
Spatial Diversification of Foreign Capital in Poland in 2013 and 2023 with Particular Consideration of Wielkopolskie Voivodship

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Abstract:

Purpose: Foreign capital is one of the key factors influencing the economic development of the region. The aim of this article is to analyse changes in the spatial differentiation of foreign capital in Poland in 2023 with respect to 2013 with the use of Z. Hellwig's taxonomic index, to present the position of Wielkopolskie Voivodship compared to other voivodships and to identify the factors related to investment attractiveness for Wielkopolskie Voivodship.

Design/Methodology/Approach: The survey was based on 12 diagnostic characteristic. On their basis, a synthetic measure developed for the Polish voivodships, which allowed to classify them in terms of the importance of foreign capital for the region's economy. The position of the Wielkopolskie Voivodship was determined in relation to other regions in Poland and the distance separating it from the model, which turned out to be the Mazowieckie Voivodship. At the end, the values of the most important indicators for foreign capital in Wielkopolskie Voivodship were presented and compared.

Findings: Poland is a highly diversified country in terms of the distribution of foreign capital. There is a single voivodship – Mazowieckie with a significant concentration of the number of companies with foreign investors as members, as well as the value of the capital invested by them in those entities. Wielkopolskie Voivodship, along with the Dolnośląskie and Śląskie voivodships, belongs to regions with a key foreign capital significance, however, the distance between them and the Mazowieckie Voivodship in this respect is very high and this has not changed in the years under review.

Practical Implications: The results of the research can be a valuable source of information for central and local authorities, which may allow them to identify the factors that most attract foreign investors to a given region and those that discourage them from investing. In the case of regions which scored lower in the survey, such result should serve as an impetus to intensify their efforts to improve their investment attractiveness. The survey may also prove beneficial for foreign investors looking for attractive business locations.

Originality/Value: This type of research in Poland was carried out several years ago, but there is a lack of up-to-date analysis in this area using the synthetic indicator, which is its added value.

Keywords: Foreign capital, spatial diversification, Hellwig's taxonomic measure.

JEL codes: F21, R12, O18.

Paper type: Research article.

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1. Introduction

During an era of increasing globalisation and internationalisation of economic activities, international capital flows are among the most important factors influencing the economic development of countries and regions. As per the definition of the Polish Central Statistical Office (GUS), foreign capital is “capital contributed to an entity in the form of financial resources (cash, shares, bonds), tangible fixed assets (machinery, equipment, means of transport, real estate) and intangible assets (patents, licences, etc.) by a foreign entity. A foreign entity can be a natural person without Polish citizenship; a legal person with its seat abroad; an organisational unit that is not a legal person with its seat abroad” (GUS).

The most desirable form of foreign capital flow into the economy are Foreign Direct Investments (FDI). They are undertaken by companies and individuals resident in one country into a new or existing company in another country with the intention of exercising long-term control over them. FDI are understood as investments in enterprises where one foreign investor holds at least 10 per cent of the shares (OECD, 2010).

Such form of foreign capital inflow to Poland is of key importance. In 2023, in the case of 99% of enterprises with foreign capital operating in Poland, the foreign capital share in the basic capital was at least 10%. Whereas in the case of as 81.6% of enterprises with foreign capital, this share amounted to 100% (GUS, 2025). Consequently, further considerations made for the purpose of this paper in particular with regard to the impact of foreign capital on regional development, will refer to foreign direct investment.

The aim of this article is to analyse changes in the spatial differentiation of foreign capital in Poland in 2023 with respect to 2013 with the use of Z. Hellwig’s taxonomic index, to present the position of Wielkopolskie Voivodship compared to other voivodships and to identify the factors related to investment attractiveness for Wielkopolskie Voivodship.

The article examines the following research hypotheses:

- foreign capital in Poland is largely concentrated in the Mazowieckie Voivodship with a significant advantage over other voivodships,
- in spite of the increase in the value of FDI inflows to Poland, trends in its distribution have not changed significantly when comparing 2023 with 2013.

The results of the research can be a valuable source of information for central and local authorities on the concentration of foreign capital in Poland, which may allow them to identify the factors that most attract foreign investors to a given area and those that discourage them from investing. In the case of regions which scored lower

in the survey, such result should serve as an impetus to intensify their efforts to improve their investment attractiveness.

The survey may also prove beneficial for foreign investors looking for attractive business locations. This type of research in Poland was carried out several years ago, but there is a lack of up-to-date analysis in this area using the synthetic indicator, which is its added value.

The survey was based on 12 diagnostic characteristics relating to foreign capital. On their basis, a synthetic measure of foreign capital was developed for the Polish voivodships, which allowed to classify them in terms of the importance of foreign capital for the region's economy.

It is worth noting that there are large disparities in foreign capital inflows between Polish regions, which is indicative of their varying investment attractiveness. An analysis was also carried out of changes in the values of selected indicators relating to foreign capital in Wielkopolskie Voivodship in 2013 and 2023. Statistics gathered by the Polish Central Statistical Office were used to conduct the research.

2. The Importance of Foreign Capital for the Development of the Region's Economy – A Literature Review

Foreign capital has a significant impact on the formation and functioning of economic structures of regions. The impact varies depending on the region. It is also multi-layered and often difficult to estimate, as it results from the specific characteristics of the host region, its level of development and depends on the type and attitude of the investor, as well as the form of capital commitment.

The impact of foreign capital, in particular foreign direct investment, on specific economic areas can be direct or indirect, and its effects can be positive or negative. However, it is assumed that the benefits of foreign capital inflows to a country/region outweigh the associated costs (Ambukita, 2013; Szewc-Rogalska and Leszczyńska, 2011).

The following factors may be identified as some of the most important positive effects of the inflow of foreign capital in the form of foreign direct investments in specific regions (Byczkowska, 2020):

- an increase in the region's income and thus the financial resources required to restructure its economy,
- an increase in production in the region, leading to an increase in GDP and GDP per capita,
- increase in employment levels,
- development of the region's infrastructure,

- the influx of advanced technologies, increasing the region's innovativeness,
- development/influence of desirable areas of economic activity,
- increasing the competitiveness of the region,
- introducing new methods of organisation and management,
- an increase in the trade exchange – enterprises with foreign capital are characterised by a higher propensity to export and import and higher trade dynamics than domestic enterprises,
- improving the quality of production by increasing competition in the local market,
- improving the skills of the local workforce and wages,
- impact on the local business community.

The indicated positive effects of foreign capital inflows lead to economic recovery at the local level and a reduction in socio-economic disparities on a national level. An increase in FDI in an area is indicative of an improvement in its investment attractiveness and often has the effect of attracting new foreign investors – thus increasing the level of internationalisation of a region's economy. In addition, a larger number of foreign-invested enterprises attracts competitors and cooperating co-operators to the region, so the effects of FDI inflows into an area may serve as multiplier effects.

Considering the long-term nature of FDI, they are considered a relatively safe form of capital investment in the region, as they do not carry the danger of a company quickly withdrawing from the investment after making an initial, temporary profit (Brezdeń, 2016).

As mentioned before, foreign capital inflows may also negatively impact the region's economy. Such adverse impacts may include (Balicki, Jaki, and Rojek, 2021):

- overexploitation of resources, in particular natural resources, especially if such resources are the key incentives for investment flows to the region,
- negative environmental impact, mainly in the case of so-called dirty industries,
- a reduction in competition on the local market if the investor seeks to achieve monopoly status and the displacement of indigenous businesses, e.g. through hostile takeovers, which may consequently lead to reduced employment levels in the region,
- low propensity of foreign-invested companies to cooperate with local companies,
- lack of inclination to develop R&D activities in the host region,
- the development of undesirable areas of economic activity,
- Lack of inclination to reinvest profits in the country/region, transferring profits out of the host country,

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- excessive supply imports that result in a high negative trade balance,
 - reluctance to hire local workers, bringing in workers from the home country.

The investment attractiveness of a region is without a doubt one of the most important variables determining the inflow of foreign capital into the region. The decision to seek a more favourable location for foreign investors to locate their operations than before is dictated by the need to optimise the production process. The assessment of the level of attractiveness made by entrepreneurs therefore determines to a large extent the economic success of the host region.

When deciding on the most favourable location for a foreign investment, entrepreneurs take into account many factors that characterise a region. Isolating the most important elements influencing the region's investment climate is particularly difficult, and as of yet it has not been possible to identify a closed catalogue of such factors. Many authors list what they consider to be the most important factors in creating definitions of investment attractiveness.

However, it should be borne in mind that the weighting of the elements taken into account depends primarily on the type of business and the subjective assessment of an investor. Therefore, it is only possible to identify universal factors that must always be taken into account, regardless of the industry in which a company operates, and even here there is no unanimity among researchers.

The factors considered when choosing a particular investment location can be divided into those general (relating to the host country) and specific (regional). The key factors to be taken into account by an investor when choosing an investment country include (Raczyk, Dołzbłasz and Leśniak-Johann, 2010):

- economic factors (macroeconomic stability of the country, size and nature of the market, factor resources and their acquisition costs),
- legal factors (economic regulations),
- social factors (lifestyle of residents, regional culture, language skills),
- political factors (political stability and the associated degree of investment risk in a specific country).

At a local level, the location of an investment is determined primarily by its qualitative location factors, which include (Raczyk, Dołzbłasz, and Leśniak-Johann, 2010):

- the presence of regional business environment institutions relevant to the entrepreneur,
- a modern, global transport and communications infrastructure,
- quality and labour costs,
- the quality of the natural environment.

Regions that offer an optimal combination of these factors become an attractive location for foreign investments. That is due to the fact that, on the one hand, they make it possible to reduce capital expenditure and the running costs of the company, while, on the other hand, they make it easier to maximise profits and reduce the risk of investment failure.

3. Research Methodology

Ranking the regions in terms of the level of foreign capital absorption was carried out based on taxonomic measure of Z. Hellwig. This method involves the construction of a synthetic measure that allows a hierarchy of regions to be created based on selected diagnostic variables. The method of selecting variables is of paramount importance, as the result of the study will depend on them. The choice of diagnostic characteristics for the purpose of this study was preceded by a critical review of the literature from the analysed subject matter.

The indicators selected in this manner were subjected to a formal assessment, i.e., those variables that were available were measurable and were complete for a given period of analysis. The final stage of variable selection involved checking the characteristics against statistical criteria. For each variable, the coefficient of variation was calculated; it illustrates the degree of its differentiation.

Quasi-constant variables were eliminated from the study, i.e., those which do not contribute significant information about the studied phenomenon – those features for which the absolute value of the coefficient of variation did not exceed the critical value of 0.1 were rejected from the set (Obrębalski, 2006). The resulting set of diagnostic variables, which was used to build a taxonomic measure of foreign capital for the Polish voivodships, contained 12 characteristics, as presented in Table 1.

Table 1. *The set of diagnostic variables adopted for the construction of synthetic measure of foreign capital for Polish voivodships*

Variable symbol	Diagnostic variable name
X ₁	number of enterprises with foreign capital
X ₂	number of persons employees in enterprises with foreign capital
X ₃	value of foreign capital invested in the voivodship
X ₄	number of enterprises with foreign capital, reporting gross profit
X ₅	fixed asset expenditures (investment expenditures) incurred by enterprises with foreign capital
X ₆	entered entities with foreign capital participation per 10 thousand population
X ₇	share of entities of the national economy with foreign capital participation in the total number entities recorded in the REGON
X ₈	value of foreign capital per capita of working-age population
X ₉	share of foreign capital located in entities in the voivodship in the total value of the capital in Poland

X ₁₀	value of imports made by enterprises with foreign capital
X ₁₁	value of exports made by enterprises with foreign capital
X ₁₂	newly established companies with foreign capital in the region

Source: Author's own study.

One of the most important stages of the survey carried out was the standardisation of the characteristics, i.e. bringing the variables to a state of comparability. This activity is carried out on the basis of the following formula:

$$z_{ij} = \frac{x_{ij} - \bar{x}_j}{S_j}$$

x_{ij} – the output value of characteristic j for an i object (voivodship),

z_{ij} – the standardised value of characteristic j for an i object (voivodship),

\bar{x}_j – arithmetic mean of characteristic j ,

S_j – arithmetic mean of characteristic j .

The transformations resulted in creating a matrix of variables containing the values of the characteristics after normalisation. The next step was to determine the direction of the impact of the individual characteristics on the phenomenon under investigation. Variables for which the highest desirable values are stimulants and those for which the lowest possible values are desired are destimulants (Panek, 2007).

In this study, all characteristics were classified as stimulants. Subsequently, a taxonomic pattern, i.e. a model object (region), was developed, characterised by the most favourable values of all variables; the voivodships under research were later compared to it.

The final stage of the study was the creation of a synthetic foreign capital index. In the first instance, the so-called Euclidean distances between the regions under investigation and the model region created at the previous stage of the study were measured. The following formula was used to calculate the Euclidean distances:

$$d_{i0} = \sqrt{\sum_{j=1}^m (z_{ij} - z_{0j})^2}$$

z_{0j} – standardized value of j characteristics of this characteristic for the formula,

m – number of features.

The value of the measure is calculated according to the formula:

$$d_i = 1 - \frac{d_{i0}}{d_0}$$

d_0 – critical distance between a specific object from the standard, is calculated by the formula:

$$d_0 = \bar{d}_0 + 2S_0$$

\bar{d}_0 – arithmetic mean of Euclidean values, calculated according to the formula:

$$\bar{d}_0 = \frac{1}{n} \sum_{i=1}^n d_{i0} \quad (\text{dla } i = 1, \dots, n)$$

S_0 – standard deviation of Euclidean values, calculated according to the formula:

$$S_0 = \sqrt{\frac{1}{n} \sum_{i=1}^n (d_{i0} - \bar{d}_0)^2}$$

The values of the indicators d_i , which constitute the result of this study, range from 0 to 1 (Stec, 2011). A score of 1 is characteristic of the pattern. The closer the index value is 0, the more the region is remote from the pattern and has a lower level of foreign capital.

4. Research Results

This section of the paper presents the results of the study carried out. First, the data (diagnostic characteristics) were compared and discussed; they were later used to construct the synthetic indicator. Finally, the analysis of data characterising foreign capital in the Wielkopolskie Voivodship was carried out.

4.1 Spatial Diversity of Foreign Capital in Poland

An expression of the investment attractiveness of a specific region is the number of companies with foreign capital operating in its area and the number of employees. In 2023, there were a total of 25,706 enterprises with foreign capital in Poland, employing 2,254,988 persons.

These enterprises accounted for 0.5% of the total number of entities entered in the REGON register [National Business Register]. By comparison, in 2013 the number of companies with foreign capital in Poland was higher – 26,128 companies (0.6%

of the total number of entities included in the REGON register) and employed 1,628,516 persons.

The largest number of registered entities with foreign capital in Poland was in 2018 – 27,902 enterprises (BDL GUS), albeit the number of persons employed in such economic entities was lower than in 2023. Data on the differentiation of the surveyed indicators in the respective voivodships in the years 2023 and 2013 are presented in Table 2.

Table 2. Number of enterprises with foreign capital and number of persons employees in them in 2013 and 2023 by voivodship

Voivodship	Number of enterprises with foreign capital		Number of persons employees in enterprises with foreign capital	
	2013	2023	2013	2023
Dolnośląskie	2,370	2,323	155,514	209,760
Kujawsko-Pomorskie	589	490	37,289	51,918
Lubelskie	400	623	22,813	43,040
Lubuskie	731	542	34,601	42,296
Łódzkie	1,086	980	81,907	106,870
Małopolskie	1,651	1,936	104,006	149,134
Mazowieckie	10,098	10,560	548,107	729,744
Opolskie	488	357	26,170	32,160
Podkarpackie	461	512	41,533	49,734
Podlaskie	183	365	10,251	13,900
Pomorskie	1,430	1,291	61,821	106,218
Śląskie	2,388	2,178	181,177	241,723
Świętokrzyskie	184	204	20,667	28,407
Warmińsko-Mazurskie	302	165	13,890	16,063
Wielkopolskie	2,302	2,148	233,591	356,556
Zachodniopomorskie	1,465	1,032	55,179	77,465
POLAND	26,128	25,706	1,628,516	2,254,988

Source: Author's own study based on data from the Central Statistical Office Local Data Bank (BDL GUS).

The largest number of foreign companies have located their capital in the Mazowieckie Voivodship, in particular due to the fact that the country's capital city is situated there. Their share in the total number of enterprises with foreign capital in Poland in both analysed years reached approximately 40%.

The second place in 2013 was held by the Śląskie Voivodship with a share of 9.1%, the third by the Dolnośląskie Voivodship with 9.1% and the fourth by the Wielkopolskie Voivodship: 8.8%. In 2023, the Dolnośląskie Voivodship came in second. The share of enterprises with foreign capital operating there in the total number of such enterprises in Poland was 9% at the time. Śląskie Voivodship ranked third with 8.5% while Wielkopolskie Voivodship ranked fourth with 8.4% in 2023.

In terms of employment levels, Mazowieckie Voivodship also dominated in both years analysed. The share of employees working in the region in the total number of employees in companies with foreign capital participation was 32.4% in 2013 and 33.7% in 2023. Wielkopolskie Voivodship came second.

There were respectively 14.3% of people employed there in 2013 and 15.8% in 2023. The results of these regions were determined by their economic potential, but in the case of Dolnośląskie and Wielkopolskie, also by the location close to the western border of the country. It is worth noting that the Polish voivodships are characterised by a particularly large variation in terms of the specific indicator. The voivodships of Eastern Poland, in particular Warmińsko-Mazurskie and Świętokrzyskie, enjoyed the least interest of foreign investors.

Among companies with foreign capital, the majority are micro-entrepreneurs, employing up to 9 persons. Their percentage share in the total number of enterprises with foreign capital participation was as high as 61.7% nationally in 2023, with only 1.8% of persons employed. Small entrepreneurs (employing between 10 and 49 persons) accounted for 18.3% of the surveyed group of companies, medium-sized enterprises (employing between 50 and 249 persons) – 13%, while large enterprises (employing at least 250 persons) accounted for 7% of the total number of companies with foreign capital.

Nearly 1.7 million persons found employment in the latter group, which accounted for 76.4% of employees of entities with foreign capital in Poland. In 2013, the percentage of micro-entrepreneurs in the surveyed group was higher, at 67.2%, and the percentage of other enterprises was lower. At that time, the share of small enterprises in the total number of entities with foreign capital was 17.8%, medium-sized enterprises 10.3% and large enterprises 4.8% (BDL, GUS).

In 2023, 461 new companies with foreign capital were established in Poland; out of those, 40% were set up in the Mazowieckie Voivodship, 9.5% in the Śląskie Voivodship, 8.7% in the Wielkopolskie Voivodship, 7.1% in the Dolnośląskie and Małopolskie voivodships, and 5.4% in the Lubelskie Voivodship. The share of new companies established in other voivodships did not exceed 5%. The smallest number of companies were established in the Śląskie and Warmińsko-Mazurskie voivodships – just 2 in each.

Despite the decrease in the number of foreign investors in Poland during the period under review, the total value of foreign capital invested in the country increased. In 2013, the total value of foreign capital was PLN 188,243 million, while in 2023 – PLN 262,356 million (BDL GUS). The differentiation between the respective voivodships (Figure 1) is a derivative of the number of foreign investment companies which operate in them.

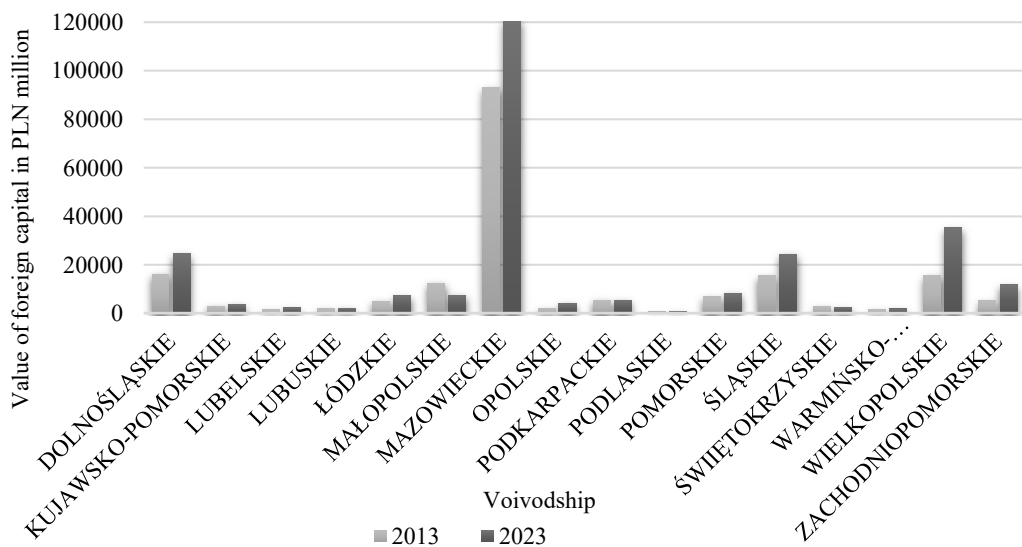
The highest value was therefore recorded in the Mazowieckie Voivodship – PLN 93,014.6 million in 2013 and PLN 120,935.1 million in 2023, which accounted for 47% and 46% of the total value of foreign capital invested in Poland in those years, respectively.

The values of the indicator for the Dolnośląskie, Śląskie and Wielkopolskie Voivodships in 2013 had similar values within the range: PLN 15.6bn – PLN 16.1bn, while in 2023 – PLN 35.2 billion in the Wielkopolskie Voivodship and approximately PLN 24.5 billion in the Dolnośląskie and Śląskie voivodships.

The least amount of foreign capital in 2023 – less than 1% of the total value of foreign capital in Poland was located in the following voivodships: Podlaskie (0.3%), Warmińsko-Mazurskie (0.7%), Lubuskie (0.8%) and Lubelskie and Świętokrzyskie (0.9% each).

It is worth noting that in the analysed years, in the case of three voivodships (Małopolskie, Podkarpackie and Świętokrzyskie) there was an outflow of foreign capital – the value of foreign capital there in 2023 was lower than in 2013.

Figure 1. Value of foreign capital invested in the voivodships in 2013 and 2023 (PLN million)



Source: Author's own study based on data from the Central Statistical Office Local Data Bank (BDL GUS).

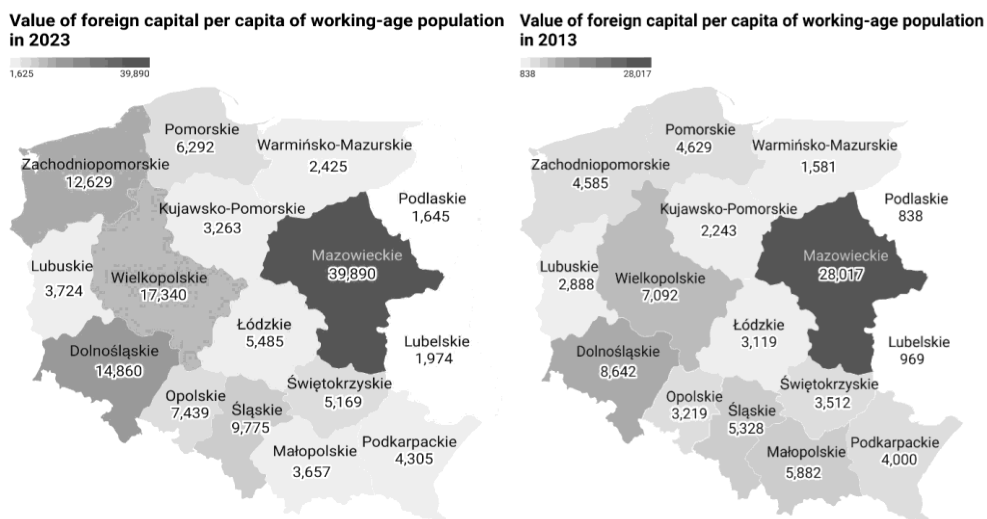
Significant knowledge of the role of foreign capital in the region's economy is provided by the index indicating the value of this capital per capita at working age (Figure 2). In both periods analysed, the Mazowieckie Voivodship was definitely dominant in this respect.

Wielkopolskie ranked third in 2013 with a score of PLN 7,092 in foreign capital per capita of working age and second in 2023 with a score of PLN 17,340. The indicator had the lowest value in both years for Podlaskie, followed by Lubelskie Voivodship.

One of the most important objectives of entrepreneurs, including those choosing to operate abroad, is to maximise profit. In 2013, on average, every second company in Poland with foreign investments achieved a gross profit from its operations (51.4%). In 2023, their percentage was 8.4 p.p. higher (59.8%) (BDL GUS).

Figure 3 presents data on the share of companies with foreign capital, which achieved a gross profit in the years under investigation in the total number of companies with such capital in each voivodship.

Figure 2. Value of foreign capital per capita of working-age population in Poland in 2013 and 2023 by voivodship (PLN)

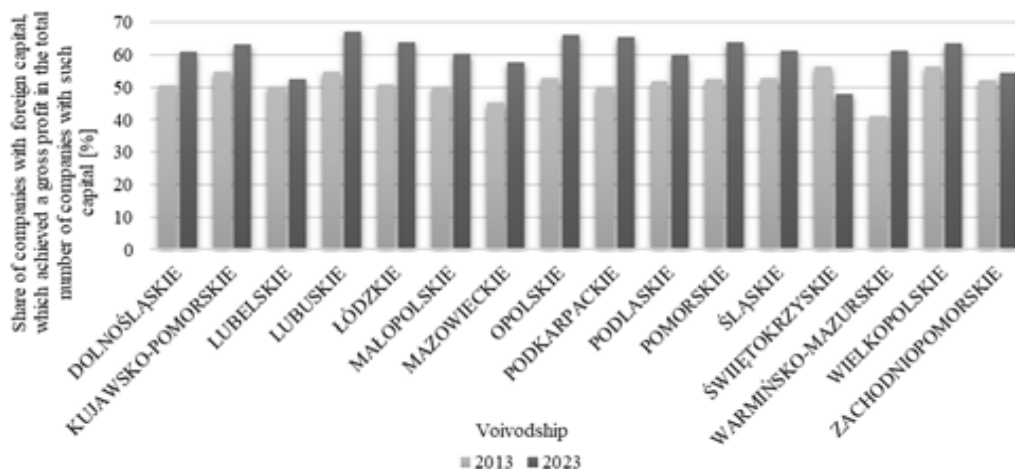


Source: Author's own study based on data from the Central Statistical Office Local Data Bank (BDL GUS).

It can be noted that in 2023, the highest share of companies with foreign capital achieving gross profit was in the Lubuskie Voivodship (67.2%), only 542 surveyed companies were operating at the time in that region (the region ranked 10th in the country).

The lowest percentage of companies with gross profit in the total number of enterprises with foreign capital was recorded in 2023 by Świętokrzyskie Voivodship – 48.0%.

Figure 3. Share of companies with foreign capital, which achieved a gross profit in the total number of companies with such capital in 2013 and 2023 by voivodship



Source: Author's own study based on data from the Central Statistical Office Local Data Bank (BDL GUS).

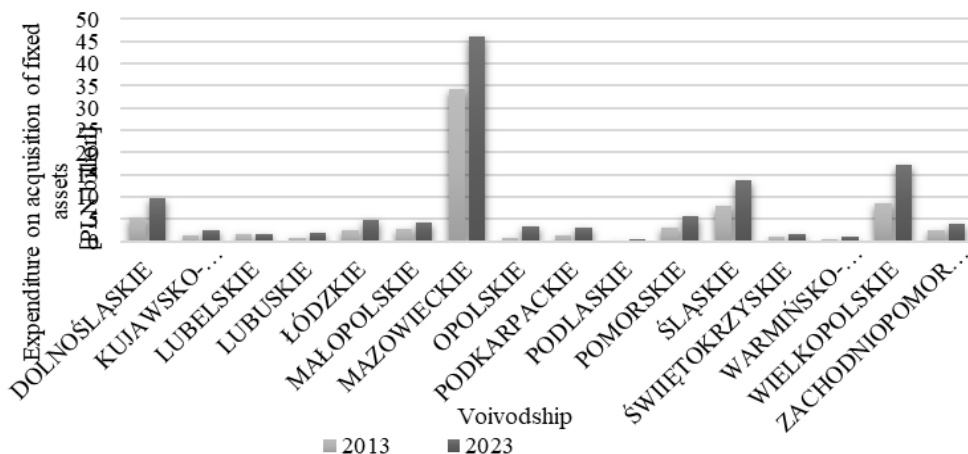
In 2023, entities with foreign capital participation incurred a total of nearly PLN 122 billion in investment expenditure (fixed asset outlays). This was two-thirds more compared to 2013, as approximately PLN 75 billion was spent at the time. In both analysed periods, Wielkopolskie Voivodship ranked second in the country in terms of this indicator, just behind Mazowieckie Voivodship. It should be noted that companies with foreign capital located in Wielkopolskie Voivodship doubled the value of their investment expenditure in 2023 compared to 2013.

A total of four regions – in addition to the above-mentioned Mazowieckie and Wielkopolskie Voivodships, also Śląskie and Dolnośląskie achieved values higher than the national average in both periods under analysis (Figure 4). The value of average outlays on fixed assets per foreign-invested enterprise in Wielkopolskie Voivodship in 2023 amounted to PLN 8 billion; significantly higher than the national average of PLN 47 billion at the time.

In 2013, the value of this indicator for Wielkopolskie Voivodship was PLN 3.8 billion, while the national average at the time was PLN 2.9 billion (BDL, GUS).

An important component of the analysis of the impact of foreign capital on the region's economy is its effect on trade. Companies with foreign capital, in particular those implementing FDI, are more likely to export goods than domestic companies, as they can derive benefits from their relationship with the parent company.

Figure 4. Expenditure on acquisition of fixed assets in 2013 and 2023 by voivodship (PLN billion)



Source: Author's own study based on data from the Central Statistical Office Local Data Bank (BDL GUS).

Domestic companies incur higher costs when undertaking export production but also do not have such experience in the exchange of an international, developed sales network or knowledge of the foreign market. An increase in imports is also a consequence of foreign investment in the host country. If it focuses on modern investment goods, its impact on the economy of the receiving region is beneficial.

In turn, if foreign investment is contingent upon supply imports, it has a negative effect, as it leads to an unfavourable balance of the trade balance and consequently also impose a burden on the paying balance of the host country (Ostrowska, 2013). Table 3 presents data on the value of trade conducted by companies with foreign capital by voivodship.

Table 3. Trade exchange of enterprises with foreign capital in 2013 and 2023 by voivodship (PLN million)

Voivodship	2013			2023		
	total import	total export	balance of trade	total import	total export	balance of
Dolnośląskie	39,735.2	46,197.5	6,462.3	113,152.6	149,354.6	36,202.0
Kujawsko-Pomorskie	8,560.4	12,062.7	3,502.3	15,682.5	26,270.4	10,587.9
Lubelskie	2,717.0	4,218.0	1,501.0	7,714.0	11,534.4	3,820.4
Lubuskie	8,526.2	10,733.6	2,207.4	14,141.2	24,563.6	10,422.4
Łódzkie	16,757.0	16,487.2	-269.8	27,747.3	41,505.2	13,757.9
Małopolskie	20,221.5	20,730.9	509.4	43,585.9	63,566.1	19,980.2

Mazowieckie	128,091.5	81,120.3	-46,971.2	296,468.8	202,376.0	-94,092.8
Opolskie	5,639.3	6,153.8	514.5	12,340.3	15,306.2	2,965.9
Podkarpackie	9,630.3	13,903.9	4,273.6	25,980.9	35,446.1	9,465.2
Podlaskie	2,279.4	2,722.7	443.3	3,224.1	5,676.6	2,452.5
Pomorskie	15,134.2	17,534.6	2,400.4	45,049.8	58,275.5	13,225.7
Śląskie	49,972.1	67,047.5	17,075.4	108,329.9	139,827.6	31,497.7
Świętokrzyskie	2,188.0	4,033.5	1,845.5	6,248.7	10,633.6	4,384.9
Warmińsko-Mazurskie	4,011.2	5,859.2	1,848.0	6,353.6	10,663.7	4,310.1
Wielkopolskie	54,152.1	51,058.2	-3,093.9	109,401.1	111,351.7	1,950.6
Zachodniopomorskie	11,681.3	15,748.5	4,067.2	16,645.2	33,684.8	17,039.6
POLAND	379,296.7	375,612.1	-3,684.6	852,065.9	940,036.1	87,970.2

Source: Author's own study based on data from the Central Statistical Office Local Data Bank (BDL GUS).

The spatial structure of the imports was dominated by companies from the Mazowieckie Voivodship during both periods analysed, followed by companies from Wielkopolskie, Śląskie and Dolnośląskie voivodships.

The total value of exports of goods and services in 2023 made by companies with foreign capital in Poland was higher than the value of imports, which indicates a positive balance of foreign investment companies during this period.

As in the case of imports, the largest share of exports was then held by companies operating in the Mazowieckie Voivodship, however, the region recorded a significant negative trade balance. That was also the case in 2013.

At that time, a large negative trade balance resulted in a negative trade balance of foreign-owned entities for the country as a whole during that period. At that time, the value of imports exceeded the value of total exports by PLN 3,684.6 million.

4.2 Synthetic Foreign Capital Meter for Polish Voivodships

The study of voivodships according to the synthetic meter, calculated using the Z. Hellwig method, based on 12 characteristics related to foreign capital showed that the dominant region in terms of the location of foreign capital in Poland is the Mazowieckie Voivodship.

Due to the fact that for this region the values of all diagnostic variables were highest in both analysed years, the Mazowieckie Voivodship plays the role of a model region, to which other regions were compared. Table 4 shows the results of the survey conducted for 2013 and 2023.

Table 4. Value of synthetic foreign capital meter for Polish voivodships in 2013 and 2023

No.	2013		No.	2023	
	Voivodship	Index value [d _i]		Voivodship	Index value [d _i]
1	Mazowieckie	1.0000	1	Mazowieckie	1.0000
2	Wielkopolskie	0.4374	2	Wielkopolskie	0.4647
3	Dolnośląskie	0.4308	3	Dolnośląskie	0.4465
4	Śląskie	0.4238	4	Śląskie	0.4270
5	Małopolskie	0.3557	5	Małopolskie	0.3469
6	Zachodniopomorskie	0.3421	6	Pomorskie	0.3360
7	Pomorskie	0.3331	7	Zachodniopomorskie	0.3276
8	Łódzkie	0.3132	8	Łódzkie	0.3086
9	Lubuskie	0.2996	9	Lubuskie	0.2865
10	Opolskie	0.2772	10	Opolskie	0.2750
11	Podkarpackie	0.2771	11	Lubelskie	0.2692
12	Kujawsko-Pomorskie	0.2690	12	Podkarpackie	0.2686
13	Lubelskie	0.2440	13	Kujawsko-Pomorskie	0.2643
14	Świętokrzyskie	0.2437	14	Podlaskie	0.2561
15	Warmińsko-Mazurskie	0.2403	15	Świętokrzyskie	0.2458
16	Podlaskie	0.2322	16	Warmińsko-Mazurskie	0.2277

Source: Authors' calculations.

It should be noted that the distance between the leader and the second-placed Wielkopolskie Voivodship is large, although it has decreased slightly in 2023 (index value: 0.4647) compared to 2013 (0.4374). Furthermore, the results achieved by all voivodships in both analysed years are very similar.

In the case of half the regions, the index value in 2023 was lower than in 2013, which indicates an increase in the distance compared to the Mazowieckie Voivodship (a model).

These included the following voivodships: Małopolskie, Zachodniopomorskie, Łódzkie, Lubuskie, Opolskie, Podkarpackie, Kujawsko-Pomorskie and Warmińsko-Mazurskie.

The study allowed for the classification of voivodships in terms of their differences in the level of foreign capital impact on the region's economy and their attribution to the following groups (Adamowicz and Janulewicz, 2012):

- I. voivodships with the highest level of foreign capital influence on the economy: $d_i \geq \bar{d}_i + S_{d_i}$, for 2023: $d_i \geq 0.5450$; for 2013: $d_i \geq 0.5420$;

- II. voivodships with a high level of foreign capital influence on the economy:
 $\bar{d}_i \leq d_i < \bar{d}_i + S_{di}$, for 2023: $0.3594 \leq d_i < 0.5450$; for 2013:
 $0.3575 \leq d_i < 0.5420$;
- III. voivodships with a low level of foreign capital influence on the economy:
 $\bar{d}_i - S_{di} \leq d_i < \bar{d}_i$, for 2023: $0.1738 \leq d_i < 0.3594$; for 2013:
 $0.1729 \leq d_i < 0.3575$;
- IV. voivodships with the lowest level of foreign capital influence on the economy: $d_i < \bar{d}_i - S_{di}$, for 2023: $d_i < 0.1738$; for 2013: $d_i < 0.1729$.

Only the Mazowieckie Voivodship qualified for the first group in both years under analysis. This means that it is the most attractive place for foreign investors to locate capital in Poland.

Wielkopolskie, Dolnośląskie and Śląskie voivodships were among the regions with a high impact of foreign capital on their economy in both analysed periods. All others were included in the third group – voivodships with a low level of foreign capital influence on the economy.

4.3 Foreign Capital in the Wielkopolskie Voivodship

Wielkopolskie Voivodship belongs to the most economically developed regions of Poland. Its share in national GDP was 9.8% in 2023%. Higher shares in national GDP were attributable only to the Mazowieckie Voivodship – 23.8%, and Śląskie Voivodship – 11.9%.

In terms of GDP per capita in the same year, the Wielkopolskie Voivodship was ranked third in the country, behind the Mazowieckie and Dolnośląskie Voivodships. The registered unemployment rate there at the end of December 2023 was 3.0%, the lowest in Poland (Urząd Statystyczny w Poznaniu 2024).

A high level of economic development can foster the interest of foreign investors in this region. Figure 5 shows how the number of entities with foreign capital participation in Wielkopolskie Voivodship changed between 2013 and 2023, as well as the number of employees.

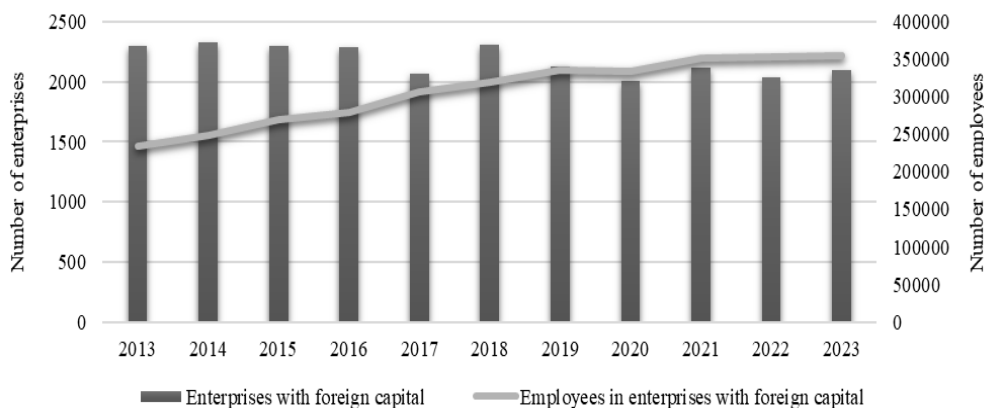
Over the period analysed, it is visible that the change in the number of enterprises has taken a downward trend, while the number of employees in entities with foreign capital has increased, reflecting the national trend.

The majority of companies with foreign capital (2,333) functioned in the voivodship in 2014. The lowest number of economic entities with foreign capital – 2,006 carried

out operations in that area in 2020. In the same year, there was also the only decrease in the number of people employed in this type of entities.

This was without a doubt related to lock-down and the plight of businesses caused by the economic crisis that followed the COVID-19 pandemic.

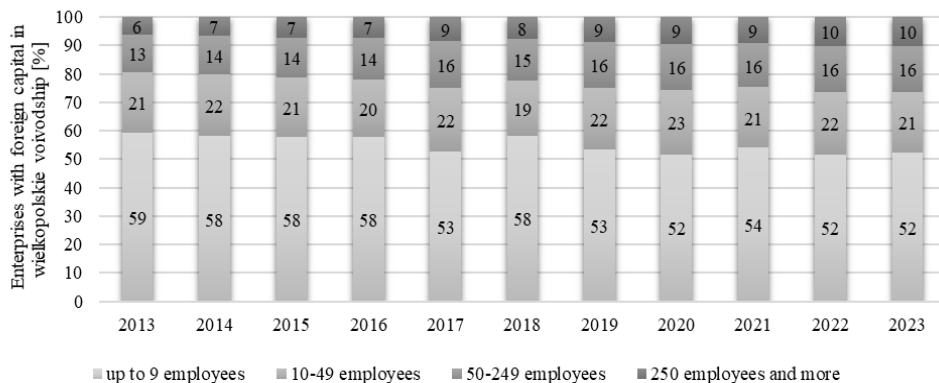
Figure 5. *Number of enterprises with foreign capital in Wielkopolskie Voivodship and the number of persons employed in them in the years 2013-2023.*



Source: *Author's own study based on data from the Central Statistical Office Local Data Bank (BDL GUS).*

Data on the change in shares of individual groups of enterprises (according to size classes) in the total number of foreign investment companies in the Wielkopolskie Voivodship in the years 2013-2023 are shown in Figure 6.

Figure 6. *Enterprises with foreign capital in Wielkopolskie Voivodship by size class in the years 2013-2023*



Source: *Author's own study based on data from the Central Statistical Office Local Data Bank (BDL GUS).*

In each year, micro-enterprises were the most numerous group of all entities with foreign capital – their percentage ranged from 52% to 58% of the total number of such companies, noting that this value decreased over the years in favour of medium-sized and large enterprises.

The share of persons working in large foreign-invested enterprises (employing at least 250 people) between 2013 and 2023 in the total number of persons employed in entities with foreign capital located in Wielkopolskie Voivodship was by far the highest and showed an increasing trend from 79% in 2013 to 85.4% in 2023.

By contrast, the proportion of employees in all other types of businesses was decreasing. In 2023, micro-enterprises employed 1% of the total number of employees in foreign-invested enterprises in the analysed voivodship, small enterprises – 3% and medium-sized enterprises – 10.6%.

The largest share of foreign capital in Wielkopolskie Voivodship is located in entities in the industrial processing sector. The second major group is made up of commercial and motor vehicle repair businesses.

It is worth to note that, as a rule, industrial processing entities, are large companies which involve higher capital values, which is why the share of companies carrying out such activities in the total number of companies with foreign capital is lower in both analysed years than the share of the capital involved in this industry. Meanwhile, trading companies, accumulate much less capital despite the fact that their numbers are lower due to their greater fragmentation (Figure 7).

The key group of foreign investors in the Wielkopolskie Voivodship is comprised of shareholders from Germany (27.1% in 2013 and 24.5% in 2023), and the Netherlands (approximately 25.5% in 2013 and 17.2% in 2023).

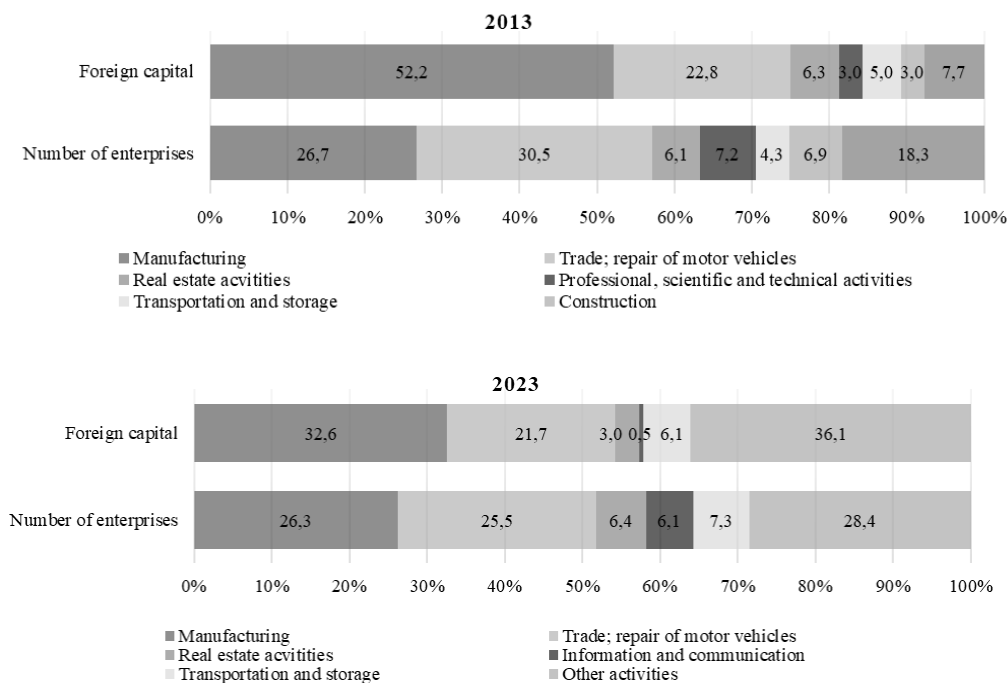
In the overall structure of the origin of foreign capital in Poland, these two countries also play the most prominent role, with the share of Dutch capital in the country in total being the largest than that of German capital in 2023 (BDL, GUS).

The results of a study commissioned by the authorities of the Wielkopolskie Voivodship confirmed that the key factor determining the inflow of foreign capital to the region is its transit geographical location (Pawlak, Standar, Kołodziejczak, 2016).

The advantages of the Wielkopolskie Voivodship, which influence its investment attractiveness include, in particular, a high level of economic development, high industrial productivity, the Poznań International Fair, a well-developed technical infrastructure and a service system supporting business, high quality labour market – well-educated and skilled personnel, due to the presence of large scientific centres, such as:

Poznań University of Technology, Poznań University of Economics and Business or Adam Mickiewicz University, good transport links or the presence of the international Airport Poznań – Ławica (PAIiH).

Figure 7. Share of enterprises with foreign capital and value of foreign capital by NACE section in Wielkopolskie Voivodship in 2013 and 2023 [%]



Source: Author's own study based on data from the Central Statistical Office Local Data Bank (BDL GUS).

Wielkopolskie Voivodship is characterised by a significant concentration of foreign capital in Poznań and Poznań district. Due to the location of the regions close to the Polish-German border, German investors dominate there. Polish branches of foreign entities such as: Volkswagen or Bridgestone employ the most employees in the region and have a positive impact on the influx of new technologies, manufacturing methods and management methods into the voivodship.

Those companies are also among the largest exporters in Poland. Nevertheless, the adverse phenomenon is the negative balance of trade conducted jointly by entities with foreign capital participation in the analysed region. This demonstrates the strong dependence of businesses on foreign partners and has a negative impact on the economic growth dynamics of Wielkopolskie Voivodship.

5. Conclusions

The analysis supported the hypotheses raised in the introduction.. The study of the voivodships involving the development of a synthetic index, based on Hellwig's method, showed that there is a single voivodship – Mazowieckie with a significant concentration of the number of companies with foreign investors as members, as well as the value of the capital invested by them in those entities.

The presented data shows that the Wielkopolskie Voivodship, along with the Dolnośląskie and Śląskie voivodships, belongs to regions with a significant foreign capital significance, however, the distance between them and the Mazowieckie Voivodship in this respect is very high and this has not changed in the years under review.

Given that foreign capital is now one of the most important factors in the economic development of regions, it should be an impulse for the central and local authorities to intensify their efforts to enhance the investment attractiveness of regions.

Unfortunately, a large number of local government units in Poland are still waiting for a foreign investor to establish contact with them, few of them contact them on their own to present their offer, which could be an opportunity to attract capital. In the case of Wielkopolskie Voivodship, the obstacle to effective promotion of individual municipalities is, in particular, the lack of financial resources (Pawlak, Standar, and Kołodziejczak, 2016).

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