

Tomasz Dorożyński

Faculty of Economics and Sociology
University of Łódź

Janusz Świerkocki

Faculty of Economics and Sociology
University of Łódź

Wojciech Urbaniak

Faculty of Economics and Sociology
University of Łódź

FDI Inflow to Special Economic Zones in Poland Regional Approach

ABSTRACT

One of the ways to convince investors, in particular foreign ones, to participate in the pursuit of host country's economic policies leads through the development of Special Economic Zones (SEZs), which are designed to offer business environment more favourable than in other locations.

The SEZs, which have been established and developed in Poland, play a positive role in attracting foreign direct investment (FDI) or creating new jobs but they may also have negative consequences, such as deepening regional disproportions in the country.

This paper aims at examining whether location in a particular region (understood as a unit of administrative division of the country at the level of a voivodship) could be a factor

determining the inflows of foreign direct investment (FDI) to the SEZs. The study uses statistical methods (Spearman's rank correlation and Pearson correlation). Our calculations have shown statistically significant positive relationships between FDI inflow to SEZs and coefficients that describe the attractiveness (collective and partial) and economic advancement of voivodships.

However, it seems that against hopes vested in them, SEZs do not reduce regional economic differentiation in Poland. The results may suggest the need to reconsider the so far applied policy designed to support investors. At the same time, they prove that State interference intended to mitigate market imperfections may itself become the source thereof.

Keywords: FDI, Special Economic Zones, Voivodships

1. Introduction

Economic policy appears to be addressed predominantly to potential domestic and foreign investors. That is because in a long-term perspective their activities may improve economic growth indicators, the effect so much desired especially by poorer countries and regions wishing to catch up with their richer competitors. Yet, politicians pay even more attention to short-term effects of investment, such as new jobs, bigger output and income, all of which improve voters' evaluations of government performance, which – in line with certain assumptions of political business cycle theory¹ – increases incumbents' chances of re-election².

Advancing globalisation and integration of markets have been bringing an increasingly bigger population of foreign investors onto the global stage. Experience tells us that capital inflows better serve economic growth when they come as direct rather than portfolio investments³. Hence, it is understandable that authorities in most countries are striving to offer the best, even preferential location and operational

¹ N. Acocella, *Zasady polityki gospodarczej. Wartości i metody analizy*, Polish Scientific Publishers, Warsaw 2002, p. 245.

² Nowadays voters more rarely meet these expectations. "Studies conducted in many countries demonstrate that how we evaluate the reality around does not impact our political choices but on the contrary: political preferences largely influence our evaluation of the reality" (R. Markowski, H. Tworzecki, *Czar silnej ręki*, "Polityka" 2016, no. 10(3049), p. 34). Results of presidential and parliamentary elections in Poland in 2015 have shown that growing output, income, and exports together with lowering unemployment rate do not guarantee the current government to remain in power.

³ G. Meier, *The International Environment of Business. Competition and Governance in the Global Economy*, Oxford University Press, New York 1998, p. 144.

conditions to attract direct investors and make them contribute to the achievement of their economic policy goals⁴.

One of the ways of encouraging them to participate in the pursuit of country's economic goals leads through the establishment of special economic zones (SEZs), which offer more favourable business conditions (e.g. tax, regulatory, infrastructural, administrative, and financial solutions) than those available in other locations across the country. Despite old theoretical debates whether such growth dualism is *per saldo* beneficial to the whole country⁵, the instrument is becoming increasingly more popular especially in developing and emerging economies. Since 1959 when the first modern industrial SEZ was established in Shannon, Ireland, ca. 4,300 new ones have been established in over 140 countries, most of them after 2000⁶.

Poland has also decided to reach for SEZs. However, differently from China and other *emerging economies* the move was made not at the initial stage, which would gradually result in a comprehensive shift from centrally planned to market economy but after the major stage of economic transformation had been completed⁷. Zones were intended as a way to mitigate social and economic discrepancies resulting from the so called shock therapy applied by L. Balcerowicz in 1990⁸.

Poland's EU accession did not stop the growth of SEZs in any way. On the contrary, their total area expanded together with the time span, for which they are established. That all happened upon the approval of the Commission whose duty is to ensure Member States compliance with common rules on competition.

Results of various studies on the impact of SEZs upon the Polish economy not always provide valid justification for political and administrative decisions. For instance, in its latest report the Supreme Audit Office concluded that SEZs are effective tools that support business although the relationship between costs and effects still remains unknown⁹. Cizkowicz et al. demonstrated that SEZs had a significant positive

⁴ Globally, over the period 2000–2014 the total number of liberalising instruments that promote FDI exceeded several times the number of restrictive measures (*Reforming International Investment Governance*, World Investment Report 2015, UNCTAD, 2015, p. 102).

⁵ J. Litwack, Y. Qian, *Balanced or Unbalanced Development: Special Economic Zones as Catalysts for Transition*, "Journal of Comparative Economics" 1988, no. 26(1), pp. 1–25.

⁶ *Political Priority, Economic Gamble*, "The Economist", April 4th, 2015, pp. 59–61.

⁷ Establishing of SEZs was enabled by the adoption of the Act of 20 October 1994 on Special Economic Zones. For its consolidated text see the Journal of Laws of the Republic of Poland 2015, item 282 (hereinafter: SEZ Act). Poland's accession to the EU forced out the amendment of the Act of 1994 and its adjustment to the EU State aid rules.

⁸ L. Balcerowicz, *800 dni. Szok kontrolowany*, Polska Oficyna Wydawnicza "BGW", Warsaw 1992; *Dynamika transformacji polskiej gospodarki*, eds. M. Belka, W. Trzeciakowski, Poltext, Warsaw 1997.

⁹ *Pomoc publiczna udzielona w latach 2006–2010 przedsiębiorcom działającym w specjalnych strefach ekonomicznych. Informacja o wynikach kontroli*, Najwyższa Izba Kontroli, Warsaw 2012.

impact upon employment and positive, but less intense influence on investment¹⁰. Pastusiak, using Warr's model (Warr 1989)¹¹, concluded that SEZs generate net present value (NPV) in the entire economy¹². From this point of view, they can be considered an effective form of State aid. Ambroziak, in turn, came to the conclusion that SEZs, on the one hand, played a positive role when it comes to attracting domestic and foreign investment and creating new jobs but, at the same time, they produced regional stratification in Poland since too often they were established in relatively highly developed areas¹³. Thus, by solving some problems they created new ones.

This paper aims at examining whether location in a particular region (understood as a unit of administrative division of the country at the level of a voivodship) could be a factor determining the inflows of foreign direct investment (FDI) to the SEZs. The study was conducted using statistical methods (Spearman's rank correlation and Pearson correlation).

2. Special Economic Zones in the Light of State Aid Rules

As of the EU accession in 2004, assistance offered to domestic and foreign investors must comply with State aid rules stipulated in Art. 107 and 108 of the Treaty on the Functioning of the European Union (TFEU)¹⁴. Pursuant to Art. 107.1, State aid is banned in general when it is granted selectively and favours only certain enterprises or the production of certain goods, by which it distorts or threatens to distort competition and when it impacts trade among the EU Member States.

There are some automatic exemptions from the general ban on granting State aid and they are listed in Art. 107.2; there are also conditional exemptions that make the aid acceptable in accordance with Art. 107.3. The last category includes actions, such as the establishing of SEZs, that enable public administration to directly assist enterprises, as well as to indirectly support them by creating favourable business environment.

¹⁰ P. Ciżkowicz, M. Ciżkowicz-Pękała, P. Pękała, A. Rzońca, *The Effects of Special Economic Zones on Employment and Investment: Spatial Panel Modelling Perspective*, NBP Working Paper no. 208, Economic Institute, Warsaw 2015.

¹¹ P. Warr, *Export Processing Zones: The Economics of Enclave Manufacturing*, "World Bank Research Observer, World Bank Group" 1989, vol. 4(1), pp. 65–88.

¹² R. Pastusiak, *Specjalne strefy ekonomiczne jako stymulator rozwoju gospodarczego*, University of Lodz, Lodz 2011.

¹³ A. Ambroziak, *Krajowa pomoc regionalna w specjalnych strefach ekonomicznych w Polsce*, Warsaw School of Economics Publishing House 2009.

¹⁴ Consolidated version of the Treaty on the Functioning of the European Union, 30 March 2010, Official Journal of the European Union, vol. 53.

Aid granted to regions where the standard of living is abnormally low or to regions suffering from exceptionally high unemployment can be considered, inter alia, compatible with the EU internal market. The aforementioned conditions are in general met in Poland as 15 out of 16 voivodships have been categorised by the Commission as the poorest regions with GDP per capita below 75% of the EU average¹⁵. Economic performance of voivodships determines State aid intensity¹⁶. Special Economic Zones are the major instrument of territorial-based aid.

SEZ Act defines a zone as a distinguished, uninhabited area of the territory of the Republic of Poland, within which economic activities can be pursued in accordance with the rules stipulated in it. Art. 3 reads: “a zone may be established to accelerate economic development of a *partial territory* (highlighted by authors) of the country, particularly by means of:

- 1) developing certain areas of economic activity,
- 2) developing new technical and process solutions and implementing them in the national economy,
- 3) developing exports,
- 4) increasing competitiveness of goods produced and services rendered,
- 5) developing the existing industrial assets and economic infrastructure,
- 6) creating new jobs, or
- 7) developing unused natural resources respecting environmentally balanced rules”.

Such wording suggests that SEZs are regional policy instruments but expected to deliver tasks important for the development of the entire economy (exports, competitiveness, innovation, new industries) that belong to the realm of industrial policy¹⁷.

By investing in SEZs and having complied with certain conditions, an entrepreneur may receive¹⁸:

- 1) tax allowances applied to corporate or/and personal income tax,
- 2) access to fully developed, ready-to-invest plots at competitive prices,
- 3) free of charge assistance in formalities connected with the investment,
- 4) exemption from property tax in some communes,
- 5) subsidies from the Zone Fund.

¹⁵ *Regional GDP. GDP Per Capita in the EU in 2013: Seven Capital Regions Among the Ten Most Prosperous*, Eurostat, 2015.

¹⁶ Regulation of the Council of Ministers, 2014. Regulation of the Council of Ministers of 30.06.2014 on the regional aid map 2014–2020, Polish Official Journal of 2014, item 878.

¹⁷ A. Ambroziak, *Krajowa pomoc regionalna ...*, op. cit., p. 121.

¹⁸ *Investment Incentives in SEZ*, Polish Information and Foreign Investment Agency, Warsaw 2015.

Allowances in corporate income tax (CIT) are considered the major form of assistance offered in SEZs in Poland¹⁹. They are valid exclusively for the part of business pursued in the zone. The amount of tax allowance depends on the size of investment outlays, the cost of employing new workers, location of the investment, and the size of business that applies for the allowance²⁰. These criteria take account of investment project characteristics preferred by the State.

Tax deduction base, i.e. the amount of costs eligible for State aid, can be calculated in two ways. First, it is understood as investment outlays or, second, as actual cost of the employment of new workers. Income tax allowance is granted after business activity has effectively been launched; when there is profit, its amount is calculated with reference to eligible cost. Profit to eligible cost ratio differs across voivodships and it may range from 15% to 50% of eligible costs. The least developed regions with the highest unemployment rates in the Eastern parts of the country get preferential treatment. The lowest assistance is granted to investment projects located in Warsaw, the richest city in Poland. State aid intensity may be increased by 20 p.p. for small and 10 p.p. for medium-sized enterprises.

The SEZs have a pool of developed plots, often in attractive locations, which are offered to potential investors on preferential terms. Plots are developed by local self-government units or by the zones themselves. Investors also get access to necessary infrastructure, such as connecting roads, water supply, sewage, gas, and power supply networks. On top of that, they may be exempted from property tax if municipal authorities so decide. Companies, who manage the zones provide assistance in legal and organisational matters.

There is a special Fund, called the Zone Fund, which operates as a kind of aid scheme that offers investment subsidies. The Fund was established by the Council of Ministers and is available to entrepreneurs who had invested in any of the zones before the end of 2000 to compensate them for benefits lost as a result of Poland's EU accession and for the need to adopt the *acquis communautaire*. Changes that adversely affected this particular group include the reduction of previously applicable exemption ceilings. Resources from the Fund are allocated to support new investments connected with the establishing of new or expansion of existing enterprises but also with introducing fundamental changes in production or production process, changes to a product or service, including changes in the way services are rendered²¹.

¹⁹ *20 Years of Special Economic Zones in Poland*, KPMG, 2014; *Ocena efektywności funkcjonowania specjalnych stref ekonomicznych w Polsce*, ed. R. Pastusiak, University of Lodz, Lodz 2013.

²⁰ *Investment incentives in SEZ ...*, op. cit.

²¹ Act amending the Act on SEZ. 2003. Act amending the Act on Special Economic Zones of 2003, Polish Official Journal of 2003, no. 188, item. 1840.

3. Special Economic Zones: Characteristics²²

There are 14 active SEZs in Poland, which in July 2014 could be found in 16% of territorial self-government units (communes). The total area of SEZs reaches 18,134 ha and systematically grows, which might be the best evidence of positive assessment of this type of aid by the State and entrepreneurs alike. At the end of 2014, 1 ha used by investors holding permits to operate in zones accumulated on average PLN 12.52 million investment outlays and 36 jobs. SEZs' areas were built-up in over 61.6%. The SEZ in Łódź reported the highest index (75.1%) while the lowest was found in the zone in Legnica (26.1%).

Most zones have plots (sub-zones) located in more than one voivodship. Their distribution can hardly be called even, e.g. a zone from the South-East part of the country has got a sub-zone in the North-West area. In individual voivodships there are between one and five zones. The smallest population of zones can be found in Śląskie and Kujawsko-Pomorskie voivodships, while the biggest in Mazowieckie and Wielkopolskie, although no zone has got its principal office there and both voivodships are amongst the best developed in Poland.

When assessing economic performance of individual zones, one must remember that it is largely determined by geographical location, the resulting quality of social and economic infrastructure, and availability of skilled labour. Zones, which are leaders when it comes to the number of granted permits, invested amounts, and the number of newly created jobs can be found in Western, Southern and Central Poland, i.e. in areas believed to be much better developed in comparison to the Northern and Eastern parts of the country (c.f. Table 3).

Since the moment the first zone was established in Poland until the end of 2014 almost PLN 102 bn have been invested and tax allowances which were granted by the state amounted to 15.5% of investment outlays. At the end of December 2014 investors employed in total almost 296 k workers.

In the eyes of investors zones differ a lot with respect to their attractiveness (Table 1). The zone in Katowice, the biggest one in terms of invested amounts, consumed 20.7% of total outlays and created 18% of all new jobs. In the smallest zone in Słupsk the shares are 1.4% and 1.2%, respectively.

²² If not stated otherwise all data come from information about the implementation of the Act on Special Economic Zones, Ministry of Economy, Warsaw 2015.

Table 1. SEZs in Poland (as at 31.12.2014)

No.	Zone	Investment outlays in PLN million	Share in total outlays (in %)	Total jobs	No. of permits	Area in ha
1.	Kamiennogórska	2,039.3	2.0	6,259	61	413.4
2.	Katowicka	21,097.1	20.7	54,498	302	2,347.3
3.	Kostrzyńsko-Słubicka	5,860.3	5.7	28,157	164	1,746.9
4.	Krakowska	2,362.1	2.3	19,792	140	707.8
5.	Legnicka	7,134.3	7.0	11,573	81	1,212.4
6.	Łódzka	12,467.9	12.2	32,230	200	1,302.3
7.	Mielecka	6,652.8	6.5	26,763	207	1,362.9
8.	Pomorska	9,064.7	8.9	17,709	139	1,863.3
9.	Słupska	1,383.6	1.4	3,656	75	816.8
10.	Starachowicka	1,886.9	1.9	6,315	76	644.5
11.	Suwalska	1,745.2	1.7	6,317	81	375.6
12.	Tarnobrzaska	7,952.4	7.8	27,225	184	1,677.2
13.	Wałbrzyska	18,619.1	18.3	40,080	261	2,648.6
14.	Warmińsko-Mazurska	3,687.6	3.6	14,995	85	1,014.9
Total		101,953.3	100.0	295,569	2,056	18,133.9

Source: own compilation based on *Information about the Implementation of the Act on Special Economic Zones*, Ministry of Economy, Warsaw 2015.

4. FDI in SEZs²³

Capital invested in SEZs is highly concentrated. At the end of 2014 almost three fourths of resources originated from six countries: Poland, Germany, U.S., the Netherlands, Japan, and Italy (Table 2). The total value of foreign investors' financial involvement in SEZ exceeded PLN 82.5 bn representing more than 80% of all investment projects.

Fifteen major investors in SEZs are companies with foreign capital. At the end of 2014 they invested almost PLN 24.3 bn, i.e. 23.8% of all investment projects. Automotive sector is the best represented in this group with 61.9% of invested resources.

The share of German capital is the biggest in SEZ in Kamienna Góra (ca. 76%). Investments from Germany dominated also in Kostrzyń-Słubice SEZ where they exceeded 35% of total outlays, mainly thanks to Homanit Polska and Volkswagen Poznań.

²³ If not stated otherwise all data come from *Information about the Implementation of the Act on Special Economic Zones*, Ministry of Economy, Warsaw 2015.

American investments were located predominantly in Katowice SEZ. Their value exceeded PLN 7.9 bn, which accounted for 37.7% of the total investment outlays in the zone and more than 63.3% of U.S. investment in SEZs in total. General Motors Manufacturing Poland is the leader among investors with almost PLN 4 bn of outlays.

The biggest share and the highest amounts of Dutch capital were reported in Legnica. It represented 48.8% of the total investment (first of all because of Volkswagen Motor Polska and Sitech). Dutch capital is also important for the SEZ in Łódź (Gillette Poland International and Procter and Gamble Operations).

Japanese entrepreneurs invested the highest amount in Wałbrzych SEZ, almost PLN 5 bn, out of which more than PLN 2.4 bn was spent on Toyota Motor Manufacturing factory in Wałbrzych and PLN 1.1 bn on Toyota Motor Industries factory in Jelcz-Laskowice.

Relatively big amounts of Italian capital have been attracted to SEZ in Katowice and in Kostrzyń-Słubice. It represented 18.1% and 10.3% of investment, respectively. Top investors in Katowice are: FIAT Powertrain Technologies Poland, Brembo Poland, Magneti Marelli Poland, and Magneti Marelli Suspension Systems Bielsko, while in Kostrzyń-Słubice: ICT Poland and Olsa Poland.

The above quoted examples suggest that the first “national” investment in SEZ is followed by further ones encouraged with its success or attracted by strong cooperation links between investors and their suppliers.

Table 2. Geographical Structure of Invested Capital (as at 31.12.2014)

No.	Country of origin	Amount (in millions of PLN)	Share in total capital (in %)
1.	Poland	19,404.8	19.03
2.	Germany	18,043.9	17.70
3.	USA	12,545.6	12.31
4.	Netherlands	11,742.4	11.52
5.	Japan	7,024.7	6.89
6.	Italy	6,963.9	6.83
7.	South Korea	4,335.9	4.25
8.	France	3,470.6	3.40
9.	Switzerland	3,419.9	3.35
10.	Sweden	2,672.5	2.62
11.	Other	12,327.1	12.10
12.	Total	101,953.3	100.00

Source: *Information about the Implementation...*, op. cit.

Region-wise SEZ from Dolnośląskie (Silesia) clearly dominated in attracting FDI with 273 permits and more than PLN 25 bn of invested capital at the end of 2014 (Table 3). It is also interesting to compare Lubelskie and Podkarpackie, the two poorest regions. The first one attracted roughly 20 times less capital and investors than the second one. The number of permits issued in Podkarpackie was the same as in Łódzkie, which is much richer. This shows that the level of development of the region is not a crucial determinant of SEZ's attractiveness to foreign investors. In other words, the development of a region measured with GDP per capita is not necessarily a credible reflection of its attractiveness to foreign investors.

Table 3. Foreign Investment in SEZs (as at 31.12.2014)

No.	SEZ in voivodships	Investment outlays (in millions of PLN)	Share in total outlays (in %)	No. of permits	Share of permits (in %)	Gross domestic product per capita in 2013 (current prices, Poland=100)
1.	dolnośląskie	25,827.069	31.27	273	26.43	111.9
2.	kujawsko-pomorskie	2,638.122	3.19	23	2.23	82.0
3.	lubelskie	257.101	0.31	5	0.48	70.7
4.	lubuskie	2,280.260	2.76	81	7.85	83.1
5.	łódzkie	8,110.357	9.82	95	9.20	93.3
6.	małopolskie	1,503.400	1.82	48	4.65	88.7
7.	mazowieckie	2,290.820	2.77	29	2.80	160.5
8.	opolskie	3,046.000	3.69	29	2.80	80.5
9.	podkarpackie	5,767.702	6.98	95	9.20	71.1
10.	podlaskie	488.963	0.59	8	0.77	72.9
11.	pomorskie	3,573.030	4.33	55	5.32	96.3
12.	śląskie	17,665.368	21.39	192	18.59	104.0
13.	świętokrzyskie	561.680	0.68	20	1.94	73.0
14.	warmińsko-mazurskie	2,183.297	2.64	17	1.65	71.5
15.	wielkopolskie	3,509.337	4.25	27	2.61	107.2
16.	zachodniopomorskie	2,892.633	3.51	36	3.48	83.3
	Total	82,595.138	100.00	1,033	100.00	–

Source: upon authors' request, data were processed by the Department of Support Instruments of the Ministry of Economy in 2015, (as at 31 December 2014); Statistical Yearbook of The Regions – Poland 2015, GUS, Table 276.

5. Relationship Between FDI Inflows to SEZs and Investment Attractiveness of Voivodships

Foreign direct investment inflows into Special Economic Zones may be driven by various factors connected with the zone itself, such as the intensity of locally available State aid, attractiveness of investment plots or the efficiency of the managing company but also by the quality of the environment, in which it operates, e.g., distance from the EU border, economic advancement of the voivodship, availability of suppliers, active involvement of local and regional authorities with investors or the quality of services of business environment institutions²⁴.

In our study we focused on the evaluation of the relationship between FDI inflows into SEZs and factors that determine investment attractiveness of voivodships. To this end we used Spearman rank correlation coefficient (r_s) and Pearson linear correlation coefficient (r_{xy}).

In the first phase of the study we selected variables that directly or indirectly determine investment attractiveness of voivodships. We used voivodship investment attractiveness rankings of the Gdansk Institute for Market Economics (Polish abbr. IBnGR) for the years 2005–2014²⁵. Average ranks from recent 10 years helped mitigate the impact of outliers in the sample. To the best of our knowledge, these are the most comprehensive studies available in Poland that have been conducted for many years using the same method, which guarantees comparability of data throughout the studied period. In order to evaluate investment attractiveness of Polish voivodships, IBnGR considered several dozen factors, out of which it then created 7 variables (partial rankings) and 1 overall ranking. Partial rankings describe:

- 1) **transport accessibility**, including the location of a voivodship vis-à-vis the Western border, Warsaw (capital city), other regional centres, international airports and big sea harbours;
- 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;
- 3) **market absorption**, including the size of the market, household affluence and investment outlays of enterprises;

²⁴ E.g. inflow of investment, including FDI, to SEZs increased sharply following the EU accession (*Specjalne strefy ekonomiczne po 2020 roku. Analiza dotychczasowej działalności i perspektywy funkcjonowania*, Ernst & Young, 2011).

²⁵ *Atrakcyjność inwestycyjna województw i podregionów Polski 2014*, ed. M. Nowicki, Instytut Badań nad Gospodarką Rynkową, Gdansk 2014.

- 4) **economic infrastructure**, including the density of business environment institutions, presence of R&D centres, fairs, exhibitions, and special economic zones (in strict terms, IBnGR ranking includes available areas and investors' activities in SEZs);
- 5) **social infrastructure development**, including the number and activities of cultural institutions, saturation with hotels and catering establishments;
- 6) **general safety**, including crime rates and structure and crime detection rates;
- 7) **involvement with investors at the level of a voivodship**, including the number of investment offers in the database of the Polish Information and Foreign Investment Agency (Polish abbr. PAIiIZ), PAIiIZ certification results of Regional Investor Service Centres, information and promotion activities vis-à-vis investors from the country of origin of capital delivered with the support of Trade and Promotion Sections at Embassies of the Republic of Poland (Polish abbr. WPHiI).

All determinants of investment attractiveness of voivodships were contrasted with amounts of FDI inflows (in PLN) to SEZs for 16 voivodships and with the number of permits granted by SEZ to entities with foreign capital. To this end we aggregated data on FDI inflows to SEZ sub-zones from all counties (poviats). Upon authors' request, data were processed by the Department of Support Instruments of the Ministry of Economy in 2015 (as at 31 December 2014). The number of permits considered in the study was 1,033 and the value of total investment exceeded PLN 82.5 bn (ca. EUR 20 bn). They are located in all 16 voivodships.

The second phase of the study focused on the evaluation of the relationship between FDI inflows to SEZs and determinants of voivodship's investment attractiveness using Spearman rank correlation coefficient (r_s)²⁶. As determinants we used variables selected in the first phase of the study.

Spearman rank correlation coefficient comes in several versions. We used the SPSS software formula (version 14.0 PL):

$$r_s = \frac{cov(R_X, R_Y)}{\delta_{R_X} \cdot \delta_{R_Y}}$$

where:

$cov(R_X, R_Y)$ – covariance of ranks for variables X, Y;

$\delta_{R_X} \cdot \delta_{R_Y}$ – standard deviation of ranks for variables X, Y.

²⁶ Spearman rank correlation coefficient (r_s), also referred to as order correlation coefficient, is used to describe the strength of two-dimensional correlation. The coefficient gives values between -1 and +1 inclusive. Examined relationship is the stronger the closer r_s gets to absolute value of 1. Its minus or plus sign informs about convergence (plus) or discrepancy (minus) of the evaluation of distinguished characteristics. It helps identify the strength and direction of relationship between examined traits by comparing ranks (positions in a row) assigned to two variables.

Rank correlation coefficient can be assessed with regard to its statistical significance. The test can be used for ordinal variables when analysed features can be expressed in numbers and the sample is small (in our case the sample includes 16 observations)²⁷. Data used in our study meet these conditions. Results for individual coefficients are presented in Table 4.

Table 4. Relationship Between FDI Inflows to SEZs and Determinants of Investment Attractiveness of Voivodships – Spearman Rank Correlation (r_s)

Item	FDI inflows to SEZs in 16 voivodships		FDI population in SEZs in 16 voivodships	
	Value of the coefficient	Significance of the coefficient	Value of the coefficient	Significance of the coefficient
Overall coefficient (value)				
Investment attractiveness	0.626	0.009	0.644	0.007
Partial coefficients (value)				
Transport accessibility	0.396	0.126	0.422	0.103
Labour resources and costs	0.602	0.014	0.643	0.007
Market size	0.532	0.034	0.620	0.010
Economic infrastructure	0.635	0.008	0.666	0.005
Social infrastructure	0.521	0.039	0.624	0.010
Public safety	-0.518	0.040	-0.651	0.006
Involvement with investors	0.641	0.007	0.535	0.033

Source: authors' calculations based on SPSS software.

Results of the study indicate the presence of statistically significant correlation between FDI value and population of economic operators in SEZs, on the one hand, and overall coefficient of investment attractiveness of voivodships, on the other hand. These relationships are highly significant at the level of significance $p = 0.01$. From among partial correlation coefficients similar significance was reached for economic infrastructure and involvement with investors (value-wise) while in quantitative terms for public safety, economic and social infrastructure, and labour resources and costs. Value-based approach suggests which determinants were especially appreciated by big investors; quantitative terms identify determinants crucial to small and medium-sized ones.

²⁷ M. Rószkiewicz, *Metody ilościowe w badaniach marketingowych*, Polish Scientific Publishers, Warsaw 2002; M. Sobczyk, *Statystyka. Podstawy teoretyczne przykłady – zadania*, Wydawnictwo UMCS, Lublin 2000.

Yet, the relationship between FDI inflows to SEZs and the remaining partial variables turned out to be weaker although significant (with the exception of transport accessibility) for FDI inflows expressed in terms of value and the number of investment projects (the level of significance $p = 0.05$). Thus, the results obtained in the study – overall and partial – provide evidence for positive and statistically significant correlation between FDI inflows to SEZs and investment attractiveness of voivodships.

Spearman's correlation coefficient enabled us to compare ranks sorted in ascending or descending order (sequentially). The analysis was expanded with Pearson correlation coefficient (r_{xy}). Compared to Spearman correlation coefficient it measures a narrower class of relationships and the co-occurrence of features for interval or ratio variables, i.e., quantitative variables. The coefficient describes the strength and direction of a relationship, which is close to linear²⁸. Results of the analysis are presented in Table 5.

Table 5. Relationship Between FDI Inflows to SEZs and Investment Attractiveness of Voivodships – Pearson Linear Correlation Coefficient (r_{xy})

Item	FDI value in SEZs in 16 voivodships		FDI population in SEZs in 16 voivodships	
	Value of the coefficient	Significance of the coefficient	Value of the coefficient	Significance of the coefficient
Overall coefficient (value)				
Investment attractiveness	0.580	0.019	0.563	0.023
Partial coefficients (values)				
Transport accessibility	0.323	0.222	0.326	0.219
Labour resources and costs	0.513	0.042	0.530	0.035
Market size	0.348	0.186	0.356	0.177
Economic infrastructure	0.769	0.001	0.736	0.001
Social infrastructure	0.552	0.026	0.574	0.020
Public safety	-0.562	0.023	-0.580	0.019
Involvement with investors	0.516	0.041	0.454	0.077

Source: authors' calculations based on SPSS software.

Correlation coefficients obtained for the overall ranking of investment attractiveness of voivodships indicate that there is a positive, statistically significant relationship

²⁸ Pearson correlation coefficient (r_{xy}) gives a value between -1 and $+1$ inclusive. It is assumed that correlation between selected characteristics is low when $r_{xy} \leq 0.3$, medium for $0.3 < r_{xy} \leq 0.5$ and high for $r_{xy} > 0.5$ (M. Sobczyk, *Statystyka...*, op. cit.).

at the level of 0.05 between FDI inflows to SEZs and investment attractiveness of voivodships. This is confirmed by results obtained using Spearman rank correlation coefficient.

In the case of partial coefficients, the highest values of Pearson coefficient were obtained for the correlation between the value and number of FDI projects in sub-zones and the development of economic infrastructure (significance level $p = 0.01$). Significant correlation but at the level of $p = 0.05$ was obtained for the value and number of FDI projects and labour resources and costs, social infrastructure, public safety and involvement of public administration with investors (in this latter case only for FDI value). For the remaining variables, correlation coefficients gave values at the level of significance higher than 0.05. We need to take note that quantitative and value-based study, contrary to the previous case, did not reveal any major differences that could be attributed to the size of investment.

Hence, both tests suggest that investment attractiveness of voivodships could be decisive for SEZs' attractiveness, not the other way round. Therefore SEZs' presence does not contribute to closing the development gap between regions. At the same time, economic infrastructure was found to be the most important partial determinant of investment attractiveness of SEZs with labour resources and costs, often considered factors the most sought after by international enterprises²⁹, playing much less prominent role.

6. Conclusions and Further Studies

In Poland SEZs are vital components of a policy intended to prevent discrepancies in regional development, on the one hand, and to contribute to overall economic growth, on the other hand. That is why special economic zones have been established in all regions, rich and poor, which offer diverse State aid intensity levels. Zones fulfil the role they have been entrusted with by attracting investors mainly from abroad (more than 80% of total investment). Contrary to the findings of earlier studies, which highlighted the importance of tax allowances³⁰, our study suggests that economic infrastructure in a region is the most important determinant of SEZs' attractiveness.

²⁹ T. Dorożyński, J. Świerkocki, W. Urbaniak, *The Location Premises of FDI in Poland. The Case of the Lodz Province*, "Comparative Economic Research. Central and Eastern Europe" 2015, vol. 18, no. 4, pp. 157–178.

³⁰ *20 Years...*, op. cit.; *Ocena efektywności...*, op. cit.

Our study also demonstrates that approach to SEZs adopted by politicians is questionable. SEZs act as a better incentive to investors if they are located in more developed regions. That is why they do not produce convergence. In order to better assess their real impact, we would have to consider, e.g. the degree to which the area covered by zones is utilised in individual voivodships. That will be feasible when we have adequate statistics.

It still remains to be seen whether SEZs stimulate exports, more competition and modernisation of production structure. To answer these questions, we would need to pursue a more extensive study, both with respect to data and methodology, which would have to go much beyond descriptive statistics used for the purpose of this paper. We would need to consider effects to enterprises operating within the zones and to their environment, which effectively means the rest of the economy.

References

1. *20 Years of Special Economic Zones in Poland*, KPMG, 2014.
2. Acocella N., *Zasady polityki gospodarczej. Wartości i metody analizy*, Polish Scientific Publishers, Warsaw 2002.
3. Act amending the Act on SEZ, 2003. Act amending the Act on Special Economic Zones of 2003, Polish Official Journal of 2003, no. 188, item. 1840.
4. Act on Special Economic Zones, 1994, Polish Official Journal of 1994, no. 123, item. 600 with further amendments.
5. *Atrakcyjność inwestycyjna województw i podregionów Polski 2014*, ed. M. Nowicki, Instytut Badań nad Gospodarką Rynkową, Gdansk 2014.
6. Ambroziak A., *Krajowa pomoc regionalna w specjalnych strefach ekonomicznych w Polsce*, Warsaw School of Economics Publishing House, Warsaw 2009.
7. Balcerowicz L., *800 dni. Szok kontrolowany*, Polska Oficyna Wydawnicza "BGW", Warsaw 1992.
8. Ciżkowicz P., Ciżkowicz-Pękała M., Pękała P., Rzońca A., *The Effects of Special Economic Zones on Employment and Investment: Spatial Panel Modelling Perspective*, NBP Working Paper no. 208, Economic Institute, Warsaw 2015.
9. Consolidated version of the Treaty on the Functioning of the European Union (TFEU), 30 March 2010, Official Journal of the European Union, vol. 53.
10. Doroczyński T., Świerkocki J., Urbaniak, W., *The Location Premises of FDI in Poland. The Case of the Lodz Province*, "Comparative Economic Research. Central and Eastern Europe" 2015, vol. 18, no. 4.

11. *Dynamika transformacji polskiej gospodarki*, eds. M. Belka, W. Trzeciakowski, Poltext, Warsaw 1997.
12. *Information about the Implementation of the Act on Special Economic Zones*, Ministry of Economy, Warsaw 2015.
13. *Investment Incentives in SEZ*, Polish Information and Foreign Investment Agency, Warsaw 2015, www.paiz.gov.pl
14. Litwack J., Qian Y., *Balanced or Unbalanced Development: Special Economic Zones as Catalysts for Transition*, "Journal of Comparative Economics" 1998, no. 26(1).
15. Markowski R., Tworzecki H., *Czar silnej ręki*, "Polityka" 2016, no. 10(3049).
16. Meier G., *The International Environment of Business. Competition and Governance in the Global Economy*, Oxford University Press, New York 1998.
17. *Ocena efektywności funkcjonowania specjalnych stref ekonomicznych w Polsce*, ed. R. Pastusiak, University of Lodz, Lodz 2013.
18. Pastusiak R., *Specjalne strefy ekonomiczne jako stymulator rozwoju gospodarczego*, University of Lodz, Lodz 2011.
19. *Political Priority, Economic Gamble*, "The Economist", April 4th, 2015.
20. *Pomoc publiczna udzielona w latach 2006–2010 przedsiębiorcom działającym w specjalnych strefach ekonomicznych. Informacja o wynikach kontroli*, Najwyższa Izba Kontroli, 2012.
21. *Reforming International Investment Governance*, World Investment Report 2015, UNCTAD, 2015.
22. *Regional GDP. GDP Per Capita in the EU in 2013: Seven Capital Regions Among the Ten Most Prosperous*, Eurostat, 2015.
23. Regulation of the Council of Ministers, 2014. Regulation of the Council of Ministers of 30.06.2014 on the regional aid map 2014–2020, Polish Official Journal of 2014, item. 878.
24. Rószkiewicz M., *Metody ilościowe w badaniach marketingowych*, Polish Scientific Publishers, Warsaw 2002.
25. Sobczyk M., *Statystyka. Podstawy teoretyczne przykłady – zadania*, Wydawnictwo UMCS, Lublin 2000.
26. *Specjalne strefy ekonomiczne po 2020 roku. Analiza dotychczasowej działalności i perspektywy funkcjonowania*, Ernst & Young, 2011.
27. Statistical Yearbook of the Regions – Poland 2015, GUS, Table 276.
28. Warr P., *Export Processing Zones: The Economics of Enclave Manufacturing*, "World Bank Research Observer, World Bank Group" 1989, vol. 4(1).
29. *World Economic Outlook: Adjusting to Lower Commodity Prices*, IMF, October 2015.