

ISSN 1732-4254 quarterly

BULLETIN OF GEOGRAPHY. SOCIO-ECONOMIC SERIES

journal homepages:

<http://www.bulletinofgeography.umk.pl/>

<http://wydawnictwoumk.pl/czasopisma/index.php/BGSS/index>

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The geography of openness to foreign trade in Poland: The role of special economic zones and foreign-owned entities

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How to cite:

Nazarczuk, J.M. and Umiński, S. (2018). The geography of openness to foreign trade in Poland: The role of special economic zones and foreign-owned entities. *Bulletin of Geography. Socio-economic Series*, 39(39), 97-111. DOI: <http://doi.org/10.2478/bog-2018-0007>.

Abstract. The aim of this paper is to present the spatial distribution of openness to foreign trade assessed at the local level (LAU 1, *poviats*) in Poland, between 2005 and 2012, with particular reference to its two determinants: activity of foreign-owned enterprises (FOEs) and functioning of special economic zones (SEZs). With the use of data from different sources, including the foreign trade statistics for the Polish regions, constituting a set of indicators on openness to foreign trade, we deliberate on the determinants and the character of regional openness, as well as the quality of the proxies used in order to assess their spatial distribution. Our results indicate high regional dissimilarities in terms of export activity, correlated with the broader picture of regional inequalities. The role of FOEs has been crucial in determining the spatial distribution of exports. As regards the SEZs, their sole contribution increased significantly during the time span. In the times of the world financial crisis, the export performance diversity of *poviats* increased temporarily but diminished afterwards.

Article details:

Received: 02 December 2016

Revised: 25 September 2017

Accepted: 23 January 2018

Key words:

trade openness,
regions,
LAU 1,
special economic zones,
FDI.

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1. Introduction

Historically, foreign trade analyses were conducted at the national level. However, the growing importance of regions as actors in the economic processes, globalisation, polarisation of the economic potential on a regional scale and the transmission of competitiveness studies to a regional level – are shifting the focus of foreign trade analyses to the regional context (Umiński, 2016). In the empirical literature devoted to the notion of trade, regions - similarly to countries - are treated as small open economies (Llop, Manresa, 2007; Scott, Storper, 2010).

The growing liberalisation of trade flows among some of the CEECs and their rapid integration with the EU economy were seen as development stimuli (i.e., through increased openness), and a chance to utilize some aspects of globalization. The strengthened EU-15 integration incorporated CEECs in regional value chains and further reinforced capital and trade linkages with the EU-15 economy. As a result, these countries developed faster but were also subject to higher sensitivity to external demand and industrial shocks coming from the eurozone (Cieślik et al., 2016a, b).

Poland is a country of high regional differences (Nazarczuk, 2015), originating from historical legacy, resource endowment, path dependency on the location of the industry and big city agglomerations, infrastructure quality, different economic prospects of potential cooperation with neighbouring countries or transformation challenges. The observed patterns of regional inequalities involve a large East-West divide (with Eastern regions lagging behind) and significant differences between the capital city of Warsaw and the rest of the country. Furthermore, Poland has one of the most prominent inter-regional differences among the OECD countries, which to a large extent are the result of increasing differences between urban and rural areas (OECD, 2010).

Considering the relatively high abundance of papers investigating regional trade at the voivodship level (NUTS 2) (Gawlikowska-Hueckel, Umiński, 2016; Maćkowiak, 2011; Umiński, 2012, 2014, 2016), the empirical evidence on trade openness associated to the local level of aggregation (LAU 1) is rather scarce. Komornicki and Szejgiec (2015) analysed the concentration of exports in poviats, while Komornicki et al. (2015) investigated the export linkages of local economies.

The paper investigates the geography of Poland's regions' openness to foreign trade, with reference to its two drivers: FOEs and SEZs. By employing different sets of variables, we deliberate on the quality of the available measures of local trade openness and present the spatial distribution thereof between 2005 and 2012. Our main contribution is two-fold. We depict the role of FOEs and SEZs in relation to local trade openness in Poland. To the knowledge of the authors, this area is yet to be investigated. We also dwell on the local consequences of the 2008+ financial crisis in Poland, with regard to the changes in the spatial distribution of the local export potential.

2. Theoretical and empirical approaches to regional trade openness

2.1. Trade openness as a relatively new dimension of regional analyses

Progressing globalisation and integration processes (especially in the EU) have led to an increased interest among researchers in economy openness and its consequences. The fact is that there are many more studies in this field at the country level than at the regional one. The research is focused on economic growth and the situation on the labour market. However, even in the case of countries, the relationship between openness on the one hand,

and dynamics and stability of economic growth on the other is rather ambiguous. This relationship depends on numerous factors, for example: institutional solutions, the market structure or social issues (Arezki, van der Ploeg, 2010; Lee, 2011). In the case of analyses of developmental processes at the regional level, a greater degree of complexity and both endogenous and exogenous factors come into play. According to Brodzicki (2014), growth determinants should be looked for in the region, in the country and in supranational structures (e.g., the EU). The so-called shallow and deep growth determinants, as identified by Rodrik (2003), should be paid attention to; the latter being, to a large extent, outside the regional authorities' scope of impact.

A new dimension in the studies of consequences of openness appeared within the New Economic Geography theory, focusing, first of all, on a search for relationships between openness and agglomeration processes (taking into account the economies of scale). Some authors go one step further by treating regions as small open economies - for which it is justified to apply concepts originating directly from international economics (Umiński, 2012) - or by studying regions and interregional trade as if countries did not exist (Batabyal, Nijkamp, 2015).

In literature, the openness of a regional economy is described from several points of view: (i) as a determinant of economic growth (Brodzicki, 2014), (ii) as a manifestation and a causal factor of regional differences and competitiveness, which earlier went rather unnoticed (Brühlhart, 2011; Umiński, 2012; Ezcurra, Rodríguez-Pose, 2014), (iii) as a determinant and measure of investment attractiveness (Ciołek, 2014), (iv) as a variable defining the exposure of a regional economy to impulses coming from outside (Zaucha et al., 2014).

The openness of a regional economy is usually studied in two dimensions: foreign trade and FDI. These are two of the most important channels, allowing external economic impulses to penetrate the economy of a region. The global financial crisis of 2008+ clearly showed that a high degree of openness has both advantages and disadvantages. Moreover, it is worth noticing that conclusions related to consequences of openness for a country are not always congruent with those for regions. This is due to the fact that such evaluations are conditioned by a series of region-specific factors, such as: the prod-

uct and geographic structure of exports, its concentration, the role of foreign capital entities in foreign trade, FDI nature (vertical vs. horizontal), as well as the very nature of the region (large or small, located close to the border, peripheral, central, etc.) (Umiński, 2014). In this place, it would be worthwhile to recall the concept of lumpy countries, as formulated by Courant and Deardorff (1992), referring to Armington's preferences. According to it, each region may specialise in the export and import of different products, with a very strong specialisation of each of the regions. In most cases, we are dealing with several regions that dominate a country's export. As a consequence, the trade structure of the dominating regions is very similar to the trade structure of the country as a whole.

2.2. Impact of openness on the growth and development of regions – overview of empirical evidence

A review of literature first of all leads to the conclusion that there is little research directly referring to openness of regions. Openness is a category usually used as an explanatory variable at the country level. Its impact on regions and regional polarisation or convergence is modelled within the scope of, for instance, GDP per capita, GDP dynamics, remuneration and many other aspects of competitiveness.

For example, Daumal (2013) indicates the differences between Brazil and India in the impact of country openness on regional differences. In the case of Brazil, increasing openness results in a reduction of differences in regional development. In Brazil, agricultural products exported by less-developed regions have a large share. The liberalisation of trade has resulted in the reallocation of industrial activity to peripheral regions. In India, on the other hand, an increased openness to trade has resulted in growing differences, stemming from the change of exports structure from agricultural to industrial products and agglomeration processes in Southern India (border regions with easier access to foreign markets). According to Daumal (2013), in both countries, FDI is concentrated in more developed regions, contributing to increasing regional differences.

Similarly, the observed increase in differences constitutes an object of analysis involving selected regions of particular countries. Buch and Monti (2010), based on foreign trade data in a regional perspective for Italy, identify a significant relationship between openness and GDP per capita levels. Differences concerning openness explain, to a large extent, the lower level of development in Mezzogiorno. Pernia and Quising (2005) conclude that openness has a positive impact on regional growth of Philippines' regions but does not lead to a reduction of regional differences. The research on the Chinese economy conducted by Coşar and Fajgelbaum (2016) also indicates that increases in regional differences arise from exporting activity. As a result, those types of economic activities in which China has comparative advantages are located in the maritime regions. For Mexico, González Rivas (2007) shows that an increase of economic openness leads to increasing regional differences.

A broad overview of literature concerning the above-mentioned topic was presented by Brülhart (2011), who considered spatial differences as the third, so far neglected, aspect/result of opening of the economy (the initial two are traditional sectoral approaches, and the heterogeneity of business entities). Brülhart (2011) points out difficulties in modelling the impact of openness on the processes of regional development convergence/divergence, resulting from the very nature of new economic geography (NEG) models in which subtle differences in theoretical assumptions and manners of analysis produce varied conclusions. In reference to empirical analyses of the within-country type, Brülhart's conclusion (2011: 78) is as follows: liberalisation is beneficial first of all for regions with good access to foreign markets and, if these regions are lagging behind, openness to trade results in convergence of regional development. However, if such regions are the developed ones, openness to trade results in polarisation.

The connection between exports and growth in the regional approach was examined for the states of the USA. One such example is Erickson's (1989) analysis showing the interrelation between exports growth in the USA and the level of employment. However, sales to the domestic market have a greater impact on the labour market than exports. On the other hand, Boschma, Minondo and Navar-

ro (2011), using Spanish regions as an example, show that export industries contribute to innovation growth and increase the dynamics of economic growth. Soukiazis and Antunes (2011) indicate a positive impact of openness to foreign trade and an increase of exports volumes with the EU on the dynamics of economic growth and convergence of Portuguese regions.

There is a relatively large number of studies concerning the consequences of openness for the regions of Canada. The system of collecting statistical data in this country allows for the identification of exports and imports within the regional system. Edgington and Hayter (1997) examined production relationships and international trade relationships in the timber industry of British Columbia and indicated the following reasons for the "transfer" of trade issues from the traditional domestic level of consideration to the regional one: (a) a growing impact of international economic relationships on the situation of the regions, (b) unequal international relationships of regions resulting in diverse centre-peripheries situations, and (c) a growing international and interregional (domestic) mobility of production factors, drawing more attention to the position of regions in the global economy. The example of British Columbia constitutes an interesting illustration of how a peripheral region may join trade exchange by benefiting from its comparative advantage in the form of a natural resource base.

When analysing the situation of small and medium-sized entities exporting from Canada in the regional context, Bagchi-Sen (1999) demonstrates that a higher export orientation entails better sales results of companies, exports growth dynamics (exports depending on previous experience in foreign markets) and value added. Orientation towards exports is accompanied by more intensive innovation efforts, especially by the implementation of process-type innovations.

Dufort and Murray (2005) examined the impact of changes in currency exchange rates on foreign trade between the Quebec region and the USA. The interpretation of relationships between changes in currency exchange rates makes a reference to certain regularities studied by international economics (the long-term and short-term impact of appreciation/depreciation on the competitiveness of export and import, the significance of currency exchange

rates fluctuations to the increase of FDI, etc.). The conclusion is that from the perspective of an individual region, a currency exchange rate that would lead to a region's external trade being in balance, may differ from the currency exchange rate balancing the trade of a country.

Drawing from the concept of an economic base, Polèse and Shearmur (2006) pointed to the threat posed by the Dutch disease (drop in export competitiveness as a result of appreciation of the exchange rate). They also describe the consequences of a “switch” in the demand structure in the relations between domestic and foreign markets. For the Quebec region (and for other regions in Canada), the NAFTA agreement resulted in changes of the trade geography, consisting in replacing the east-west system of domestic trade with the north-south system of international trade.

Baldwin and Brown (2004) examined the impact of export on employment in the regions of Canada. Liberalisation may lead to increased specialisation (due to economies of scale), resulting in growing fluctuations in employment. Liberalisation may also lead to the growing intensiveness of intra-industry trade – at this point, there is no further progress of specialisation. As Baldwin and Brown (2004) conclude, regions with closer links to the global economy are characterised by a greater stability of employment, although it depends on the size of a region. In the large regions of Canada, the growing intensiveness of exports led directly to increased stability. In the case of small regions, the process of integration with global economy, i.e., reaching the state with a stabilising effect on employment, entails a temporary need to perform structural changes with a destabilising impact on the economy.

Coulombe (2007) treated foreign trade as the most important platform for transmitting consequences of globalisation into the economy of the Canadian regions. A dynamic internationalisation process does not lead to growth of regional differences. It is rather a convergence in the area of internationalisation that results in a reduction of variations in GDP per capita between regions. Coulombe (2007) indicates the role of first nature geographical factors (including location) and economy structure. If the economy is oriented towards resources, then there is a large probability that it will not be able to benefit from dynamic transforma-

tions (globalisation) as successfully as in the case of regions whose comparative advantages concern the industry (especially its modern branches).

2.3. Trade openness and regional growth – summary

For many years, openness and the consequences thereof have constituted the subject of serious discussions, primarily focused on countries. With reference to regions, the main object of empirical studies is the impact of a country's openness towards polarisation or convergence. This is due to the varied availability of statistical data across different regions (or the unavailability thereof) and the fact that economists have only relatively recently noticed that regions may be considered as small open economies for which international economics tools may be applied. While the consequences of openness in relation to regional growth are often analysed, research on the intra-industry trade, effects of international trade agreements, monetary integration or trade policy changes from a regional point of view of regions is *in statu nascendi*.

If attention is focused strictly on the regional dimension, the conclusions concerning the consequences of openness remain rather ambiguous. They are, to a large extent, “contextual” and refer to specific regions; an attempt to generalise them entails the risk of mistakes or too far-reaching simplifications. The number of factors determining the impact of openness on a regional scale makes complex analyses difficult. There are two concepts that look promising for the interpretation of openness and its nuances.

The first concept is referred to as the NEG. It provides a good illustration for the complexity of the relationships between the openness of an economy and the agglomeration tendencies and consequences thereof. Economic integration processes and falling transport costs lead to the agglomeration of economic activities. It brings a whole range of benefits in the form of new jobs, improved settlement incentives, increased innovativeness, remuneration levels, etc. Such agglomerative tendencies are usually accompanied by increased openness. Agglomerative tendencies are strengthened by cu-

mulative causality (and expectations), usually stimulated by FDI. As multiple equilibria are possible, the final result is difficult to foresee. After exceeding a certain threshold, there may be a return to an even distribution of the economic activity (due to the costs of agglomeration). Not only first nature, but also second nature factors are important. The message of the NEG is that external impulses, which are transmitted to the regional economy through the channel of foreign trade FDI, may throw the region's economy out of balance. However, they may also "switch" it to a new path of development which may signify, for instance, moving away from developmental path dependency.

The result triggered by changes in the regional economy induced by an increased openness are difficult to predict because: (a) there are numerous possible states of equilibria; (b) the course of the economic processes in the region may take a violent (catastrophic) turn whereby an apparently insignificant event may result in serious consequences; (c) due to the changes in expectations and cumulative causation, it is possible, as already mentioned, to introduce a region to a new path of development (Zaucha et al., 2014).

A second useful category is the concept of sensitivity. It is an imprecise term and there is an on-going discussion concerning the conceptualisation of sensitivity itself and of related concepts such as: susceptibility, resilience (Masik, Rzyński, 2014), sensitiveness, reaction to stimulus, etc. However, sensitivity has become a very important notion along with the increased exposure of regional economies to external stimuli under the conditions of globalisation and increased openness (especially during periods of crisis). Sensitivity is a category debated not only at a purely economic level, but also at a socio-economic one (Turner et al., 2003; James, Scott Cato, 2014). Zaucha et al. (2014: 208) conclude that sensitivity is highly dependent on the context and conditioned territorially (place-based). Martin (2011) identifies four issues constituting the resistance of a regional economy: (a) low sensitivity and resilience to economic shocks, (b) renewability, understood as a region's capacity to return to the path of growth or to enter a new path of growth, (c) recovery, understood as an economy's capacity to regain its strength after a shock, and (d) reorientation understood as an economy's adaptation to change.

These issues create a broad context for interpreting the consequences of openness.

3. Research methodology

The data were obtained from three sources. The Polish Central Statistical Office (CSO) provided data on the characteristics of the selected poviats. The volume of trade flows was acquired from the Customs Chamber, whereas the Ministry of Development delivered the data on the location of the SEZs.

As data on the GDP at poviat level are unavailable, proxies were used for local trade openness other than the ratio of the sum of exports and imports to GDP that is often used in the empirical literature devoted to the issue of regional trade (Farole, 2013). Considering the importance of the appropriate selection of the key variables in the study, two different variables were eventually selected:

share of exports and imports in firms' revenues from sales, obtained from annual questionnaires (F-01 form) directed by the CSO to firms from the manufacturing sector, having some missing data for several poviats;

exports per capita, provided by the Customs Chamber, extracted from the Intrastat/Extrastat database – according to the location of the business entity.

The ability to compare the exact data on the firms' standings results in more precise assessments of trade openness due to the fact that the data were obtained from one form, filled in by the entrepreneurs. The proposed measure is also more appealing regarding firm-level behaviour.

Kernel densities, which allow for the estimation of the probability density function (Epanechnikov, 1969), are used as a non-parametric technique applied for the visualisation of the underlying distribution of a variable (Trosset, 2009). One of the advantages of the Epanechnikov kernel density function is that it generates smooth densities, whereas an additional advantage is represented by the minimisation of the mean integrated squared error. By analysing the differences associated to the plots in different time periods (2005 and 2012), conclusions are formulated on the scope and magnitude of the

changes affecting trade openness at the level of poviats.

4. Research results

A review of the literature implies that the degree of an economy's openness is determined by a range of spatially diversified factors. An openness assessment is conditioned by the "context" of the analysis. There is also the issue of selecting the scope of research and data disaggregation. Analysis conducted at a more detailed level focuses on individual business entities. At this point, the application of the concept of heterogeneity of business entities, developed by Melitz (2003) or, in general, of theories with reference to enterprises (including FDI) seems more justified than the application of theoretical concepts concerning the location of the business activity (which focuses on spatial aspects). Thus, an interpretation of the regularities concerning the spatial distribution of openness may be executed from various perspectives.

The figures below present the results of the analysis in the case of poviats. Openness is measured using two different data sets: (a) share of the sum

of exports and imports in total revenues from sales (Fig. 1, left-hand side), (b) value of exports per capita (Fig. 1, right-hand side). Although the data in both sets are collected according to different rules, the results obtained are similar.

With reference to the spatial distribution of openness, several conclusions may be formulated:

- the degree of openness (based on quartile measurements) increases from East to West. Consequently, the general regularity of the territorial differentiation of Poland is confirmed in the East-West setting;

- in East Poland, there are, however, poviats characterised by high openness (larger municipal areas and their vicinity). This reflects the impact of the location of particular enterprises operating in the industry, characterised by a high degree of internationalisation, often due to FDI and agglomeration processes (e.g., the aviation cluster in the Podkarpackie Voivodship, near Rzeszów);

- the developing (modernised) network of road infrastructure – see Rosik et al. (2015) – seems to have a positive impact on openness. It does not exclusively apply to the eastern voivodships (the strip of poviats from Warsaw to: Białystok, Rzeszów or Lublin). This regularity is rather universal in its na-

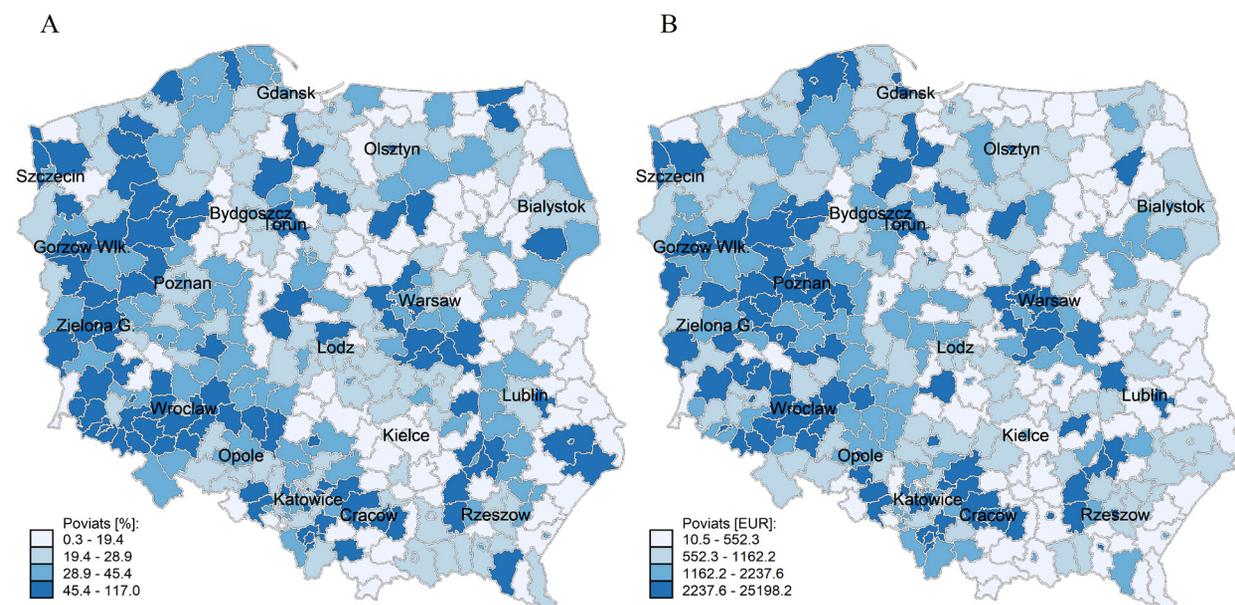


Fig. 1. Trade openness (left) and export per capita in EUR (right); mean values for 2005–2012

Explanation: A – trade openness, B – export per capita in EUR. Cities serving as regional capitals were labelled. Classes generated based on the quantile division

Source: Own compilation

ture (the strip of poviats from Kraków through Katowice, Opole, Wrocław to Jelenia Góra);

- the analysis on the level of poviats indicates an internal diversification within individual voivodships. Within voivodships characterised by high openness, there are poviats which are “not very open”;

- as previously mentioned, the results of the openness analysis conducted using the two methods are similar. In the case of the Wielkopolskie Voivodship, more significant differences are visible. The identification of the causes of these differences (not only for Wielkopolskie) would require a more extensive analysis. In principle, they are derived from the differences in the location of company headquarters vs. plants producing for exports and the role of companies acting as export intermediaries.

Between the years 2005 and 2012, significant changes were noticed in trade openness. The distributions of the kernel densities for exports per capita and trade openness shifted towards the right, indicating an increase in the mean export orientation of poviats (Fig. 2). Apart from the increased trade openness, determined to some extent by the accession to the EU, the competitive power of growing firms and the location of FOEs and SEZs, the share

of poviats featuring low export per capita has diminished. Similarly, the proportion of poviats with companies endorsing a more trade-oriented approach has increased.

Fig. 3 presents the changes in openness between 2005 and 2012 (based on two sets of data, similarly to Fig. 1). The following conclusions may thus be formulated:

- while the East-West differentiation is also noticeable, it is the eastern poviats that show higher dynamics in relation to an increase in openness. This may be indicative of the processes of “catching up” or closing the gap by the eastern poviats (towards more open ones);

- the correlation between growing openness and the communication system (including the road infrastructure under construction) is even more visible in this instance than in Fig. 1. The following strips of poviats shall be noted: Łódź-Gdańsk, Warsaw-Białystok-Suwałki-Lithuania, Warsaw-Kraków, Warsaw-Katowice, Kraków-Katowice-Wrocław.

FOEs and SEZs play an important role in Poland's exports. The contribution of FOEs has fluctuated, reaching its peak in 2009 and diminishing gradually after the period of the financial crisis, probably as a result of the significant changes implemented in relation to the strategies of MNCs. In

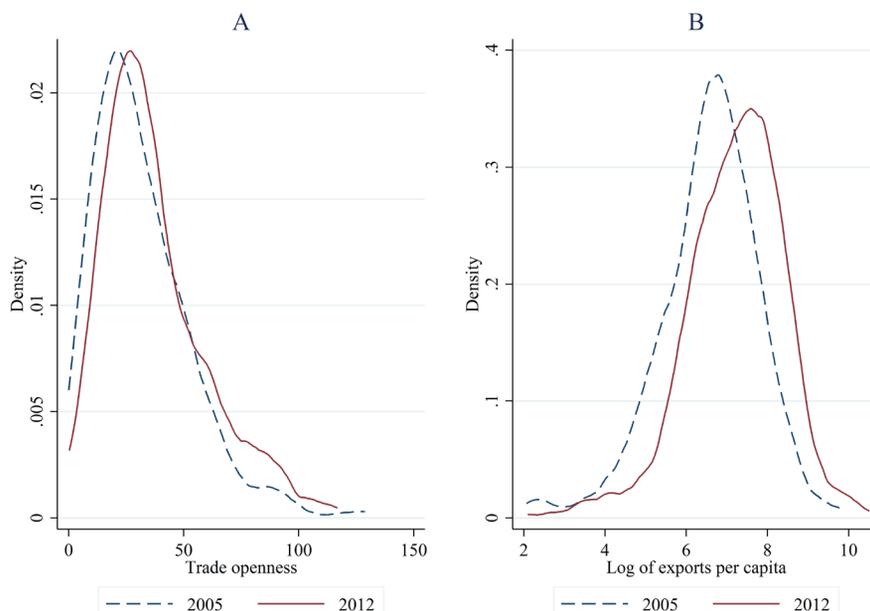


Fig. 2. Distribution of logged exports per capita and trade openness in 2005 and 2012

Explanation: A - trade openness, B - log exports per capita

Source: Own calculations

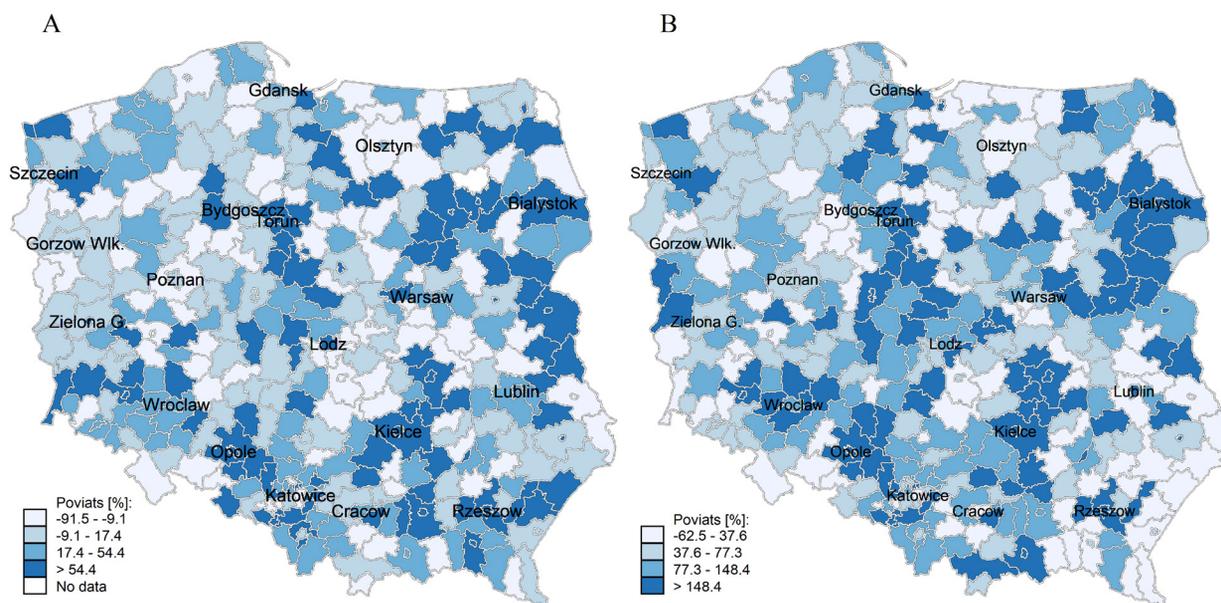


Fig. 3. Increase of trade openness (left) and export per capita (right) in 2005–2012

Explanation: A – trade openness, B – export per capita

Source: Own compilation. Classes generated based on the quantile division

contrast, the role of SEZs remained consistent during the entire timeframe, largely due to the location of new firms within the zones. However, a large proportion of the firms operating within the zones are FOEs (about half of the total number of companies). Unfortunately, due to the unavailability of data, we cannot directly distinguish between domestic and FOEs in the case of SEZs contribution.

Starting with 2009, both FOEs and SEZs have reduced their contribution to the creation of new exports. The highest decline was noticeable in 2012, when in both cases a negative contribution to national exports was recorded as a result of the economic slowdown in Europe. An inferior economic performance of foreign affiliates compared to do-

mestic entities caused a further reduction in terms of the contribution to Poland's exports. A relatively high and non-negative domestic demand could have also triggered production shifts from external to domestic markets (Table 1).

From a spatial perspective, the participation of FOEs and SEZs in trade is not homogenous. Similarly to the compilations presented above, differences in the East-West system may be noticed. The concentration of FOEs is visible around cities, and especially around metropolises. Similarly to the compilations presented above, the positive role of the road infrastructure may be observed (good transport accessibility) (Fig. 4, left-hand side).

Table 1. The contribution of FOEs and SEZs to Poland's exports between 2005 and 2013

Contribution	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total exports									
FOEs	57.0	57.3	59.0	59.5	62.0	61.2	58.8	56.2	55.8
SEZs	14.3	17.6	19.6	21.3	23.6	23.9	24.5	23.4	23.8
Increase of total exports									
FOEs	58.8	58.6	70.4	64.5	48.8	57.8	43.3	-10.0	49.6
SEZs	45.8	32.6	32.9	38.4	11.0	25.5	27.9	-5.6	29.6

Explanation: Due to the frequent location of FOEs in SEZs, a certain degree of the FOE contribution is involved within SEZs operations
The data on the sole contribution of domestic vs. FOEs' exports within SEZs in Poland are not available

Source: Own compilation

In comparison to the location of FOEs, the location of SEZs (Fig. 4, right-hand side) is more concentrated, primarily due to the relatively low number of SEZs. The relatively high shares of exports from SEZs are initially observed in the case of strongly industrialised territories with a high economic potential, in the proximity of large population centres, mainly in the south-west of the country, and in a few areas in the north, south and centre of Poland. The eastern part of the country is significantly underrepresented, being characterised by an accumulation of structural problems: low development, poor quality of transport infrastructure, labour market problems, lower levels of entrepreneurship and poor access to mineral resources (Gawlikowska-Hueckel, Umiński, 2013).

The division of poviats in relation to FOEs vs. SEZs location had some significant consequences regarding the presented distribution densities. As regards the impact of FOEs, due to a high number of their locations being scattered across most poviats, it was necessary to adopt a minimum threshold of 10 percent in relation to FOEs' share in poviat exports (corresponding to OECD FDI benchmarking definition related to enterprises) in order to reduce their number to these local units only, in which FOEs might have a substantial effect. The

same criterion was established with reference to the operation of SEZs in order to sustain compatibility between the two distributions.

The results proved that poviats with FOEs and SEZs were more trade-oriented. However, the sole role of FOEs seemed to have a slightly higher effect on the trade openness of poviats because of its discriminative power. The differences were noticeable in 2005, as compared to SEZs operation. Over time the mean level of trade openness has increased (Fig. 5).

The pattern of FOE participation in the exports of the poviats seemed to be stable. In 2005–2012 no serious changes were identified (Table 2). Nevertheless, this does not mean that such changes did not occur: they tend to be an object of interest for self-government authorities, significant from the point of view of the territorial cohesion being a subject of interest and observation within the area of individual voivodships.

On the contrary, the role of SEZs in terms of export contribution has increased significantly between 2005 and 2013 together with the reduction of inequalities between poviats. The increasing number of SEZ subzones established in new locations has resulted in the decrease of inequalities between poviats due to a higher spatial dispersion of SEZ op-

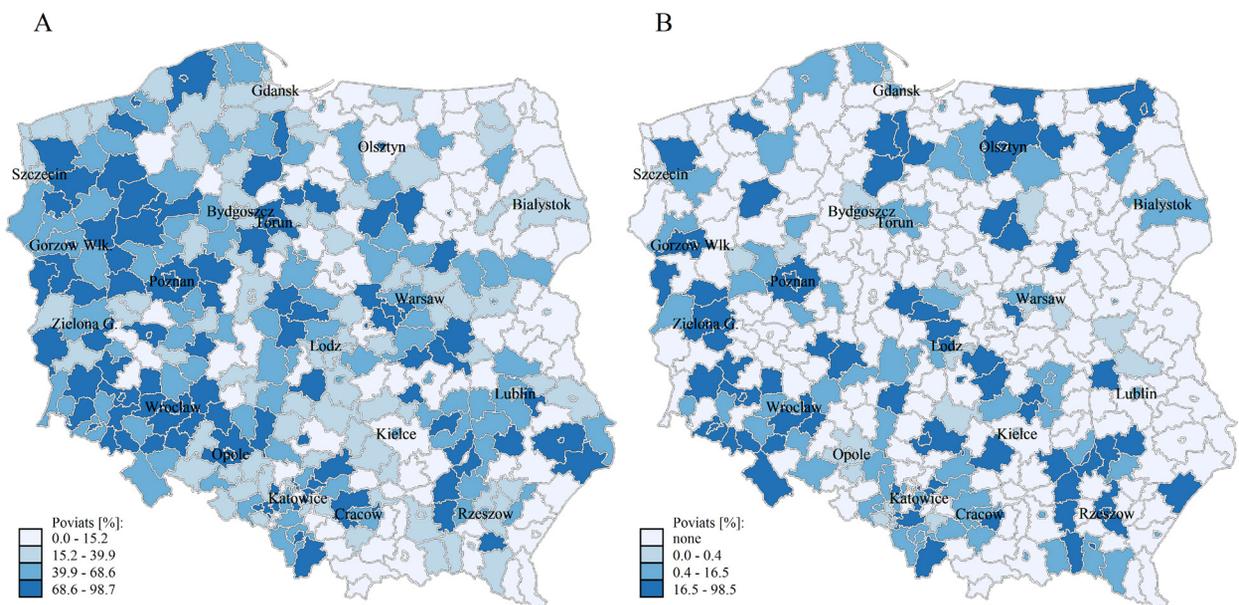


Fig. 4. Participation of foreign-owned enterprises (left) and SEZs (right) in total exports of poviats

Explanation: Mean values for 2005–2012. A – participation of foreign-owned enterprises in total exports [%]; B – SEZs' contribution to total exports [%]. Classes generated based on the quantile division.

Source: Own calculation

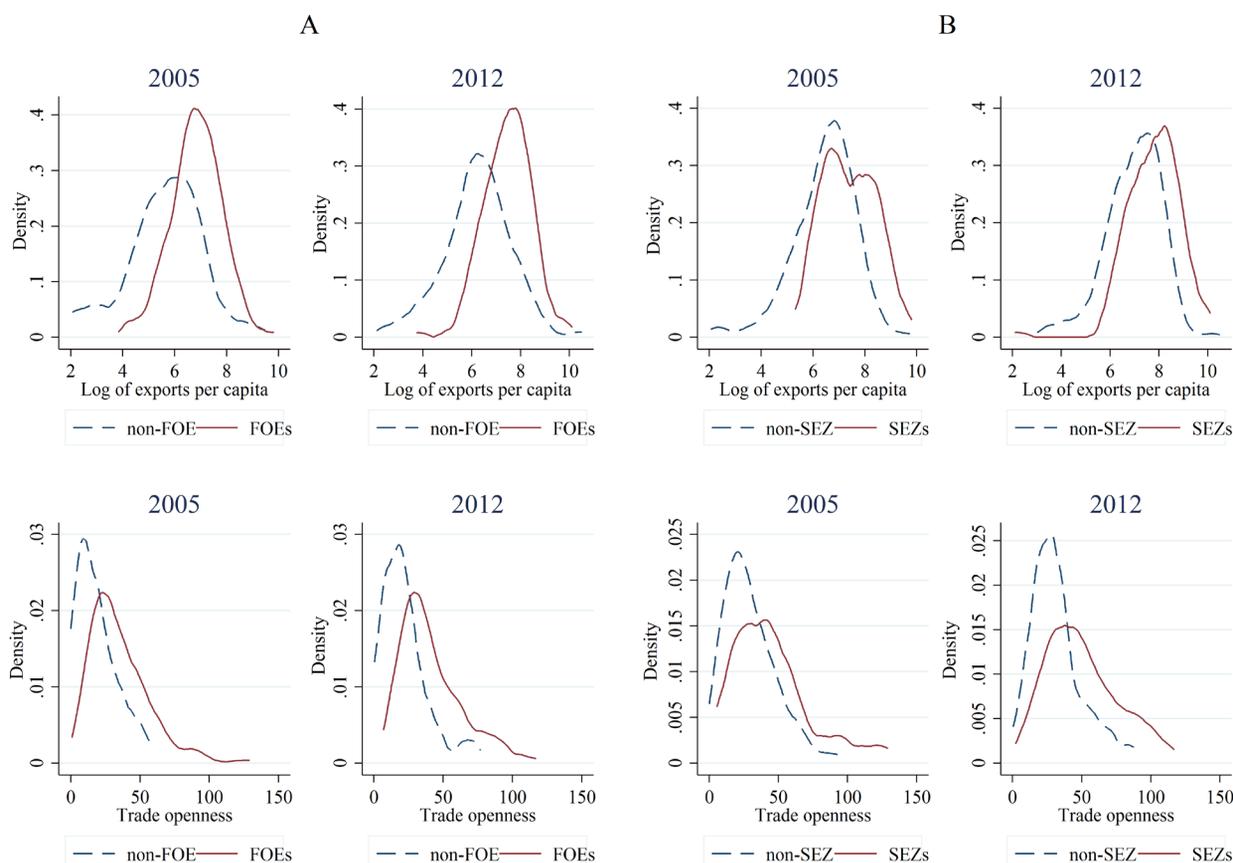


Fig. 5. Spatial distribution of logged exports per capita and trade openness in 2005 and 2015 with regard to FOEs' and SEZs' location

Explanation: Spatial distribution of trade openness and log of exports per capita with respect to: A – FOEs' location, B – SEZs' location. For FOEs' and SEZs' location the minimum threshold of 10 percent share in the poviats' exports was embraced

Source: Own calculations

Table 2. Poviats' local trade openness – selected descriptive statistics between 2005 and 2013

Variables	2005	2006	2007	2008	2009	2010	2011	2012	2013
Mean									
Exports per capita*	1330.2	1653.5	1906.9	2078.7	1706.6	2028.5	2345.5	2458.6	2624.8
Trade openness**	31.5	33.3	33.9	32.7	32.7	33.8	35.6	37.1	-
FOEs' share in exports	41.0	41.1	41.8	42.0	42.5	43.2	42.2	41.3	41.2
SEZs' share in exports	5.1	6.4	8.4	9.8	10.6	11.8	13.1	13.1	13.7
Coefficient of variation									
Exports per capita*	1.4	1.53	1.45	1.45	1.59	1.52	1.50	1.39	1.30
Trade openness**	0.67	0.66	0.66	0.65	0.68	0.65	0.63	0.61	-
FOEs' share in exports	0.73	0.74	0.73	0.73	0.73	0.73	0.74	0.74	0.74
SEZs' share in exports	2.92	2.59	2.23	2.11	2.01	1.92	1.82	1.79	1.74

Explanation: * Exports per capita in EUR, ** trade openness = mean firms' exports plus imports divided by the net share of revenues from sales. - no data

Source: Own compilation

erations and the positive consequences thereof. Local government authorities took action in order to establish SEZ subzones that have increased the poviats' competitiveness in terms of, i.e., capital acquisition.

5. Discussion

By showing the geography of openness to foreign trade in Poland at poviat level, we indicate a new dimension of analysis that shall be taken into account in the assessment of regions' resilience to the economic crisis. Diversification within regions in this respect, seems to be neglected, although it should be taken into account. A certain voivodship may rank high in the resilience index but may be significantly internally diversified in terms of openness and the role of FOEs in exports, which makes resilience a more complex term. The rankings of regions' resilience (for instance presented by Masik and Rzycki (2014)) should also make reference to the regions' internal diversification of openness.

Despite temporary fluctuations, FOEs play an essential role in Poland's exports. It has been showed that there is a concentration of FOEs around cities, and especially around metropolises. Our observations are in line with the conclusions by Csomós (2017) who treats cities as command and control centres of the world economy. We also find concentrations of exporting activity in Poland at the local level of analysis similar to those of Komornicki et al. (2015) and Komornicki and Szejgic (2015). Our contribution in this regard is the attempt to show the role of often neglected albeit important factors contributing to the resulting image of trade openness in Poland. The sole determinants of exporters' location are the subject of the analysis conducted by Nazarczuk et al. (2017).

The results obtained are also in line with the observations by Edgington, Hayter (1997), stating that even a peripheral region can participate in foreign trade, relying on its particular comparative advantages. In fact, they also confirm the concept of lumpiness (Courant, Deardorff, 1992). In Poland, it is manifested by high openness observed in several poviats that are situated within less competitive, peripheral voivodships. This openness stems from

the activity of particular enterprises, which draws our attention to the firm level of analysis, affecting i.a. firm's productivity (Nazarczuk 2017), as well as to the commodity structure of exports (Maćkowiak, 2011) and the role and structure of FDI (Tobolska, 2013).

6. Conclusion

Poland's local (poviats') trade openness analyses based on sets of two proxies, originating from various data sources, have produced similar outcomes. Between 2005 and 2012, the mean level of exports per capita and trade openness has increased. However, we have noticed a slight convergence in this respect, knowing that inequalities have increased temporarily during the period of the financial crisis. The spatial distribution of inequalities fits in its nature into well-known dissimilarities between eastern and western regions, with the exception of city agglomerations, industrial centres and improved road infrastructure influencing the vicinities thereof in a positive manner.

From a regional policy perspective, the results bring important implications in light of the NEG theory and the sensitivity/vulnerability concept. The role of FOEs together with SEZs was substantial in boosting the creation of new exports, showing the importance of a place-based approach in stimulating exports. The FOEs' spatial contribution to exports was rather stable. However, during the crisis, its volume diminished more abruptly than in the case of SEZs (where domestic and foreign entities operate). Thus, according to the location of FOEs, poviats were more susceptible to the negative effects of the recent crisis.

Due to the location of new export increments, related to new SEZ establishments spatially scattered in numerous poviats, the spatial imbalances within the foreign trade performance of poviats were reduced. However, the type of capital located within SEZs can differentiate the outcomes for poviats' economies. Reference is thus made to the crucial role of domestic entities (locating/moving into SEZs) that were responsible for this convergence, yet analyses conducted at different aggregation levels can bring different results.

Knowing the differences in SEZ operation in Poland, as well as their frequently discussed location, one should state that individual zones could have a positive effect on the reduction of trade performance inequalities. The question arising at this point is the desired location of SEZs (in economically poor regions or industrialised/well-developed ones). According to the NEG theory, a further corporate concentration in the subzones should be considered, which could in turn bring extra benefits for the entities located in the proximity of SEZs, with the exception of the entities operating in SEZs SEZ-operating entities. However, in order to reduce the spatial inequalities associated to the income level, SEZs should be predominantly located in deprived areas, allowing for the concentration of firms in a limited number of subzones and enabling them to gain critical mass that could spill over to vicinities. Nevertheless, amendments in the SEZ location criteria could be beneficial in terms of achieving better results in this regard, depending on the main aim of the regional policy and SEZs currently being implemented.

Acknowledgements

This work was prepared within the project entitled “Foreign Trade in Special Economic Zones in Poland” financed by the Polish National Science Centre under grant no. DEC-2013/11/D/HS4/04007. The project’s website: <https://www.researchgate.net/project/Foreign-Trade-in-Special-Economic-Zones-in-Poland>.

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Ministry of Science
and Higher Education
Republic of Poland

The proofreading of articles, positively reviewed and approved for publishing in the 'Bulletin of Geography. Socio-economic Series', was financed from the funds of the Ministry of Science and Higher Education earmarked for activities popularizing science, in line with Agreement No 509/P-DUN/2016.

