overall pattern has been increasing since 1994 (see figure 1 below). At present, Poland is one of the leading FDI attracting countries in Europe. According to UNCDAT's (United Nations Conference on Trade and Development) World Investment Prospects 2011 Survey, for the periods of 2011-2013 Poland is chosen as the 6th FDI priority country globally by transnational corporations (while it was 13th in the report of 2010) after the largest economies China and US and surprisingly before Germany and the UK. Moreover, Ernst & Young's most recent European Attractiveness Survey (EAS) report (2011) shows that Poland ranked 1st among CEE countries and 7th in Europe in terms of attracting FDI. This indicates that Polish lands are becoming more and more attractive to foreign investors. The report also shows that the number of FDI projects in Poland increased by 40% from 2009 to 2010 which is the highest growth rate among other European countries. Another report of Ernst & Young (2010) states that Poland is the 3rd in terms of job creation through FDI after the UK and France in Europe. If we look at figure 1 and figure 2 which

show FDI inflow and unemployment rate in Poland respectively, we can see that there is, to some extent, correlation between FDI increase and unemployment fall. When FDI inflow started to increase in 1995, the unemployment rate started to decrease from that year and, when FDI is going down from 2000 unemployment rate is rising again.

Since Poland's position and its conditions are increasing rapidly in the eyes of foreign investors, it is important to analyze what possible factors are making Poland such an attractive location for foreign investors.

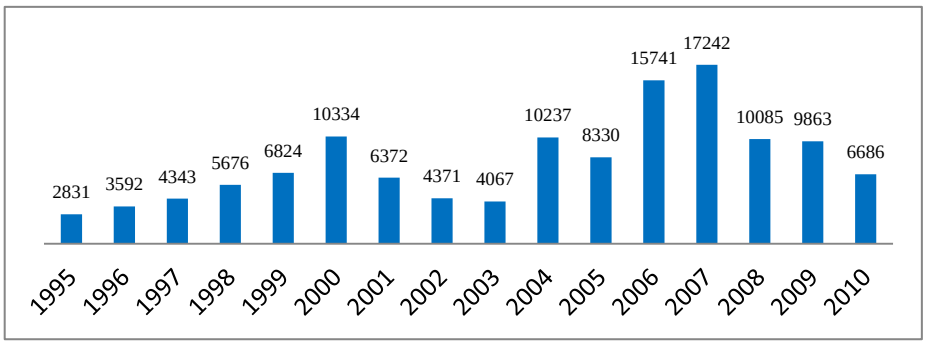

Figure 1. FDI inflow into Poland in EUR million from 1994 to 2011

Source: Polish Information and Foreign Investment Agency (PAIiIZ)

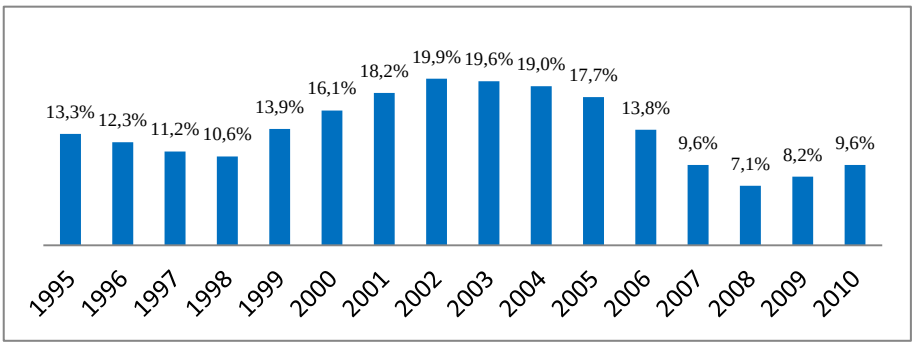

Figure 2. Unemployment rate in Poland from 1995 to 2010

Source: Central Statistical Office (CSO)

Polish official statistics again proves that Poland's position in international level is also increasing steadily through country's increased export volume in international trade. We can see from the numbers that during the periods from 1998 to 2010 export of the country has grown substantially from EUR 28.9 billion to EUR 125.1 billion (see figure 3).

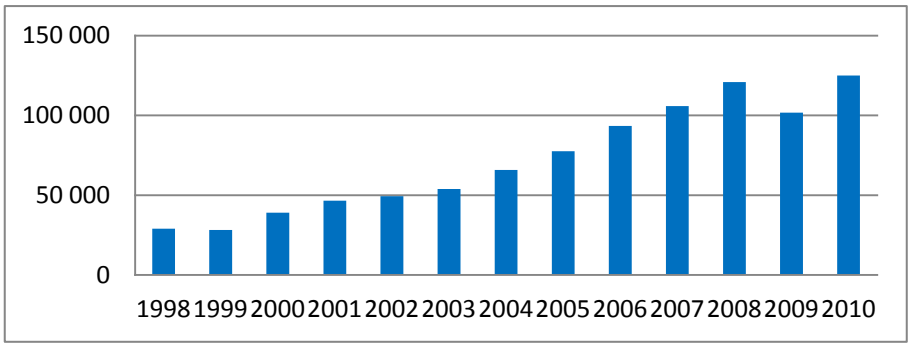

Figure 3. Poland's goods export growth in EUR million from 1998 to
Source: National Bank of Poland (NBP)

To a certain extent, growth of export volume is associated with increase in the existence of foreign firms. According to the Central Statistical Office data, in 2007 there were 3794 new firms with foreign capital participation registered to Polish REGON system in order to start their operations in Poland. The main leading investor countries to Poland are Netherlands, France, Germany, USA, Luxemburg, Germany, Italy, Cyprus, Switzerland, United Kingdom, Sweden, Austria, Spain and Portugal. Their foreign capital values and shares are shown in table 1 below.

Table 1. Investor countries of which capital is over 1.5% of total foreign capital in Poland (2007)

Country	Foreign capital value (EUR mln)	Share
Netherlands	8824,9	25,94%
France	6672,2	19,61%
Germany	6468,8	19,02%
USA	1438,7	4,23%
Spain	1313,1	3,86%
Luxemburg	1261,4	3,71%
United Kingdom	1245,2	3,66%
Denmark	1176,8	3,46%
Switzerland	1172,1	3,45%
Italy	1081,8	3,18%
Belgium	1029,1	3,03%
Sweden	942,6	2,77%
Cyprus	759,8	2,23%
Austria	632,2	1,86%

Source: *Author's own calculation based on data provided by CSO and NBP*[3]

[3] Central Statistical Office data on the value of foreign capital is given in Polish zloty million. Based on historical exchange rate of 2007 provided by National Bank of Poland (http://www.nbp.pl/homen.aspx?c=/ascx/archen.ascx), we have converted the value in Polish zloty into Euro and took the share from the total foreign capital.

Top leading ten powiats in terms of total number of newly registered firms with foreign capital participation and number of population can be found in table 2. After analyses I found that 8 out of 10 powiats with more firms with foreign capital are in the list of ten most populated powiats of Poland. To some extent this means that those powiats are more urbanized and better developed, and obviously they have larger market size, most probably therefore they have managed to attract more foreign capital than less populated powiats.

If we look at their status as well, we can see that these 8 powiats are actually capital cities of different 8 voivodships (regions) and have the largest agglomeration of economic activities. They are truly central business locations of their regions and most probably that's why these locations are more preferred by foreign investors to locate in. Other two powiats, piaseczyński and pruszkowski in the list of top ten attractive locations, are also located in central region Mazowieckie where capital city Warsaw is located. I have found that these two powiats are the 3rd and 4th most populated powiats in Mazowieckie voivodship in 2007 after Warsaw and the city with powiat status Radom. It is interesting to know reason why Radom was not able to attract more foreign investors than piaseczyński and pruszkowski powiats based on the size of population, and I found that Radom is about 93km far from Warsaw while piaseczyński and pruszkowski powiats are about 27 km and 16km in distance with Warsaw respectively. So, one may think that foreign investors more likely to choose locations with larger population and at the same time closer to capital city Warsaw, *ceteris paribus*. To find out empirically if population size of a powiat and distance between Warsaw really matter in attracting foreign investment I am including distance and population variables into my estimation.

Table 2.Top ten powiats with more foreign capital participated firms and population

	Top ten powiats in terms of total number of new firms with foreign capital participation	# of newly registered firms with foreign capital participation (2007)			Top ten powiats in terms of total number of population	Population (person) (2007)
1	City with powiat status Capital City Warszawa	1428		*1*	City with powiat status Capital City Warszawa	1702139
2	City with powiat status Wrocław	207		*2*	City with powiat status Kraków	756267
3	City with powiat status Kraków	211		*3*	City with powiat status Łódź	760251
4	Powiat piaseczyński	208		*4*	City with powiat status Wrocław	634630
5	City with powiat status Poznań	157		*5*	City with powiat status Poznań	564951
6	City with powiat status Szczecin	87		*6*	City with powiat status Gdańsk	456658
7	Powiat pruszkowski	48		*7*	City with powiat status Szczecin	409068
8	City with powiat status Łódź	61		*8*	City with powiat status Bydgoszcz	363468
9	City with powiat status Katowice	59		*9*	City with powiat status Lublin	353483
10	City with powiat status Gdańsk	51		*10*	City with powiat status Katowice	314500

Source: Local Data Bank of CSO

Historically, attracting FDI has been Polish government's one of the main agenda because we can see that for a transition country during a transition period FDI inflow is crucially important and highly needed due to the aforementioned benefits FDI gives, such as jobs creation, increase in total production capacity and export, technology and knowledge spillovers etc. Domański (2003) states that through benefits FDI generates the Poland would be able cover its current account deficit, increase modernization and all in all increase whole economy.

Considering the possible advantages of FDI, the Polish government started to take action imposing such policies as to make the Polish lands much more attractive for foreign investors. Consequently, the government has decided to establish 14 Special Economic Zones (SEZs) in different Polish regions and aimed to develop the economy especially those regions' economy where SEZs are established. Spatial distribution of SEZs within Polish regions can be seen in the figure 5 in

Appendix. In the literatures we can find different definitions of SEZs, however I am going to present the following definition stated by Ge (1999):

> …a special economic zone may be characterized, in general terms, as a geographic area within the territory of a country where economic activities of certain kinds are promoted by a set of policy instruments that are not generally applicable to the rest of the country. Institutionally, the existence of a SEZ reflects the fact that the host government conducts its economic policy in such a discriminate manner that certain geographical regions, economic activities, and interest groups are strongly favored over others *(Ge, 1999)*.

In the World Bank's report, the benefits successful SEZs might generate have been defined in three categories such as static economic benefits, dynamic economic benefits and socio-economic benefits *(Farole, 2010)*. Static economic benefits can be reached when zones are used as trade and investment policy instruments and through this regions will benefit from investment inflow, new work places creation and export growth. Dynamic economic benefits include transfer of technology, integration of foreign and domestic industries, diversification and increase in openness. Regions can reach socio-economic benefits through creation of employment quality upgrade. Moreover, foreign investors may be involved into communities through their supports of social provisions to local events and institutions such as hospitals, schools etc. *(Domański, 2003)*.

Indeed, there are some successful special economic zones in several countries; especially China's experience shows the real success of SEZ. Chinese zones were able to transform China into one of the attractive heavens for foreign investment and made the country a large FDI recipient and a huge foreign exchange earner in the world. As there are certain advantages of establishing SEZs, according to World Bank's report there had been 176 SEZs in 47 countries in 1986 and by 2006 this figure increased to 3 500 SEZs in 130 countries *(Farole, 2010)*.

In Poland, the first SEZ was established in 1995 in Mielec city which is located in Podkarpackie voivodship (region), and after two years later a number of new SEZs started to be established within Polish regions. Under the government regulations Polish SEZs will maintain their title until the end of 2020. Table 3 below shows all 14 Polish SEZs by established years, covered regions and received investments as a share of GDP in 2007.

Table 3. 14 Polish SEZs with established years, covered regions and investments

#	Special Economic Zones	Regions located	Year of establishment	Investments (% of GDP, 2007)
1	Kamienna Góra Special Economic Zone	Dolnośląskie, Wielkopolskie	1997	0,018
2	Katowice Special Economic Zone	Śląskie, Małopolskie, Opolskie	1996	0,132
3	The Kostrzyn-Słubice Special Economic Zone	Lubuskie, Zachodniopomorskie, Wielkopolskie	1997	0,080
4	Kraków Technology Park	Małopolskie, Podkarpackie	1997	0,046
5	The Legnica Special Economic Zone	Dolnośląskie	1997	0,042
6	The Łódź Special Economic Zone	Łodzkie, Wielkopolskie, Mazowieckie	1997	0,075
7	The Special Economic Zone EURO-PARK MIELEC	Podkarpackie, Małopolskie, Lubelskie	1995	0,026
8	Pomeranian Special Economic Zone	Pomorskie, Kujawsko – Pomorskie, Zachodniopomorskie	2001	0,078
9	Słupsk Special Economic Zone	Zachodniopomorskie, Pomorskie, Wielkopolskie	1997	0,008
10	The “Starachowice” Special Economic Zone	Świętokrzyskie, Mazowieckie, Opolskie, Łydzkie, Lubelskie	1997	0,012
11	Suwałki Special Economic Zone	Podlaskie, Warmińsko-Mazurskie, Mazowieckie	1996	0,031
12	The Tarnobrzeg Special Economic Zone EURO-PARK WISŁOSAN	Podkarpackie, Mazowieckie, Świętokrzyskie,Lubelskie, Dolnośląskie	1997	0,147
13	The Wałbrzych Special Economic Zone	Dolnośląskie, Opolskie, Wielkopolskie, Lubuskie	1997	0,168
14	The Warmia-Mazury Special Economic Zone	Warmińsko-Mazurskie, Mazowieckie	1997	0,036
				Total : 0.9 %

Source: PAIiIZ and author’s own calculations based on data provided by PAIiIZ and CSO

Initial overall area of the zones was 13 000 hectares and based on new Act on SEZs in 2008 the total area was expanded to 20 000 hectares which is 66% increase in overall (PAIiIZ, 2011). Theoretically, if SEZs are attractive enough for foreign investors and cause large amount FDI inflow into the country, then these zones will improve economic activity of the region making it internationally competitive with its increased exports capacity. Due to the export volume increase, the country might earn and accumulate huge amount of foreign exchange. Local economy's competitiveness might be improved as well due to technology and knowledge spillovers and mutual connection and built relationship of companies in the zones.

Successful special economic zones will definitely create new work places for local inhabitants when a huge volume of FDI flows into the zones, as a result the employment rate will increase in the area causing economic life of the region to be better off. According to the report provided under Polish Information and Foreign Investment Agency (PAIiIZ), Polish SEZs were established particularly to enhance the regional economic development, operate post-industrial property and infrastructure, create new work places and attract FDI. From this one can say that the Polish government is trying to increase economic development of poorer regions. Moreover, newly established foreign firms with modern technology and with new approach for production will also help domestic workers' skills upgrade. According to PAIiIZ, there are over 225 000 people employed in firms located in Special Economic Zones in 2011.

The uniqueness of SEZ comparing to other areas is that SEZs offer special care for their investors and tax exemptions so that firms can build and run their businesses easily on those particular areas without paying income taxes. If an entity is formed and run a business as a legal person then it will be exempted from corporate income tax (CIT-19%) or as a physical person then personal income tax (PIT-18%; 32%) will be exempted (PAIiIZ, 2011). So, overall what special economic zones offer for businesses operating in the zone is tax exemption (CIT or PIT), well prepared areas at a competitive price, free support in dealing with administrative procedures and free property tax. Polish officials explain the reason for the establishment of SEZs with fiscal incentives in connecting with

regional economies development. The authority considers tax exemptions as a regional aid which is funded by public for the development of poorer regions.

There are public aids (including the tax exemptions) provided by administration for businesses operating in SEZs but in order to get them investors must be granted special permission by SEZs board under the regulation of Ministry of Economy. Investors will be granted this aid based on their investment locations, volume of investment outlays, number of created new jobs and business size. There are certain regulations and conditions that investors have to meet and follow. Firms operating in SEZs will be granted the income tax exemptions only if they make new investment with at least EUR 100 000 investment expenditure (PAIiIZ, 2011) and also when the following conditions are met[4]:

1. The ownership of properties related to investment expenditure has to be preserved for 5 years starting from the date of entry into fixed and intangible assets registration, and in the case of small and medium sized businesses for 3 years
2. Businesses have to be in operation for minimum 5 years and for small and medium sized entities the minimum period is 3 years
3. New workplaces have to be created and maintained for minimum 5 years bearing the labor costs, while this is three years for small and medium sized entities.

Not any kind of business can be granted aid according to the legal regulations. Subsidies can be given to new investing companies in sectors such as automotive, aviation, biotechnology, IT and electronics, research and development (PAIiIZ, 2011). However, there are certain business activities for which the permit will not be issued. According to Council of Ministries Regulation (CMR) of 10 December, 2008, particular business activities such as production of explosives, tobacco products, engine fuel processing, alcoholic beverages production related activities, running game centers and many more other special activities will not be granted with public aids[5].

[4] Regulation of The Council of Ministries (December 10, 2008)
[5] See the Regulation for more information:
http://www.lublin.eu/images/upload/Regulation%20on%20public%20aid%20granted.pdf

The Polish government came up with a special way of calculating tax allowance which is calculated based on the amount of investment expenditure of the firm or new employed labors' two-year labor costs. Moreover, the public aid (including tax allowance) provision differs according to each Polish region. The following figure 4 summarizes the rate of state aid by regions which is calculated as a proportion of investment expenditure. Authority introduced these regional aids level on January 1st, 2007 and since then the state aids have been provided and will be provided in this pattern until 2013 only to the businesses operating in SEZs.

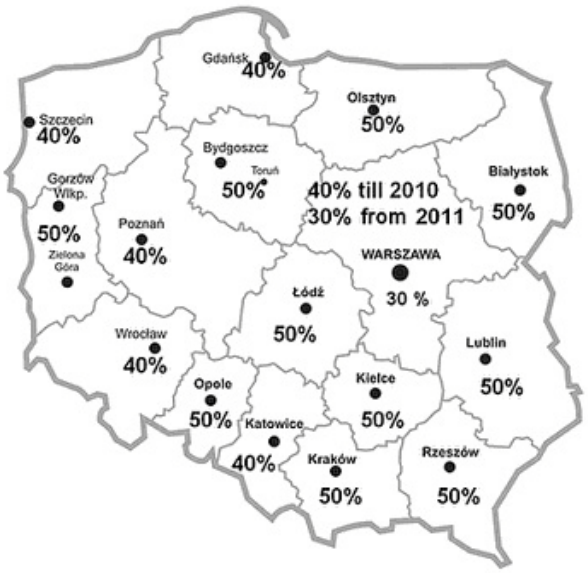

Figure 4. Maximum intensity of regional aids by voivodships (regions)

Source: Polish Information and Foreign Investment Agency (PAIiIZ)

Maximum intensity of regional aid of 50% is provided for the regions namely Lodzkie, Malopolskie, Lubelskie, Podkarpackie, Podlaskie, Swietokrzyskie, Lubuskie, Opolskie, Kujawsko-Pomorskie, Warminsko-Mazurskie while 40% is applied for Slaskie, Wielkopolskie, Zachodniopomorskie, Dolnoslaskie and Pomorskie regions, and 30 % is for Mazowieckie central region. In Mazowieckie region, it was 30% only in the areas around capital city of Warsaw before January 1, 2011 and after January 1, 2011 this percentage (30%) applied to the whole region. Until December 31, 2010 in all provinces of Mazowieckie excluding capital city of Warsaw it was 40 %[6].

[6] Regulation of The Council of Ministries (December 10, 2008)

Maximum amount of aid implies that an investor will not pay income tax until his maximum amount of aid including tax exemption granted for him is not exhausted totally.

Interestingly, if we look at the GDP per capita figures of 2007 of the Polish regions provided by the Government Statistical Office, we can see that those regions with higher percentage of public support limit are relatively lagging behind comparing to other regions except Lodzkie (see table 4 below).

Table 4. Voivodships ranked by GDP per capita

	Voivodships	Capital city	GDP per capita in zloty (2007)	Regional aid
1	Mazowieckie	Warszawa	49350	30%
2	Dolnośląskie	Wrocław	33470	40%
3	Śląskie	Katowice	32831	40%
4	Wielkopolskie	Poznań	32236	40%
5	Pomorskie	Gdańsk	30346	40%
6	Łódzkie	Łódź	28551	50%
7	Zachodniopomorskie	Szczecin	27487	40%
8	Lubuskie	Gorzów Wielkopolski, Zielona Góra	27242	50%
9	Kujawsko-pomorskie	Toruń, Bydgoszcz	26828	50%
10	Małopolskie	Kraków	26560	50%
11	Opolskie	Opole	25473	50%
12	Świętokrzyskie	Kielce	23816	50%
13	Warmińsko-mazurskie	Olsztyn	22908	50%
14	Podlaskie	Białystok	22872	50%
15	Lubelskie	Lublin	20979	50%
16	Podkarpackie	Rzeszów	20895	50%

Source: CSO and PAIiIZ

This tells us that the Polish government wants to develop those relatively poorer regions by attracting more investment to those locations with higher subsidies through special economic zones. If the entity has also operations outside the SEZs then the operations within SEZs must be organizationally separated according to regulations and the aid applies only to the activities within SEZs. Moreover, in order to be granted real estate tax exemption, investors are again required to meet special conditions similar to income tax exemptions such as investing and creating new work places

and keeping the investment for minimum 5 years in the region while 3 years for small and medium sized enterprises (PAIiIZ, 2011).

We have seen that the Polish government imposed different techniques to calculate state aid which is investment incentives through SEZs for investors based on their investment volume and location. Whether these kinds of subsidies, various types of aids, tax exemptions matter in investors' investment location decision has been a critical question among economists and argued in many empirical studies. Hines (1997) analyzed the effect of different US states tax rates on FDI distribution among states and found that differences in state corporate tax rates have significant effect on foreign investors' location decisions. Another empirical study shows that tax incentives, market size and labor cost plays a significant role in German multinationals' location decisions *(Buettner & Ruf, 2007)*. The study concludes that the probability of the German multinationals' investment falls by 12.5 percentage points when the tax rate rises by 10 percentage points. Although empirical studies support the hypothesis of a negative correlation between tax rate and FDI flow, we are going to find out how it works in Poland's case taking SEZ variable as the locations with lower tax rates and various kinds of investment incentives. Since I am not able to know exactly what kind of and how many investment incentives (like income, real estate tax exemptions, administrative support etc.) each SEZ offers for investors and there is no data even on the regional aid levels for years before January 1st, 2007 I can only use SEZ as a variable which comprise all investment incentives.

CHAPTER 2. FDI Location Choice

Since foreign direct investment (FDI) contributes considerably to economic development of the region, indeed it is crucially important to know what may attract FDI and affect foreign investors' location choice decision. We can see there are already a lot of empirical studies have been done in different kinds of approaches to find out location determinants of FDI. Most of the empirical studies included similar variables in general such as demand conditions, labor market conditions, agglomeration economies, infrastructure and various kinds of incentives for attracting foreign investors. However, there are limited studies on Special Economic Zones (SEZ) which are established by governments with fiscal incentives with the aim of attracting FDI. Theoretically, SEZ should be positively correlated to foreign capital inflow. The aim of this study is to find out how important SEZ alongside with other related factors is in foreign investors' location decisions in Poland. Investigation of firm's location determinants will be based on NUTS 4 powiat (county) level dataset from 2002 to 2007. There is no study yet for this powiat level and time range for Poland. Therefore, this study is aimed to find out possible foreign capital location determinants including special economic zones, which will be in the focus, using lower region (powiat) level data and, the results will be compared with previous empirical findings.

Three empirical studies has been done by Cieślik *(Cieślik, 2005a, 2005b; Cieślik & Ryan, 2005)* on foreign capital location choice within Polish regions. In his first study using dataset based on former 49 voivodships[7] (administrative regional division of Poland, NUTS-2) for the period of 1993-1998 Cieślik (2005a) found that foreign firms' location choice is positively affected by infrastructure variable such as road network, and industry and service agglomerations, and negatively relates to unemployment rate. In addition, unlike other empirical findings his analyses showed that GDP, wage rate and education which are believed to be important location determinant factors are not robust, either negative or positive significant or insignificant while SEZ variable is statistically insignificant.

[7] Before January 1, 1999 Poland regional division consisted of 49 voivodships. After Local Government Reorganization Act of 1998 was introduced, 16 new voivodships were created (effective January 1 1999) and replaced the 49 voivodships which had existed since 1 July 1975.
http://www.gnatowski.org/index.php?option=com_content&view=article&id=35&Itemid=84&lang=en

In his second study also using regional data but for the periods of 1991-2001, Cieślik has analyzed Japanese multinationals location choice within Polish regions including SEZ variable among other traditional variables and found that Polish SEZs do not play a significant role in attracting Japanese capital into regions *(Cieślik & Ryan, 2005)*.

In his third study, Cieślik (2005b) has analyzed border effect for location choice of FDI inflow into Poland using the same regional data of 49 voivodships for the periods of 1993-1998 as he used in the first study and found that foreign investors take regions' border into account before investing into that region meaning that it matters with which neighboring countries the region is bordered. He pointed out that Poland's regions bordered with Belarus, Russia and Ukraine were less attractive to foreign investors than other Polish regions. Unlike Cieślik's study I am going to use border dummies for smaller regional divisions – powiats (NUTS-4). This enables me to estimate more precise border dummies as I only consider a location as bordered if it is not more than about 60 km far from border.

Interestingly, Cieślik's three studies' findings on special economic zones which are intentionally established by government to attract FDI are statistically insignificant. However, there are other empirical studies which found special economic zones as an important factor to attract FDI. For instance, Makabenta (2002) found a positive relationship between SEZs in Philippines and FDI along with other highly significant factors such as income (positive), wage (negative) and infrastructure (positive).

One of the few studies on regional determinants of FDI inflow into Poland has been done by Chidlow (2009). The study examined FDI location determinants at a regional level (NUTS 2) using primary data from a survey and showed the empirical result that central Polish region, Mazowieckie is chosen by those foreign investors who take external factors such as agglomeration, knowledge and market factors into account in location decision making process. However, the other regions are chosen by those investors who seek lower input costs, available labor force and resources, low transportation costs and market access.

In many empirical studies agglomeration economies have been included as a main explanatory factor for foreign investors' location determination *(Boudier-Bensebaa, 2005; Chen, 2009; Cieślik, 2005a; Coughlin & Segev, 2002; Donald F. & Florida, 1994; Guimarães et al., 2000; K. Head et al., 1995)*. For example, Guimarães, Figueiredo, and Woodward (2000) have analyzed the factors that affect location of FDI focusing on agglomeration economies and found that agglomeration economies are significant in foreign investors' location decision. Deichmann, Karidis, and Sayek (2003) investigated the factors cause uneven regional distribution of FDI within Turkey and found that agglomeration economies with other variables such as local financial markets, human capital and coastal access are significant players in multinational firms' location decisions. The significant importance of industrial agglomeration in FDI location choice has also been found in several empirical studies *(Cieślik, 2005a; Coughlin & Segev, 2002; K. Head et al., 1995)*.

The first study of agglomeration economies dates back to Marshall (1890) who showed three reasons why firms would like to agglomerate in particular localities. He states that firstly, clustering generates a pooled market for special skilled workers in the location. As David and Rosenbloom (1990) argued this could be great advantage and very beneficial for workers because there is always need for their skills in that region and as a consequence they can find a job easily. At the same time it is also good for employers as they can more likely find desired workers with required skills in a pooled market because to find a job a specialized worker goes himself to the place where his special skill is highly appreciated and demanded. Secondly, when firms operate in one place near to each other they develop special inputs and services. Firms producing intermediate goods can also increase their sales volume by selling their products to firms located nearby with less transportation costs *(Krugman, 1991)*. Thirdly, in close proximity firms might benefit from positive externalities through business communications, knowledge spillovers and technological spillovers *(Guimarães et al., 2000; K. Head et al., 1995)*.

In the early 1990s, Krugman's "New economic geography" (NEG) theory emerged and this theory explains the possible reasons for firms' localization more in detail. According to NEG, by locating near to each other and clustering firms enjoy scale economies and low transportation costs.

When they agglomerate in one region, various types of products will be produced there. This enables consumers (workers) to consume more variety of goods in the region resulting workers' real income in that region to be high. This encourages other workers in the other regions to move into the agglomerated region. As a consequence, the more consumers (workers) in the region locate, the larger market emerges. This indicates that from *centripetal (agglomeration) forces* the *home market effect* emerged *(Fujita & Krugman, 2005)*. Krugman argues that *centripetal (agglomeration) forces* which bring entities to locate in one region emerge due to forward and backward linkages. While forward linkages drive workers (consumers) to be close to producers backward linkages motive producers to be close to the larger markets. Based on Marshallian and relatively new Krugman's notions economists, therefore, try to find out empirically whether agglomeration economies matter significantly in firm's investment location decision.

Among other studies on foreign investors' location choice, using US county level data Coughlin and Segev (2002) found that economic size, educational attainment, transport infrastructure, industrial agglomeration and urban locations are statistically significant and positive factors in FDI location determination. Bouder-Bensebaa (2005) studied FDI location determinants at Hungarian regional level and the findings showed that counties with high available labor force, industrial demand, manufacturing and well developed infrastructure grab more foreign investors' attention while unit labor cost has positive effect on FDI. Interestingly, labor cost estimated by wage at both regional and county level has been found to be positive and statistically significant in other several empirical findings as well *(Donald F. & Florida, 1994; Kawai, 2006)*. Authors' explanations on this positive and significant correlation between FDI and wage is that foreign investors most probably seek highly qualified labor with specific skills for their specific manufacturing activities, so because of the need in special skilled labor force foreign investors enter regions where they can find skilled labor ignoring high level wage rate.

There are more empirical studies on FDI location determinants mostly for US or China compared to European countries. One of the US related studies done by Friedman, Gerlowski and Silberman in 1992 analyzed the factors affect foreign multinational corporations location decisions

and found that market access, labor market conditions, state incentives to attract FDI and taxes are important players in location choice process. C. K. Head et al., (1999) also found that there is more Japanese FDI inflow into those states in which foreign trade zone, various types of subsidies for job creation and lower taxes exist. If fiscal incentives and taxes play a considerable role in FDI location choice according to past empirical studies then this study result on special economic zone is expected to show positive relationship with foreign capital inflow in contrast to Cieślik's findings. However, there are some other empirical findings as well in which fiscal incentives did not show significance. For example, Bobonis and Shatz (2007) found that state investment incentives do not have much influence on firms' location decision.

In many studies economic size of the region is widely used and estimated using different variables based on available data, for example we can see GDP, income per capita, population etc. are used to estimate region's market demand and market size. For instance, using regional data from 1995-2005, Villaverde and Maza (2011) analyzed the main determinants of FDI and its regional distribution within Spain and found that region's market size, which they tried to measure with population size and GDP, does not have significant role in attracting FDI while labor market and region's competitiveness indicators play a significant role in FDI inflow into Spanish regions. Unlike many other empirical studies Crozet, Mayer and Mucchielli (2004) calculated market potential based on Harris's concept for their demand variable and found the positive effect of market potential on foreign firms' location choice. In this study, since there is no data on distances between powiats I only include distances between each powiat and Warsaw, and border dummy variables to try to capture market potential.

Since China is one of the countries receiving largest FDI there are numerous studies for it among other empirical studies on FDI location determinants. Using Chinese regional data from 1985 to 1995 Cheng and Kwan (2000) analyzed FDI determinants and found that large market size and good infrastructure attracts foreign investors while high labor cost affects negatively on their location choice. As this study also found that education as a proxy for labor quality is positive but not statistically significant variable, Gao (2005) found significant and positive labor quality relationship

with FDI into Chinese provinces based on using data from 1996-1999 on employed persons by education level. HONG and CHIN (2007) analyzed the location determinants of FDI in logistic industry in China using data on 1775 foreign logistics establishments for the periods of 1992-2001 and found that large market size, well developed transportation infrastructure, high skilled labor force and agglomeration economies attract foreign investment while high labor cost deter FDI. However, their findings on SEZs were unexpected, which show that SEZs do not play a significant role in attracting foreign logistics investments.

According to empirical studies, the factors affect foreign investors' location choice change by countries and time period. Although most of the studies did not find the importance of SEZs in attracting FDI, there are few empirical findings exist which showed the significance of these incentive zones. So, the empirical evidence from various countries shows that the impact of SEZs on FDI inflow is mixed. Following existing literature, I will include certain factor variables which known as traditional variables with the main interested variable SEZ into my estimation and make analysis using smaller regional data for recent years. The next chapter provides information more in detail about the estimation strategy, data used and estimation results.

CHAPTER 3. Estimation Strategy, Data Description and Estimation Results

3.1 Estimation Strategy and Data Description

The main objective of this study is to find out what factors influence foreign investors' location decision and what makes them choose particular locations in Poland. This chapter shows how I am going to construct my model estimation and what variables I am going to include. Basically, my analysis is based on quantitative data. For simplicity I use OLS model and estimate the following estimation equation:

$$\begin{aligned} log(f) = \beta_0 + \beta_1 SEZ + \beta_2 log(wage) + \beta_3 log(pop) + \beta_4\, log(dst) + \beta_5\, log(income) + \beta_6 log(unempl) \\ + \beta_7\, log(stud) + \ \beta_8 brdrb + \ \beta_9 brdrcz + \beta_{10} brdrg + \beta_{11} brdrl + \beta_{12} brdrr + \beta_{13} brdrs \\ + \beta_{14} brdrsea + \beta_{15} brdru + \ \beta_{16}\, log(road) + \beta_{17}\, log(railway) + \beta_{18} maritime \\ + \beta_{19} airport + \beta_{20}\, log(water) + \beta_{21}\, log(gas) + \beta_{22}\, log(airpoll) + \varepsilon \end{aligned}$$

In this study, the main dependent variable is the number of firms with foreign capital participation for 366 Polish powiats/county (NUTS-4) in the periods of 2002-2007. There are basically 379 powiats in Poland nowadays including 314 rural powiats and 65 towns with powiat status (PAIiIZ, 2011). Due to data availability limit I have had to cut the total number of 379 powiats to 366. I have collected data on firms with foreign capital participation based on the firms which have been registered for REGON system[8] since there is no exact available data on FDI at powiat level. The data has been extracted from Local Data Bank of Polish Central Statistical Office and Polish Information and Foreign Investment Agency (PAIiIZ, 2011).

In order to have flow data on newly registered firms with foreign capital participation for each year, I have subtracted the number of foreign firms (which is stock) in a year before from the year after ones and got the data on the number of newly registered (or unregistered) firms for each year. Since I have got negative number of firms which means unregistered (closed) firms after having flow

[8] One of the required steps to establish a business in Poland is to register for REGON (National Official Business Register) system and get a REGON identification number (statistical number) which is issued by Statistical Office. Sources: http://www.stat.gov.pl/bip/regon_ENG_HTML.htm ; http://www.investing-in-poland.pl/steps.html ; http://www.doingbusiness.org/data/exploreeconomies/poland/starting-a-business

data, I cannot take a "log" and include this data into the estimation as desired. Therefore, I have replaced all negative values in my main variable to "zero" and after that add "one" to all my observations.

I have split my estimations into two stage in order to catch short run and long run effects. Estimation for short run effect which is for one year from 2002-2003 is aimed to see how 2002 explanatory variables explain the number of newly registered firms with foreign capital participation in 2003 which is our dependent variable. Estimation for long run effect which is for 5 years from 2002-2007 is aimed to see how 2002 explanatory variables explain the number of newly registered firms with foreign capital participation from 2002 to 2007.

Following the previous empirical studies on optimal location choice of foreign firms, I have included certain variables which might determine regional characteristics. Based on these characteristics, foreign firms decide where to invest. According to Krugman there are two forces (*centripetal and centrifugal forces*) that influence location of economic activities *(Fujita & Krugman, 2005)*. Krugman explains that c*entripetal forces* bring the economic activity to the location, for example, natural characteristics of location including being close proximity to larger markets, seaports, having desired labor market and existing positive external economies in the location attract investors, whereas *centrifugal forces* hinder economic activity enter the region and operate there, for example, higher input costs, various kinds of negative externalities and higher pollution in the location might impede economic activity to enter the location. Our location factors (independent variables) relate to both forces and their expected signs are given in following table 5.

Table 5. Dependent and explanatory variables with their expected signs, definition and sources

Variable	Definition	Expected effect	Source
Dependent variable			
Firms with foreign capital *(f)*	Log of number of firms with foreign capital participation		Local Data Bank of Polish Central Statistical Office
Independent variable			
Special Economic Zone *(SEZ)*	0/1 dummy	+	Polish Information and Foreign Investment Agency

Income *(income)*	Log of average monthly available income per capita (in zloty)	+	Local Data Bank of Polish Central Statistical Office
Wage *(wage)*	Log of average monthly gross wages (in zloty)	Could be either positive or negative	Local Data Bank of Polish Central Statistical Office
Population *(pop)*	Log of population	+	Local Data Bank of Polish Central Statistical Office
Unemployment *(unempl)*	Log of number of registered unemployed	Could be either positive or negative	Local Data Bank of Polish Central Statistical Office
Students *(stud)*	Log of number of students and graduates	+	Local Data Bank of Polish Central Statistical Office
Distance *(dst)*	Log of distance between each powiat and Warsaw (in km)	-	Google maps
Roads *(road)*	Log of length of road network (in km)	+	Local Data Bank of Polish Central Statistical Office
Railway lines *(railway)*	Log of length of operated railway lines (in km)	+	Local Data Bank of Polish Central Statistical Office
Maritime transport *(maritime)*	0/1 dummy	+	Polish Information and Foreign Investment Agency
International Airport *(airport)*	0/1 dummy	+	Polish Information and Foreign Investment Agency
Border Belarus *(brdrb)*	0/1 dummy	+	Google maps
border Czech Republic *(brdrcz)*	0/1 dummy	+	Google maps
Border Germany *(brdrg)*	0/1 dummy	+	Google maps
Border Lithuania *(brdrl)*	0/1 dummy	+	Google maps
Border Russia *(brdrr)*	0/1 dummy	+	Google maps
Border Slovakia *(brdrs)*	0/1 dummy	+	Google maps
Border Sea *(brdrsea)*	0/1 dummy	+	Google maps
Border Ukraine *(brdru)*	0/1 dummy	+	Google maps
Water line system *(water)*	Log of length of water line systems (in km)	+	Local Data Bank of Polish Central Statistical Office
Gas line system *(gas)*	Log of length of gas line systems (in km)	+	Local Data Bank of Polish Central Statistical Office
Air pollution *(airpoll)*	Log of emissions of air pollutants (t/y)	-	Local Data Bank of Polish Central Statistical Office

Our interested variable SEZ can be rarely found in previous empirical studies on FDI location determinants among other traditional factor variables such as income/GDP, wage, unemployment etc.

This could be due to the fact that SEZs are established in few countries particularly in transition countries during transition period. Therefore, the focus of this study is to find out if SEZs have impact on location decision of foreign investors together with other factors. I use SEZ as a dummy variable based on the data on SEZs provided by PAIiIZ: dummy 1 if there is a location with SEZ status in a powiat, 0 otherwise. Theoretically, SEZs should have positive impact on foreign capital location choice since they have been established in order to attract investors with investment incentives (including fiscal) and enhance the economic development of particular regions. However, it is questionable whether investors care about various incentives or their main interest is other regional factors.

Unlike existing empirical studies on foreign capital location choice within Polish regions, I use SEZ as a dummy variable at powiat (county, NUTS-4) level. Because, by using regional (voivodship, NUTS-2) data the estimation on SEZs may not be analyzed precisely as there are different numbers of cities and powiats entitled as special economic zones in different Polish regions. For example, there are 3 cities/powiats entitled as SEZs in Podlaskie region while there are more than 30 cities/powiats with SEZ title in Dolnoslaskie region (PAIiIZ, 2011). So, considering this fact I will analyze SEZ's impact in a deeper approach using the dataset at smaller regional level.

The richer the regions are with higher income per capita obviously the more attractive they are to foreign investors, as people with higher income demand more, as a result firms may serve regional markets with higher profit. So, as one of the traditional factors included in previous econometric analyses *(Coughlin, Terza, & Arromdee, 1991)*, I also include average monthly income per capita as an expected influencing factor to the dependent variable. Due to data availability constraint, I am using data on income extracted from regional (voivodships) dataset. I believe that using regional data for income variable is not a big problem since this data has been calculated based on region's contained powiats. Moreover, it is possible that a firm located in any powiat of the region may serve the neighboring powiat's market since the distance between powiats is not large.

Taking past empirical studies' results into account one can hardly expect the impact of labor market indicators such as wage and unemployment on investors location decisions. From theoretical point of view, one can argue that since an investor wants to invest in a location where s/he can earn more profit, the regional difference of input costs should play a role in the process of investors' location choice. Therefore, I include average monthly wage levels as a labor cost but according to past empirical results the expected sign cannot be determined beforehand while theoretically it should be negative. For instance some empirical findings showed negative relations between labor cost and FDI *(Cieślik, 2005a; Makabenta, 2002; Roberto, 2004)* while other studies found positive and statistically significant relation between these variables *(Boudier-Bensebaa, 2005; Cieślik & Ryan, 2005; Donald F. & Florida, 1994; Kawai, 2006)*. The latter studies explain the reason why foreign investors are willing to invest into the locations with high level of wage. They argue that this is most probably because they need highly specialized worker skills for their operations, therefore ignoring the labor cost they are willing to invest into those locations where they can find desired labor force. There are also empirical studies which did not find significance of labor cost at all *(Guimarães et al., 2000)*. So, considering these findings I cannot expect the effect of wage level on foreign capital inflow.

In the case of unemployment, from a theoretical point of view, availability of labor force is crucially important for business operations especially for those activities which need a low skilled labor force. In addition, labor availability might have dampening influence on wages *(Coughlin & Segev, 2002)*. So, from these points of views, the regions with high unemployment (high level of available labor force) may attract foreign investment. However, high level of unemployment in the region may also indicate poor competitive conditions and lower quality of life *(Woodward, 1992)* which are not the atmosphere foreign investors want to be in. Therefore, it is difficult to expect the unemployment variable's effect on foreign firms' location choice within Poland.

I also include the variable of the number of students and graduates in each voivodship (region) as a proxy for labor quality, since there is no available data on worker quality at powiat level. The reason for using data on students taken from regional data is that firstly due to data availability limit and secondly I think it makes sense to use regional data for this variable because labor is mobile.

If a firm locates in one of the region's powiats, anyway it can benefit from pooled skilled labor force of a region no matter in which part of the region it locates since labor can move easily within a region. In many empirical studies, the relationship between labor quality and foreign investment inflow has been found to be positive *(Coughlin & Segev, 2002; Gao, 2005)*. Like previous studies, I also expect positive relations between the number graduates (labor quality) and foreign firms in a location.

I hypothesize that the regions with more population (consumers) attract investors because the market size in those regions is bigger with higher demand since more consumers are located and, in addition, agglomeration forces exist there. So, I expect that population will show positive relation with foreign capital inflow. After checking the correlations between total number of population and amount of people living in urban areas, I found a high correlation which might indicate that the more people are in a region the more proportions live in urban areas. Urbanization has been considered to be one of the agglomeration effects and included in many econometric analyses in the past. However, I have decided not to include urbanization but only population variable as a proxy for both market size and an indicator of agglomeration forces since there is a high correlation between population and urban population.

In addition to urbanization agglomeration force, one can argue that a location with more inhabitants generates knowledge spillover. In other words, if a lot of people live together in one location, the atmosphere there induces them to get knowledge learning more new things and new information from each other, as a result overall knowledge level of inhabitants (workers) will increase leading to new ideas and innovations. Marshall describes this situation as follows:

> … 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 sources of further new ideas (Marshall, 1890).

Moreover, an investor more likely finds diversity in labor force with specific skills in a location with high population; this could be another fact that I expect population influence positively on the existence of foreign firms. Infrastructure level could be also better in a region with more inhabitants comparing to the one with few population. Last but not least, most probably foreign investors care about population size of the region as they care about their future more. In other words,

if there are more inhabitants (consumers) in a location currently, this means that there will be more inhabitants (consumers) in the near future as well. So, present level of consumers may predict near future level of consumers in a location. Considering all the facts, my expectation on population's effect on foreign firms' location choice is positive.

As I have already mentioned, agglomeration effects have been included and studied in many empirical studies on foreign investors' location choice. In this study I only include population as well as income as indicators of agglomeration economies and I hypothesize that more urbanized powiat with higher market demand and market size attracts more foreign investments pulling them into one location as centripetal (agglomeration) forces explained by Krugman. However, due to growth of agglomeration, in other words, as more and more firms agglomerate in one location, a number of negative externalities may emerge as well such as higher labor and land rent costs, congestions and pollution *(Potter & Watts, 2011)*. These negative externalities may discourage investment as Krugman's centrifugal forces. So, in order to see if one of those negative externalities – pollution really matters in foreign firms location decision I am including air pollution variable in my estimation.

In the past empirical studies there is an argument that regional market demand factors such as GDP, in our case income per capita cannot be powerful explanatory variables for FDI inflow *(Guimarães et al., 2000)* as firms do not always concentrate only on regional market, but they can have access to neighboring markets as well. Especially, in our case the market size of powiat could be small and not satisfactory for particular large project investments. Taking this into account, I have measured the distance between each powiat and capital city of Warsaw using Google Maps and included the obtained data in my estimation assuming the main central market of Poland is in Warsaw and each investor wants to be close to that large market. Therefore, I expect that the farther the powiat locates from Warsaw, the less attractive it is for foreign investors.

Transport costs are also one of the main concerns for an investor. That is why I expect a powiat in close proximity to widely available transportation access such as to international airport, much cheaper maritime transport, road networks and operating railway lines is a more attractive

location for foreign investors. In the frame of data availability, I have created variables for road networks and railway lines using their total length in kilometers. I found the data on road networks for powiats level but I was not able to find for railway lines because this makes sense if there is no data on railway lines in kilometers for each such a small district – powiat. Therefore, I use dataset for railway lines extracted from data at voivodships (regional) level. In addition to road and railway variables, I include air and sea transportations as dummy variables: dummy 1 if there is seaport/international airport in a voivodship (region) where powiat (county) is located, 0 otherwise.

I also expect that investors will care about the condition of municipal infrastructure of the powiat since business needs a good provision of necessary resources, at least water and gas for normal operation. That is why I have decided to include the variables of gas and water line systems as municipal infrastructure variables to check if foreign investors really care about municipal infrastructure.

There could be foreign investors investing into Poland but not going to serve Polish domestic market rather going to export to neighboring countries. In this case, those investors prefer locations near borders due to lower transportation costs for exporting to neighboring countries. Considering this fact, I am going to check border effect on location decision of foreign investors using border dummies in my estimation and I want to see if border effect differs based on bordering countries namely Belarus, Czech Republic, Germany, Lithuania, Russia, Slovakia, Ukraine and Sea border. Unlike other previous studies I only consider a location as bordered if it is not more than about 60 km far from border. I have got the data on the distance between powiats and bordering countries using Google Maps. Since I do not know much about neighboring countries market conditions I may consider country borders have equally the same advantage for exporters and because sea border offers cheap maritime transportation access I expect all border dummies show have positive signs.

3.2 Estimation Results

The results of the estimations for short run effect for the period of 2002-2003 and longer run effect for the period of 2002-2007 are shown in the table 6 and table 7 in Appendix. The findings show that SEZ does not have the effect I expected; it is statistically insignificant either with positive or negative signs in the estimation for short run effect. Whereas, even though it is with positive sign in the estimation for long run effect in all specifications and significant at 10% level in specification 1, it is losing its significance when I include more other variables into the estimation.

Being inconsistent with theory, labor cost measured by wage is positive and statistically significant at 5% level in all specifications of the estimation for short run effect while for long run effect it is statistically significant at 1% and 10% in the first three specifications. Results may indicate that investors prefer locations where there is a high level of wage because their businesses most probably need highly skilled and experienced labor. Highly skilled and experienced labor force can be found easily in a location where there is high level of employment. Unemployment variable's negative significance in the results supports this interpretation meaning that investors try to avoid locations with high unemployment level. If the number of the unemployed increases by 10% in a powiat, the foreign capital inflow into that powiat decreases by 6.2% in the long run while in the short run the increase of unemployment causes foreign capital to decrease by 3.7%. I tried to capture labor quality with student variable even if it is not the exact variable to measure labor quality level but the concerning results are unexpected showing that student variable has significant negative effect on foreign capital inflow.

As I expected, population is positive and highly related to the existence of firms with foreign capital participation. The findings show that population is statistically significant at 1% level in all specifications of the estimations for both short run and long run effect. So this result totally supports my expectations based on theory and my analyses in Chapter 1 when I presented table 2 which is about top ten most FDI attractive powiats and most populated powiats. If we interpret the findings in specification 1 for both short run and long run effects we can see that 1% increase in population in a

location leads to approximate 0.78% increase in establishment of new foreign firms there in a short run while in a longer run it results 1.3% more new foreign firms to be established.

The variable distance which intended to capture market potential to some extent, does not show the result I expected. It is positive and significant at 10 % level in the specification 1 of estimation for short run effect and in the other specifications it is insignificant either with positive or negative sign. However, it is positive and more statistically significant at 1% and 5% levels respectively in the first three specifications of the estimation for the long run effect, but when I control for other explanatory variables the significance disappears in the last specification.

Although income has expected positive sign, it is statistically significant at 10% level only in the first estimation for short run effect and in the rest specifications it becomes insignificant when more variables added. In the estimation for long run effect, however, it is positive and significant at 1% and 5% levels respectively in the first two specifications. According to the result in the first estimation for long run effect, if a powiat has 1% growth in income per capita, it attracts about 1.82% more foreign capital.

Among border dummies only German and Sea border dummies are always positive and statistically significant at 1% in all specifications of estimation for long run effect and at 1% and 5% levels depending on specification of estimating equation for short run effect. The results show that if a powiat is located near German border it attracts more foreign capital than other powiats by 0.94%; if it is near the Sea, it has 0.50% higher foreign capital inflow comparing to other powiats. Interestingly, dummy for Slovakia border shows negative and statistically significant correlation at 1% level in the estimation for long run effect and, at 1% and 5% levels in the estimation for short run effect depending on specifications. Czech Republic also shows positive and significant relation only if I include infrastructure and transportation related variables into the estimation equation. Other border dummies such as Belarus, Lithuania, Russia and Ukraine are either with positive or negative signs but never significant.

Transport infrastructure variables – road network and railway lines – did not show the expected result, changing their signs and significance level depending on the specifications of the estimating equation. Moreover, this is the same case for municipal infrastructure variables - gas and water line systems. Air pollution variable, that I included to check if foreign investors care about negative externalities (pollution) of a location before investing, is not significant. Transportation variables – maritime transport and international airport – are positive and significant at 5% and 1% levels respectively in the estimation for long run effect indicating more attractiveness of powiats with better access to major transportations.

CONCLUSION

This paper has aimed at investigating the factors behind foreign investors' location decision within Polish powiats (counties), particularly focusing on the role of Special Economic Zones which have been established to attract investors to targeted locations. From the findings we have seen that the effect of SEZ is not significant at all in the estimation for short run effect, meaning that there is no SEZ role in attracting FDI in a short run such as in one year. In the estimation for long run effect, however, such as for 5 years from 2002 to 2007, results show the significance of SEZ at 10% level only when I omit other regional characteristic variables from the regression in specification 1. This means that SEZs could be one of the small players in attracting FDI if we look at longer term and compare with estimation results of short run effect, but when I control for other variables the importance of SEZ disappears in the long run as well.

Overall results show that SEZ is not a significant factor that foreign investors take into account in investment location decision process. This could be because there are other much more important factors affecting foreign investors' location choice. For instance, results show that foreign investors prefer locations with less unemployment and high income per capita. When I analyzed the correlation between SEZ and number of unemployed people in a location, I found small positive correlation (r=0.25) but significant (t=4.91). From this I may say that SEZs may be established in such powiats where there is a high level of unemployment. This makes sense, logically because one of the objectives of establishing SEZ was to decrease unemployment in a region. Another possible reason why foreign investors do not care about SEZs advantages could be that SEZs lifetime is short until 2020 which is definitely not appropriate for those investors who plan long-term investments.

All SEZs except Pomeranian Special Economic Zone (which was established in 2001) were established in the periods of 1995-1997. Within 2-3 years after their establishment, they were probably successful and contributed to attract FDI, but after 2002, according to my findings, their role is insignificant. From table 3 in Chapter 1, we can also see how small their attracted investment value

is in 2007; even combined total investment share is not 1% of GDP. Therefore, to see if SEZs did really matter in the transition period of Poland it can be recommended for future studies to include the same powiat level data for the periods before and after establishments of SEZs.

The significant and positive correlation of labor cost with number of firms with foreign capital is to some extent opposite to theoretical expectation that firms prefer locations with lower input costs. However, since my finding is not the first which shows positive relation of wage, this result is not surprising. Interpretation of this result can be as foreign investors are sensitive to the number of unemployment in a location according to results, and since they prefer locations with less unemployment then they access to already employed persons who are more qualified and require higher wages. In past empirical findings arguments for negative relations of unemployment and FDI is that foreign investors do not like locations with high unemployment because when there is high unemployment in a region it means this region is less competitive with poor conditions *(Donald F. & Florida, 1994)*.

Showing positive and high significance population variable supports the theory and my expectation. So, foreign investors invest in more populated powiats with bigger markets as this variable reflects the market size of the region. Moreover, as we have stated earlier, more people in a powiat means more proportions of them live in urban areas indicating a region is more urbanized and has larger agglomeration of economic activities. Hence, in urban areas infrastructure level and various kinds of service levels are generally high and this might also attract foreign investors. Last but not least, in a location with more inhabitants foreign investors more likely find diversity in labor skills and quality, for this reason they might choose more populated locations as well. The significance of income variable in some specifications has also supported my expectation that a location with richer inhabitants with higher income is more attractive to foreign investors since there is a high market demand in that location.

In the estimation for long run effect, distance between each powiat and Warsaw is statistically significant and positively related to number of firms with foreign capital, however, my expectation

was negative relation. This result means that the further the powiat from Warsaw the more firms registered with foreign capital participation in that powiat. This could be due to the fact that foreign investors prefer the powiats located near the country's borders with Germany, Czech Republic and the Sea, according to the findings on border dummies. If we look at the map, all German, Czech Republic and the Sea borders are very far from the capital city, Warsaw, and dummy border variables for German and Sea borders are always statistically significant either at 1% or 5% levels. The results for sea borders can be interpreted easily associating them with access to cheap transportation – maritime transport. However, findings for country borders were interesting, therefore motivated further analysis to find Poland's major trading partners. According to CSO data, Germany is a leading trading partner of Poland with 26% share of total export in 2010 and the Czech Republic is also in the top exporting countries list with 6% share of Poland's 2010 total export (see figure 6 in Appendix). The finding of negative significance for Slovakia border can be also due to the fact that Polish export share to Slovakia is the lowest among other neighboring countries in 2000 (except Belarus[9]), indicating that trade between Poland and Slovakia is not large enough to attract export-oriented foreign investors into the locations near the Slovak border.

According to results, transportation and municipal infrastructure variables are ambiguous since their effect and significance depend on specifications and term (for short term or long term) estimations. However, findings on air and maritime transportation show positive significance in estimation for long term indicating that if a powiat is close to an international airport or seaport, it is more attractive for foreign investment.

All in all, we have seen that foreign investors investing into Poland do care more about market related factors such as population size, income level, number of unemployment, proximity to borders and transportations to export with less cost, rather than various kinds of investment incentives provided by government through special economic zones.

[9] There is no data on Belarus

Policy Conclusion

Since SEZs are not a significant factor in foreign investors' investment location decision, it would be better for the Polish government to consider the related costs for the operations of these zones very carefully. At first, there are initial costs for establishing SEZs and later in the form of fiscal and administrative costs.

During the establishment, it is obvious that by simply announcing one area as a special economic zone, that area does not become special for economic activities. It requires governments, firstly, to separate a special area and, secondly, to provide better facilities around this area through infrastructure and transportation facilities in order to make it attractive and ready for investors use. These all require huge establishment costs. In addition, in some cases governments might simply take farm lands and use them to establish SEZs aiming at developing industry at the expense of agriculture. This happened in India, when local Tamil Nadu government took the farmers' land at very low prices to establish Nokia Telecom SEZ in Sriperumbadur *(Murray, 2010)*. If SEZs are established on agricultural lands, the farmers and workers in the farm will lose their income source and become long term unemployed since they are relatively unskilled and thus it will be difficult to find a proper job for them.

In the case of Poland, we have seen that if unemployment rises in a powiat, it becomes less attractive to foreign investors. So, in this sense, it can be recommended to change the policy from offering investment incentives through SEZs to take real actions to create more work places. To the question about Polish legal system, one of the foreign investors in Poland replied that there are too many regulations and rules without clear interpretations (PAIiIZ, 2011). This means that authorities should change the legal system at first and provide more liberalized environment for business activities, and this leads to more firms emerging and job creation. Increase in employment rate in a powiat will lead to the growth of income level and this will cause further foreign capital inflow into the powiat, according to the estimation results.

In addition to establishment costs, SEZs status requires fiscal costs which are basically generated from different kinds of state aids comprising tax exemptions. The government's main objective of offering these types of generous aids is to attract especially foreign investors into country's targeted regions. However, when I checked the companies list operating in Polish SEZs, I found that about 43% of major investors in the zones are Polish companies (see table 8 in Appendix). This indicates that along with foreign firms numerous domestic firms are also enjoying government's generous subsidies. They could have been taxed normally and made contribution to the budget if there were no any SEZs exist in Poland.

As it is not easy to regulate SEZs, each zone is separately administered indicating more administration cost is required. Since we cannot see the significance of SEZs in attracting foreign capital according to the findings, it can be recommended that authorities should study the locations carefully where most proportions of FDI is flowing and then find out the factors affecting foreign investors' location decision. For instance, our findings show that foreign firms prefer to locate in the areas near German, Czech Republic and Sea borders where they can find better access to export market. We have seen earlier that there is a strong trade relationship between Poland and two neighboring countries, Germany and Czech Republic, which could be the reason for foreign firms' agglomeration in the powiats bordered with these countries. While trade relationship between Poland and the rest neighboring countries, Slovakia, Lithuania, Russia and Ukraine are weak, therefore most probably the powiats near these countries borders are less attractive. This might cause increase in regional disparities if the Polish government does not take a policy to make these powiats more attractive as well. Building a strong trade relationship with Slovakia, Lithuania, Russia and Ukraine might be a possible solution as this leads to increase in export volume to these countries. Consequently, locations near these countries might become attractive to export-oriented investors. In sum, it can be recommended that the Polish government better impose such policies that exactly deal with the important factors investors care about before their investment, rather than offering investment incentives through SEZs which are found to be insignificant and at the same time costly factor.

REFERENCES

Belderbos, R., & Carree, M. (2002). The Location of Japanese Investments in China: Agglomeration Effects, Keiretsu, and Firm Heterogeneity. Journal of the Japanese and International Economies, 16(2), 194–211.

Bobonis, G. J., & Shatz, H. J. (2007). Agglomeration, Adjustment, and State Policies in the Location of Foreign Direct Investment in the United States. Review of Economics and Statistics, 89(1), 30–43.

Borensztein, E., De Gregorio, J., & Lee, J.-W. (1998). How does foreign direct investment affect economic growth? Journal of International Economics, 45(1), 115–135.

Boudier-Bensebaa, F. (2005). Agglomeration economies and location choice: Foreign direct investment in Hungary1. Economics of Transition, 13(4), 605–628.

Branstetter, L. (2006). Is foreign direct investment a channel of knowledge spillovers? Evidence from Japan's FDI in the United States. Journal of International Economics, 68(2), 325–344.

Buettner, T., & Ruf, M. (2007). Tax incentives and the location of FDI: Evidence from a panel of German multinationals. International Tax and Public Finance, 14(2), 151–164.

Chen, Y. (2009). Agglomeration and location of foreign direct investment: The case of China. China Economic Review, 20(3), 549–557.

Cheng, L. K., & Kwan, Y. K. (2000). What are the determinants of the location of foreign direct investment? The Chinese experience. Journal of International Economics, 51(2), 379–400.

Chidlow, A., Salciuviene, L., & Young, S. (2009). Regional determinants of inward FDI distribution in Poland. International Business Review, 18(2), 119–133.

Chung, W., & Alcácer, J. (2002). Knowledge Seeking and Location Choice of Foreign Direct Investment in the United States. Management Science, 48(12), 1534–1554.

Cieślik, A. (2005a). Regional characteristics and the location of foreign firms within Poland. Applied Economics, 37(8), 863–874.

Cieślik, A. (2005b). LOCATION OF FOREIGN FIRMS AND NATIONAL BORDER EFFECTS: THE CASE OF POLAND. Journal of Economic and Social Geography, 96(3), 287–297.

Cieślik, A., & Ryan, M. (2005). Location determinants of Japanese multinationals within Poland: Do special economic zones really matter for investment decisions?, 2005 Vol.(20), 475–496,22p.

Coughlin, C. C., & Segev, E. (2002). Location Determinants of New Foreign-Owned Manufacturing Plants. Journal of Regional Science, 40(2), 323–351.

Coughlin, C. C., Terza, J. V., & Arromdee, V. (1991). State Characteristics and the Location of Foreign Direct Investment within the United States. The Review of Economics and Statistics, 73(4), 675–683.

Crozet, M., Mayer, T., & Mucchielli, J.-L. (2004). How do firms agglomerate? A study of FDI in France. Regional Science and Urban Economics, 34(1), 27–54.

David, P. A., & Rosenbloom, J. L. (1990). Marshallian factor market externalities and the dynamics of industrial localization. Journal of Urban Economics, 28(3), 349–370.

Deichmann, J., Karidis, S., & Sayek, S. (2003). Foreign direct investment in Turkey: regional determinants. Applied Economics, 35(16), 1767–1778.

Domanski, B. (2000). Foreign manufacturing investment in rural Poland: regularities and conditions. Institute of Geography, Jagiellonian University. Retrieved from http://econlab.uom.gr/~move/images/stories/articles/rural_investment.pdf

Domański, B. (2003). Industrial Change and Foreign Direct Investment in the Postsocialist Economy The Case of Poland. European Urban and Regional Studies, 10(2), 99–118.

Donald F., S., & Florida, R. (1994). Agglomeration and Industrial Location: An Econometric Analysis of Japanese-Affiliated Manufacturing Establishments in Automotive-Related Industries. Journal of Urban Economics, 36(1), 23–41.

Driffield, N., & Love, J. H. (2003). Foreign Direct Investment, Technology Sourcing and Reverse Spillovers. The Manchester School, 71(6), 659–672.

Ernst & Young. (2010). Ernst & Young's 2010 European attractiveness survey. Retrieved from http://www.ey.com/GL/en/Issues/Business-environment/2010-European-attractiveness-survey---The-reality-of-FDI-in-Europe

Ernst & Young. (2011). Ernst & Young's 2011 European attractiveness survey. Retrieved from http://www.ey.com/Publication/vwLUAssets/Europe_attractiveness_2011_web_resolution/$FILE/Europe_attractiveness_2011_web_resolution.pdf

Farole, T. (2010). Special Economic Zones Performance, policy and practice- with a focus on Sub-Saharan Africa. International Trade Department, World Bank. Retrieved from http://siteresources.worldbank.org/INTRANETTRADE/Resources/Pubs/SpecialEconomicZones_Sep2010.pdf

Friedman, J., Gerlowski, D. A., & Silberman, J. (2006). WHAT ATTRACTS FOREIGN MULTINATIONAL CORPORATIONS? EVIDENCE FROM BRANCH PLANT LOCATION IN THE UNITED STATES. Journal of Regional Science, 32(4), 403–418.

Fujita, M., & Krugman, P. (2005). The new economic geography: Past, present and the future*. Papers in Regional Science, 83(1), 139–164.

Gao, T. (2005). Labor quality and the location of foreign direct investment: Evidence from China. China Economic Review, 16(3), 274–292.

Ge, W. (1999). Special Economic Zones and the Opening of the Chinese Economy: Some Lessons for Economic Liberalization. World Development, 27(7), 1267–1285.

Guimarães, P., Figueiredo, O., & Woodward, D. (2000). Agglomeration and the Location of Foreign Direct Investment in Portugal. Journal of Urban Economics, 47(1), 115–135.

Head, C. K., Ries, J. C., & Swenson, D. L. (1999). Attracting foreign manufacturing: Investment promotion and agglomeration. Regional Science and Urban Economics, 29(2), 197–218.

Head, K., Ries, J., & Swenson, D. (1995). Agglomeration benefits and location choice: Evidence from Japanese manufacturing investments in the United States. Journal of International Economics, 38(3–4), 223–247.

Hines, J. R. (1997). Altered States: Taxes and the Location of Foreign Direct Investment in America. National Bureau of Economic Research Working Paper Series, No. 4397. Retrieved from http://www.nber.org/papers/w4397

HONG, J., & CHIN, A. T. H. (2007). Modeling the location choices of foreign investments in Chinese logistics industry. China Economic Review, 18(4), 425–437.

Kawai, N. (2006). Spatial determinants of Japanese manufacturing firms in the Czech Republic (Duisburger Arbeitspapiere Ostasienwissenschaften No. 71/2006). University of Duisburg-Essen, Institute of East Asian Studies IN-EAST. Retrieved from http://ideas.repec.org/p/zbw/udedao/712006.html

Krugman, P. R. (1991). Geography and Trade. MIT Press.

Li, X., & Liu, X. (2005). Foreign Direct Investment and Economic Growth: An Increasingly Endogenous Relationship. World Development, 33(3), 393–407.

Makabenta, M. P. (2002). FDI Location and Special Economic Zones in the Philippines. Review of Urban & Regional Development Studies, 14(1), 59–77.

Marshall, A. (1890). Principles of economics. Macmillan and Co.

Murray, M. (2010, February 9). What Are Special Economic Zones? | University of Iowa Center for International Finance and Development. Retrieved from http://ebook.law.uiowa.edu/ebook/faqs/what-are-special-economic-zones

Potter, A., & Watts, H. D. (2011). Evolutionary Agglomeration Theory: Increasing Returns, Diminishing Returns, and the Industry Life Cycle. Journal of Economic Geography, 11(3), 417–455.

Roberto, B. (2004). Acquisition versus greenfield investment: the location of foreign manufacturers in Italy. Regional Science and Urban Economics, 34(1), 3–25.

Sadik, A. T., & Bolbol, A. A. (2001). Capital Flows, FDI, and Technology Spillovers: Evidence from Arab Countries. World Development, 29(12), 2111–2125.

Thompson, E. R. (2002). Clustering of Foreign Direct Investment and Enhanced Technology Transfer: Evidence from Hong Kong Garment Firms in China. World Development, 30(5), 873–889.

UNCTAD. (2011). WORLD INVESTMENT REPORT Non-equity Modes of International Production and Development (p. 19). Retrieved from http://www.unctad-docs.org/files/UNCTAD-WIR2011-Full-en.pdf

Villaverde, J., & Maza, A. (2011). Foreign direct investment in Spain: Regional distribution and determinants. International Business Review, 21(4), 722–733.

Weresa, M. A. (2004). Can foreign direct investment help Poland catch up with the EU? Communist and Post-Communist Studies, 37(3), 413–427.

Woodward, D. P. (1992). Locational Determinants of Japanese Manufacturing Start-Ups in the United States. Southern Economic Journal, 58(3), 690–708.

Zhang, K. H. (2007). DOES FOREIGN DIRECT INVESTMENT PROMOTE ECONOMIC GROWTH? EVIDENCE FROM EAST ASIA AND LATIN AMERICA. Contemporary Economic Policy, 19(2), 175–185.

Central Statistical Office (CSO), http://www.stat.gov.pl

Polish Information and Foreign Investment Agency (PAIiIZ, 2011), http://www.paiz.gov.pl

Eurostat, http://epp.eurostat.ec.europa.eu

National Bank of Poland, http://www.nbp.pl

Kamienna Góra Special Economic Zone, www.ssemp.pl

Katowice Special Economic Zone, www.ksse.com.pl

The Kostrzyn-Słubice Special Economic Zone, http://www.kssse.pl/en.html

Kraków Technology Park, www.sse.krakow.pl

The Legnica Special Economic Zone, http://lsse.eu/index.php/en

The Łódź Special Economic Zone, www.sse.lodz.pl

The Special Economic Zone EURO-PARK MIELEC, www.europark.com.pl

Pomeranian Special Economic Zone, www.strefa.gda.pl

Słupsk Special Economic Zone, http://www.sse.slupsk.pl

The “Starachowice” Special Economic Zone, www.sse.com.pl

Suwałki Special Economic Zone, www.ssse.com.pl

The Tarnobrzeg Special Economic Zone EURO-PARK WISŁOSAN, http://www.tsse.eu/

The Wałbrzych Special Economic Zone, www.invest-park.com.pl

The Warmia-Mazury Special Economic Zone, www.wmsse.com.pl

APPENDIX

Table 6. OLS regression estimates (data from 2002-2003)

Variables	Specification 1	Specification 2	Specification 3	Specification 4
Constant	-20.85702***	-15.29887***	-16.1536***	-12.30884***
	(-5.59)	(-3.67)	(-3.59)	(-3.84)
SEZ	0.081303	0.010665	-0.030154	-0.035857
	(0.91)	(0.12)	(-0.33)	(-0.39)
Log(wage)	0.878582**	0.728232**	0.89602**	0.839035**
	(2.41)	(2.03)	(2.31)	(2.07)
Log(population)	0.786732***	0.872085***	0.889141***	1.304038***
	(9.04)	(9.94)	(9.78)	(6.57)
Log(distance)	0.138712*	-0.010037	0.046229	-0.12952
	(1.79)	(-0.11)	(0.50)	(-1.20)
Log(income)	0.843784*	0.126344	0.398502	
	(1.80)	(0.24)	(0.65)	
Log(unemployment)				-0.369323**
				(-2.19)
Log(student)				-0.262227*
				(-1.75)
border Belarus		0.226275	0.415756	0.367849
		(0.79)	(1.41)	(1.25)
border Czech Republic		0.216006	0.304681*	0.302707*
		(1.35)	(1.85)	(1.91)
Border Germany		0.625611***	0.388994**	0.41764**
		(3.50)	(2.11)	(2.23)
Border Lithuania		0.053638	0.106124	0.222931
		(0.11)	(0.22)	(0.46)
Border Russia		0.487907	0.401095	0.262595
		(1.31)	(1.07)	(0.70)
Border Slovakia		-0.393729**	-0.591236***	-0.620877***
		(-2.25)	(-3.14)	(-2.85)
Border Sea		0.446717***		0.340438**
		(2.58)		(2.07)
Border Ukraine		0.07475	0.116804	0.030955
		(0.27)	(0.43)	(0.11)
Log(Road network)			0.016196	0.272762**
			(0.26)	(2.45)
log(Railway lines)			-0.426726**	-0.08403
			(-2.09)	(-0.30)
Maritime			0.206188	
			(1.29)	
International Airport			0.465815***	0.549635***
			(2.72)	(3.18)
log(Water line systems)				-0.333246**
				(-2.65)
Log(Gas line systems)				0.024908
				(0.57)
Log(Air pollution)				-0.016916
				(-1.00)
R-squared	0.291688	0.343677	0.352752	0.385714
Number of observations	366	366	366	366

Notes: t-Statistics in parentheses. Statistical significance at 1%, 5% and 10% are shown by ***, ** and *, respectively

Table 7. OLS regression estimates (data from 2002-2007)

Variables	Specification 1	Specification 2	Specification 3	Specification 4
Constant	-36.08238***	-27.30342***	-20.38484***	-15.58076***
	(-8.49)	(-5.85)	(-4.12)	(-4.55)
SEZ	0.196351*	0.090794	0.031162	0.020254
	(1.92)	(0.90)	(0.31)	(0.20)
Log(wage)	1.222904***	1.017506***	0.804146*	0.652663
	(2.95)	(2.53)	(1.89)	(1.51)
Log(population)	1.310671***	1.411567***	1.456168***	2.002971***
	(13.23)	(14.37)	(14.58)	(9.46)
Log(distance)	0.459863***	0.255624***	0.209419**	-0.085964
	(5.22)	(2.52)	(2.04)	(-0.75)
Log(income)	1.821766***	0.692089**	0.097451	
	(3.41)	(1.17)	(0.14)	
Log(unemployment)				-0.61281***
				(-3.41)
Log(student)				-0.567412***
				(-3.55)
border Belarus		0.11146	0.497333	0.464266
		(0.35)	(1.53)	(1.48)
border Czech Republic		0.258757	0.363262**	0.312771*
		(1.45)	(2.01)	(1.85)
Border Germany		0.939821***	0.784392***	0.829921***
		(4.70)	(3.87)	(4.16)
Border Lithuania		-0.282637	-0.075531	0.190159
		(-0.52)	(-0.14)	(0.36)
Border Russia		0.193216	0.059095	-0.207637
		(0.46)	(0.14)	(-0.52)
Border Slovakia		-0.563778***	-0.763118***	-0.748747***
		(-2.87)	(-3.69)	(-3.22)
Border Sea		0.505924***		0.459511***
		(2.61)		(2.62)
Border Ukraine		-0.107849	-0.05181	-0.096545
		(-0.35)	(-0.17)	(-0.34)
Log(Road network)			-0.16192**	0.244349**
			(-2.33)	(2.06)
log(Railway lines)			-0.177758	0.469766
			(-0.79)	(1.56)
Maritime			0.392019**	
			(2.24)	
International Airport			0.614288***	0.772206***
			(3.26)	(4.19)
log(Water line systems)				-0.427852***
				(-3.19)
Log(Gas line systems)				0.084836**
				(1.81)
Log(Air pollution)				-0.014703
				(-0.82)
R-squared	0.472446	0.528312	0.552308	0.598869
# of observations	366	366	366	366

Notes: t-Statistics in parentheses. Statistical significance at 1%, 5% and 10% are shown by ***, ** and *, respectively

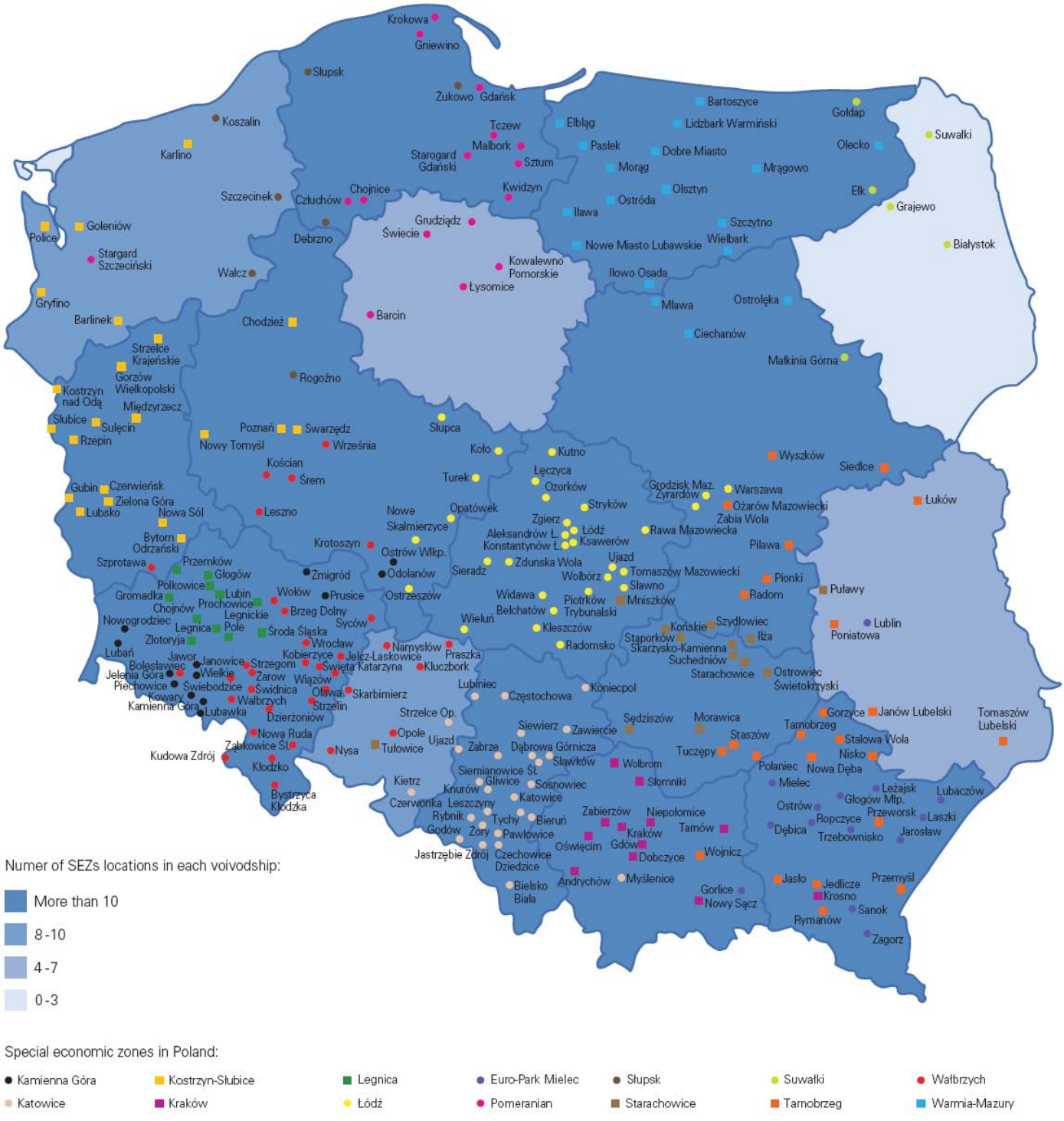

Figure 5. Spatial Distribution of Polish Special Economic Zones

Source: PAIiIZ

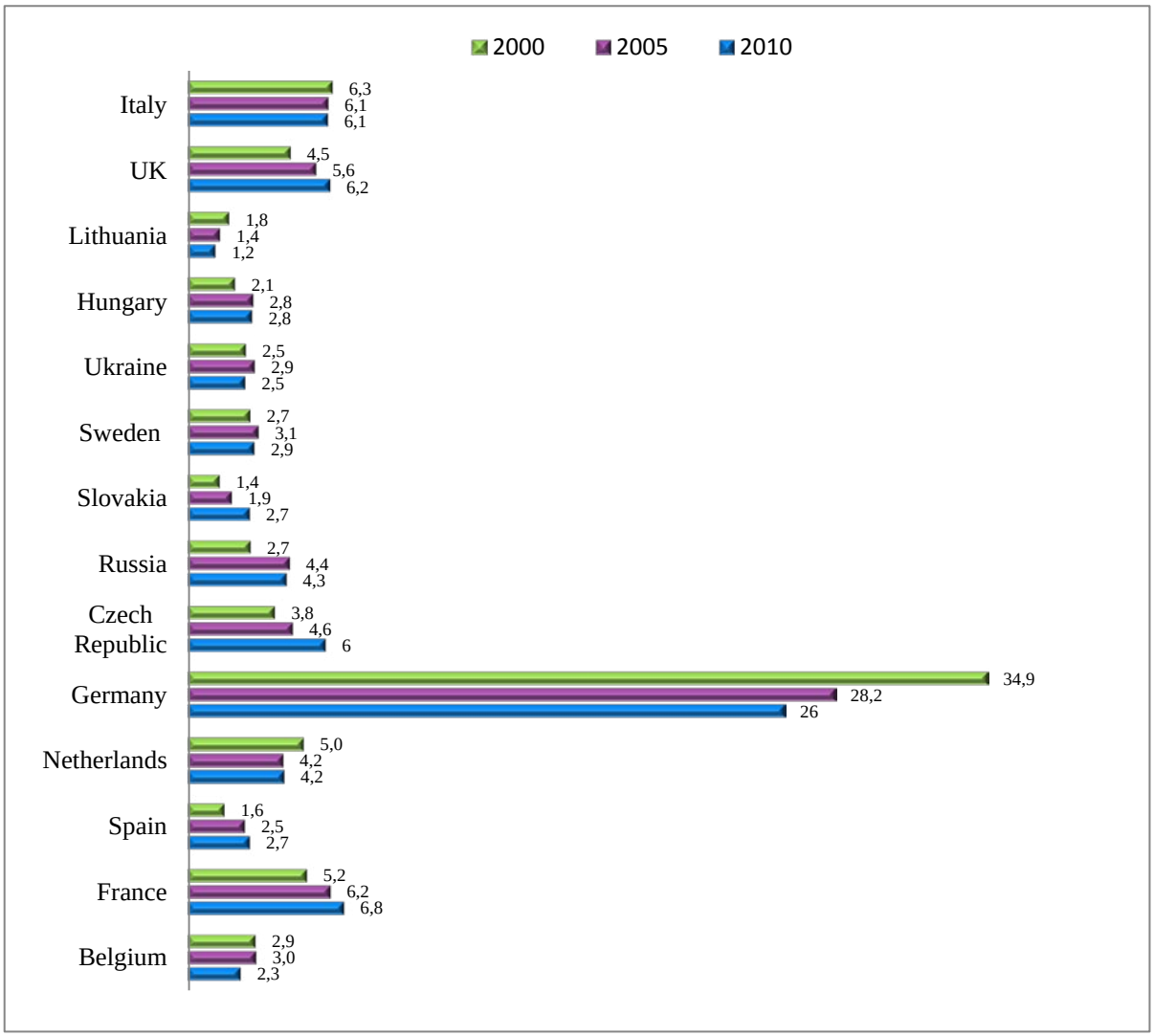

Figure 6. Poland's main trade partners with export shares by years

Source: Author's own calculation based on data provided by Central Statistical Office

Table 8. Special Economic Zones with major foreign and Polish investors

#	Special Economic Zones	# of major foreign investors	# of major Polish investors
1	Kamienna Góra Special Economic Zone	9	1
2	Katowice Special Economic Zone	10	7
3	The Kostrzyn-Słubice Special Economic Zone	2	8
4	Kraków Technology Park	9	3
5	The Legnica Special Economic Zone	12	5
6	The Łódź Special Economic Zone	12	15
7	The Special Economic Zone EURO-PARK MIELEC	10	2
8	Pomeranian Special Economic Zone	8	5
9	Słupsk Special Economic Zone	2	8
10	The "Starachowice" Special Economic Zone	7	11
11	Suwałki Special Economic Zone	3	7
12	The Tarnobrzeg Special Economic Zone EURO-PARK WISŁOSAN	4	6
13	The Wałbrzych Special Economic Zone	17	1
14	The Warmia-Mazury Special Economic Zone	5	4
		Total: 110	Total: 83

Source: SEZs websites and PAIiIZ