

## Determinants of Investment Attractiveness of Polish Special Economic Zones

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### ABSTRACT

**Objective:** The objective of this article is to explain why some Special Economic Zones in Poland have attracted more foreign and domestic investment than others.

**Research Design & Methods:** Referring to the OLI paradigm, we identified 25 variables which might impact the stock of investment in each individual SEZ. They were divided into three groups: zone's investment climate, investors' opinions and region-level factors. We used correlation and regression analyses to check dependencies.

**Findings:** The investment climate mattered most. Regional level characteristics were the least important. Foreign investors were more concerned than domestic ones about the location factors we considered. There is clearly a closer correlation between SEZ reputation and the number rather than the value of investment projects. It may mean that small investors pay more attention to the opinions which circulate in business circles and that big companies probably rely on their own evaluation of a SEZ's investment climate.

**Implications & Recommendations:** Special Economic Zones in less developed parts of Poland can successfully compete for capital if they are well managed. Tax reliefs are secondary for choosing a particular zone. Supply factors count much more. The most important factors for attracting FDI were: outlays on the provision and modernisation of zone infrastructure, the number of towns and cities, overall investment attractiveness of voivodeships, as well as labour resources and costs.

**Contribution & Value Added:** Location advantages and their significance for domestic and foreign investors were rarely examined at the SEZ level.

**Article type:** research article

**Keywords:** special economic zones; foreign and domestic investors; location premises; investment attractiveness; investment policy tools; state aid

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## INTRODUCTION

Special economic zones (SEZs) are used in a growing number of countries as an incentive to stimulate investment and attract foreign capital (The Economist, 2015). The term SEZ covers many varieties of the tool, known under about 30 different names (Singa Boyenge, 2007)<sup>1</sup> (for example, *export zones*, *free enterprise zones*, *industrial zones*, *free zones*, *enterprise zones*). Aid offered to businesses in SEZs may be quantifiable (tax allowances, financial assistance) and/or unquantifiable (regulatory, infrastructural or administrative privileges) and eligibility for its various forms usually depends upon meeting certain criteria. Hence, zones cannot be classified into one category of investment incentives. For instance, James (2013) considers SEZs as fiscal instruments, while VCC (2013) puts them into the *business facilitation* category. Zones may be public or private, and they may even be owned by foreign capital.<sup>2</sup> Their tasks differ depending on country policy goals and its level of economic and institutional development.

In developing countries, they are usually established to develop export production, one of the major barriers to growth. By offering space for experimenting with market mechanisms, they may be also treated as a step towards a thorough modernisation of institutional and economic structures of a particular region or a whole country (Farole, 2011; Farole & Akinci, 2011). The inflow of foreign direct investment (FDI) is vital for implementing these goals.

In developed countries (UK, USA, France, Italy), the SEZ model has been applied as well. However, within a mature market economy it is not intended to stimulate its transformation but to correct some market failures. Foreign trade zones may directly encourage international trade (Seyoum & Ramirez, 2012), while enterprise zones help urban or suburban areas which struggle with above-average unemployment rates and the resulting problems (Kolko & Neumark, 2009; Gobillon, Magnac, & Selod, 2010; Briant, Lafourcade, & Schmutz, 2015).

There are numerous theoretical and empirical studies about SEZs. Most research is devoted to the economic consequences of their establishment in various countries (Aggarwal, 2012; Baissac, 2011; Briant *et al.*, 2015; Ciżkowicz, Ciżkowicz-Pękała, Pękała, & Rzońca, 2017; Jensen & Winiarczyk, 2014; Warr, 1989; Yeung, Lee, & Kee, 2009). A less popular thread in studies on SEZs focuses on explaining the success or failure of a given zone scheme, that is, on comparing the experiences of different countries (Farole, 2011; Farole & Akinci, 2011; Moberg, 2015). Another less prevalent problem, but one still worth considering by scholars (Meyer & Nguyen, 2005), is the differentiated performance of zones in one country, that is, when they operate under the same set of rules. We explore it on the example of Poland.

We assume that, like regions (Blanc-Brude, Cookson, Piesse, & Strange, 2014; Meyer & Nguyen, 2005; Pusterla & Resmini, 2007; Villaverde & Maza, 2015), individual zones in a given country may be more or less appealing to entrepreneurs who are seeking the best

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<sup>1</sup> Sometimes they are used as SEZ synonyms, e.g., on the websites of national organisations which promote incentives to foreign investors. The SEZ is often understood as a general model with a broad functional framework. Some authors (Aggarwal, 2012, Table 2.1), however, classify it as a specific form of *export zone*.

<sup>2</sup> For instance, in mid-2010, six zones were being built in Africa; two of them were 100% owned by Chinese capital and 4 were joint ventures with minority shareholding of the host countries. The government of China treats them as complementary to Chinese direct investment (Brautigam & Xiaoyang, 2011).

locations for their businesses. This aspect, however, has not received any particular attention in transition economies (Meyer & Nguyen, 2005). In particular, the lack of interest seems odd in the case of the new EU Member States, where SEZs operate as important regional policy tools.<sup>3</sup> Poland is a good example due to the unprecedented size of the SEZ population, their long track record and relatively high importance to the economy (Dorożyński, Świerkocki, & Urbaniak, 2017).

Poland is a unitary state. Therefore, the international economic environment (global and EU-related) and the national economic framework (policies, law, institutions, macro stability) are the same for all zones. With an identical level of autonomy, SEZs' performance depends on location-specific reasons. We assume that the location decision to pursue a project in one of the SEZs in Poland was already made and now the investor must only choose the one he considers the best for him. Hence, our goal is to identify the advantages which explain why some SEZs have attracted more investment (especially foreign) than others.<sup>4</sup> We also compare the significance of their location advantages for domestic and foreign investors. By identifying them, we may provide guidelines to those who implement regional policy, also through the SEZs, in Poland<sup>5</sup> and in other countries. As a measure of performance, we use capital stock and the approximated cumulated number of investment projects up to the end of 2015. We use statistical methods such as Spearman's rank correlation, the Pearson correlation coefficient and a regression model.

The remainder of the text is organised as follows. In the next section, we refer to theoretical insights about the location choice by investors, especially foreign ones. In the third section, we present correlation analysis between investment inflows to SEZs and selected variables. In the fourth section, we use regression analysis to identify value and the number of investment projects in SEZs depending on explanatory variables. In the final section, we present our conclusions together with policy implications and suggestions for further research.

## LITERATURE REVIEW

For many years economists, international business academics and representatives of other disciplines have been interested in criteria for choosing FDI locations. Numerous theoretical and empirical studies (for an overview see Faeth, 2009; Kim & Aguilera, 2016; Nielsen, Asmussen, & Weatherall, 2017) have not proposed any clear-cut answer to this question (Lautier & Moreau, 2012).<sup>6</sup> One of the reasons is the fact that the choice of location is dictated not only by its specific features (geography, resources, demand, institutions) but

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<sup>3</sup> Latvia has SEZs and free ports, Estonia – free trade zones, the Czech Republic – industrial zones, Bulgaria and Lithuania – free economic zones, Croatia and Romania – free zones, and Hungary – free enterprise zones (data from the websites of institutions that promote the economies of the respective countries among foreign investors, accessed in February 2017).

<sup>4</sup> Ciżkowicz *et al.* (2017) point out that it is the first question to be answered when analysing the effectiveness of SEZs as a policy tool. However, it was largely avoided by researchers in Poland. Most of them were interested in the evaluation of the impact which SEZs had on various variables (unemployment, job creation, social-economic development, attracting investment) but not in factors which were responsible for differences among SEZ.

<sup>5</sup> In 2014, State aid granted in SEZs as tax exemptions represented over 98% of such aid in Poland and 35% of total regional aid (Report on State aid in Poland in 2015, 2016).

<sup>6</sup> One factor which encouraged scholars to come back to the subject is the increasingly higher position of transition economies in FDI flows (Meyer & Nguyen, 2005; Dunning & Lundan, 2008). The countries of Central and Eastern Europe are especially under-researched (Pusterla & Resmini, 2007).

also by the motivation driving investors (Dunning, 2000). As a result, a location attractive to some companies (for example, high tech ones) may prove totally uninteresting to other (for example, low tech ones).<sup>7</sup>

For economists, the key to analysing the problem lies in three formalised models of a multinational enterprise (MNE) which take advantage of the legacy of the so-called new trade theory and are developed by many researchers (Markusen, 2002; Yeaple, 2003; Ekholm, Forslid, & Markusen, 2003; for an overview see Helpman, 2013). They do not address the location of the business abroad directly but they imply general criteria of its choice.

The first model explains vertical FDIs by making reference to the Heckscher-Ohlin theory (Helpman, 1984). Such FDIs occur when a company originating from a country where capital is abundant moves the labour-intensive part of its production to a labour-abundant country to benefit from the difference in relative factor endowments. The choice of location is dictated by the wish to optimise the cost of production in accordance with the comparative advantages of both countries (assuming no cost of trade and production coordination).

The second model addresses horizontal FDIs (Markusen, 1984). They occur between countries that are similar when it comes to relative factor endowments. In this case, a company is believed to locate its production in places for which the trade costs are too high to consider any exports from a plant in the home country. The trade-off between FDI and exports depends on the economies of scale in the home country in relation to the trade costs in a given market (the so-called *proximity-concentration* hypothesis). When the former are lower, FDI is a more viable option.

The third model assumes that firms are heterogeneous, and starting activities abroad involves additional fixed costs (Melitz, 2003). As a result, the least productive firms sell only in domestic markets, more productive ones export and only the most productive can afford FDIs (Helpman, Melitz, & Yeaple, 2004). These FDIs will target markets where the fixed cost of entry (organising a foreign affiliate, advertising) does not go beyond their financing capacity dictated by the achieved level of productivity.

The strategy of production relocation to other countries is also investigated by international business scholars (for a survey see: Kim & Aguilera, 2016). One of the key concepts explains such a decision from a macroeconomic point of view. In accordance with the OLI eclectic paradigm of international production (Dunning, 1977; Dunning, 2001), to engage in FDI a firm must have unique resources, for example knowledge, that can ensure an ownership advantage (O) over its competitors and it must find a location abroad (L), where these assets can be exploited through internalising markets (I), that is, by engaging in a foreign affiliate rather than selling a licence to other firms.

Major L advantages include (Dunning & Lundan, 2008): (1) general factors (political and economic stability, governance quality, ownership rights, competition rules, economic policies), (2) FDI related policies (international agreements on FDI protection, incentives and restrictions imposed upon investors, advertising effort, social infrastructure), and (3) determinants based on motivation followed by investors. In the case of investment, these determinants can be:

- market seeking: market size and per capita income, country-specific consumer preferences, psychic distance, access to regional and global markets;

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<sup>7</sup> We ignore investors' characteristics.

- resource seeking: availability of real estate, cost of raw materials, low cost of unskilled labour, availability and cost of skilled labour;
- efficiency seeking: costs of resources adjusted for labour productivity, transport and communication costs, quality of market-facilitating institutions;
- asset seeking: technological, managerial and relational assets, physical infrastructure, macro-innovatory, entrepreneurial and educational capacity environment (in short: agglomerative economics).

The non-formalised nature of the OLI paradigm allows us to consider the L advantages in a less aggregated way and with a greater variety of motives than the MNE models based on trade theories. Horizontal FDI motive is equivalent to market seeking while vertical FDI encompasses resource, asset and efficiency-seeking motives. Against a broader context, the OLI paradigm is not constrained to purely economic parameters (costs) but it may take account of the impact of institutions and cultural factors of the host country. Secondly, apart from the national level, the paradigm provides a framework for studying the intra-national space (advantages of regions, sub-regions, metropolises). Thirdly, the L variables are well grounded in location theories. Therefore, the OLI paradigm seems also more suitable for analysing FDI distribution across different SEZs of the same country.

## MATERIAL AND METHODS

SEZs in Poland were initially intended to ease the social problems which accompanied the transition to a market economy. Following the EU accession, their regime was subordinated to the regional policy rules. Within this framework, they were also expected to contribute to the growth and competitiveness of the entire economy.

Corporate income tax exemption is the most important of the various forms of support to investors, foreign and domestic alike. In order to get the subsidies, they need to accomplish several bureaucratic formalities. In addition to the transaction costs involved they also have to fulfil strict requirements regarding the number of employed people, investment outlays, minimum time of operation, and share of their own resources. If these thresholds are not met, an investor has to pay the aid back (with interest). As a result, by the end of 2015 only two-thirds of granted permits had translated into actual development of economic operations. Despite various limitations, SEZs have turned out to be popular among domestic and especially foreign investors. To a large extent, it may be due to the fact that they can be established almost anywhere an (important) investor wants to locate its project. In effect, creating a SEZ in better-developed parts of Poland may not contribute to the closing of the development gap between regions, following the objectives of regional policy (Dorożyński *et al.*, 2017).

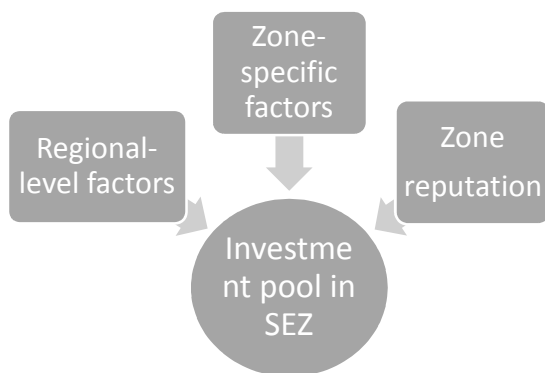
### Description Of Variables and Data Sources

Referring to the OLI paradigm and empirical literature, we hypothesised that three groups of circumstances might, directly or indirectly, impact the stock of investment accumulated in each individual zone as at the end of 2015.<sup>8</sup> The stock was considered in terms of its value and the number of projects, taking account of (Figure 1):

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<sup>8</sup> 'Site selection for manufacturing locations is an extremely complex process requiring the selection team to evaluate numerous quantitative and qualitative parameters before choosing the optimum location' (Williams & Campolo, 2016).

1. Zone specific factors, that is, its investment 'micro'- climate. The positive investment climate of a country or region is considered important to catalyse investment and to improve outcomes for society as a whole (World Bank, 2004). It is equally important for a SEZ where it can be defined as 'the infrastructure and administrative environment for firms operating in the zones, which will affect net production costs' (Farole, 2011, p. 117).
2. Regional level factors. The economic environment of zones and its investment attractiveness may add to their L advantages.<sup>9</sup> Thus, they may become more beneficial for doing business only because they are established in a better-developed part of a country. Empirical studies suggest that a SEZ location really matters to their effectiveness (Frick, Rodríguez-Pose, & Wong, 2018).
3. Zone reputation in Polish and foreign business circles. According to research on FDI inflows to Central and Eastern Europe, the positive perception of a host economy (for example, due to good PR) may be more important to potential investors than 'hard' data, such as market size, labour costs or quality of infrastructure (Orłowski, 2010). We presume that it may also be true in the case of SEZs.



**Figure 1. Determinants of investment inflow into SEZs**

Source: own study.

In the group of zone-specific factors we included:<sup>10</sup>

1.1: the size of the zone. The bigger the area of a zone, the bigger supply of land and the more investors it may host;

1.2: the share of zone area allocated to investors. On the one hand, more occupied space may mean the zone is more attractive but, on the other hand, it informs businesses that there is not much room left and they should look for another location. That is why it is hard to predict the strength and direction of the relationship;

<sup>9</sup> According to Villaverde and Maza (2015), the inward FDI performance of a region in Europe is largely linked to that of its neighbours. It is possible that similar regularity is present in the case of zones and their spatial environment.

<sup>10</sup> Data come from: factors 1.1, 1.2, 1.5 - 1.7, 1.10, 1.12 & 1.13 (Information about the implementation, 2016); factors 1.8 & 1.11 (Lichota, 2016), factors 1.3 & 1.4 (Colliers, 2016), and factor 1.9; own calculations based on information on SEZs' websites.

1.3 & 1.4: the maximum and average plot size in a zone. Big manufacturers need more investment space than small ones. Therefore, we expect the variables to be correlated with capital stock rather than with the number of projects (valid permits);

1.5: the number of towns and cities where sub-zones are located. They should attract more investors due to agglomeration benefits (for example, the ease of finding suppliers and employees) and better social infrastructure, that is, universities, hotels, theatres, restaurants, and schools offering instruction in foreign languages, all of which are important to foreign investors;

1.6: the number of communes where sub-zones are located, which approximates a bigger supply of plots with specific parameters. The variable should be more important for valid permits rather than for investment value;

1.7: the equity of ZMCs. Higher equity may facilitate their access to loans that may be used to develop the zone and attract more investment;

1.8: state aid granted to investors. The greater the support, the more investment (value and number of projects) should be present in a zone;

1.9: the fee for launching the permit application procedure in the zone. The fee differs across individual SEZs. This tends not to be a barrier for big companies. If it mattered to small investors, it would be reflected in the number of projects rather than the value of capital stock;

1.10: promotion outlays by ZMCs. The subject-specific literature (Harding & Javorcik, 2013) generally acknowledges the effectiveness of promotion in attracting FDI to countries and regions; hence, there are no grounds for challenging it at zone level;

1.11: the cost of provision and modernisation of infrastructure surrounding the zone, controlled and managed by the central, regional or local government administration (for example, connecting roads to the plots). Better infrastructure is a fundamental advantage which should translate into more capital and more projects;

1.12: the infrastructure outlays of ZMCs. Clearly these are smaller than public outlays (1.11). Nevertheless, as they are directly related to the quality of plots and roads within respective zones, higher outlays should be reflected in a bigger pool of investment;

1.13: tax allowances for ZMCs granted when they invest in zone development. If there are more resources left for improving the quality of zone services, more investors may appear.

Regional level factors are exogenous to the SEZ. We assumed that they were best reflected in the investment attractiveness of voivodeships, which are regions in the administrative sense. The variables were taken from the annual rankings of the Gdansk Institute for Market Economics (Polish abbr. IBnGR) over the period 2006–2015 (Nowicki, 2006–2015). Average ranks from the last 10 years allowed us to offset the effect of outliers in the sample. Since most zones are located in more than one voivodeship (six is the maximum number), all elements of the index were weighted with the share of investment in sub-zones at county (poviat) level.

IBnGR considered several dozen determinants, out of which it then created seven aggregated variables (partial rankings) and one overall ranking (as a weighted average). The variables consist of:

2.1: market absorption, including the size of the market, household affluence and investment outlays of enterprises;

2.2: labour resources and costs, including the size of working population and the number of unemployed, vacancies, migration of secondary school and university graduates, salaries and wages;

2.3: transport accessibility, including the location of a voivodeship vis-à-vis the western border, capital city, other regional centres, international airports and big ports;

2.4: economic infrastructure, including the density of business environment institutions, the presence of R&D centres, fairs, exhibitions, and SEZs (available areas and investors' activities);

2.5: social infrastructure, including the number and activities of cultural institutions, saturation of hotels and catering establishments;

2.6: public safety, including crime rates, the nature of the crimes, and crime detection rates;

2.7: information and promotion efforts of regional public administration.

We decided to supplement the above variables with variable 2.8 identifying maximum allowable state aid in voivodeships. It is probably the most important measurable factor which differentiates L advantages among the zones and should be reflected in their performance.<sup>11</sup>

As the third group of variables, we used the results of a questionnaire-based study conducted by Norstat Polska (KPMG, 2014). The sample included 234 enterprises, at least 10% from each zone (foreign and domestic investors). On a scale from 1 to 5 (1 – very poor, 5 – very good), the investors assessed:

3.1: the general performance of a zone;<sup>12</sup>

3.2: infrastructure (for example, roads and motorways, railway connections, technical infrastructure);

3.3: business environment (for example, distance to logistics centres, suppliers, availability of legal and financial services);

3.4: cooperation with the SEZ's authorities, supporting enterprises within the zone and new investors;

3.5: human resources (quality and availability of labour within the zone and in its vicinity).

All of the above-mentioned variables were compared against cumulated inflow of investment into an SEZ in terms of value (in PLN) and quantity (cumulated number of valid permits as an approximate measure of investment projects; usually there are slightly more permits than actual projects) processed for our study by the Ministry of Economic Development in 2016 (as of 31 December 2015). We used the Pearson correlation coefficient and Spearman's rank correlation coefficient (Sobczyk, 2000; Rószkiewicz, 2002).<sup>13</sup>

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<sup>11</sup> Aid is inversely proportional to the development advancement of voivodeships. Aid ceilings evolved in subsequent multiannual EU budgets starting from Poland's EU accession in 2004. As a result, the average was calculated as the weighted average of maximum ceilings in voivodeships in the periods 2007-2013 and 2014-2020 (Regulations of the Council of Ministers of 13.10.2006 and 30.06.2014 on the map of regional aid). The period 2004-2006 was omitted as the ceilings were the same for all voivodeships with the exception of some big cities (Warsaw, Poznań, Wrocław, Kraków, and Gdańsk) where investments in zones were almost non-existent.

<sup>12</sup> A general assessment (3.1) was made based on a separate question and is not a resultant of answers to detailed questions (3.2-3.5).

<sup>13</sup> The Spearman coefficient shows the correlation between rankings (ranks) of values of variables (in ascending or descending order). In contrast to the Pearson coefficient, it measures any monotonic, not only linear, dependence between variables; it is also more robust and resistant to outliers in the sample.



## RESULTS AND DISCUSSION

The results of the correlation analysis demonstrate that the relationship between the three groups of factors and the inflow of investment to the SEZs was not uniform (Tables A1 & A2 in the Appendix). Zone-specific determinants played a relatively more important role, its reputation was less important, while exogenous determinants, that is, regional economic and social environment of zones, were the least important. It may mean that zones situated in less attractive regions of Poland also stand a chance of winning more investors if they are well managed and provide good services to businesses.

The factors we examined were much more strongly related to the inflow of FDI than domestic investment (Table 1). More significant relationships were obtained especially for zone-specific factors. This result suggests that domestic firms pay less attention to zone characteristics than foreign ones.

In the case of zone-specific factors, not all of the dependencies that we have revealed satisfy our expectations. Both groups of investors, foreign and domestic, preferred zones with towns and cities, that is, their agglomeration economies, and with good infrastructure in the zone vicinity<sup>14</sup>. They were also sensitive to the promotion efforts of the ZMCs. However, smaller Pearson and Spearman coefficients for promotional outlays and the number and value of domestic investors compared to respective FDI coefficients suggest that the promotion activities target domestic companies less intensively (Tables A1 & A2 in the Appendix). On the other hand, both groups of investors did not care (variables were insignificant) about the maximum and average plot size or about the amount of state aid offered in the zone, which is quite surprising<sup>15</sup>. The differences in fees for entering a zone and in the equity at the ZMC's disposal were also insignificant as L advantages.

Only FDI inflows were positively correlated with the size of the zone, the diversity of plots (number of communes), infrastructure outlays in the zone and the ZMCs' tax allowances. Domestic capital, which on average is provided by smaller investors rather than foreign ones, was positively correlated with the share of built-up land in the zone territory.

There is clearly a closer correlation between SEZ reputation (Table A3 in the Appendix) and the number rather than the value of investment projects. It may mean that small investors pay more attention to opinions which circulate in business spheres, while big companies probably rely on their own evaluation of SEZ's advantages.

Rather surprisingly, most dependencies between FDI inflow and variables describing the attractiveness of voivodeships were insignificant. They concern such fundamental fea-

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<sup>14</sup> In all SEZs, the share of the three leading sectors exceeded 40% of the investment value, and in ten it was higher than 50%. At the same time, the share of one sector in ten out of the fourteen SEZs exceeded 20% of the total investment value, and in four it was not smaller than 40% (Information about the implementation..., 2017). It testifies to the high sectoral concentration of investment in individual zones. Thus, we decided to validate a hypothesis about the relationship between concentration and the inflow of investment into SEZs. By using the Pearson correlation coefficient and Spearman's rank coefficient, we examined the dependences between FDI inflow and total investment, in quantitative and value terms, and the level of sectoral concentration in SEZs. Concentration was measured by the share of one, two and three leading sectors in a SEZ and the Herfindahl-Hirshman (HHI) index of sectoral concentration. In all cases, the values of Pearson and Spearman correlation coefficients turned out to be statistically insignificant. It means that sectoral concentration in a SEZ was not accompanied by a bigger inflow of investment. It may be the effect of the geographic dispersion of investment plots across individual SEZs.

<sup>15</sup> Using selected indicators of regional development Ambroziak (2016) conducted counterfactual impact evaluation in poviats (NUTS 4). His conclusion was that income tax exemption in SEZs mattered as a location factor.

tures of zones' business environment as market absorption, economic and social infrastructures, public safety and authorities' approach to investors. Exceptions include labour resources and cost and transport accessibility. Interestingly, domestic investors did not care about this group of variables.

Dependencies between the inflow of domestic and foreign investments into SEZs, value-wise and in terms of their numbers, and the maximum allowable state aid in voivodeships, turned out to be statistically insignificant (at the level of 0.05). Thus, this kind of incentive seems too weak to direct investors to zones in less developed voivodeships, where higher amounts of aid are possible. The above conclusion is confirmed by the negative correlation between the value of FDI and state aid intensity (Pearson coefficient of -0.518 for  $p=0.058$ ). It also corresponds with the insignificance of state aid as an intra-zone variable.

**Table 1. Significant correlations between investment projects in SEZ and their determinants: foreign versus domestic**

Determinants of investment projects in SEZs (first variable)	Significant correlations based on coefficients			
	Pearson		Spearman	
	Second variable		Second variable	
	FDI	Domestic investment	FDI	Domestic investment
<b>Value of investment</b>				
Zone specific factors (13)	5	2	7	4
Regional level factors (8)	1	–	1	–
Foreign & domestic investors' assessment of SEZs – their reputation (5)	2		4	
<b>Number of investment projects</b>				
Intra zone factors (13)	6	4	7	3
Regional level factors (8)	2	–	2	–
Foreign & domestic investors' assessment of SEZs – their reputation (5)	4		4	

Source: own study based on tables A1, A2 & A3.

Correlation methods were used to check the strength of the relationship between the inflow of investment and a series of factors. Next, we specified the regression function in order to identify the value of investments in SEZs depending on explanatory variables. To this end, for regression equations, we selected the same dependent variables, reflecting the inflow of domestic and foreign investment, that were used in correlation analysis:

1. cumulated investment inflow into a SEZ in value terms (in PLN) as of the end of 2015;
2. and cumulated investment inflow into a SEZ in quantitative terms (valid permits) as of the end of 2015.

We also used the same independent variables (zone-specific factors, regional level factors and zone reputation indicators). We supplemented them with the variable *overall investment attractiveness of voivodeships*, which is a weighted average of partial attractiveness (2.1-2.7): market absorption (15%), labour resources and costs (25%), transport

accessibility (20%), economic infrastructure (10%), social infrastructure (5%), public safety (5%), information and promotion efforts (20%).

The equations included two explanatory variables each, with no constant term, which turned out to be insignificant:

$$y = b_i x_i + b_j x_j \quad (1)$$

where:

- y - explained variable;
- $x_i, x_j$  - explanatory variables;
- $b_i, b_j$  - structural parameters;
- $i, j$  - numbers of explanatory variables.

Due to the limited number of observations (14), we were not able to use more variables. Overall, several dozen varieties of equations were estimated with explanatory variables from the same or different groups<sup>16</sup>, in accordance with the classification adopted in the correlation analysis. Following formal and substantive validation, we selected seven equations with the best stochastic structure parameters of the model. These were exclusively equations with a number of FDI and a value of FDI. No significant relations were found for domestic investment. We calculated structural parameters and stochastic structure parameters of the model using the ordinary least squares method (OLS) with the SPSS software.

The above equations explain well the differences in investment inflow to SEZs. The determination coefficient assumed values within the range of 0.630-0.905. Structural parameters estimates are significant at levels 0.01 or 0.05. The Durbin-Watson test shows the absence of auto-correlation in six cases and one inconclusive result. It means no important independent variable was omitted in the equations. Neither is there co-linearity of variables.

Estimates in Table 2 explain the role of factors belonging to intra-zone and voivodeship attractiveness groups. The presentation also ignores equations with predictors, which reflect the zone reputation as their estimates were found to be insignificant.

Comparing the  $\beta$  coefficient for predictors in individual equations, we may observe that only in one case (equation 2) is the value for a variable from the group 'investment attractiveness' higher than the value of an independent variable from the group 'zone specific.' It is confirmed by the conclusion from the correlation analysis, which reveals the crucial role of intra-zone factors in shaping investment inflow into SEZs.

Best estimates (equations 4 and 5) of FDI inflow (value and projects) were achieved when we took overall outlays on the provision and modernisation of zone infrastructure (Group I) as the independent variable. In two cases, the determination coefficient exceeded 0.9. Notably, the variable reflecting the quality of infrastructure in voivodeships (by attractiveness ranking) was insignificant when it comes to correlation with FDI inflow. Investors' opinions about zone infrastructure were significant in terms of correlation, although we did not manage to design an adequate regression equation with this variable. That may mean that investors appreciate much more zone infrastructure and infrastructure in its proximity than infrastructure in the whole voivodeship, which may be satisfactory or not important.

Quite good results were obtained for both the number of cities and towns with SEZ plots and for resources and costs of labour in the voivodeship as predictors (equations 6 and 7). In combination with the slightly worse but significant results of equations 1 and 2, it suggests

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<sup>16</sup> Group I – zone-specific factors, Group II – investment attractiveness of voivodeships, Group III – SEZs' reputation.

that FDI inflow into SEZs is greater when a zone has numerous sub-zones with better infrastructure located in regions attractive to investors, especially in terms of labour resources.

**Table 2. Results of regression analysis**

No.	Dependent variable*	Explanatory variables (predictors)*	Structural parameters (b)	R <sup>2</sup>	Empirical significance (p-value)	Durbin-Watson statistic**	β coefficient	Multicollinearity tolerance	Multicollinearity - VIF
1	Y <sub>1</sub>	X <sub>1</sub>	36.7	0.662	0.003	1.267	0.632	0.999	1.001
		X <sub>2</sub>	11,992.1						
2	Y <sub>1</sub>	X <sub>1</sub>	27.4	0.630	0.024	1.894	0.471	0.926	1.080
		X <sub>3</sub>	11,901.9						
3	Y <sub>1</sub>	X <sub>4</sub>	19.8	0.830	0.000	1.918	0.788	0.912	1.097
		X <sub>2</sub>	6,248.4						
4	Y <sub>1</sub>	X <sub>4</sub>	18.2	0.849	0.000	2.357	0.725	0.808	1.238
		X <sub>3</sub>	7,587.0						
5	Y <sub>2</sub>	X <sub>4</sub>	0.214	0.905	0.000	2.161	0.777	0.808	1.238
		X <sub>3</sub>	75.9						
6	Y <sub>1</sub>	X <sub>5</sub>	483.9	0.839	0.000	2.393	0.721	0.798	1.253
		X <sub>2</sub>	7452.6						
7	Y <sub>2</sub>	X <sub>5</sub>	5.576	0.877	0.000	2.329	0.759	0.798	1.253
		X <sub>2</sub>	75.8						

Source: own study.

## CONCLUSIONS

Looking for the causes determining the popularity of a given SEZ among investors, we considered three aggregates of variables: (1) zone-specific factors constituting its investment climate; (2) regional-level factors reflected in the investment attractiveness of voivodeship indicators, and (3) zone reputation. Correlation analysis showed that the first group was definitely the most important, the third one – less, and the second – the least important. Almost all variables were much more strongly related to the inflow of FDI than to domestic investment.

In the case of zone-specific factors, not all dependencies we have revealed satisfy our expectations. As we presumed, both foreign and domestic investors preferred zones with towns and cities with good infrastructure in the vicinity of the zone. They were also sensitive to the promotion efforts of the ZMCs. Smaller Pearson and Spearman coefficients for promotional outlays, and the number and value of domestic investors compared to respective FDI coefficients, suggest that domestic companies were targeted less effectively (Tables A1 and A2 in the Appendix). Both groups of investors did not care about maximum or average size of plots or about the amount of state aid offered in the zone, which is quite surprising. Differences in fees for entering a zone and in equity at the ZMC's disposal were also insignificant as L advantages.

Only FDI inflows positively correlated with the size of the zone, the diversity of plots (the number of communes), infrastructure outlays in the zone, and ZMC tax allowances.

Domestic capital, which on average is provided by smaller investors, was positively correlated with the share of built-up land in zone territory.

There is clearly a closer correlation between SEZ reputation (Table A3 in the Appendix) and the number rather than the value of investment projects. It may mean that small investors pay more attention to the opinions which circulate in business circles and that big companies probably rely on their own evaluation of a SEZ's investment climate.

Rather surprisingly, most dependencies between FDI stock and regional level variables describing the attractiveness of voivodeships were insignificant. It concerns such fundamental features of zones' business environment as market absorption, economic and social infrastructures, public safety and the local authorities' approach to investors. Exceptions included labour resources and cost, and transport accessibility. Interestingly, domestic investors seemed not to care about regional factors.

Dependencies between the inflow of domestic and foreign investments into SEZs, value-wise and in terms of their numbers, and the maximum allowable state aid in voivodeships turned out to be statistically insignificant (at the level of 0.05). Thus, this kind of incentive seems too weak to direct investors to zones in less developed voivodeships, where higher amounts of aid are possible. The above conclusion is confirmed by the negative correlation between the value of FDI and state aid intensity (Pearson coefficient of  $-0.518$  for  $p=0.058$ ). It also corresponds with the insignificance of state aid as a zone-specific variable differentiating territorial allocation of investments.

The results of the correlation analysis were partially confirmed by the regression analysis. The most important factors for attracting FDI were: outlays on the provision and modernisation of zone infrastructure, the number of towns and cities, overall investment attractiveness of voivodeships, as well as labour resources and costs. No significant relations were found for domestic investment. It was probably indifferent to SEZ characteristics.

It seems that zones located in less developed parts of Poland are not in a hopeless position when competing for foreign capital. A lot depends on the ZMCs and local authorities' professionalism. Central government should simply leave them the resources and initiative to act. The relevance of tax reliefs is secondary when it comes to choosing a particular zone. Supply factors, such as good infrastructure, labour availability, and qualified employees are much more important.<sup>17</sup> It shows that from an investor's point of view they act rationally although not always in line with the legislator's intentions.<sup>18</sup>

With better data availability, the cognitive value of our research could be improved. Firstly, we showed that foreign and domestic investors react differently to SEZs, but we do not know why. Secondly, as a measure of a zone's success, we used static indicators (stocks of capital and projects instead of flows). With correlation coefficients and stock data, it is not possible to evaluate the directions of dependencies (Nielsen *et al.*, 2017). Thirdly, stock data did not allow us to include more variables in the regression model due to the small number of observations. Finally, the L advantages of a zone can change over time, and we did not take this into account. We also did not confront zones' and investors' characteristics.

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<sup>17</sup> With respect to that, our conclusion concurs with the results of numerous other studies on the importance of taxes for attracting FDI. For an overview of studies, see Tavares-Lehmann, Coelho, and Lehmann (2015).

<sup>18</sup> Choosing a site based on the most generous incentive offer is one of the most expensive mistakes companies make (Williams & Campolo, 2016).

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## Appendix:

Table A1. Determinants of FDI value and population in SEZs (as of 31.12.2015)

No.	Variables	Pearson				Spearman			
		Coefficient		Empirical significance level		Coefficient		Empirical significance level	
		Cumulated value and number of investment projects in SEZ							
		value	number	value	number	value	number	value	number
<b>Zone specific factors</b>									
1.1	Size of the zone (in ha)	0.874	0.864	<b>0.000</b>	<b>0.000</b>	0.851	0.838	<b>0.000</b>	<b>0.000</b>
1.2	Share of built-up land in %	0.036	0.075	0.903	0.798	0.108	0.062	0.714	0.834
1.3	Maximum plot size in ha	0.334	0.227	0.265	0.455	0.369	0.295	0.214	0.328
1.4	Average plot size in ha	0.485	0.525	0.093	0.065	0.412	0.420	0.162	0.153
1.5	No. of towns and cities hosting sub-zones	0.727	0.701	<b>0.003</b>	<b>0.005</b>	0.775	0.682	<b>0.001</b>	<b>0.007</b>
1.6	No. of communes hosting sub-zones	0.507	0.635	0.064	<b>0.015</b>	0.685	0.748	<b>0.007</b>	<b>0.002</b>
1.7	Equity of ZMCs	-0.043	0.004	0.885	0.989	0.275	0.143	0.341	0.625
1.8	State aid granted to operators in SEZ (tax allowances)	-0.301	-0.384	0.296	0.176	-0.308	-0.462	0.283	0.096
1.9	Tender specification fee	-0.045	-0.134	0.874	0.663	0.145	0.039	0.637	0.899
1.10	Cumulated promotion outlays of ZMCs	0.666	0.788	<b>0.009</b>	<b>0.001</b>	0.622	0.757	<b>0.018</b>	<b>0.002</b>
1.11	Total outlays on the provision and modernisation of infrastructure in zone vicinity, cumulatively	0.718	0.759	<b>0.004</b>	<b>0.002</b>	0.732	0.779	<b>0.003</b>	<b>0.001</b>
1.12	Outlays of ZMCs on the provision and modernisation of zone infrastructure, cumulatively	0.278	0.248	0.336	0.393	0.538	0.614	<b>0.047</b>	<b>0.020</b>
1.13	Cumulated tax allowances of ZMCs	0.667	0.692	<b>0.009</b>	<b>0.006</b>	0.613	0.717	<b>0.020</b>	<b>0.004</b>
<b>Regional level factors (investment attractiveness of voivodeships)</b>									
2.1	Market	0.453	0.414	0.104	0.141	0.110	0.059	0.708	0.840
2.2	Labour resources and costs	0.718	0.735	<b>0.004</b>	<b>0.003</b>	0.713	0.707	<b>0.004</b>	<b>0.005</b>
2.3	Transport accessibility	0.454	0.535	0.103	<b>0.049</b>	0.370	0.562	0.193	<b>0.037</b>
2.4	Economic infrastructure	0.496	0.467	0.071	0.092	0.427	0.390	0.128	0.168
2.5	Social infrastructure	0.382	0.406	0.178	0.150	0.238	0.260	0.413	0.370
2.6	Public safety	-0.450	-0.401	0.106	0.155	-0.418	-0.396	0.136	0.160
2.7	Authorities' activities addressed to investors	0.366	0.378	0.199	0.183	0.233	0.297	0.422	0.302
2.8	State aid ceiling	-0.518	-0.448	0.058	0.109	-0.396	-0.422	0.161	0.133

Source: own study.

**Table A2. Determinants of value and population of domestic investment projects in SEZs (as of 31.12.2015)**

No.	Variables	Pearson				Spearman			
		Coefficient		Empirical significance level		Coefficient		Empirical significance level	
		Cumulated value and number of investment projects in SEZ							
		value	number	value	number	value	number	value	number
<b>Zone specific factors</b>									
<b>1.1</b>	Size of the zone in ha	0.285	0.269	0.324	0.352	0.322	0.315	0.246	0.273
<b>1.2</b>	Share of built-up land in %	0.519	0.673	0.057	<b>0.008</b>	0.538	0.614	<b>0.047</b>	<b>0.020</b>
<b>1.3</b>	Maximum plot size in ha	-0.030	-0.195	0.923	0.523	-0.185	-0.306	0.546	0.309
<b>1.4</b>	Average plot size in ha	0.285	0.108	0.346	0.725	0.270	0.008	0.372	0.978
<b>1.5</b>	No. of towns and cities hosting sub-zones	0.822	0.671	<b>0.000</b>	<b>0.009</b>	0.684	0.756	<b>0.007</b>	<b>0.002</b>
<b>1.6</b>	No. of communes hosting sub-zones	0.334	0.270	0.243	0.350	0.409	0.403	0.147	0.153
<b>1.7</b>	Equity of ZMCs	0.058	0.560	0.845	<b>0.037</b>	0.031	0.225	0.917	0.440
<b>1.8</b>	State aid granted to operators in SEZ (tax allowances)	0.112	0.204	0.702	0.484	0.225	0.189	0.440	0.519
<b>1.9</b>	Tender specification fee	0.434	0.066	0.137	0.830	0.183	0.041	0.550	0.895
<b>1.10</b>	Cumulated promotion outlays of ZMCs	0.640	0.279	<b>0.014</b>	0.334	0.635	0.339	<b>0.015</b>	0.236
<b>1.11</b>	Total outlays on the provision and modernisation of infrastructure in zone vicinity, cumulatively	0.507	0.680	0.064	<b>0.007</b>	0.622	0.746	<b>0.018</b>	<b>0.002</b>
<b>1.12</b>	Outlays of ZMCs on the provision and modernisation of zone infrastructure, cumulatively	0.074	0.200	0.800	0.494	0.424	0.427	0.131	0.128
<b>1.13</b>	Cumulated tax allowances of ZMCs	0.267	0.457	0.355	0.101	0.420	0.528	0.135	0.052
<b>Regional level factors (investment attractiveness of voivodeships)</b>									
<b>2.1</b>	Market	0.118	0.053	0.689	0.858	-0.150	0.011	0.610	0.970
<b>2.2</b>	Labour resources and costs	0.462	0.175	0.096	0.549	0.176	0.200	0.547	0.492
<b>2.3</b>	Transport accessibility	0.006	-0.353	0.984	0.215	-0.273	-0.381	0.345	0.179
<b>2.4</b>	Economic infrastructure	-0.231	-0.298	0.427	0.301	-0.295	-0.004	0.306	0.988
<b>2.5</b>	Social infrastructure	-0.027	-0.009	0.926	0.976	-0.233	0.053	0.422	0.858
<b>2.6</b>	Public safety	0.089	0.475	0.762	0.086	0.356	0.297	0.211	0.302
<b>2.7</b>	Authorities' activities addressed to investors	-0.317	-0.352	0.270	0.217	-0.493	-0.218	0.073	0.454
<b>2.8</b>	State aid ceiling	0.219	0.482	0.452	0.081	0.342	0.399	0.232	0.158

Source: own study.

**Table A3. Foreign & domestic investors' assessment of SEZs – their reputation (as of 31.12.2014)**

No.	Variables	Pearson				Spearman			
		Coefficient		Empirical significance level		Coefficient		Empirical significance level	
		Cumulated value and number of investment projects in SEZ							
		value	number	value	number	value	number	value	number
<b>3.1</b>	Overall assessment	0.519	0.490	0.057	0.075	0.582	0.407	<b>0.029</b>	0.149
<b>3.2</b>	Infrastructure	0.693	0.767	<b>0.006</b>	<b>0.001</b>	0.763	0.719	<b>0.002</b>	<b>0.004</b>
<b>3.3</b>	Business environment	0.666	0.728	<b>0.009</b>	<b>0.003</b>	0.691	0.717	<b>0.006</b>	<b>0.004</b>
<b>3.4</b>	Cooperation with SEZ authorities	0.501	0.616	0.068	<b>0.019</b>	0.560	0.657	<b>0.037</b>	<b>0.011</b>
<b>3.5</b>	Human resources	0.481	0.714	0.081	<b>0.004</b>	0.503	0.710	0.067	<b>0.004</b>

Source: own study.

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The contribution share of authors is as follows  
T. Dorożyński 45%, J. Świerkocki 45%, W. Urbaniak 10%.

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