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The Oligopolistic Structure of the Cement Market in Poland after Complete Takeover by Foreign Capital

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Abstract:

Purpose: *The purpose of this article is to analyse the structure and degree of concentration of the Polish cement market and to assess whether it exhibits persistent oligopolistic characteristics in the context of increasing integration into global value chains and evolving competitive pressures.*
Design/Methodology/Approach: *The study applies a quantitative analysis of market structure based on firms' financial data, in particular sales revenues derived from financial statements. Market concentration is assessed using the Herfindahl–Hirschman Index (HHI) and concentration ratio (CR_k), while structural stability over time is evaluated using the Proportional Similarity Index (PSI). The analysis covers the period 2019–2024.*
Findings: *The results confirm that the Polish cement market is highly concentrated and exhibits stable oligopolistic features. The leading firms maintain dominant market positions over time, and structural changes are limited, as evidenced by consistently high PSI values. The sector remains strongly influenced by a small number of multinational corporations integrated into global production networks.*
Practical Implications: *The findings highlight the need for continued antitrust monitoring and competition policy enforcement in the cement sector. Given the high level of concentration and history of anti-competitive conduct, regulatory oversight remains essential to ensure effective competition and to protect downstream users such as the construction industry.*
Originality/Value: *The article contributes to the literature by combining traditional concentration measures with a structural similarity approach to assess both the level and stability of market concentration in a capital-intensive, oligopolistic industry. It also provides updated empirical evidence on the Polish cement market in the context of global integration and environmental cost pressures.*

Keywords: *Oligopoly, market concentration, Proportional Similarity Index.*

JEL codes: *L13, L61, L40.*
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1. Introduction

Market analysis is of particular importance from the perspective of competition policy. In the literature, the cement market is frequently identified as an example of an oligopolistic market (Allevi *et al.,* 2018; Yang, 2020; Barjot, 2022; Айдарова, 2026; Salvatierra Espinosa *et al.,* 2022; Roberts *et al.,* 2023; Hüschelrath *et al.,* 2013). This is primarily due to the limited number of producers and the existence of substantial barriers to entry.

The construction of a cement plant requires access to raw material deposits, significant investment, and compliance with stringent environmental regulations. These factors constrain the expansion of production capacity and hinder the entry of new firms into the market. Furthermore, global cement production is concentrated in the hands of a relatively small number of multinational corporations (Global Cement Top 100, 2026).

Under such conditions, market equilibrium is shaped through strategic interactions among producers, who adjust their production and pricing decisions to maximize individual profits. However, these firms operate within a common market environment, implying that their decisions are mutually interdependent. Each producer must consider the likely responses of its competitors, resulting in the strategic interdependence that is characteristic of oligopolistic markets. Consequently, prices and output levels are not determined solely by the mechanisms associated with perfect competition.

The Polish cement market has undergone significant structural changes since the economic transition of the 1990s (Igliński and Buczkowski, 2017). The privatization process led to the acquisition of domestic cement plants by international corporations (Bochan, 2012; Domański, 2001; Igliński and Buczkowski, 2017.). As a result, the sector is currently controlled by several large global business groups.

Among the companies operating in Poland are three firms ranked among the world's ten largest cement producers: Holcim, Heidelberg Materials, and CEMEX (Global Cement Top 100, 2026).

The aim of this article is to analyze the structure of the Polish cement market and to assess its degree of concentration during the period 2019–2024. The study focuses on identifying the market positions of the largest firms operating in the industry and determining the extent of dominance exercised by the leading producers.

The analysis employs the Herfindahl–Hirschman Index (HHI) as well as the concentration ratio CR_k, which are among the most widely used measures of market structure in economic research and competition policy analysis. These indicators were calculated based on firms' shares in total sales revenues generated within the Polish cement market.

Such approach makes it possible to capture the economic significance of individual firms and to evaluate the degree of market concentration from the perspective of sales value rather than solely in terms of production volume.

2. Literature Review

Oligopoly is one of the fundamental market structures, characterized by the presence of a small number of firms holding significant market shares and many buyers. In an oligopolistic market, products may be homogeneous, as in the case of the fuel industry, or differentiated, which is more common in sectors such as the automotive and electronics industries. A key feature of oligopoly is the existence of technological, capital, or economic barriers to entry that limit the ability of new competitors to enter the market. As a result, the market is dominated by a few large firms whose actions exert a substantial influence on overall market performance (Sloman and Garratt, 2016).

The most distinctive characteristic of oligopoly is the interdependence among firms. Decisions regarding output levels, pricing strategies, or marketing activities must consider the potential reactions of competitors. Consequently, firms do not operate independently but rather make decisions under conditions of strategic interaction. In practice, this creates a dilemma: companies may compete to increase their market share or seek to reduce competitive pressure through various forms of cooperation or tacit agreements. Such arrangements are generally aimed at stabilizing the market and maximising profits by avoiding costly price competition (Colander, 1998).

A consequence of this interdependence is the relative stability of prices in oligopolistic markets. Firms tend to avoid frequent price adjustments and typically respond only to significant and persistent changes in demand or production costs. A special case of oligopoly is a duopoly, in which only two firms supply the same product.

On the demand side, related market structures include oligopsony, where a small number of buyers interact with many sellers, and monopsony, characterised by the presence of a single dominant buyer. These market structures demonstrate that the concentration of market power on either the supply or demand side can significantly influence competition, pricing mechanisms, and the overall efficiency of market operations (Sloman and Garratt, 2016).

The strategic interdependence of firms operating in oligopolistic markets has made oligopoly one of the central areas of application of game theory in economics. Firms must anticipate competitors' reactions when making decisions regarding prices, output, investment, and innovation, which distinguishes oligopoly from both perfect competition and monopoly. Unlike perfect competition, oligopolistic firms consider competitors' reactions when making strategic decisions. In an oligopoly, firms can compete on both production volume and price.

The choice of strategy depends on product characteristics, production technology, and cost structure. A key characteristic of oligopoly is the ability to achieve above-average economic profits thanks to limited competitive pressure. At the same time, firms may strive to maintain market stability by taking actions that limit aggressive rivalry (Waldman and. Jensen, 2019).

Competition in the cement industry can be analyzed from the perspective of two models (Ponssard and Hoarau, 2025; Ryan, 2012; Leone *et al.,* 2022). In the short run, the market is most described using the Cournot competition model, in which firms compete by adjusting their output levels while utilizing existing production capacity.

This implies that producers make decisions regarding output under the assumption that their infrastructure and production capabilities remain unchanged. In the long run, however, competition encompasses processes of entry by new firms into the market and exit of existing participants. These changes are often associated with technological progress and the need to modernize production facilities.

Of particular importance is the replacement of older, less efficient kilns with more modern ones, thereby reducing energy consumption and production costs. As a result, long-run competition influences not only market structure but also the overall level of technological efficiency within the sector. The two models are closely interrelated, as investment decisions made in the long run determine the conditions of competition observed in the short run. In practice, however, cement producers did not rely solely on competitive strategies to protect their market positions and revenues.

Historically, European companies limited aggressive rivalry through cartel agreements. Such actions led to investigations at the European level, aimed at detecting and ending the violations (European Commission, 1994).

They resurfaced around the time of EU enlargement in 2004 – being detected by national competition authorities in Germany (2003) and in Poland (2009) (Fulk and Frubing, 2015). In each case, companies that engaged in practices restricting effective competition were subjected to significant financial penalties, highlighting the importance of enforcing competition law in the cement industry.

3. Research Methodology

The following research hypothesis was formulated: The Polish cement market exhibits characteristics of a persistent oligopoly, in which the dominant position of the largest producers is maintained over time.

To verify this hypothesis, the following research questions were posed:

- What was the level of concentration in the Polish cement market in the period 2019–2024?
- Did the largest cement producers maintain dominant market shares throughout the period analyzed?
- To what extent was the structure of firms' market shares in the cement industry stable over time?
- Did changes in individual producers' market shares lead to significant changes in the overall level of market concentration?
- Do the values of concentration measures confirm the existence of persistent oligopolistic characteristics in the Polish cement market?

In the analysis of the cement market, firms' market shares were calculated on the basis of financial data derived from financial statements, in particular income statements. Sales revenue was adopted as the measure of market size and was related to the total revenue generated by all firms included in the study.

Measures commonly used to assess the degree of market concentration include the concentration ratio (CR_k) and the Herfindahl–Hirschman Index (HHI) (Pavic et al., 2016). The concentration ratio CR_k measures the combined market share of the largest firms:

$$CR_k = \sum_{i=1}^{k} s_i \tag{1}$$

where s_i - the market share of sales of the i-th firm in the total sales of n firms.

The CR_k index ranges from close to zero (in a highly fragmented market) to 100 (in the case where K firms account for 100% of total market sales).

The second commonly used measure is the Herfindahl–Hirschman Index (HHI), which is calculated as the sum of the squared market shares of all firms:

$$HHI = \sum_{i=1}^{n} (s_i)^2 \tag{2}$$

The Herfindahl–Hirschman Index (HHI) is most frequently used in antitrust proceedings and sectoral regulation. The higher the value of the index, the greater the degree of market concentration.

The HHI ranges from close to zero (in a highly competitive market) to 10,000 (in the case of a pure monopoly), assuming market shares are expressed in percentage terms. It was originally developed and applied by US antitrust authorities.

The European Commission treats its level and changes over time as key indicators of market power (European Commision, 2022). The HHI is interpreted as follows (U. S. Department of Justice and Federal Trade Commission):

- HHI below 1,500 – indicates a competitive market
- HHI between 1,500 and 2,500 – indicates a moderately concentrated market
- HHI equal to or above 2,500 – indicates a highly concentrated market
- HHI equal to 10,000 – indicates a monopoly with no competition.

Structural similarity between market-share distributions in consecutive years is measured using the Proportional Similarity Index (PSI). The PSI ranges from 0 to 100, where values closer to 100 indicate a high degree of similarity between market structures in consecutive periods, while values closer to 0 reflect substantial structural changes. In the present study, higher PSI values therefore indicate greater stability of the market structure over time (Levy *et al.,* 2025).

$$PSI = \sum_{i=1}^{n} \min (p_i, q_i) \tag{3}$$

where p_i – the proportion (share) of the i-th firm in period t, q_i – the proportion (share) of the i-th firm in period t+1.

4. Research Results and Discussion

The production capacity of cement plants located in Poland is estimated at approximately 20 million tonnes of cement per year. An analysis of monthly cement production reveals clear seasonal fluctuations.

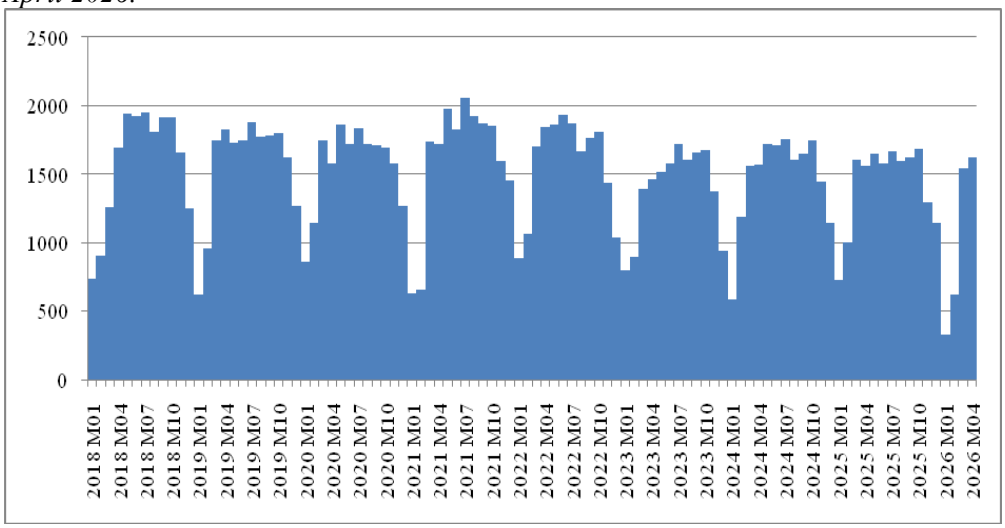
The lowest production levels are typically observed in the winter months, particularly in January and February, which is associated with reduced activity in the construction sector. With the beginning of the construction season, production increases steadily, reaching its highest levels in the summer and autumn months.

In recent years, one of the main sources of competitive pressure has been the rapidly increasing import of cement from Ukraine (Baic *et al.,* 2024). In the coming years, cement imports into Poland are expected to depend primarily on the relationship between production costs in third countries and the costs incurred by EU producers because of climate policy (Gosk and Rudowska, 2025).

The ownership structure of the cement sector in Poland is characterised by a highly concentrated oligopoly, controlled by a small number of global capital groups. This structure is the outcome of the systemic transformation and privatisation of former state-owned enterprises, which took place mainly in the 1990s. Currently, there are nine integrated cement plants operating a full production cycle (Górażdże, Kujawy,

Małogoszcz, Chełm, Rudniki, Ożarów, Nowiny, Warta, Odra), two grinding plants for cement and additives (Ekocem and Gdynia), and one alumina cement plant (Górka Cement in Trzebinia).

Figure 1. *Monthly cement production in Poland (thousand tonnes), January 2018–April 2026.*



Source: *Statistics Poland (GUS), https://new.stat.gov.pl/.*

The main actors shaping the market structure are multinational corporations that have integrated Polish facilities into their broader European production networks.

The key capital groups and their respective units include:

- Heidelberg Materials (Germany): Górażdże cement plant, Ekocem grinding plant in Dąbrowa Górnicza.
- Holcim (Switzerland/France, formerly Lafarge): Kujawy and Małogoszcz cement plants.
- CEMEX (Mexico): Chełm and Rudniki cement plants, and the Gdynia grinding plant.
- CRH (Ireland): Ożarów cement plant.
- Dyckerhoff / Buzzi (Italy/Germany): Nowiny cement plant.
- Polen Cement (Germany): Warta cement plant.
- Miebach (Germany): Odra cement plant in Opole.
- Mapei (Italy): Górka Cement plant in Trzebinia.

This structure is characterised by a high degree of vertical integration. Firms such as Heidelberg Materials and Holcim Polska control not only cement production but also aggregates extraction and ready-mixed concrete plants. This structure enables cost optimization but simultaneously creates barriers to entry for competitors lacking

their own raw material base. Structural changes occur almost exclusively through mergers and acquisitions within the existing oligopolistic framework.

Market share analysis constitutes a fundamental element in assessing the degree of market concentration. In the case of the Polish cement market, most of the production is controlled by a small number of large enterprises belonging to international capital groups.

The largest market shares in the period 2019–2024 were held by Heidelberg Materials (Górażdże Cement), Holcim Polska (Kujawy and Małogoszcz cement plants), and Cemex (Chełm and Rudniki cement plants).

Table 1. *Market shares of firms (%)*

Company name	2019	2020	2021	2022	2023	2024
CEMEX Polska Sp. z o. o.	18.7	19.0	18.7	18.0	17.6	18.1
Górażdże Cement S.A.	19.3	20.9	20.2	20.1	21.0	20.9
Cement Ożarów S.A.	13.8	13.4	13.3	13.7	13.9	14.0
Dyckerhoff Polska Sp. z o.o.	8.2	7.6	7.7	7.2	7.3	7.0
Cementownia Warta S.A.	8.7	9.6	9.5	9.6	8.7	10.7
Cementownia Odra S.A.	3.4	3.3	3.3	3.3	3.6	3.4
Górka Cement Sp. z o.o.	3.1	3.1	3.3	3.4	2.8	2.5
Holcim Polska S.A.	24.7	23.0	23.9	24.6	25.1	23.3

Source: *Authors' calculations.*

In the period 2019–2024, the three largest producers controlled over 60% of the market, the four largest producers accounted for more than 75% of the market, and the five largest producers held over 85% of the market (the CR_3 ratio exceeded 60, the CR_4 ratio exceeded 75, and the CR_5 ratio was above 85). This indicates a level of concentration characteristic of an oligopolistic market structure.

Table 2. *Analysis of market concentration in the cement industry*

	2019	2020	2021	2022	2023	2024
CR_3	62.8	62.9	62.8	62.7	63.7	62.3
CR_4	76.7	76.3	76.1	76.4	77.6	76.4
CR_5	85.3	85.9	85.7	86.1	86.3	87.0
HHI	1,692	1,678	1,679	1,689	1,724	1,686

Source: *Authors' calculations.*

The HHI for the cement market exceeds 1,500 points, indicating that the market is moderately concentrated. In practical terms, this implies that the actions of the largest producers have a significant impact on the competitive conditions of the entire sector. Investment, production, and pricing decisions made by market leaders influence the behaviour of other market participants.

Table 3. *Proportional Similarity Index (PSI)*

	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024
PSI	97.2	98.8	98.8	98.2	97.4

Source: *Authors' calculations.*

The values of the Proportional Similarity Index for consecutive periods exceed 97%, which indicates a very high degree of similarity in the analyzed market structures over time. The results therefore point to a high degree of persistence and stability in the market structure throughout the entire period analyzed. Despite some shifts in market share among participants, no significant changes in the competitive structure or substantial restructuring of the market were observed.

Pricing policy in cement companies is one of the most important areas of competition. At the same time, the specific characteristics of the market mean that firms rarely engage in aggressive price competition. Cement production requires substantial capital investment and is characterized by high fixed costs. This implies that firms seek to maintain high levels of capacity utilization. In certain situations, they may apply selective discounts to large customers; however, this does not lead to a sustained reduction in market prices.

High market concentration increases the transparency of competitors' actions. Each producer can monitor the activities of other market participants. This situation favours the maintenance of relatively stable price levels and simultaneously reduces incentives for aggressive competition. Information on price changes is rapidly transmitted across the market. Consequently, producers can adjust their own strategies in response to competitors' behaviour, giving rise to mutual interdependence of pricing decisions.

The oligopolistic structure of the market, dominated by foreign capital, supports the maintenance of stable market shares, which in turn limits the intensity of price competition. The Office of Competition and Consumer Protection (UOKiK), Poland's antitrust and consumer protection authority, has repeatedly emphasized that the Polish cement market is controlled by a small number of international groups, which facilitates the coordination of market behaviour. This stability is further reinforced by structural interdependencies and a shared history of producer associations.

The most serious negative consequence of high capital concentration was the so-called cement cartel uncovered by UOKiK, which operated for over a decade (Ostoj, 2015; Fink and Frübing, 2015; Knapp and Korycińska-Rządca, 2017; Bejger, 2010; Bychowska, 2022).

Seven major producers (including Lafarge, Heidelberg, and Cemex) coordinated prices, divided markets, and exchanged confidential commercial information, constituting a serious infringement of competition law.

These practices ensured income stability for firms at the expense of consumers, who were forced to pay inflated prices. The experience of the cement cartel remains one of the most significant reference points in the history of Polish competition law.

In 2009, the President of UOKiK issued a decision imposing what was at the time a record fine (over PLN 411 million) on seven major grey cement producers, which collectively controlled almost 100% of the domestic market. The investigation found that companies such as Lafarge, HeidelbergCement, Cemex, Dyckerhoff, Grupa Ożarów, Warta, and Odra had, for more than a decade (since at least 1998), coordinated prices, divided the market geographically and by product range, and exchanged confidential commercial information.

This mechanism emerged during the economic transition period, when producers - accustomed to the absence of competition in a centrally planned economy, where cooperation between producers was even encouraged - attempted to protect their existing customer base and, through mutual arrangements, to avoid price rivalry and secure stable revenues at the expense of consumers.

Given the specific structure of the construction materials sector, competition authorities place particular emphasis on controlling concentration using conditional merger approvals. Although the sector is dominated at the national level by a small number of global capital groups, it is in fact local and regional in nature.

This is due to the high transport sensitivity of products such as ready-mixed concrete, whose economically and technologically viable transport radius is typically limited to approximately 25 kilometres from the production plant. The same principle also applies to cement, as its economically efficient distribution is generally confined to a radius of approximately 200 km from the production facility. Transport over longer distances adversely affects distribution costs and, consequently, the firm's financial performance.

Under such conditions, even mergers between firms that are not globally dominant may lead to the creation of a quasi-monopoly in a specific local market, thereby justifying regulatory intervention based on the SIEC test (Significant Impediment to Effective Competition). An example of this approach is the case of Lafarge Cement / Eurobud Chajewscy (UOKiK, 2024). UOKiK concluded that the acquisition by Lafarge (part of the Holcim Group) of production assets in Piła would have resulted in the firm controlling two key concrete plants in the region, thereby eliminating effective competitive pressure.

The competition authority highlighted high barriers to entry, including the need for an appropriate location and access to aggregates, which prevents a rapid market response to potential price increases. To prevent unilateral effects, rather than issuing a prohibition decision, a conditional clearance was granted requiring the divestiture of one of the concrete plants in Piła to an independent operator.

The use of remedial measures instead of prohibitive decisions has become the dominant approach in this sector. It allows global groups to pursue consolidation strategies while simultaneously safeguarding the interests of local customers such as construction companies and property developers.

The activity of groups such as Holcim (Lafarge) in mergers and acquisitions means that the sector remains under continuous and stringent regulatory scrutiny. In 2025, UOKiK conducted analyses concerning the potential re-emergence of cartel-like behaviour in the cement market, which confirms the structural vulnerability of this industry to competition law infringements (UOKiK, 2025).

5. Conclusions

The inflow of foreign capital has led to the lasting integration of Polish assets into the global value chains of corporations such as Holcim, Heidelberg Materials, and Cemex. The Polish cement industry has become an integral part of the European production network, enabling knowledge transfer and logistical optimization with a transnational level.

The empirical findings of the study provide strong support for the research hypothesis that the Polish cement market exhibits characteristics of a persistent oligopoly, in which the dominant position of the largest producers is maintained over time. The results of the concentration measures (HHI, CR_k) indicate a sustained high level of market concentration, while the Proportional Similarity Index confirms a high degree of structural stability in successive periods.

In particular, the limited variation in market share among leading firms suggests that competitive positions within the industry remain largely unchanged over time. Although minor shifts in individual market shares are observed, they do not translate into significant changes in the overall market structure.

Consequently, the evidence suggests that the Polish cement industry is characterized by stable oligopolistic conditions with persistent dominance of a small number of major producers.

The history of the cement market demonstrates that there is a real risk of anti-competitive agreements being formed. Effective competition policy therefore remains a key prerequisite for maintaining a balance between the economic efficiency of the sector and the protection of customer interests.

A significant threat to the long-term sustainability of the sector in Poland is the increasing import pressure, as well as high energy costs and the cost of CO_2 emission allowances. The industry reports declining production in the face of competition from imports originating in countries with less stringent environmental regulations, which in the long run may threaten the profitability of domestic plants.

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