
What are the Key Location Factors for Firms in Special Economic Zones? Evidence from Poland

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Abstract:

Purpose: Since the Polish special economic zone programme (SEZ) serves as a good ground for running location-based studies, due to its footloose approach towards the location of SEZs subzones, the paper aims at depicting the hierarchy of location factors investors in SEZs have, compared to non-SEZs entities.

Approach/Methodology/Design: Basing on the data obtained from a survey on equally-sized and comparable two groups of firms: (i) in SEZs, and (ii) operating outside SEZs, the paper verifies the magnitude of influence of particular location factors on firms' decisions where to locate their establishments. Differences in the perception of factors are further tested with parametric and nonparametric statistical tests to reveal significant differences among them.

Findings: Firms in SEZs put the availability of tax exemptions in SEZs as an essential location factor. Statistical tests have proved significant heterogeneity among SEZ and non-SEZ entities, generally signalling higher attention (in case of the former) put to the closeness to outlet markets, research centres, FDIs, leaders in the industry and availability of low-skilled workers.

Practical Implications: The knowledge of the hierarchy of location factors in SEZs may enhance the quality of management in SEZs, reveal areas supervising agencies should take care in the expansion of SEZs, and finally increase the effectiveness of SEZs programmes.

Originality/Value: The paper advances by indicating a series of success factors in the operation of special economic zones, the managing agencies should bear in mind when undertaking decisions on the location of particular zones.

Keywords: special economic zones, location determinants, success factors, firm location.

JEL classification: R12, R38, L60, G18.

Paper Type: Research study.

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1. Introduction

Over the decades, zonal policies have pursued the goals of economic growth and development in many countries. In some of them, they effectively contributed to the promotion of industrialisation (Zeng, 2015; 2016), the attraction of foreign capital and job creation (Akinci and Crittle, 2008; Ambroziak, 2016; Capik, 2013; Farole, 2011), as well as played a positive role of a catalyst for structural transformations (Ambroziak, 2003; Farole and Moberg, 2014; Hsu and Chu, 2016; Yeung *et al.*, 2009; Zacharias and Tang, 2010), or integration with global trade (Farole, 2011). In others, however, they failed to achieve their goals (Farole and Kweka, 2011), did not create an attractive business environment that would make it competitive for foreign capital, and as a result, did not differ from the rest of the economy (Bernstein *et al.*, 2012; Farole, 2010).

Zonal projects were launched by countries all over the world, regardless of their socio-political system or the level of economic development. Different types of zones in many forms and classifications have emerged in various types of macroeconomic environments. Despite different motives for their formation, expectations and models of operation, their common denominator is the idea of promoting a friendly investment climate aimed at attracting domestic and foreign investors. Their capital was to support and activate the economic development of selected areas, sometimes also to alleviate structural problems occurring in their area (as in the case of Poland). In addition, it was expected that the inflow of foreign capital would initiate the exchange of knowledge, transfer of modern technologies, innovations (Akhmetshina *et al.*, 2017; Kanungo, 2016; Pakdeenurit *et al.*, 2014) and facilitate access to world-class marketing and management systems (Palit, 2010).

Privileged areas had, above all, a good chance of achieving their goals in countries such as India, China and the United States (Chatterjee, 2008; Pakdeenurit *et al.*, 2014; Raheem, 2011). These countries are not only pioneers in conducting zone policies, but also are examples of success stories of using this instrument to drive exports, attract foreign investments or generate employment. On the contrary, in many cases of African counties, SEZs-programmes either have failed, or their effects were moderate (Capik, 2013; Farole, 2010; 2011).

At this background, Polish special economic zone (SEZ) programme mostly proved to be successful i.a. in job creation and lowering the unemployment rate (Ciżkowicz *et al.*, 2016; Jensen, 2018; Nazarczuk and Cicha-Nazarczuk, 2016), boosting exports (Nazarczuk and Umiński, 2018; Nazarczuk and Umiński, 2019), the attraction of investment (Ciżkowicz *et al.*, 2016). Nevertheless, their efficiency in ensuring local economic development is questioned (Kopczewska, 2020). Yet, Poland also serves as an interesting experiment framework for a location-based study on firms in SEZs, as from more than 15 years the majority of the decisions on location in SEZs subzones is due to endogenous firms' choices and not the government site selection. Therefore,

the example of Poland can provide key implications in terms of the successful location of SEZs, also for other countries.

The paper aims at showing the hierarchy of location factors investors in SEZs have, compared to non-SEZs entities. Apart from signalling the magnitude of importance of particular factors, the paper also undertakes formal tests to verify if the obtained results differ significantly between two equally-sized groups of firms. The results, provide substantial implications for bodies supervising SEZ-programmes in terms of crucial factors, which investors in SEZs consider, helping to improve the quality of management in SEZs and by showing key areas of improvement when the funds allocated to introduction or operation of SEZs programmes are limited.

The remainder of the paper is the following. Section one provides a review of theoretical and empirical evidence on the effects of SEZs in attracting capital. Section two describes the datasets and utilised methods. Section three depicts and discusses the results, whereas section four concludes the paper and provides implications for economic policy.

2. Literature Review

2.1 The Effects of SEZs in a Global Perspective

Many years of experience, successes and failures of individual countries in the field of the impact of zonal policies on the development of economic systems are a part of the rich research material presenting the role played by these instruments, among others, in supporting entrepreneurship, economic growth, promotion of industrialisation, development of activities aimed at exporting or in attracting investments.

The attraction of new investors is undoubtedly a determinant of the effectiveness of the zonal policy in a country or region. For many years, more or less methodologically advanced analyses have been carried out in order to find evidence on the effectiveness of the fiscal and financial incentives used within the zones in obtaining domestic and foreign capital. Even though many of these studies are reliable analyses, providing information on the characteristics that make a given zone effective in this regard, yet the findings that emerge from these analyses limit the possibility of generalising them, comparing them, or translating them into specific policy recommendations. The reason for these limitations is not only the specificity of the zone, its form and location, but also the different socio-economic and political context in which these policies operate.

Most of the conducted analyses lead to the conclusion that the impact of the tax incentives and privileges offered in special economic zones on the process of attracting investors is positive. Wang (2013), analysing the functioning of Chinese special economic zones, clearly indicates that the packages of solutions applied in SEZ

(including protection of private property rights, tax reliefs and land use policy) proved to be effective in attracting capital, mainly in the form of foreign direct investment and export-oriented industrial enterprises.

Chaurey (2017) arrives at an equally positive conclusion when studying the system of location-based tax incentives in India. Tax exemptions and investment subsidies increased the inflow of capital in the regions subject to intervention. It was connected not only with the implementation of investments by new economic entities, but also with the possibility of developing existing companies. Billings (2008) is slightly less optimistic in this respect, as he has shown, based on the analysis of the Colorado Entrepreneurship Zone in the US, that geographically targeted tax incentives had only a small (insignificant) impact on decisions regarding the location of new entities in the zone. The effect was diversified, conditioned on the sectors of economic activity.

Other studies on the functioning of French corporate zones *Franches Urbaines* (ZFU) (Givord *et al.*, 2018; Mayer *et al.*, 2017) proved that tax reliefs offered as a part of zonal policies in France become an effective instrument stimulating the inflow of capital to areas requiring support. French companies reacted quite strongly to such incentives. However, as emphasised by Mayer *et al.* (2017), the effectiveness was significantly associated with the attractiveness of the location of such areas, which turned out to be the lowest in urban areas most threatened by economic difficulties.

The literature draws attention to the fact that one of the crucial factors determining the success of the zone, mainly in terms of attracting capital, is the choice of its location. Countries usually decide to introduce such tools in the hope of improving the economic performance and efficiency of those areas where market failures have been located (Kline and Moretti, 2013; 2014). Therefore, they concentrate mainly on areas at risk, with a relatively unfavourable socio-economic situation, with little competitive industrial monoculture requiring restructuring (the example of Poland), and consequently, low investment attractiveness and to some extent disturbed economic structure. As emphasised by Peters and Fisher (2002), Kanungo (2016), and Pastusiak *et al.* (2016) and Krzeczewski (2016), the solutions proposed under the zonal policies (i.e. incentives or financial privileges), may be insufficient to persuade entities to locate their investments in underdeveloped areas, encompassed by public support. Investors are not willing to accept locations without properly prepared back-up facilities in the form of socio-economic infrastructure, transport accessibility, proximity to urban agglomerations or large outlets. Therefore, it is expected that the level of fiscal and financial incentives will be high enough - while the solutions proposed within the zones will be diversified enough - to overcome the inconveniences related to the development disproportions of these regions.

The discussion in the literature on the impact of zonal policies on the location of economic activity in individual countries or regions underlines the specificity of special economic zones operation in Poland. In this country, the gradual and systematic evolution of the instrument meant that it was not the privileged areas that

attracted investors, but the investors who decided where the subzones of SEZs were created, guided by the objective factors of investment location. Therefore, the Polish example of SEZs operation provides an intriguing experiment framework for location-based studies within the zones.

2.2 The Polish Case of SEZs

Special economic zones in Poland are a notable example of zone policies, which were created in response to the adverse effects of the economic transformation. Growing competition in the state of a market economy, progressing economic recession, the collapse of old industrial centres and, consequently, an increase in structural unemployment forced the state to intervene in the form of institutional support with the participation of external investors. Therefore, SEZs originally constituted a tool stimulating the inflow of investors to underdeveloped, peripheral areas, areas threatened with recession or experiencing economic problems.

Over time, however, the gradual erosion of the original idea of SEZs creation not only changed the essence of the instrument but also influenced the criteria for the location of new zones, causing the so-called “market” selection of the location of new subzones. SEZs, as an instrument of the state’s regional policy, have undergone a significant transformation. The original tool, supporting mainly areas with social and economic difficulties, has evolved into a form of public aid dedicated to specific investors. The zones became an instrument whose main goal was to obtain foreign capital. In practice, this meant quite often that new privileged areas (subzones) were created in places indicated by potential investors. As a consequence, the positive selection of territories was observed, i.e. the creation of privileged areas in attractive, well-developed regions with appropriate infrastructure, often near large urban agglomerations.

Therefore, the current distribution of economic activity within SEZs in Poland seems to be a derivative of the investment attractiveness of the regions and objective location factors. Moreover, a consequence of the government’s loose attitude on SEZs and readiness to adjust the policy of shaping their areas to the requirements of investors (Ambroziak and Hartwell, 2018), was the process of dispersion and fragmentation of special economic zones in the country, which is deepening every year.

The consequences of freedom in choosing the location of zonal investments in Poland have become the subject of many scientific studies. Numerous efforts were made to establish, inter alia, whether the zones are an attractive place for capital (Sobol, 2016), what factors determine the location of investments in SEZ (Ambroziak, 2009; Dorożyński *et al.*, 2016; Sobol, 2016) and finally, to what extent tax exemptions affect the inflow of capital among other public aid programmes (Jasiniak and Koziński, 2017; Nazarczuk and Kisiel, 2013; Walkiewicz, 2017).

The Polish literature emphasises primarily the fact that the effectiveness of zones in terms of improving the competitiveness of regions, their situation on the labour market or the growth of local entrepreneurship (resulting from the inflow of investments) is highly diversified spatially (Dorożyński *et al.*, 2016; Sobol, 2016; Walkiewicz, 2017). Systemic transformations and restructuring changes that the Polish economy underwent during the transformation period revealed a clear differentiation in the level of socio-economic development of individual regions and the persistence of certain unfavourable trends in the long run (Bogdański, 2010). The concentration of adverse effects of reforms to this day has an impact on economic competitiveness and the perception of these areas as an unattractive place for investment. Therefore, the effectiveness of SEZ in attracting investors and capital is to a large extent related to the overall investment attractiveness and development opportunities of the regions, encompassed by the support.

Taking into account the fact that entities interested in locating investments in Polish SEZs first choose a convenient place to conduct their business, guided in this respect by objective location factors, and only then seek for public aid within the zones, it is important to determine the factors underlying their endogenous decision on where to locate their establishment.

3. Material and Methods

To evaluate the importance of location factors that firms in SEZs and non-SEZs find important, we run survey-based research on two samples of firms and compare the importance of particular location factors. The survey was conducted on a sample of SEZs firms (155 entities out of ca. 1300 actively operating in SEZs in Poland) and re-run on a sample of similar firms (equally-sized) operating outside the zones.

The first group researchers drew out from a registry of firms having valid permits to operate within special economic zones in Poland³, which had already started their operation in SEZs. The selection was made in line with the characteristics of the whole population of firms functioning in SEZs in Poland according to a series of firm-level characteristics like NACE rev. 2 activity (2-digit), size of a firm (small/medium/large), presence of foreign capital as well as the foreign trade status. Therefore, the resulting research sample captured the characteristics of all firms operating in SEZs. The second group of firms, amounting for 155 entities, was drawn out from a large InfoCredit database, according to similar criteria as the first group (branch of economic activity, firm size, presence of foreign capital). Thus, one ended with two comparable groups of firms.

Table 1 presents selected characteristics of all the entities questioned. Foreign trade status depicts firms' internationalisation in the form of exports or imports (variable

³The registry was obtained from the Ministry of Economic Development, Labour and Technology, which supervises the issuance of permits to operate within the zones.

ft_status equals in that case 1), either not being active in the sphere of foreign trade (coded as 0). The majority of firms in the dataset has taken part in some form of foreign trade. Most of them are medium-sized domestic entities. Since firms in SEZs can run a service-related activity from a few years, the majority of firms in SEZs, and as a result in the research sample, comes from the manufacturing sector (289 firms, amounting for ca. 92% of the total research sample).

Table 1. Descriptive statistics of the research sample

Variable	Description	N	Mean	SD	Min	Max
age	Firm's age	310	17.523	13.296	4	118
employ	Firm's employment	310	168.165	344.589	1	2200
foe	Foreign-owned entity [dummy]	310	0.239	0.427	0	1
ft_status	Foreign trade status [dummy]	310	0.716	0.452	0	1
mne	Multinational entity [dummy]	310	0.135	0.343	0	1
SEZ	Firm operating in SEZs [dummy]	310	0.500	0.501	0	1

Source: Own study.

To capture the differences in the hierarchy of location factors between two groups of firms, the authors utilise two approaches: (1) index of importance and (2) statistical tests. The former approach is used to depict the importance of particular location factors, whereas the latter test if the importance of each factor differs significantly between the groups.

In the first case, a simple index of influence following (Karaszewski *et al.*, 2009) is used, as firms' owners/managers were asked to assess the importance of each location factor from the list on the following scale: 1 definitely low significance, 2 rather low significance, 0 have no idea, 3 rather high significance, 4 definitely high significance. The *INF_index* is a weighted arithmetic mean of answers evaluating particular location factor in the following form:

$$INF_index = \frac{\sum_{i=1}^k w_i \cdot n_i}{k \cdot N}$$

where: *INF_index* – index of influence, *i* – an index, *w_i* – weight (an assessment) of a location factor by a manager on a scale from 1 to 4, *n_i* – number of responses with an *w_i* assessment, *k* – maximum value managers could give a particular location factor (in the case of the study it is 4), *N* – total number of responses for particular location factor.

Due to the construction of the *INF_index*, it ranges from 1 (low stimulus for location) to 4 (decisive location factor). However, we may assume that values of the *INF_index* above 0.5 depict a strong location factor rather, whereas above 0.25 a moderate stimulus to investment.

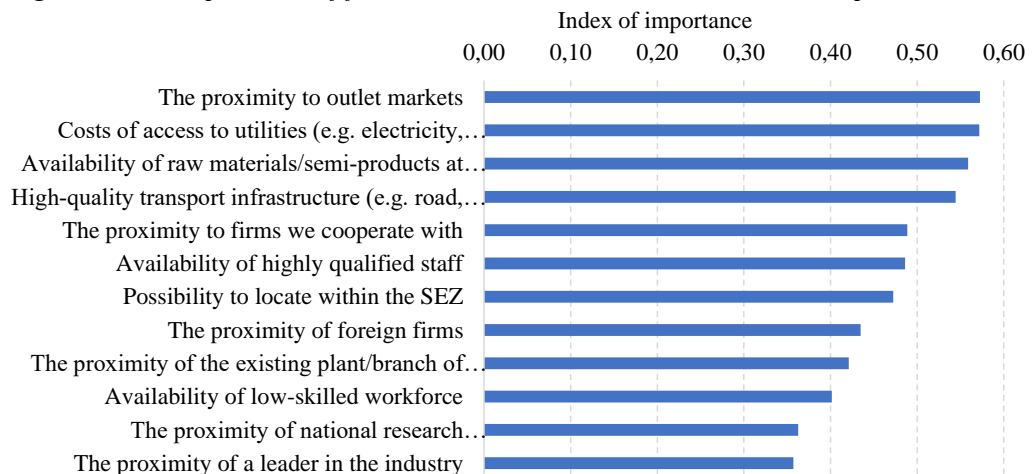
The study utilises two different statistical tests to grasp the differences in the assessment of location factors between two groups of respondents. The first one – an

unpaired test of equality of means – requires the assumption of normality to be met, whereas the nonparametric one - Wilcoxon rank-sum test - relaxes this assumption. According to the Shapiro-Wilk normality test our variables of interest, representing managers' location factors assessments are distributed non-normally; thus we rely more on the nonparametric version of the test. However, we also present the results of the former test for comparability.

4. Research Results and Discussion

The most important location factors were the ones related to the cost of firms' operation and availability of high quality of inputs, coupled with proximity to high-speed transport infrastructure and outlet markets (Figure 1). From the view of the majority of firms (including SEZs and non-SEZs ones) the possibility of obtaining tax exemption in SEZs was only a moderate stimulus for firm location in the desired place, probably signalling important diversification of the views among two groups of entities. Whereas, the proximity to research centres, leaders in the industry were not taken as important location factors in relative terms. Similarly, the availability of low-skilled labour force or a nearby location of other plants of the firm were collateral in explaining decisions to start a firm in a particular place.

Figure 1. The importance of firms' location criteria in the research sample

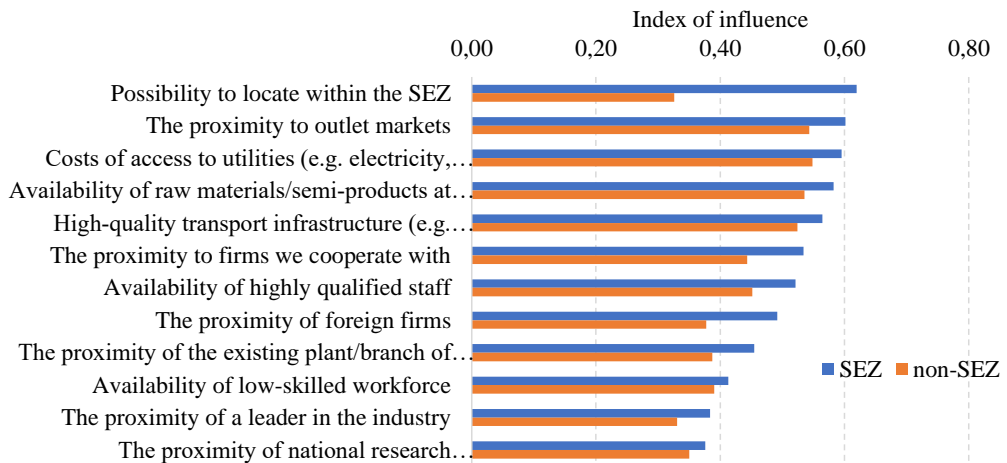


Source: Own study.

Due to a possible rift between views of SEZs-related and non-SEZs firms, stemming i.a. from different strategies obtained or the level of internationalisation, affecting the importance of particular location factors, the hierarchy of location criteria may vary. A more in-depth review of the factors acknowledges a few substantial differences. SEZs firms place the possibility of location within the SEZs' subzones as the most important location criteria, contrary to the non-SEZs entities, for which it is the least important factor (out of the analysed) (Figure 2). Secondly, SEZs firms evaluate all of the location factors as of higher influence than in the case of non-SEZs firms. The

results to some extent acknowledge the ones obtained by Nazarczuk *et al.* (2020), which also direct to higher susceptibility of foreign-owned exporters vs domestic-owned exporters to agglomeration externalities and the proximity to infrastructure. The hierarchy of remaining location factors is generally similar, however not identical. Since in many cases, the differences in the value of the influence index do not seem to be high, there is a need for additional analysis to reveal the significant differences among the two.

Figure 2. Differences in the location preferences of SEZs and non-SEZs firms



Source: Own study.

The observed differences in the views of SEZs firms and non-SEZs entities were further tested with statistical tests comparing views of two groups of firms on particular location factors to reveal statistically significant differences among them. Since the results of the Shapiro-Wilk normality test point to the non-normal distribution, the results of the Wilcoxon rank-sum test should be treated as primary, while the results of the t-test are presented for comparison reasons (Table 2). Yet, the choice of the p-value of 0.05 yields in identical outcomes of the tests.

The non-significant differences in the opinions of two similar groups of firms point to usually highly important location factors such as high-quality transport infrastructure, availability of raw materials, semi-products at a low price, cost of access to utilities, and availability of highly-qualified staff. The proximity of the existing plant/branch of your company was also rather equally ranked. In the case of remaining location factors with the exception to the availability of a low-skilled workforce (which non-SEZs firms placed it at a higher rank), the SEZs firms ranked particular location factors as of stronger influence than the non-SEZs entities. SEZs firms are to a greater extent attached to proximity to outlet markets, cooperating firms, leaders in the industry and foreign-owned entities. It may reflect the more internationalising nature of the economic activity carried out in special economic zones, paying higher attention to the presence of foreign markets as well as closeness to large domestic markets.

Table 2. Differences in the importance of locational criteria between SEZs and non-SEZs firms.

Location factors	T-test				Wilcoxon rank-sum test		
	Mean: SEZ	Mean: non-SEZ	Mean: diff	p-val	Var	z	p-val
High-quality transport infrastructure (e.g. road, rail)	3.182	3.125	0.057	0.555	155787.4	0.378	0.706
The proximity to outlet markets	3.161	2.808	0.353	0.001	213146	-2.139	0.032
The proximity of the existing plant/branch of your company	2.541	2.286	0.255	0.082	182622.1	-1.534	0.125
The proximity to firms we cooperate with	2.878	2.644	0.234	0.026	157093.8	-1.764	0.078
The proximity of foreign firms	2.563	2.147	0.416	0.001	220259.5	-3.076	0.002
The proximity of a leader in the industry	2.532	2.071	0.461	0.001	135591.6	-3.362	0.001
The proximity of national research centres/science centres	2.330	1.973	0.357	0.009	172194.7	-2.773	0.006
Costs of access to utilities (e.g. electricity, water, gas, Internet)	3.209	3.119	0.089	0.252	157879	-0.818	0.413
Availability of raw materials/semi-products at a low price	3.167	3.223	0.057	0.577	162723	1.025	0.305
Availability of highly qualified staff	3.198	3.111	0.087	0.382	109316.7	-0.250	0.803
Availability of low-skilled workforce	2.306	2.719	-0.413	0.003	145073.6	2.905	0.004
Possibility to locate within the SEZ	3.227	1.726	1.500	0.000	244667.2	-11.050	0.000

Notes: *denotes the difference between SEZ and non-SEZ firms. Statistically significant differences between the two groups (at p-level <0.05) are bolded and green-coloured.

Source: Own study.

Since, SEZs offer a variety of different incentives, including profit tax exemptions, well-prepared sites for investment, a variety of consulting services, and are frequently coupled with local-taxes exemptions (Nazarczuk and Umiński, 2018), they are often the desired place for foreign-owned entities, which can maximise their operational efficiency. According to the data presented by the Ministry of Economic Development, Labour and Technology, almost 80 per cent of incoming capital attracted to SEZs in Poland is of foreign ownership (mostly originating from Germany, USA and Holland).

Since the footprint of foreign-owned entities is crucial for SEZs operation, to a higher extent they are related to other foreign-owned entities, with whom they are frequently cooperating with. However, the degree of cooperation with other firms seems to be also significantly higher than in the comparison group. The fact may be grounded in more conscious location decisions made by SEZs firms, or the fact SEZs firms are located as secondary to their business partners; in many cases as a new plant or part of existing ones. Similar concern pertains leaders in the industry, which in many cases are FOEs.

Lastly, SEZ firms put the proximity of research centres/science centres as more important compared to non-SEZ entities, while the availability of low-skilled workforce as less important. The observation is consistent with the results of Nazarczuk and Umiński (2019), according to which SEZs-firms are on average more technically advanced than firms operating outside of SEZs. The majority of firms in SEZs operates within medium high-technology and medium low-technology. The demand for workers of particular competences or experience is a consequence of the type of activity carried out in a firm. Thus, non-SEZs entities put higher importance to the need of low-qualified staff.

5. Conclusion

Special economic zones are a world-wide instrument, mostly attracting investments to a country or a region. However, they are often overstated as a panacea for a series of economic problems countries or regions have. Since the effects of the programmes vary across the globe, it is important to understand the factors differentiating their operation (apart from different designs of the zonal programmes). The paper presents one of the aspects affecting SEZs operation, which are factors influencing firm location in SEZs (in comparison to non-SEZ entities).

The obtained results proved a kind of heterogeneity of SEZ vs non-SEZs entities in terms of their locational decisions. To some extent, the difference in locational strategies may be an effect of foreign-owned entities' abundance in SEZs, their more footloose attitude towards investments, or a willingness to exploit all possible spheres affecting firms' competitiveness and productivity, indirectly suggesting self-selection of firms entering SEZs.

Thanks to the knowledge on the hierarchy of location factors, bodies supervising SEZs operations may enhance the quality of sites offered for investors, which may result in higher interest in SEZs. The quality of management may also arise, as even with the limited funds, managing agencies will know aspects of the zonal operation, they should concentrate their efforts.

However, the analysis presented in the paper has a few limitations. Most of them arise due to one-country example of zonal operation in Poland; thus country-level location factors are neglected in the study. However, one may also assume that the intensity of

particular location factors may be diversified by the type (branch) of economic activity carried out or the regional context (i.e. economic development), in which firms operate. Therefore, they may constitute interesting strands of further studies.

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