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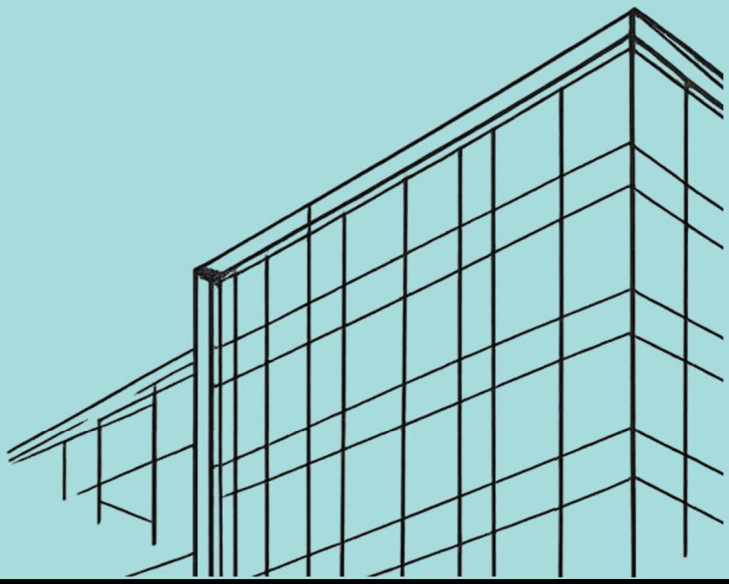

# World of Real Estate Journal

Świat nieruchomości

2025 | 120

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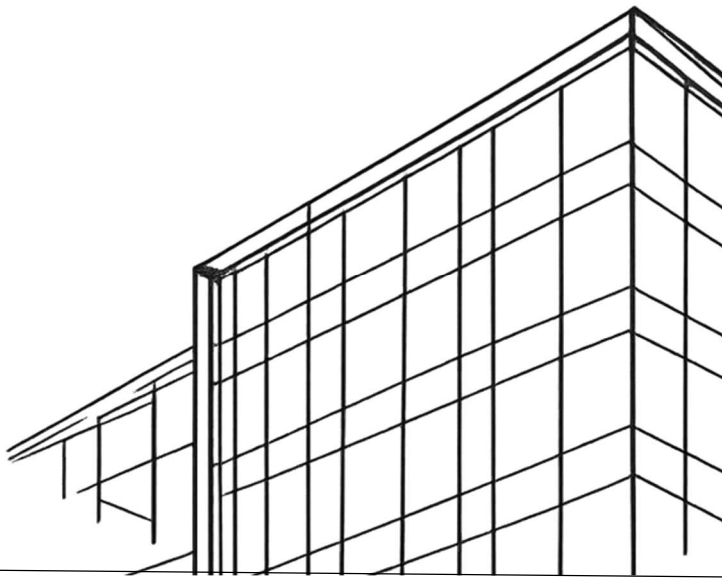

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World of Real Estate Journal
SWIAT NIERUCHOMOSCI

**2025,** Vol. 120

# Editorial: Contemporary regulatory and investment challenges in real estate

Joanna Wegrzyn[1]

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The contemporary real estate market in Poland is shaped by a complex interplay of many factors that operate simultaneously at regulatory, financial, spatial, and macroeconomic levels. Regulatory changes affect development processes and market transparency (Kucharska – Stasiak et al., 2022). Financial innovations influence access to capital and the adoption of sustainable principles (Węgrzyn & Kania, 2024). At the same time, pronounced spatial differentiation, reflecting uneven urban growth patterns, leads to divergent market dynamics across regions and cities (Bełej & Gwiaździńska-Goraj, 2025). The articles collected in this issue of World of Real Estate Journal address these challenges from complementary perspectives, offering a multidimensional view of risk, investment attractiveness, sustainability, and financial reporting within the real estate and construction sectors.

The issue opens with an analysis of investment risks associated with infrastructure projects implemented under public procurement procedures. Ewa Siemińska highlights the vulnerability of the construction sector to economic fluctuations and institutional conditions, drawing attention to tender strategies adopted by contractors in response to changing market environments.

A spatial and developmental perspective is introduced by Anna Wojewnik-Filipkowska and Klaudia Biała, who examine the investment attractiveness of residential housing markets in selected medium-sized Polish cities. Their findings suggest that local development policies, demographic dynamics, and infrastructure investments play a decisive role in shaping market attractiveness. In this context, real estate investment emerges as a potential instrument for counteracting urban shrinkage and supporting more balanced territorial development.

The theme of sustainability and financing is further developed in Ewa Gorlecka-Łabiak's contribution on green covered bonds. The analysis reveals that while green covered bonds offer significant potential as instruments for sustainable real estate financing, their development is constrained by systemic barriers, including the limited supply of environmentally efficient properties and insufficient regulatory clarity.

The financial dimension of regulatory change is further explored by Paweł Wiśniewski, who examines the impact of lease capitalisation under IFRS 16 on the golden financing rules in Polish real estate companies. The study demonstrates that changes in accounting standards exert a significant influence on the perceived asset and capital structure of firms, with direct implications for liquidity assessment and financial decision-making.

Taken together, risk management, spatial development, sustainable finance, and accounting regulation constitute deeply interconnected dimensions shaping investment decisions and market outcomes. By addressing these themes through empirical analysis and sector-specific case studies, this issue of World of Real Estate Journal contributes to a more nuanced understanding of the forces currently transforming the Polish real estate market and offers valuable insights for researchers, policymakers, and practitioners.

## References

Bełej, M. & Gwiaździńska-Goraj, M. (2025). Quantitative and spatial aspects of the real estate markets in the Warmian-Masurian Voivodeship, Poland. *Real Estate Management andValuation,* 33(4), 1-14. https://doi.org/10.2478/remav-2025-0031

Kucharska-Stasiak, E., Źróbek, S. & Żelazowski, K. (2022). European Union Housing Policy—an attempt to synthesize the actions taken. *Sustainability,* 14 (1), 39. https://doi.org/10.3390/su14010039

Węgrzyn, J., & Kania, K. (2024). Heterogeneous preferences for sustainable housing: evidence from Poland. *Journal of housing and the built environment*, *39*(2), 749-767. https://doi.org/10.1007/s10901-023-10101-6

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# Risks of investment projects implemented under public procurement in Poland

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## Abstract

**Objective:** The purpose of this article is to present, first, the main causes of contractual risk associated with infrastructure projects implemented under public procurement law in Poland, and second, the tender strategies used by construction companies. Against this background, the latest European Union regulations on the protection of domestic construction companies, in line with the idea of 'local content', are also presented.

**Material and methods:** The study mainly uses the method of analysis and evaluation of primary data on completed and ongoing tender procedures for the implementation of public infrastructure projects posted on the electronic tender platforms of the General Directorate for National Roads and Motorways and PKP Polskie Linie Kolejowe S.A., as well as on the EU tender platform.

**Findings:** The results of the research clearly indicate that the construction sector is highly susceptible to economic fluctuations and the associated availability of investment financing sources. An interesting observation is that contractors bidding for investment projects adapt to prevailing market conditions, which is reflected in the lowering or raising of bid prices depending on the level of competition, as well as the implementation of legal tools aimed at protecting the domestic construction market from the often aggressive strategies of companies from countries outside the European Union.

**Research limitations:** The databases used on tender procedures are not always complete and up to date, and therefore have their limitations in terms of information.

**Research implications:** The presented analyses imply the need for a broader study of the impact of economic fluctuations and external conditions on the (in)stability of entities in the construction sector and the effectiveness of introducing instruments to protect domestic entities against aggressive competition from third-country companies.

**Keywords:** Investment project risks; Public procurement; Investment project tender procedure; Local content
**JEL codes:** D81, D86, L50, R53
**Article type:** Review article
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## INTRODUCTION

Risk is inherent in every investment project, and there are many sources of risk. It turns out that the lack of a stable and predictable policy in Poland regarding public infrastructure projects that would strengthen domestic construction companies, especially during economic downturns or external threats such as pandemics or wars, supported by appropriate legal regulations, is not conducive to building competitive advantages and developing the construction sector.

The aim of this article is to present the most important causes of contractual risk associated with infrastructure projects carried out under the public procurement law regime in Poland and the tender strategies used by construction companies. In addition, the latest international regulations and good practices aimed at protecting domestic construction companies, in line with the idea of 'local content', are presented.

The article is based on an analysis of a large amount of empirical data on completed and ongoing tender procedures for public infrastructure projects posted on electronic tender platforms.

The study first identifies the nature and main sources of risk in construction contracts, and then provides numerous examples of road contracts awarded in particular by the General Directorate for National Roads and Motorways (GDDKiA), illustrating the various business strategies of construction companies participating in tender procedures. In addition, it points to current European Union legal instruments aimed at protecting domestic construction companies from often aggressive competition from third-country entities.

## LITERATURE REVIEW

Zaghloul and Hartman point out that over the past 50 years, both in the US and Canadian markets, the risks associated with the construction process have increased significantly due to a large number of diverse factors, however, these processes have not been accompanied by a change in the allocation of risk in construction contracts that is adequate to the changing situation (Zaghloul & Hartman, 2002). Similar conditions for the implementation of construction projects, which are exposed to high volatility in demand and conditions on the construction site, and in this context, the importance of risk management in the construction sector is highlighted by, among others, Almusaed and Almssad (Almusaed & Almssad, 2018, p. 49 ff.). Lam, Wang, Lee and Tsang emphasize the need for the parties to a construction contract to negotiate an appropriate

allocation of risk, which in practice often determines the success of a project (Lam, Wang, Lee, & Tsang, 2007).

Mazzucato, on the other hand, believes that the state should strengthen the importance of the public sector as an important pro-investment market participant and focus in particular on the long-term evaluation of projects and research (Mazzucato, 2013). Inshakova, Matytsin and Inshakova also add that sustainable economic development requires an appropriate investment policy supported by updated legal regulations (Inshakova, Matytsin and Inshakova) (2024).

„Global foreign direct investment (FDI) fell by 2% to $1.3 trillion in 2023 amid an economic slowdown and rising geopolitical tensions, according to the World Investment Report 2024. But the report highlights that the decline exceeds 10% when excluding the large swings in investment flows in a few European conduit economies" (UNCTAD, 2024).

In his famous October 2024 report on the future of European competitiveness (Draghi, 2024), Mario Draghi noted, among other things, that after the global financial crisis of 2008, capital savings and debt limits imposed in EU countries caused a slowdown in public investment, especially in new technologies and infrastructure projects. Therefore, in order to improve the competitiveness of the European Union, it is necessary to create a friendly investment climate and to start urgent work on deregulation and reducing bureaucracy (Draghi, 2024).

In addition, as in other countries, in Poland too, the uncertainty that increasingly accompanies us in various spheres of life and unexpected events such as the pandemic, the war in Ukraine, and the sharp rise in energy prices directly influences the investment decisions made by various groups of investors. This is reflected in Poland's persistently weak investment activity, measured by the investment rate, which in 2022 stood at a record low of 16.4%, while in 2023 it rose to 17.7% and in 2024 to 17.4% (Figure 1).

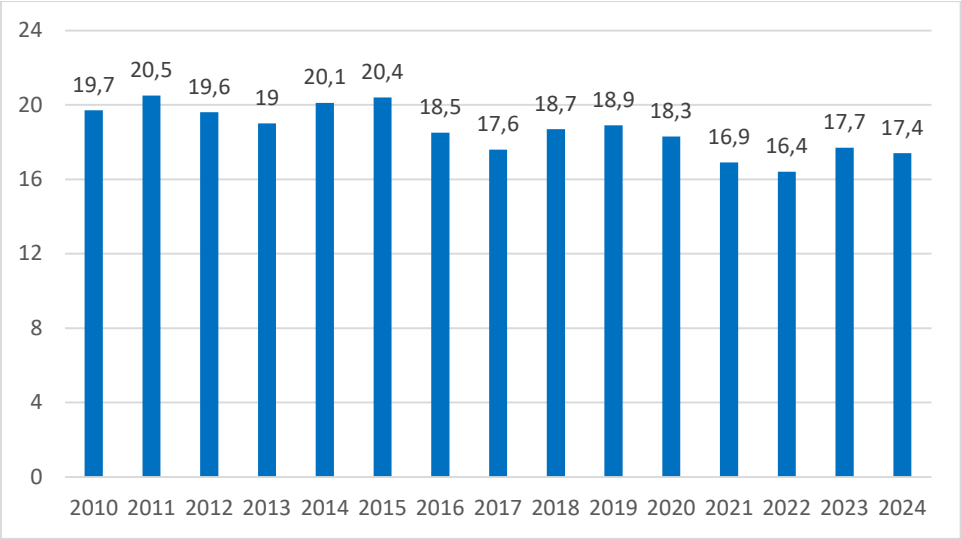


**Figure 1. Investment rate in Poland in 2010-2024 (%)**
Source: Macroeconomic indicators, GUS, stat.gov.pl (13.07.2025).

These macroeconomic conditions are also compounded by imbalances between supply and demand in various market segments, which are typical of a market economy. In the construction industry, economic fluctuations cause many problems for various groups of participants in investment processes and are largely related to the availability of funds for investment projects. Many of these projects, including those of strategic importance for the entire country, are carried out under public procurement law (PZP) (Act of September 11, 2019 Public Procurement Law), which does not always keep pace with the changing market situation and can be a source of various problems related to so-called contractual risk, i.e., the risk resulting from the provisions of the negotiated terms of the contract for the preparation and/or implementation of a given investment project (Siemińska, 2024). This is mainly due to at least several reasons, among which it is worth mentioning, among others (Siemińska, 2024), (Wysoczański, 2018):

1. asymmetry in contractual relations and an imbalance in the distribution of risk between the parties to a civil law contract concerning the preparation and/or implementation of an investment project (depending on the tender option: 'design and build' or 'build', especially when the client is a large public entity (Gransberg, 2023),
2. the long time that elapses between the submission of the tender offer and the actual start of the project, which, depending on the complexity of the procedure and the project itself, – from several months to even several years, which often results in the value of the signed contract deviating from

the actual costs incurred by the contractor for the implementation of the project and necessitates appropriate contract indexation,

3. the risk of leaving the construction site or not undertaking the works, or the bankruptcy of the contractor selected in the tender due to changing conditions in the investment process that directly affect the financial security of such an entity,
4. the dominance of the lowest price as the criterion for selecting bids in tender procedures, despite the use of non-price criteria, which in practice are most often declared by all bidders and do not constitute a real competitive advantage,
5. the lack of effective procedures and mechanisms limiting access to tenders for entities that are not reliable bidders and the resulting practice of open access to tenders for the implementation of strategic infrastructure projects, i.e., all potential interested parties, regardless of their country of origin and real financial, organizational, and technical capabilities,
6. the burdensome length of appeal and mediation proceedings, which has many negative consequences for all parties involved in a given investment process, as well as for the state treasury, from whose budget any penalties and damages awarded are ultimately paid,
7. the risk of construction contract insurance related to its (in)adequacy to events that may occur at various stages of the investment process, and the problem of the financial capacity of such insurance, which is a key parameter of any policy, determining the level of financial protection of the insured in the event of insured events and related damages.

Marques and Berg conclude that risk is a key issue in contracts with the private sector; an appropriate allocation of risks is a necessary condition for successful contracts (Marques & Berg, 2011) (Martell & Moldogaziev, 2025). In turn, the difficult choice of risk allocation strategies in infrastructure projects is discussed by, among others Jin and Zuo (Jin & Zuo, 2011). The advantages of price transparency in construction contracts are discussed, among others, by Gransberg, Pala and Gransberg, who emphasize that it is in the interest of contractors to demonstrate to the owner that their prices reflect the actual market situation and to avoid a situation in which the contractor withdraws from the project (Gransberg, Pala & Gransberg, 2025).

In addition, it is worth noting that various sources of risk may arise both before the actual commencement of work on the construction site, i.e. in the pre-investment phase of the project, and after the completion of the work, i.e. in the

operational phase, i.e. during the use of the project (Behrens and Hawranek, 1993) (Teixeira et al., 2009) (Table 1). Ko and others note that construction cost estimates are typically inaccurate early in the investment process because they are subject to the risk of imprecise definition of the full scope and specifications of the project (Ko et al., 2024).

**Table 1. Sources of risk in the individual phases of the investment project life cycle.**

| Phase | Sources and types of risk | Examples of risk effects |
|---|---|---|
| pre-investment | macroeconomic factors | – global crisis or economic slowdown<br>– wars<br>– natural disasters |
| | risk of a failed project | – high competition in a given market segment and, consequently, inability to achieve the intended results |
| | scale of the project | – the larger the project, the greater the risk, as a rule |
| | sectoral profile of the project | – some projects are subject to greater risk, e.g. road and rail projects, projects related to raw material extraction or energy |
| | technological solutions, including the level of innovation of the project | – the more innovative the solutions adopted by the designer, the greater the risk of the project during its implementation and operation |
| | location of the investment, including planning conditions | – the level of risk varies depending on whether the project is located in an area covered by a local plan or not |
| | impact of the project on the environment, including the natural environment | – the location of the project in "investment-sensitive" areas (e.g., floodplains or natura 2000 sites) increases its location risk |
| | image of the project among the local community | – lack of proper communication between the investor and the local community about the investment plans and the resulting lack of acceptance for the project. |
| | legal regulations concerning procedures and legal, environmental, fiscal, and financial regulations | – interpretation of legal regulations concerning a given investment project, e.g., regarding tax settlements or co-financing of a given project, building permits or their absence, expropriation decisions, etc. |
| investment | tender procedures and criteria, including those under public procurement law | – a grossly low price as the dominant criterion for selecting bidders or other evaluation criteria selection of a bidder that is unreliable in financial and/or technical and organizational terms |
| | poorly prepared tender documentation and project design and cost estimates | – problems and conflicts at the stage of selecting the bidder(s)<br>– making wrong business, environmental or location decisions based on incorrect or incomplete preliminary information about the project |
| | failure to obtain a building permit | – delays in the start of construction works and the risk of not meeting the deadline for the completion of the entire project |

| | | |
|---|---|---|
| | increase in production costs, inflation | – deterioration of the profitability of a given project if these changes are not accompanied by adequate contract indexation |
| | shortage of workers on the construction site | – delays in project implementation and higher implementation costs |
| | equipment failures, etc. | – as above |
| | negotiated terms of construction contracts | – lack of symmetrical distribution of contractual risk<br>– court disputes and time-consuming and costly claims<br>– payment of contractual penalties<br>– deterioration of the financial standing of the contracting parties |
| | relations between all participants in the investment process | – conflicts of interest between the investor, general contractor (consortium), subcontractors, suppliers, construction manager, contract engineer, cost estimators, etc. |
| | performance risk - unfair behavior of participants in the investment process | – falsification of construction documentation<br>– overestimation of cost estimates<br>– use of materials or equipment that do not meet the specified parameters (e.g., inferior quality)<br>– falsification of invoices<br>– unreliable performance of work on the construction site<br>– acceptance of a poorly constructed facility or refusal to accept it |
| | financial risk | – financial difficulties of all participants in the investment process, including the possibility of these problems spreading quickly from one company to another<br>– risk of bankruptcy of financially weaker market participants<br>– lack or loss of the possibility of (co-)financing the project |
| | risk of failure to meet project deadlines | – delays in generating the functional and economic benefits planned by the investor(s) |
| | reputation risk | – this risk concerns the possibility of loss of reputation by all participants in a given project and is related to the "contagion" effect. |
| operational | failure to obtain a use permit | – inability to start using a given facility<br>– inability to commercialize the investment |
| | technical risk | – neglect of mandatory technical inspections and the technical condition of a given facility |
| | market risk | – unsatisfactory level of use of the facility in relation to the assumed level<br>– the so-called "white elephant" syndrome, i.e. an overly large and costly project that is a burden on the owner<br>– competition in a given segment of facilities |
| | operational risk | – use of the facility contrary to its intended purpose and/or technical parameters, e.g. intensity of use<br>– unsatisfactory quality of services or level of functional parameters of the facility<br>– restrictions on the accessibility of the facility for users<br>– the impact of the project on the environment |

| | | |
|---|---|---|
| | location risk | – nuisances to the surrounding area, e.g., acoustic or traffic-related<br>– changes to the surroundings of a given project during its use<br>– irregularities in documentation, e.g., in the land register or cadastral maps relating to the project |
| | legal risk of the project | – irregularities in documentation, e.g., in the land register or cadastral maps relating to the project<br>– unregulated legal status of a given project |
| | financial risk | – lack of sufficient funds for facility maintenance<br>– lack of satisfactory income from the use of a commercial project<br>– increase in facility maintenance costs in relation to the assumed costs |

Source: Siemińska, 2024, s. 37-39.

## RESEARCH METHOD

The problems presented regarding the risks of construction contracts are illustrated with numerous current examples of investment projects commissioned mainly by the General Directorate for National Roads and Motorways and PKP Polskie Linie Kolejowe S.A., as the two most important leaders in public procurement on the Polish infrastructure project market.

The above information was obtained both (1) from primary sources obtained through a search of documents from selected tender procedures published on the websites of the aforementioned entities' purchasing platforms: https://gddkia.eb2b.com.pl/auction-public-opefning.html, https://platformazakupowa.plk-sa.pl/servlet/HomeServlet, and on the websites of the Polish government and the European Union: https://ted.europa.eu/pl, and (2) from secondary sources derived from professional industry materials (including tender data presented in Table 2).

Several criteria were used to select open tenders commissioned by GDDKiA, namely:

– the period of the study was from January 1, 2020, to June 30, 2025,
– the scope of works included the fragment "budo" in the description,
– the type of contract was "construction work."

These criteria were met by 843 tenders, of which 418 were excluded, concerning projects such as the construction of lighting, pedestrian and bicycle paths, sidewalks, noise reduction devices, connections to the sanitary or gas sewer system, construction of salt storage facilities, administrative buildings, expansion joints, etc., leaving 425 tenders for analysis. Of these, the following were selected:

1. 7 examples of construction projects commissioned by the General Directorate for National Roads and Motorways (GDDKiA), representing tenders with both relatively low and medium-to-high investment costs (see Table 3).
2. 13 additional tender examples were described in the last section of the study.

The examples presented correspond to the conditions and risks related to public investment projects described in this study and are also intended to present the tendering strategies of companies in the construction sector.

The study utilized research methods such as economic analysis, comparisons, analogies, synthesis, and critical analysis of practical examples of tender procedures (the aforementioned query of over 840 GDDKiA tenders) according to the criteria for selecting submitted bids adopted by the author. Additionally, current international regulations and best practices were analyzed as solutions aimed at protecting domestic companies from competition from entities, especially from non-European Union countries, in accordance with the concept of 'local content.'

## RESULTS & DISCUSSION

Uncertainty and risk are inherent in the activities of every company, especially in a rapidly changing environment, but entities in the construction sector experience them particularly strongly. Due to the lengthy investment process, the conditions for preparing a tender offer are often significantly different in practice from those that apply when the contractor physically enters the construction site and begins the project implementation phase until its completion. In addition, the Polish public investment market is subject to legal regulations resulting from the Public Procurement Law (Act of September 11, 2019, Prawo zamówień publicznych), which impose certain obligations and requirements on participants in the investment process that do not always keep pace with dynamically changing market and geopolitical conditions.

The tender procedure itself, carried out under public procurement law, covering the period from the date of publication of the contract notice to the date of conclusion of the contract specified in the contract award notice, for construction works with a value equal to or exceeding the so-called EU thresholds (Obwieszczenie, 2023) in 2023 averaged 127 days, in 2022 – 125 days, in 2018 – 96 days, in 2017 – 93 days, and in 2016 – 81 days (UZP, 2018, 2019, 2023, 2024).

However, according to the General Directorate for National Roads and Motorways (GDDKiA), the largest public investor alongside PKP PLK SA, the full cycle of preparation and implementation of a road investment project takes an average of 9-10 years, with most of this time devoted to the tedious and very time-consuming formal and administrative work that is crucial to the entire investment process and administrative work required by law, as well as obtaining the necessary permits, decisions, and opinions, on which the final decision on the possibility of entering the construction site and actually starting construction and assembly works will depend (GDDKiA, 2019). In addition, it often happens that tender procedures are accompanied by complaints and appeals, which cause further delays (GDDKiA, 2025b) (Miąsko, 2019). During this time, the market situation may change dramatically to the detriment of contractors, resulting in them not achieving their projected margins on projects or, worse still, the company incurring losses on previously planned orders. Recently, such periods of turmoil on the Polish market took place, for example, in 2015-2019, when the prices of construction materials increased significantly (Fig. 2), and during and after the Covid-19 pandemic in 2020-2024, which was related, among other things, was related to the lack of another pool of funds from the European Union funds planned for the period 2021-2027 (European Funds Portal, 2025). Examples of changes in the costs of constructing buildings, including public buildings, in recent years are illustrated in Figs. 2 and 3.

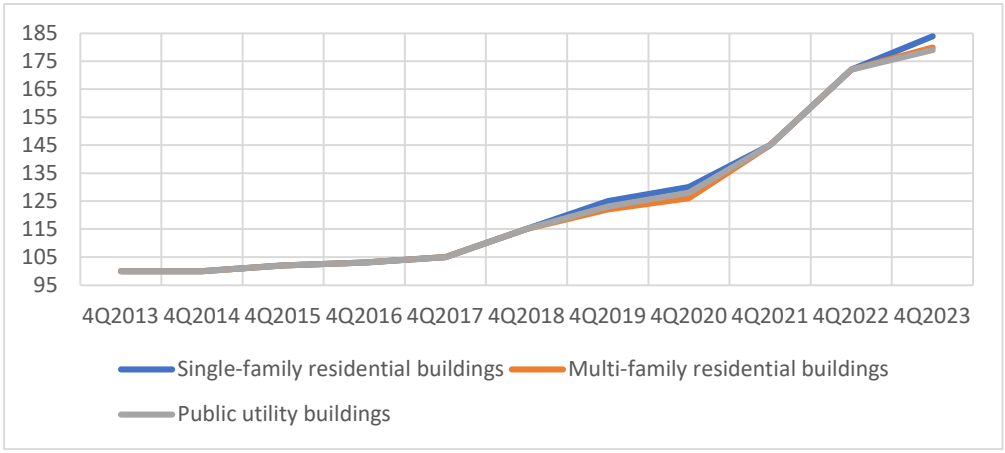


**Figure 2. Changes in construction costs (% cumulative) in Poland in 2013-2023**
Source: (Secocenbud, 2024)

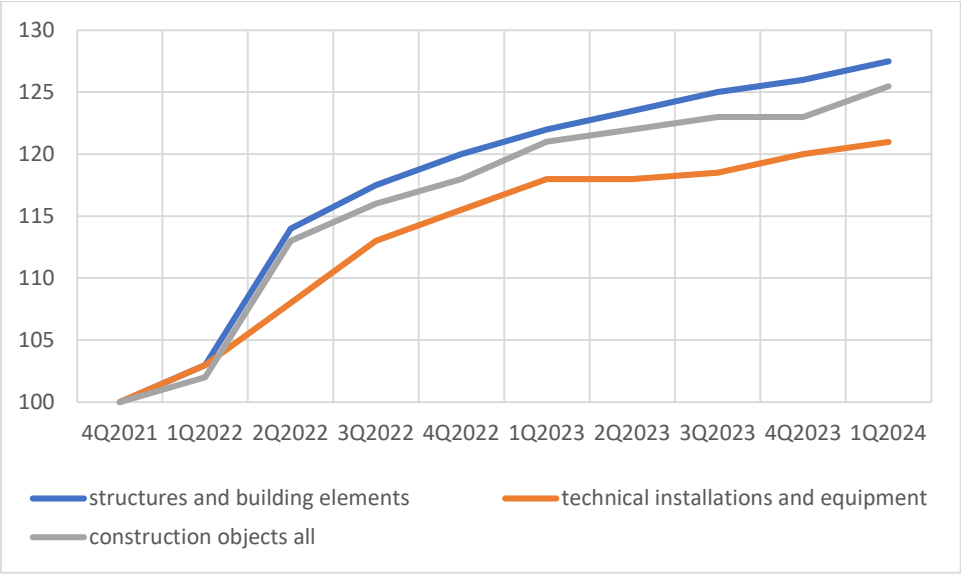


**Figure 3. Changes in the costs of construction of public utility facilities by type of work (% cumulative) in Poland in 4Q2021-1Q2024 (4Q2021 = 100%)**
Source: (Secocenbud, 2024)

In the phase of the economic slowdown in the construction sector, there is a huge potential of contractor companies, much greater than the projects offered in the tenders announced, which is why in such a period several or a dozen companies join the tenders, which sometimes significantly underestimate investment projects in their bids even by 30-40% compared to the size of the budgets of the contracting party, just to win the tender, as illustrated in Table 2 on selected examples from the second decade of the 21st century.

**Table 2. Examples of GDDKiA road contracts with a bid price below 65% of the ordering party's amount (tenders until 2018)**

| No. | Section | Price min (PLN million) | Budget GDDKiA (PLN million) | % price min to budget | Contractor |
|---|---|---|---|---|---|
| 1. | S5 road junction Korzeńsko - road junction Widawa (road section III) | 597,6 | 946,1 | 63,16 | Astaldi |
| 2. | S7 Jędrzejów – Voivodeship border | 348,6 | 584,6 | 59,63 | Budimex |
| 3. | S5 road junction Korzeńsko- road junction Widawa (road section II) | 310,5 | 529,2 | 58,67 | Dragados |

| | | | | | |
|---|---|---|---|---|---|
| 4. | S11 bypass Kępna stage I | 66,0 | 118,5 | 55,71 | Budimex |
| 5. | S8 Wyszków - road junction Poręba | 334,8 | 516,8 | 64,79 | Skanska |
| 6. | S5 road junction Szubin - road junction Jaroszewo | 352,0 | 548,6 | 64,16 | Intercor/Trakcja |
| 7. | S7 Mława - Strzęgowo | 446,2 | 695,5 | 64,15 | Porr |
| 8. | S5 road junction Nowe Marzy - road junction Dworzysko | 374,7 | 590,5 | 63,46 | Impresa Pizzarotti |
| 9. | S5 road junction Tuszyn - road junction Białe Błota | 328,5 | 524,1 | 62,68 | Pol Aqua/Dragados |
| 10. | S3 road junction Legnica - road junction Jawor II | 295,6 | 475,9 | 62,11 | Eurovia/Warbud |
| 11. | S19 road junction Lasy Janowskie - road junction Zdziary | 236,3 | 382,6 | 61,76 | Strabag |
| 12. | S6 Nowograd - Płoty | 390,2 | 639,3 | 61,05 | Mosty Łódź |
| 13. | S2 road junction Wał Miedzeszyński – road junction Lubelska | 561,7 | 923,9 | 60,80 | Warbud |
| 14. | S7 Naprawa – Skomielna Biała | 968,9 | 1 595,2 | 60,74 | Astaldi |
| 15. | S5 road junction Białe Błota – road junction Szubin | 260,0 | 428,4 | 60,68 | Impresa Pizzarotti |
| 16. | S5 road junction Dworzysko – road junction Aleksandrowo | 409,8 | 683,7 | 59,93 | Impresa Pizzarotti |
| 17. | S7 Strzegowo - Pieńki | 516,2 | 872,5 | 59,16 | Strabag |
| 18. | S2 road junction Przyczółkowa – road junction Wał Miedzeszyński | 757,6 | 1 764,8 | 42,93 | Gulermak/PBDiM Mińsk Mazowiecki |

Source: (Sierakowski, 2018)

A similar situation also occurred in the years 2020-2025, when several and a dozen companies competed for tenders mainly with the price offered to the project principal. This was mainly due to the aforementioned increases in the prices of construction materials and workmanship and the cost of financing, in addition to a weaker than planned inflow of European funds. For example, as many as 15 companies applied for large tenders worth billions of zlotys each in the railway segment, while 13 companies applied for the tender for the construction of a 13 km bypass between Szczekocin and Goleniów along the DK78 road announced in April 2025, as well as the tender for the design and construction of the national

road to Poland's first nuclear power plant ‘Lubiatowo-Kopalino’ in Pomorskie Voivodeship, in turn, 19 companies were interested in the construction of two sections of the S11 expressway in Wielkopolska with a length of more than 30 km, in turn, 12 companies applied for the tender for the design and construction of a nearly 16 km long bypass around Starogard Gdański, 10 offers were received in the tender for the construction of a bypass around Brzostek and Kołaczyce (woj. Podkarpackie voivodship), 8 bidders came forward for the tender for the construction of the Złocieńc bypass in the Zachodniopomorskie voivodship, 14 bids were received for the tender for the construction of a sports hall with a connector and technical infrastructure at the School Complex in Stegna, Warsaw (stage 3) (https://platformazakupowa.pl, 2025), (Ołdak, 2025a), (Ołdak, 2025b), (Wroński, 2025c), etc. (Table 3).

**Table 3. Selected examples of GDDKiA road contracts from 2020-2025**

| No. | Section | Bid min (PLN million) | GDDKiA budget (PLN million) | Bid max (PLN million) | Year/ Number of bidders |
|---|---|---|---|---|---|
| 1. | Adaptation of National Road No. 18 to motorway parameters | 180,5 | 173,0 | 207,8 | 2020/5 |
| 2. | Expansion of National Road No. 32 at the intersection with Voivodeship Road No. 304 | 5,8 | 4,3 | 6,2 | 2021/6 |
| 3. | Expansion of National Road No. 32, including the demolition and construction of a bridge over the Bóbr River | 85,4 | 64,4 | 137,1 | 2022/10 |
| 4. | Expansion of National Road No. 92 near WILKOWO | 38,9 | 54,1 | 53,7 | 2025/10 |
| 5. | Construction of the Mierzyn bypass along National Road No. 10 (Dołuje – Szczecin) | 140,0 | 130,1 | 227,2 | 2025/10 |
| 6. | Expansion of National Road No. 92 in PNIÓW | 28,3 | 28,4 | 30,6 | 2025/3 |
| 7. | S6 Western Road Bypass of Szczecin. Section 3 Police – Goleniów | 4 920,0 | 4 852,7 | 8 517,9 | 2025/5 |

Source: (own study based on: https://gddkia.eb2b.com.pl/, https://platformazakupowa.pl/transakcja/893282, retrieved on 31/07/2025).

In addition, it often happens in practice that companies bidding for tenders have to compete with non-EU entities that are not bound by all the requirements of the Member States (Wroński, 2025a). The European Court of Justice, in its judgment of 22 October 2024, ruled that in public tenders within the EU, the participation of entrepreneurs from so-called third countries, i.e. other than a member state of

the European Union, a state party to the WTO Agreement on Government Procurement (GPA) or a state party to a bilateral or regional agreement concluded by the European Union in the field of public procurement, depends on the decision of the contracting authority, i.e. de facto on the conditions that are set by the contracting party, and they cannot count on equal treatment with entities from EU countries (C-652/22, 2024). Indeed, according to the aforementioned judgment in a case brought by Croatia (Case C-652/22 Kolin Inşaat Turizm Sanayi ve Ticaret A.Ș. v Državna komisija za kontrolu postupaka javne nabave), when launching a public tender, a contracting authority from an EU country may determine whether, and under what conditions, it allows entities from third countries to participate in the tender procedure. These conditions may be different from those applicable to EU bidders (C-652/22, 2024). The aforementioned decision of the Court of Justice of the EU is also confirmed by its judgment of 13 March 2025 in Case C-266/22 CRRC Qingdao Sifang CO LTD et Astra Vagoane Călători S.A. v Autoritatea pentru Reformă Feroviară and Alstom Ferroviaria S.P.A., ECLI:EU:C:2025:178 (C-266/22, 2025).

In the wake of the aforementioned verdicts, more and more voices are being raised in the Polish construction and non-construction sectors about the need to introduce a similar regulation into public procurement law so that it can be universally applied in tendering procedures. This is because there are loud echoes of information about, among other things, the possibility of excluding companies from third countries, including consortium members and so-called resource providers, in the tender procedure announced by (1) PKP PLK SA in 2024/25 for the construction of a section of the Rail Baltica railway from Białystok to Elk (MW, 2025), and (2) in July 2025 by GDDKiA for the extension of the A2 motorway between Łódź and Warsaw. The GDDKiA emphasises in the release that this decision "is aimed at protecting the Polish and EU public procurement market and strengthening the position of Polish construction companies" (GDDKiA, 2025a) and takes into account the assumptions of the aforementioned European Court of Justice ruling of 22 October 2024 and 13 March 2025.

In this context, it is also worth mentioning the tender announced in 2022 by the Port of Gdansk for one of the key investments in the Inner Port - the comprehensive reconstruction of the Vistula Quay. Originally, in the 2022 tender, the cheapest offer submitted by a consortium of Gap Insaat Yatirim from Turkey, Sine Midas Stroy from Kazakhstan and Fabe Polska was selected from a group of six bidders. However, after formal objections were raised and an investigation carried out, which did not end until nearly 3 years later in mid-2025, the Port of

Gdansk signed an agreement for the implementation of the aforementioned project with the Doraco Building Corporation from Gdansk (Wroński, 2025b).

A similar problem concerns, inter alia, the terms and conditions of the tender announced by the Central Communication Port (CPK) for the construction works of the passenger terminal. The original conditions concerning, inter alia, the obligation to demonstrate at least PLN 4 billion in revenue for the last four financial years meant de facto that only three foreign companies present on the Polish market could participate, namely: Budimex, Strabag and Porr. Following criticism from the construction community, the CPK softened the tender criteria so that also smaller, including domestic, entities could take part in the said tender, in order to ensure that the largest possible part of this strategic project is realised by entities operating in Poland and paying taxes here (CPK, 2025).

The establishment of the PZPB-Atom Energia Jądrowa association by the Polish Association of Construction Employers is also part of this trend, with the aim of integrating national contractors and suppliers from the construction sector in the design and implementation of solutions supporting the construction of the first Polish nuclear power plant. It is therefore not only about '...representing the interests of Polish companies in the Choczew nuclear power plant construction process, but first and foremost about building sustainable competencies and creating real conditions for increasing the participation of national companies in the supply and contractor chain' (PZPB ATOM, 2025). This entails the need: firstly, to write hard commitments into the EPC contract regarding the participation of so-called local content, and secondly, to develop mechanisms for monitoring their implementation, as practised in many countries (Wektor Polska, 2025).

In mid-2025, the Ministry of Development and Technology confirmed its intention to introduce into the public procurement law provisions implementing a judgment of the European Court of Justice allowing non-EU contractors to be excluded from proceedings, which would consequently sanction these regulations in the Polish legal order (UZP, 2025) (Wektor Polska, 2025). Given the nature and scale of the strategic infrastructure investments planned in Poland in the near future, including in particular the nuclear power plant and the Central Transport Port, as well as over 6,100 km of roads under the Government's National Roads Construction Programme until 2030 (with an outlook until 2033), the announced changes are necessary to ensure the safety and continuity of the development of the national infrastructure and economy.

At this point, it is worth adding that many countries, including those from the European Union, are much less accessible to contractors for investment projects not only from outside the Community, but sometimes also from outside these countries, and companies entering tenders, especially those of strategic importance, are subjected to a thorough and detailed verification of their financial, performance and organisational potential. This is in line with the aforementioned "local content" concept, which favours the participation of national companies and resources in projects, mainly related to the energy and construction sectors, and thus the use of local materials, technologies, services, as well as human resources. Indeed, the essence of "local content" is to leave as much of the economic benefits of a project as possible in the country where it is implemented (Wells and Hawkins, 2008), (Kola, 2023), (Jayasudha and Vidivelli, 2016), (Dhivya and Prabu, 2019), (MAP, 2025).

One of the main economic benefits is, of course, the taxes paid to the state budget. Data from the Ministry of Finance shows that between 2012 and 2023, the value of CIT paid by the largest companies in the construction sector amounted to more than PLN 3 billion, of which nearly half (46.23%), was taxes paid by the sector's leader, BUDIMEX S.A. (Fig. 4).

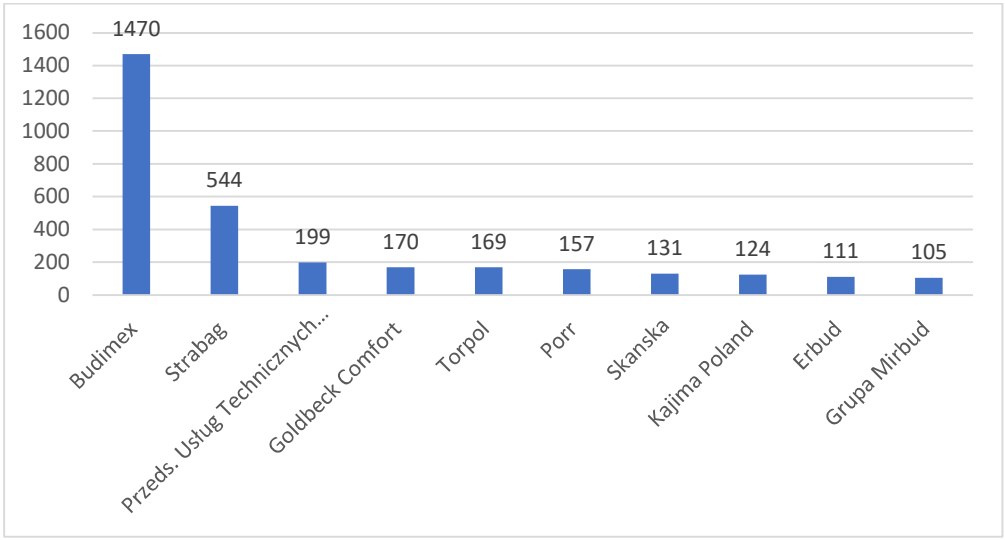


**Figure 4. CIT value of the largest construction companies in Poland in 2012-2023 (PLN million)**
Source: (BUDIMEX, 2025)

In turn, during the investment boom phase, many bids submitted in tenders exceed the investor's budget, which results in the latter having to increase

expenditures on the project, or the tender is cancelled and the investment is not created at all (Table 3).

A separate problem related to the risk of the procedure for selecting contractors for investment projects is the adopted criteria for their selection. In practice, the offer price is the most important and the main instrument for the evaluation of the bids submitted, although non-price criteria are usually used in addition to it, such as the provision or extension of a guarantee for specific elements/fragments of the investment task, the experience of the construction manager, etc. It is common practice in tenders for all bidders to declare the fulfilment of all additional criteria, with the result that only the price determines the final results of tenders (UZP, 2025), (Siemińska, 2024), (Wroński, 2025d), Wroński, 2025e), (Wroński, 2025f).

## CONCLUSIONS

Infrastructural investments are an important and strong stimulus of development for any economy, on the level of which the existence of many jobs depends not only in the companies directly involved in their implementation, but also in their surroundings. It is therefore in the interest of a stable development of the construction industry to maintain a relatively constant level of investment activity supported by adequate financing. This in turn - in the context of public investment - depends on investors from the local and governmental sectors and their financial capabilities. The role of the state is therefore to at least mitigate the high volatility of investment demand in order to minimise the risks associated with construction contracts described here. In addition, the implementation of good practices to protect indigenous construction companies involved in particularly strategic investment projects is an example of the “local content” concept used in many countries.

Furthermore, an extremely important issue related to the risks of infrastructure investments discussed here is not only the amount of expenditures incurred for their implementation, but also the maintenance costs of completed projects. It is increasingly being pointed out, for example, that many roads already built in Poland need to be repaired and thus incur repair costs. As infrastructure resources increase, this problem will increasingly require decisions to be made regarding sources of funding. As infrastructural resources increase, this problem will increasingly require decisions regarding the sources of financing for maintaining the efficiency and ensuring the safe use of said resources (Wroński, 2025e), (EEC, 2025). This problem requires further research and analysis.

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## References

Almusaed, A. & Almssad, A. (2018). Sustainable Buildings: Interaction Between a Holistic Conceptual Act and Materials Properties. London: IntechOpen.

Behrens, W. & Hawranek, P. (1993). *Poradnik przygotowania przemysłowych studiów feasibility*. Warszawa: UNIDO.

BUDIMEX. (2025). Prezentacja inwestorska za I półrocze 2025 r. Online, Retrieved on 29/07/2025 https://budimex.pl/relacje-inwestorskie/informacje-dla-inwestorow/prezentacje/.

C-266/22. (2025). CRRC Qingdao Sifang CO LTD et Astra Vagoane Călători S.A. przeciwko Autoritatea pentru Reformă Feroviară i Alstom Ferroviaria S.P.A., ECLI:EU:C:2025:178. Online, Retrieved on 13/03/2025 https://curia.europa.eu/juris/document/document.jsf?text=&docid=296546&pageIndex=0&doclang=PL&mode=req&dir=&occ=first&part=1&cid=7907835

C-652/22. (2024). C-652/22 Kolin Inşaat Turizm Sanayi ve Ticaret A.Ş. przeciwko Državna komisija za kontrolu postupaka javne nabave. Online, Retrieved on 11/07/2025 https://curia.europa.eu/juris/document/document.jsf?text=&docid=291384&pageIndex=0&doclang=EN&mode=req&dir=&occ=first&part=1&cid=6022832

CPK. (2025). Przetarg na budowę terminala. KIO w całości podzieliła argumentację Spółki CPK. Online, Retrieved on 21/07/2025 https://www.cpk.pl/pl/aktualnosci-2/przetarg-na-budowe-terminala-kio-w-calosci-podzielila-argumentacje-spolki-cpk

Dhivya, B. & Prabu, V. (2019). Analysis of Risk in Construction Projects. *International Research Journal Of Multidisciplinary Technovation (IRJMT), 1*(1), 64-69. Online, Retrieved on 13/07/2025 http://www.mapletreejournals.com/index.php/IRJMT

Draghi, M. (2024). The Future of European Competitiveness: Part A – A Competitiveness Strategy for Europe & Part B - In-Depth Analysis and Recommendations. Online, Retrieved on 20/07/2025 https://commission.europa.eu/topics/competitiveness/draghi-report_en

EEC. (2025). Infrastruktura transportowa wobec nowych wyzwań. Inwestycje, utrzymanie, finanse. Rekomendacje Europejskiego Kongresu Gospodarczego. PTWP SA.

GDDKiA. (2025a). Ruszamy z przetargami na rozbudowę A2. Online, Retrieved on 3/07/2025 https://www.gov.pl/web/gddkia-lodz/ruszamy-z-przetargami-na-rozbudowe-a2.

GDDKiA. (2025b). Mamy wykonawcę S8 pomiędzy Łagiewnikami a Niemczą. Online, Retrieved on 10/07/2025 https://www.gov.pl/web/gddkia-wroclaw/mamy-wykonawce-s8-pomiedzy-lagiewnikami-a-niemcza

GDDKiA. (2019). Cykl przygotowania inwestycji drogowej. Online, Retrieved on 18/07/2025 https://www.archiwum.gddkia.gov.pl/pl/a/34339/Cykl-przygotowania-inwestycji-drogowej

European Funds Portal. (2025). Online, Retrieved on 14/07/2025 https://www.funduszeeuropejskie.gov.pl/strony/o-funduszach/fundusze-2021-2027

Gransberg, D.D. (2023). Implementing Progressive Design Build: Enabling Legislation May Not Be Required. *Journal of Legal Affairs and Dispute Resolution in Engineering and Construction*, 15(4). https://doi.org/10.1061/JLADAH.LADR-1015.

Gransberg, D.D., Pala, M., Gransberg, N.J. (2025). Off-Ramp Applications in Open-Book GMP Negotiations: Three Case Studies. *Journal of Legal Affairs and Dispute Resolution in Engineering and Construction*, 3(17). https://doi.org/10.1061/JLADAH.LADR-1285

GUS. (2025). Główny Urząd Statystyczny. Online, Retrieved on 13/07/2025 https://stat.gov.pl/
Inshakova, A., Matytsin, D. & Inshakova, E. (2024). *Remote Investment Transactions in the Digital Age: Perception, Techniques, Law Regulation.* Springer.
Jayasudha, K. & Vidivelli, B. (2016). Analysis of major risks in construction projects. *Journal of Engineering and Applied Sciences*, 11(11). Online, Retrieved on 14/07/2025 https://www.arpnjournals.org/jeas/research_papers/rp_2016/jeas_0616_4375.pdf
Jin, X.-H., & Zuo, J. (2011). Critical uncertainty factors for efficient risk allocation in privately financed public infrastructure projects in Australia. *International Journal of Construction Management*, 11(3), https://doi.org/10.1080/15623599.2011.10773170.
Ko, T.; Le, Ch.; Jeong, H.D.; Nguyen, P.; Choi, K.; Gransberg, D. (2024). Risk Identification, Prioritization, and Mapping for Early Construction Cost Contingency in Transportation Infrastructure Projects. *ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part A: Civil Engineering*, 3(10). https://doi.org/10.1061/AJRUA6.RUENG-1315
Kola, J. (2023). The 'Local Content' Concept. Ruch Prawniczy, Ekonomiczny i Socjologiczny in Public Procurement: Global Trends in the Development of Public Procurement Law on the Examples of the USA, South Africa and Poland. https://doi.org/10.14746/rpeis.2023.85.1.08
Lam, K. C., Wang, D., Lee, P. T. & Tsang, Y. T. (2007). Modelling risk allocation decision in construction contracts. International Journal of Project Management, 5(25), 485-493. https://doi.org/10.1016/j.ijproman.2006.11.005
MAP (Ministerstwo Aktywów Państwowych). (2025). Local content priorytetem MAP, Online, Retrieved on 4/11/2025 https://www.gov.pl/web/aktywa-panstwowe/local-content-priorytetem-map
Marques, R.C.; Berg, S. (2011). Risks, Contracts, and Private-Sector Participation in Infrastructure. *Journal of Construction Engineering and Management*, 11(137). https://doi.org/10.1061/(ASCE)CO.1943-7862.0000347.
Martell, Ch.R., Ivonchyk, M. & Moldogazíev, T.T. (2025) Is City Agency With Financial Management Levers Critical for Credit Ratings? An Analysis of Information Transparency and Certification. *Public Budgeting & Finance*, 3(45). https://doi.org/10.1080/00220388.2025.2498931
Mazzucato, M. (2013). *Przedsiębiorcze państwo.* Poznań: Wydawnictwo Ekonomiczne HETERODOX.
Miąsko, M. (2019). *Analiza metodologii powstawania przestępstw ekonomicznych w sektorze zamowień publicznych na przykładzie inwestycji drogowych i energetycznych.* Warszawa: Instytut Wymiaru Sprawiedliwości.
MW. (2025). GDDKiA analizuje bezprecedensowy ruch PKP PLK. Nie wyklucza, że zrobi to samo. Online, Retrieved on 2/03/2025 https://www.wnp.pl/budownictwo/gddkia-analizuje-bezprecedensowy-ruch-pkp-plk-nie-wyklucza-ze-zrobi-to-samo,909998.html
Obwieszczenie Prezesa Urzędu Zamówień Publicznych z dnia 3 grudnia 2023 r. w sprawie aktualnych progów unijnych, ich równowartości w złotych, równowartości w złotych kwot wyrażonych w euro oraz średniego kursu złotego w stosunku do euro stanowiącego podstawę przeliczania wartości zamówień publicznych lub konkursów, (Polish Monitor 2023 item 1344).
Ołdak, A. (2025a). Chińczycy zablokowani w rekordowym przetargu PKP PLK. Pierwszy taki przypadek w Polsce, Online, Retrieved on 4/06/2025 https://www.wnp.pl/logistyka/chinczycy-zablokowani-w-rekordowym-przetargu-pkp-plk-pierwszy-taki-przypadek-w-polsce,903813.html
Ołdak, A. (2025b). Budownictwo kolejowe wciąż głodne. Rysuje się jednak duża szansa na zmianę, Online, Retrieved on 3/11/2025 https://www.wnp.pl/budownictwo/budownictwo-kolejowe-wciaz-glodne-rysuje-sie-jednak-duza-szansa-na-zmiane,999029.html
Platforma zakupowa (2025) https://platformazakupowa.pl, Online, Retrieved on 2/07/2025
PZPB ATOM. (2025). Online, Retrieved on 1/08/2025 https://pzpb-atom.com.pl/oficjalny-kickoff-pzpb-atom/#toc_Cele_powoania_PZPBAtom

Wektor Polska. (2025). Online, Retrieved on 5/07/2025 https://wektorpolska.org.pl/
Sekocenbud. (2024). Zmiany kosztów budowy obiektów budownictwa kubaturowego na przestrzeni ostatnich 10 lat wg danych SEKOCENBUD. Online, Retrieved on 16/04/2025 https://sekocenbud.pl/zmiany-kosztow-budowy-obiektow-budownictwa-kubaturowego-na-przestrzeni-ostatnich-10-lat-wg-danych-sekocenbud/
Siemińska, E. (2024). *Kontrakty budowlane. Ryzyka, waloryzacja, ubezpieczenia.* Warszawa: CeDeWu.
Sierakowski, T. (2018). Waloryzacja wynagrodzenia wykonawcy w kontraktach drogowo-mostowych. Możliwości i ograniczenia wynikające z zapisów umownych – studium przypadku. In: Wycena inwestycji budowlanych w zamówieniach publicznych. Przesłanki waloryzacji ceny kontraktowej (pp: 113-114). Ciechocinek: Ośrodek PROMOCJA Sp. z o.o.
Teixeira, J., Kulejewski, J., Krzemiński, M. & Zawistowski, J. (2009). *Zarządzanie ryzykiem w budownictwie.* Biblioteka Menedżerów Budownictwa.
UNCTAD. (2024). World Investment Report 2024. Online, Retrieved on 13/06/2025 https://unctad.org/publication/world-investment-report-2024
Ustawa z dnia z dnia 11 września 2019 r. Prawo zamówień publicznych. (Journal of Laws 2024 item 1320 as amended).
UZP. (2018, 2019, 2023, 2024, 2025). Sprawozdanie Prezesa Urzędu Zamówień Publicznych z funkcjonowania systemu zamówień publicznych.
UZP. (2025). Wykonawcy z państw trzecich - Komisja ds. Deregulacji jednogłośnie za ustawą. Online, Retrieved on 27/06/2025 https://www.gov.pl/web/uzp/wykonawcy-z-panstw-trzecich--komisja-ds-deregulacji-jednoglosnie-za-ustawa
Wektor Polska. (2025). Online, Retrieved on 5/06/2025 https://wektorpolska.org.pl
Wells, J. & Hawkins, J. (2008). Increasing local content in the procurement of infrastructure projects in low income countries. London: ICE.
Wroński, M. (2025a). UE nie taka gościnna. Wybór wykonawców na europejskich rynkach bardziej rygorystyczny niż w Polsce. Online, Retrieved on 5/06/2025 https://www.wnp.pl/budownictwo/ue-nie-taka-goscinna-wybor-wykonawcow-na-europejskich-rynkach-bardziej-rygorystyczny-niz-w-polsce,941983.html
Wroński, M. (2025b). Spór o inwestycję w Porcie Gdańsk czeka na swój epilog. Jak szeroko otwierać drzwi dla firm z Azji? Online, Retrieved on 15/04/2025 https://www.wnp.pl/budownictwo/spor-o-inwestycje-w-porcie-gdansk-czeka-na-swoj-epilog-jak-szeroko-otwierac-drzwi-dla-firm-z-azji,927810.html
Wroński, M. (2025c). Ścisk jak w budowlanym przetargu. Kiedy skończy się ostra walka o kontrakty? Online, Retrieved on 22/02/2025 https://www.wnp.pl/budownictwo/scisk-jak-w-budowlanym-przetargu-kiedy-skonczy-sie-ostra-walka-o-kontrakty,935874.html
Wroński, M. (2025d). Polską specjalnością stała się tzw. optymalizacja. "Niepokojące. W Niemczech tego nie ma". Online, Retrieved on 19/07/2025 https://www.wnp.pl/budownictwo/polska-specjalnoscia-stala-sie-tzw-optymalizacja-niepokojace-w-niemczech-tego-nie-ma,963689.html
Wroński, M. (2025e). Kryteria pozacenowe w przetargach to fikcja? Pojedynek na argumenty z miliardami złotych w tle. Online, Retrieved on 19/07/2025 https://www.wnp.pl/budownictwo/kryteria-pozacenowe-w-przetargach-to-fikcja-pojedynek-na-argumenty-z-miliardami-zlotych-w-tle,960010.html
Wroński, M. (2025f). Wykonawcy sobie dyktowali ceny. Szykuje się duża zmiana dla firm budowlanych. Jest jedno "ale". Online, Retrieved on 13/06/2025 https://www.wnp.pl/budownictwo/wykonawcy-sobie-dyktowali-ceny-szykuje-sie-duza-zmiana-dla-firm-budowlanych-jest-jedno-ale,968283.html
Wysoczański, H. (2018). *Kontrakty budowlane Nowe warunki FIDIC*, Oficyna Wydawnicza Polcen, Warszawa.
Zaghloul, R. i Hartman, F.T. (2002). Construction contracts and risk allocation. Paper presented at Project Management Institute Annual Seminars & Symposium, San Antonio TX. Newtown

Square, PA: Project Management Institute. Online, Retrieved on 17/06/2025
https://www.pmi.org/learning/library/construction-contracts-risk-allocation-1025

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# Investment attractiveness of the residential housing market in selected medium-sized cities in Poland - a perspective for counteracting urban shrinkage

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## Abstract

**Objective:** The objective of the paper is to assess the investment attractiveness of the real estate market in selected provincial cities in Poland up to 200,000 inhabitants.
**Material and methods:** Grounded in the theory of endogenous growth, the study uses an analysis, critique, and synthesis of the literature on the investment attractiveness of the real estate market. The analysis employs an investor perspective, using the Hellwig method, which allows multiple variables to be aggregated into a single synthetic measure. The dataset covers variables identified from the literature review and selected according to data availability and cost of acquisition. The analysis refers to the period 2019 - 2023 for seven selected cities.
**Findings:** Differences in investment attractiveness in the real estate market of the cities under study result from their development policies, infrastructure, demographic situation, and actions of local authorities. Rzeszów was characterised by the highest investment attractiveness in the entire period under study.
**Research limitations:** Disadvantages of the synthetic indicator, limited selection of cities, time-span and variables for the study.
**Research implications:** Despite the lack of metropolitan advantages, medium-sized voivodeship cities may offer attractive investment conditions if their potential is correctly identified; the development of medium-sized cities may be an important tool for counteracting the processes of shrinking of the cities and ensuring balanced spatial development; the procedure may be used e.g. by investors to take investment decisions and by local authorities - to build development strategies.

**Keywords:** Investment attractiveness; Housing market; Medium-sized cities; Multi-criteria analysis
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## INTRODUCTION

Investment attractiveness is a complex concept determined by several factors which are important from the point of view of planned investments. Localisation with features that are favourable from the investor's point of view may attract investments and thus trigger a development effect, which in turn contributes to increasing the socio-economic potential and competitiveness of a given spatial unit. How should the concept of investment attractiveness be understood in relation to the real estate market? What factors determine it? How to assess the investment attractiveness of local housing markets? Recent research on urban investment policy in Poland proves that the attractiveness and long-term competitiveness of local housing markets depend on strategic public investments and integrated planning. These policies, when effectively implemented, can create more stable conditions for residential investors and support sustainable urban growth, even in the context of medium-sized cities with demographic and economic challenges (Koj et al., 2023).

The capitals of voivodeships with a population of up to 200,000 inhabitants constitute a specific group of medium-sized cities in the country (Śleszyński, 2017). According to the categories adopted in socio-demographic studies, cities with more than 100,000 inhabitants are considered large, but still differ significantly from the largest metropolises in terms of development dynamics, social structure, demographic and investment challenges (Erickcek, & McKinney, 2006). Although, as voivodeship capitals, they perform key administrative, economic, and cultural functions in their regions, they do not fully exploit their development potential, which may be due to the lack of adequate investment impulses and strategic planning. Developers, therefore, focus on large agglomerations, even though smaller cities offer attractive opportunities for capital investment. So as smaller cities have not been explored as intensively in terms of development potential and real estate market specificity, the capitals of voivodeships with a population of up to 200,000 were selected for the study fulfilling creates both a scientific research and practical investment gap (Cardoso, Meijers, 2016; Kresl, 2013; Adam, 2006; Dębkowska et. al, 2020; Rsng.pl, 2025).

On the other hand, the justification for voivodeship capitals selection is also based on data accessibility. They are well documented in public statistics, which allows for reliable comparative analysis - both in terms of demographic changes and socio-economic processes. Access to data makes it possible to analyse various demographic and economic phenomena, including the investment attractiveness

of local real estate markets. Medium-sized cities are not agglomerations on the scale of voivodeship capitals such as Warsaw, Kraków or Wrocław, but their analysis makes it possible to identify specific conditions of precisely medium-sized urban centres.

Conceptually, the article aligns with the endogenous theory of growth, emphasizing the importance of local, internal factors for development. According to this approach, the investment attractiveness results from a qualitative combination of human capital, infrastructure, institutions, and innovation. This perspective connects with Begg's (1999) emphasis on endogenous growth driven by internal urban factors, highlighting the city's capacity to foster growth from within rather than relying on external agglomeration economies.

Therefore, grounded in the theory of endogenous growth, the study fills a research gap by focusing specifically on assessing the investment attractiveness of the residential market in selected voivodship cities in Poland up to 200,000 inhabitants, an area underexplored in existing literature, which mainly addresses metropolitan centres. By adopting the investor-developer perspective, the analysis integrates selected key financial and non-financial determinants shaping investment decisions, such as demographic trends, infrastructure, and market dynamics specific to housing development. Accordingly, the present study incorporates variables that operationalise these factors and reflect the core components of investment attractiveness relevant specifically to the residential development sector by employing a multidimensional approach. The Hellwig method enabled to synthesize of these diverse factors into a coherent attractiveness measure, thus providing actionable insights tailored to the needs and constraints of housing market investors. This targeted focus distinguishes the research, adding value to broader regional investment attractiveness debates and informing policy and practice in non-metropolitan urban markets. The indicator developed in the study can be used in decision-making by both investors and municipal authorities. For investors, it provides a clear, comparable assessment of different local housing markets, helping to identify the most promising cities for new residential investments. For city policymakers and local authorities, the indicator may serve as a diagnostic and strategic tool. It highlights areas of strength and weakness in the local investment environment, informing targeted interventions, resource allocation, and the design of policies or incentives supposed to make the city more attractive to future residential development and therefore counteracting the shrinking of the cities.

The research procedure included a review and critical analysis of the literature on the definition and measurement of investment attractiveness of the real estate market, which is also the next part of the study. The literature review considered the specificity of medium-sized cities. Next, the methodology of the analysis, i.e. the stages of aggregation of indicators using Hellwig's method, the cities and variables selected for the study, along with their justification, are presented. Data was obtained from the Local Data Bank of the Central Statistical Office (GUS), and the analysis covered the years 2019 - 2023 for seven selected cities. The last part of the paper is the results, discussion, and conclusions with limitations.

## LITERATURE REVIEW

In a general sense, attractiveness is a phenomenon in which one object is attracted to another because of perceived potential benefits. This phenomenon can be observed in different spheres of life (Kresl, 2013), seen in entity and spatial contexts, as the attractiveness and competitiveness of companies, countries, and cities (Ručinska & Ručinsky, 2007; Porter & Ketels, 2003). In the context of investment, there is a demand among investors for business models described as “attractive,” and the category of “investment attractiveness” is interpreted as “investment climate”, “market attractiveness”, “investment potential”, and “investment competitiveness” (Kyshakevych et. al., 2019). From the point of view of planned investments, investment attractiveness is a complex concept, determined by several factors of political, socio-cultural, financial, economic, and legal conditions. Location advantages may arise from specialisation and resources that create living conditions and the pursuit of different activities. In broad terms, attractiveness can be equated with competitiveness, which consists of twelve pillars, including education (Schwab 2017). Competitiveness factors also include those related to the level of innovation, security, resilience, or connections (networking) with other cities (functional and infrastructural) (Table 1).

**Table 1. Investment attractiveness factors**

| Factor | Characteristics |
|---|---|
| Level of overall economic development | Includes production, distribution of goods and services, mechanisms of functioning of the economy, consumption, and the state of the environment. Dynamic economic development promotes investment attractiveness through improved infrastructure and increased population income, which increases demand for real estate. |
| Labour costs, size and quality of labour resources, | Includes the level of labour costs, availability of workers with the right qualifications and personal qualities (conscientiousness, responsibility, initiative). Influences the profitability of an investment by the ability to |

| | |
|---|---|
| demographic characteristics | employ the right number and quality of workers while maintaining the profitability of the venture. |
| The level of development of economic infrastructure | Refers to facilities, equipment and institutions that make it possible to meet the needs of society in the sphere of material activities (e.g. energy networks, water supply, telecommunications, industrial parks). A higher level of development increases the investment attractiveness of the region. |
| Transport accessibility and access to infrastructure | One of the basic features of the assessment of the transport system in spatial terms; it results from the geographical location and the provision of transport infrastructure. Includes both supply (network of roads, railways, airports) and demand (transport needs). |
| Level of development of social infrastructure, urban amenities | Related to the provision of socio-economic services necessary for society to function (e.g. education, health care, culture, sport). A high level of social infrastructure improves the living conditions of residents and attracts investors and new residents. |
| Market size and capacity | Determined by the budget expenditure of voivodeships, communes and districts, retail sales, investment expenditure of enterprises and sold production of industry. Indicates the purchasing potential and market development opportunities for the products and services offered. |
| Degree of environment protection, the state, and the quality of the natural environment | An increasingly important factor for investors. A good state of the environment favours the location of service and high-tech investments, while the presence of protected areas may limit industrial investments. Also linked to investments in sustainable development and the attractiveness of the region to residents. |
| Level of safety, resilience | Means ensuring that investments are risk-manageable. A high level of public safety attracts investors and residents; a low level (high crime, low detection) can be a deterrent and perpetuate negative stereotypes about the region. |
| Proactiveness of regions towards investors, governmental efficiency, institutional flexibility | Includes activities of local authorities to attract investors: promotion of the region, investment support, concessions, subsidies, development of infrastructure, building relationships with entrepreneurs, cooperation within public-private partnerships and development of strategies tailored to the needs of investors. |

Source: Based on (Kyshakevych et al., 2019; Kresl, 2013; Ručinska & Ručinsky, 2007; Hildebrandt et al., 2006; Begg 1999).

An area with features that are favourable from the investor's point of view can attract investments and thus trigger a development effect, which consequently contributes to increasing the socio-economic potential and the aforementioned competitiveness of a given spatial unit - which, in the context of medium-sized cities facing the problem of shrinkage, takes on particular significance (Marjanović et al., 2024; Jopek & Musiał-Malago, 2010; Wolff & Wiechmann, 2018; Śleszyński, 2017). Indeed, investments are a sign of

development. And although they entail significant financial outlays and are realised over a long period of time, they are ultimately associated with the emergence of a new substance or the improvement of the condition of, for example, an existing property. One can therefore conclude about the specific objective of increasing attractiveness, which is the competitiveness defined by the European Commission from the point of view of quality of life: ”Competitiveness is understood to mean high and rising standards of living of a nation with the lowest possible level of involuntary unemployment, on a sustainable basis” (European Commission 2007, p. 13). In the context of medium-sized cities, increasing competitiveness and quality of life is a specific tool to prevent urban shrinkage. Despite that, medium-sized cities (regardless of their accepted definition (Cardoso & Meijers, 2016)) are overlooked in competitiveness analyses in favour of metropolises, even though they play a key role in the settlement systems of many countries. A significant proportion of the population lives in such settlements, so their development is crucial for the country's economic and social sustainability. Despite the absence of the ”first city bonus” characteristic of national capitals or regions (voivodeships) (Cardoso & Meijers, 2016), medium-sized cities play a key role as pillars of polycentricity and balancing spatial development. For instance, investing in medium-sized cities can reduce excessive migration. By maintaining the attractiveness of these cities, young, educated people can be retained, and new residents can be attracted. Moreover, medium-sized cities can react more quickly and flexibly to economic change than large agglomerations. The advantages offered by smaller cities include less pollution and a lower level of congestion, lower living and business costs, including cheaper real estate, and easier access to local resources, making them an attractive place to live and work. Finally, it is the potential to create strong, integrated communities, which fosters trust and effective local networks (Kresl, 2013; Hildreth, 2007).

However, the survival and development of medium-sized cities require the adaptation of policies to local conditions and the active management of advantages such as functional diversity, moderate density, and the ability to act as service centres for the surrounding area. In the context of demographic challenges and regional competition, medium-sized cities remain an important, albeit diverse, component of the urban system (Adam, 2006). From an investor's perspective, making decisions about housing investment localisation, the question of how to assess the attractiveness of a particular medium-sized city in the context of the housing market rises. Housing issues - such as supply,

accessibility, and quality of residential environments - remain central topics both in economic and urban Polish studies, reflecting historical transitions and current urban challenges (Węcławowicz, 2017).

From the perspective of housing real estate developers and investors, the literature identifies a distinct set of factors shaping investment attractiveness that extends beyond factors of general regional competitiveness. Empirical studies emphasise financial determinants such as market absorption capacity, demand stability, construction activity, land and housing supply constraints, transaction liquidity and expected profitability. They are key determinants of developers' location choices according to Geltner et al. (2014) and Miles, Netherton and Schmitz (2015). Other researchers in real estate investment decision-making also highlight the importance of price dynamics, development intensity indicators, regulatory risks, the alignment between demographic trends and housing preferences, and quality of life (Wilczek, 2013; Gdakowicz and Hozer, 2012; Foryś, 2009). These studies show that developers prioritise markets where demographic potential, purchasing power, infrastructure, and institutional conditions reduce development risk and therefore improve return prospects. Therefore, investment decisions made by residential real estate developers are conditioned by both financial and non-financial factors.

Attractiveness, as an intangible and multidimensional phenomenon, is not subject to direct measurement. In research practice, synthetic indicators are used, among others, which combine economic and social variables. This method involves grouping variables into key dimensions that form a comprehensive analytical framework covering selected measurable aspects of development (Carpio, Feldman and Avolio, 2023). According to Kresl (2013), benchmarking using synthetic indicators is widely applied in assessing urban competitiveness. There are several reasons for that. First, the method is relatively straightforward. Secondly, it allows the incorporation of many variables that the analyst regards as credible. Third, identified variables and indicators can be linked to policy choices available to urban planners and city managers. Synthetic measure-based benchmarking can also be applied for specific markets within cities, such as the real estate market (Gdakowicz and Hozer, 2012; Foryś, 2008; Foryś, 2009). Attractiveness can also by analysed on contextual basis (Boschma, 2004). Trend analysis (Henzel, Śmietana and Maszczyk, 2014) or econometric models can also be used. For example, Guzik (2008) proposes a regression model, and Carpio et al. (2023) propose an econometric panel data model with fixed effects to measure regional competitiveness.

## RESEARCH METHODOLOGY

The article applies the synthetic development measure (Taxonomic Measure of Attractiveness of Investments, TMAI) based on Hellwig's Measure of Economic Development Method linear ordering (Hellwig, 1972). TMAI belongs to multivariate comparative analysis methods, which refers to statistical methods that analyse simultaneously at least two variables that describe the object under study. Ultimately, it leads to the ordering of a relatively homogeneous set of objects to make decisions on object selection (Tarczyńska-Łuniewska, Tarczyński, 2006). The value of a synthetic measure used to analyse investment attractiveness is established in several stages (Foryś 2009, Gierusz-Matkowska, Wojewnik-Filipkowska and Krauze-Maślankowska 2023; Roszkowska, 2024). The calculations were performed in Microsoft 365 Excel.

The first stage of the taxonomic analysis consists of creating a matrix (table) of objects (cities) and diagnostic variables that describe these objects for each year of analysis. Then, all the variables should be brought to homogeneity. A transformation involving the calculation of its inverse was used to convert destimulants into stimulants:

$$z_{ij(s)} = \frac{1}{z_{ij(d)}} \tag{1}$$

where $z_{ij(s)}$ - the value of the stimulant obtained from the transformation of destimulant $z_{ij(d)}$. Once all variables have been transformed into stimulants, the next step is to bring them to comparability. All variables are standardised according to the formula:

$$z_{ij} = \frac{x_{ij} - \bar{x}_j}{S_j} \tag{2}$$

where $z_{ij}$ and $x_{ij}$ are respectively the standardized and the observed value of variable j for city i, whereas xj and sj are the mean and the standard deviation of variable j calculated over cities, for $i = 1, 2,\ldots, n$ and $j = 1, 2 ,\ldots, k$, being here $n = 7$ and $k = 13$. Next, the pattern objects (cities) are created. A pattern is assigned considering the best possible value for each variable, that is the maximum in the dataset. The Euclidean distance $d_0$ between the pattern and each object is then calculated according to the formula:

$$d_i = \sqrt{\sum_{j=1}^{m} \left(z_{ij} - z_{0j}\right)^2} \tag{3}$$

where $z_{0j}$ is the value of variable j into the pattern. Next step requires calculation of norm to ensure that the TMAI takes values in the range <0,1>:

$$d_0 = \overline{d} + 2 \times S_{di} \quad (4)$$

where $\overline{d}$ is average obtained for $d_i$ plus twice the standard deviation of the measure. Finally, the taxonomic measure TMAI is then obtained for each city i using the formula:

$$TMAI_i = 1 - \frac{d_i}{d_0} \quad (5)$$

The higher the values of the measure TMAI, the better the object in terms of the general criterion.

## DATA & MATERIALS

Voivodeship capitals with a population of up to 200,000 were selected for the study. The time range for which the study was conducted is the five-year period 2019 - 2023 (Table 1).

**Table 1. Voivodeship capitals with up to 200,000 inhabitants - basic characteristics**

| City | Area (km²) | Population (2024) | Voivodship |
|---|---|---|---|
| Toruń | 116 | 194 771 | kujawsko - pomorskie |
| Gorzów Wielkopolski | 86 | 115 247 | lubuskie |
| Zielona Góra | 277 | 138 932 | lubuskie |
| Opole | 149 | 126 077 | opolskie |
| Rzeszów | 129 | 197 268 | podkarpackie |
| Kielce | 110 | 182 295 | świętokrzyskie |
| Olsztyn | 88 | 167 311 | warmińsko - mazurskie |

Source: Local Data Bank (https://bdl.stat.gov.pl/bdl/), Public Information Bulletin (BIP) of selected cities

For the analysis, variables were selected to reflect different aspects of the selected cities corresponding to financial and non-financial determinants of investment attractiveness. These variables were selected and grouped based on the literature review. Demographic, housing economy determinants, and the labour market are linked to Gdakowicz and Hozer (2012), Foryś (2008, 2009), and Adam (2006). Infrastructure-related variables (transport, education, health, culture, and recreation) are linked to Hildebrandt et al. (2006), Ručinska and Ručinsky (2007), Drobniak (2016), and Wojewnik-Filipkowska, Gierusz-Matkowska, Krauze-Maślankowska (2024). Data completeness was maintained throughout the study using the criterion of data availability and cost of data acquisition, which means that variables with a high proportion of missing values were excluded from the analysis. As a result, no significant gaps remained in the final dataset, and further data imputation procedures were not necessary. The set of twenty variables was applied for the study (Table 2).

**Table 2. Grouped variables for the study of housing market attractiveness**

| No. | Variable (X) | Category |
|---|---|---|
| 1 | Population density – people per 1 km² | Demographics |
| 2 | Total population | |
| 3 | Working - age population | |
| 4 | Post - working - age population | |
| 5 | Building permits and construction notifications with a building design – new residential buildings | Housing economy |
| 6 | Usable floor area of residential units sold in market transactions in m² (primary market) | |
| 7 | Average price per 1 m² of residential units sold in market transactions (primary market) | |
| 8 | Average number of people per dwelling | |
| 9 | Average usable floor area per dwelling | |
| 10 | Active stops (bus, trolleybus, tram) – total | Infrastructure and transport |
| 11 | Length of bicycle paths | |
| 12 | Registered unemployment – total registered unemployed | Labour market |
| 13 | Average gross monthly wages | |
| 14 | Primary education – total number of primary schools | Education |
| 15 | Total secondary education | |
| 16 | Preschools – total preschool education | |
| 17 | Outpatient entities (as of 31 Dec) – total clinics | Health |
| 18 | Green areas in m² | Culture and recreation |
| 19 | Cultural centres, community centres, clubs, and common rooms | |
| 20 | Crimes confirmed by the Police in completed preparatory proceedings | Safety |

Source: own elaboration.

Each of the seven cities, for the five years under study, was described by variables in the eight thematic groups. A preliminary analysis of basic statistical parameters (coefficient of variation and correlation) allowed variables selection. A coefficient of variation of more than 10% allows the incorporation of variables that strongly differentiate the studied objects (variables X8, X9, X13 were removed). Variable X7 was retained because the coefficient of variation was just below the assumed threshold for one year of analysis (9.32%), and it was a variable directly related to the housing market. The next step was to eliminate highly correlated variables, i.e. those carrying the same information for the analysis (variables X3, X4, X14, X16 were removed as Pearson's correlation coefficient was above 0.9 or below −0.9). The adopted threshold values reflect conventions found in prior research, which commonly suggest a correlation coefficient threshold ranging from 0.5 to 0.9 and a variation coefficient threshold between 5% and 10% (Oleńczuk-Paszel and Sompolska-Rzechuła, 2013; Kowalczyk-Rólczyńska, 2016; Horbaczewska, 2020). As a result, a final set of thirteen variables was obtained (Table 3).

**Table 3. Descriptive statistics (average and coefficient of variation) of the variables adopted to order the sites according to the taxonomic measure of investment attractiveness (TMAI) for the period 2019 - 2023**

| Year | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| X1 - Population density – people per 1 km$^2$ | | | | | |
| Average | 1 403 | 1 380 | 1 366 | 1 358 | 1 351 |
| Vs (%) | 0.3480 | 0.3458 | 0.3454 | 0.3448 | 0.3443 |
| X2 - Total population | | | | | |
| Average | 165 336 | 162 789 | 161 810 | 161 020 | 160 272 |
| Vs (%) | 0.1897 | 0.1873 | 0.1911 | 0.1927 | 0.1937 |
| X5 - Building permits and construction notifications with a building design – new residential buildings | | | | | |
| Average | 188 | 174 | 188 | 136 | 114 |
| Vs (%) | 0.6962 | 0.6612 | 0.5252 | 0.7257 | 0.8312 |
| X6 - Usable floor area of residential units sold in market transactions in m$^2$ (primary market) | | | | | |
| Average a | 47 648 | 54 242 | 49 851 | 53 076 | 40 858 |
| Vs (%) | 0.7651 | 0.5697 | 0.8793 | 0.5895 | 0.5314 |
| X7 - Average price per 1 m$^2$ of residential units sold in market transactions (primary market) | | | | | |
| Average | 4 903 | 5 339 | 5 885 | 6 508 | 7 078 |
| Vs (%) | 0.1186 | 0.1027 | 0.1137 | 0.1122 | 0.0932 |
| X10 - Active stops (bus, trolleybus, tram) – total | | | | | |
| Average | 506 | 519 | 514 | 522 | 541 |
| Vs (%) | 0.2424 | 0.2321 | 0.2457 | 0.2347 | 0.2464 |
| X11 - Length of bicycle paths | | | | | |
| Average | 93 | 101 | 107 | 110 | 117 |
| Vs (%) | 0.4012 | 0.3589 | 0.3240 | 0.3171 | 0.2817 |
| X12 - Registered unemployment – total registered unemployed | | | | | |
| Average | 3 286 | 4 123 | 3 405 | 2 902 | 2 765 |
| Vs (%) | 0.5333 | 0.4388 | 0.5027 | 0.5017 | 0.4852 |
| X15 - Total secondary education | | | | | |
| Average | 24 | 23 | 22 | 21 | 22 |
| Vs (%) | 0.3021 | 0.2808 | 0.2446 | 0.2608 | 0.2585 |
| X17 - Outpatient entities (as of 31 Dec) – total clinics | | | | | |
| Average | 140 | 145 | 149 | 157 | 166 |
| Vs (%) | 0.3148 | 0.3272 | 0.3242 | 0.3117 | 0.2893 |
| X18 - Green areas in m$^2$ | | | | | |
| Average | 528 | 533 | 534 | 536 | 546 |
| Vs (%) | 0.9110 | 0.9070 | 0.9060 | 0.8733 | 0.9007 |
| X19 - Cultural centres, community centres, clubs, and common rooms | | | | | |
| Average | 10 | 9 | 9 | 9 | 9 |
| Vs (%) | 0.6768 | 0.6870 | 0.7050 | 0.7896 | 0.7717 |
| X 20 - Crimes confirmed by the Police in completed preparatory proceedings | | | | | |
| Average | 4 309 | 3 848 | 4 888 | 4 460 | 3 785 |
| Vs (%) | 0.2168 | 0.2088 | 0.2386 | 0.2022 | 0.2369 |

Source: own elaboration.

The method proposed by Helwig was used to determine the taxonomic measure of investment attractiveness (TMAI). The obtained values of the index fall within the range <0, 1> thanks to the conversion of destimulants (variables: X12, X20) into stimulants.

## Results & Discussion

The analysis made it possible to calculate the investment attractiveness index of real estate markets for selected cities (Table 4).

**Table 4. Taxonomic measure of attractiveness according to a fixed pattern in 2019 - 2023 for selected cities**

| City | 2 019 | 2 020 | 2 021 | 2 022 | 2 023 | Average | Rank |
|---|---|---|---|---|---|---|---|
| Rzeszów | 0.6764 | 0.6208 | 0.6638 | 0.5918 | 0.6549 | 0.6415 | 1 |
| Olsztyn | 0.3909 | 0.3495 | 0.4113 | 0.3652 | 0.412 | 0.3858 | 2 |
| Kielce | 0.3228 | 0.3348 | 0.3451 | 0.3115 | 0.3571 | 0.3343 | 3 |
| Toruń | 0.3479 | 0.3126 | 0.36 | 0.2841 | 0.3076 | 0.3224 | 4 |
| Opole | 0.3115 | 0.3053 | 0.2938 | 0.2785 | 0.28 | 0.2938 | 5 |
| Zielona Góra | 0.1946 | 0.1671 | 0.189 | 0.1683 | 0.2071 | 0.1852 | 6 |
| Gorzów Wielkopolski | 0.1474 | 0.1307 | 0.1373 | 0.1249 | 0.1337 | 0.1348 | 7 |

Source: own calculations.

Rzeszów stands out with the highest level of the TMAI indicator in the analysed period. The city combines a large scale of residential investment (high number of permits, large areas sold), has a favourable environment as evidenced by low unemployment, good social infrastructure (schools, clinics). It is a typical example of a city "breaking out" from the trend of shrinking medium-sized cities. Systematically satisfactory results, growing attractiveness - reinforced by improved "recreational" infrastructure (green areas) are presented by Olsztyn and Kielce. These are cities with the potential to attract investors looking for attractive but smaller markets than e.g. Tricity or Kraków. Toruń records a decline after 2021 - possibly due to stagnating investments or demographic problems. Opole has low attractiveness - perhaps it is saturated or losing its regional function. The weakest residential markets for developers in this set are presented by Zielona Góra and Gorzów Wielkopolski. Zielona Góra shows a slight increase but is still not an attractive market based on the survey. Gorzów is an "alert" case - low TMAI values, low rate of change, possible demand barrier.

The results of the study indicate a diversified level of investment attractiveness of residential markets in the selected cities. The analysis confirms the complex nature of the concept of investment attractiveness, which, according to the literature (Kyshakevych et al., 2019), should be understood as a

combination of social, economic, infrastructural, and institutional factors influencing investment decisions. According to the literature (Hildebrandt et al., 2007; Schwab, 2017), investment attractiveness is linked to the level of development of local human capital, technical infrastructure, access to services and the overall investment climate. The research conducted revealed that not all medium-sized cities are equally attractive - and, on the other hand, problematic, for developers. Developers may consider Rzeszów, Olsztyn or Kielce as more attractive markets. Gorzów or Zielona Góra may need policies to support the local housing market. The methodology used has demonstrated its usefulness in the assessment of medium-sized cities, which, according to the literature, are currently experiencing population outflow and are often overlooked in analyses even though they perform important regional functions (Adam, 2006; Śleszyński, 2017). Depopulation undoubtedly poses a threat to investors. After all, demographic variables are a decisive element of the housing market environment (Foryś, 2009).

## Conclusions

Investment attractiveness in the real estate market refers to a given area's ability to attract investors by offering a combination of local characteristics that can be turned into competitive advantages. From the perspective of the housing market, it is the capacity of a local market to attract development investment through a mix of favourable socio-economic and spatial conditions. These include both economic factors (e.g., stable prices, growing demand for housing) and social factors (e.g., human capital, quality of life, infrastructure), which jointly determine the profitability of residential investments.

The results of the study, based on Hellwig's method, confirm the complex nature of investment attractiveness. It may be captured by a synthetic approach that integrates multiple dimensions - demographic, economic, infrastructural, and social - consistent with the frameworks proposed by Schwab (2017) and Carpio et al. (2023). As indicated in the literature (Kresl, 2013; Foryś, 2009), the investment potential of local housing markets can be assessed through the analysis of selected indicators using multivariate analysis methods. The application of Hellwig's synthetic indicator method in this study enabled the evaluation of each city's position, the identification of leaders and followers, and the detection of differences among medium-sized cities. The findings also support the conclusions of the literature review (Cardoso & Meijers, 2016), which suggest that medium-sized regional cities - despite lacking metropolitan advantages - can

still offer attractive investment conditions, provided their potential is properly identified. Rzeszów serves as a case. As highlighted by Kresl (2013) and Marjanović et al. (2024), the development of medium-sized cities may serve as an effective tool to counteract urban shrinkage and promote spatially balanced development.

One of the key limitations of the present study lies in the relatively small number of cities analysed and the constraints imposed by the analytical method used. A critical issue is the arbitrariness in the construction of the synthetic indicator, which involves subjective decisions regarding variable selection, normalization methods, and data aggregation techniques. These choices can unintentionally distort the results. Additionally, the synthetic nature of the indicator carries the risk of oversimplifying complex phenomena and concealing important details.

Nevertheless, synthetic indicators remain a valuable tool for analysing multifaceted issues. They offer simplification and standardization of large data sets by reducing them to a single composite measure (Carpio et al., 2023). Such indicators allow for intuitive and transparent interpretation, facilitating the identification of trends, enabling comparisons, and supporting decision-making processes - particularly in the context of resource allocation and public policy. Their illustrative and communicative potential makes them appealing not only to experts but also to the public and policymakers. Moreover, these indicators enable classification and ranking, making them a practical instrument for monitoring the development of regions, cities, or sectors.

Further research focusing on medium-sized cities beyond regional capitals, incorporating more variables, a longer time-span and TMAI forecast could help develop strategies to promote the medium-sized cities among investors-developers as attractive locations for investment and among people as an attractive place for living. Such strategies of promoting and improving cities' attractiveness could also play a role in mitigating urban shrinkage and fostering sustainable spatial and social development.

## References


Adam, B. (2006). Medium-sized cities in urban regions. *European Planning Studies*, 14(4), 547–555. https://doi.org/10.1080/09654310500421220

Begg, I. (1999). Cities and competitiveness. Urban Studies, 36(5–6), 795–809. https://doi.org/10.1080/0042098993222

Boschma, R. (2004). Competitiveness of regions from an evolutionary perspective. *Regional Studies*, 38(9), 1001-1014. https://doi.org/10.1080/0034340042000292601

Cardoso, R. V., & Meijers, E. J. (2016). Contrasts between first - tier and second - tier cities in Europe: A functional perspective. *European Planning Studies*, 24(5), 996–1015. https://doi.org/10.1080/09654313.2015.1120708

Carpio, L. D., Feldman, P. M., & Avolio, B. (2023). Measuring regional competitiveness. *Global Business Review*, 24(1), 1–20. https://doi.org/10.1177/09721509221145445

Dębkowska, K., Kłosiewicz-Górecka, U., Szymańska, A., & Ważniewski, P. (2020). *Weryfikacja scenariuszy rozwoju średnich miast w perspektywie 2035 roku*. Polski Instytut Ekonomiczny.

Drobniak, A. (2016). Dynamika rozwoju miast w kontekście ich wielkości i rangi. *Studia Ekonomiczne Regionu Łódzkiego*, (21), 217-226.

Erickcek, G. A., & McKinney, H. (2006). "Small cities blues:" Looking for growth factors in small and medium-sized cities. *Economic Development Quarterly*, 20(3), 232–258. https://doi.org/10.1177/0891242406290377

European Commission. (2007). *European Competitiveness Report 2007*. Luxembourg.

Foryś, I. (2008). Wykorzystanie metod porządkowania liniowego do oceny polskiego rynku nieruchomości. *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu. Taksonomia, klasyfikacja i analiza danych -teoria i zastosowania*, 7 (1207), 381-389.

Foryś, I. (2009). Wykorzystanie analizy wielowymiarowej do oceny potencjału rozwoju lokalnego rynku nieruchomości mieszkaniowych. *Studia i Materiały Towarzystwa Naukowego Nieruchomości*, 17(2), 7-19.

Gdakowicz, A., & Hozer, J. (2012). Analiza rozwoju rynków nieruchomości mieszkaniowych w wybranych miastach Polski z zastosowaniem metod taksonomicznych. *Studia i Materiały Towarzystwa Naukowego Nieruchomości*, 20(1), 123-133.

Geltner, D., Miller, N. G., Clayton, J., & Eichholtz, P. (2014). Commercial Real Estate, Analysis and Investments (3rd ed.). Mbition LLC.

Gierusz-Matkowska, A., Wojewnik-Filipkowska, A., & Krauze-Maślankowska, P. (2023). Ranking cities according to their fundamental power: A comparison among results of different methods of linear ordering. *Social Indicators Research*, 170(2), 731–763. https://doi.org/10.1007/s11205-023-03216-4

Guzik, B. (2008). Atrakcyjność inwestycyjna województw. *Gospodarka Narodowa. The Polish Journal of Economics*, 222(3), 39-64. https://doi.org/10.33119/GN/101306

Hellwig, Z. (1972). Procedure of Evaluating High - Level Manpower Data and Typology of Countries by Means of the Taxonomic Method. In Z. Gostowski (Ed.), *Towards a System of Human Resources Indicators for Less Developed Countries. Papers Prepared for a UNESCO Research Project* (pp. 115–134). Wrocław: Ossolineum - The Polish Academy of Sciences.

Henzel, H., Śmietana, K., & Maszczyk, A. (2014). Rynek nieruchomości jako rynek inwestycyjny - parametry oceny, tendencje zmian w latach 2007-2011. *Studia Ekonomiczne*, (177), 133-151.

Hildebrandt, A., Kalinowski, T., Nowicki, M., Susmarski, P., & Tarkowski, M. (2006). *Atrakcyjność inwestycyjna województw i podregionów Polski*. Gdańsk: Instytut Badań nad Gospodarką Rynkową.

Hildreth, P. A. (2007). Understanding medium-sized cities. Town and country planning, May, 163-167.

Horbaczewska, O. (2020). Przestrzenne zróżnicowanie konkurencyjności i atrakcyjności turystycznej powiatów w Polsce. Studia Ekonomiczne. *Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach*, 391, 57–76.

Jopek, D., & Musiał-Malago, M. (2021). Kurczące się miasta jako proces przemiany miast w świetle wybranych aspektów. Teka Komisji Urbanistyki i Architektury Oddział PAN w Krakowie, 49, 115-135. https://doi.org/10.24425/tkuia.2021.138706

Koj, J., Dawid, M., Dawid, W., Kudłacz, K., Mróz, M., Stelmaszewska, N., Sykała, Ł. (2023). *Polityka inwestycyjna polskich miast*. Badania Obserwatorium Polityki Miejskiej, Instytut Rozwoju Miast i Regionów, Warszawa–Kraków. Doi.org/10.51733/opm.2023.17. Online, retrieved on 15/11/2025: https://obserwatorium.miasta.pl/wp-content/uploads/2023/05/Polityka-inwestycyjna-polskich-miast.pdf

Kowalczyk-Rólczyńska, P. (2016). Zastosowanie metody sum standaryzowanych do oceny lokalnych rynków nieruchomości mieszkaniowych. *Studia Ekonomiczne. Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach*, 297, 90-101.

Kresl, P. (2013). *The Competitiveness of Cities*. UN - Habitat.

Kyshakevych, B., Nahayeva, M., & Kryński, A. (2019). The economic essence of the investment attractiveness of the regions. *Scientific Journal of Polonia University*, 37(6), 46-53.

Miles, M. E., Netherton, L. M., & Schmitz, A. (2015). Real Estate Development: Principles and Process (5th ed.). Washington, DC: Urban Land Institute.

Marjanović, M., Sagot Better, M., Lero, N., & Nedović - Budić, Z. (2024). Can acceptance of urban shrinkage shift planning strategies of shrinking cities from growth to de - growth? *Urban Planning*, 9(1), 1-20. https://doi.org/10.17645/up.6904

Oleńczuk-Paszel, A., & Sompolska-Rzechuła, A. (2013). Przestrzenne zróżnicowanie obrotu nieruchomościami gruntowymi przeznaczonymi pod zabudowę mieszkaniową w ujęciu województw. *Ekonometria*, 4(42), 13-24.

Porter, M. E., & Ketels, C. H. (2003). *UK Competitiveness: Moving to the Next Stage*.

Roszkowska, E. (2024). A comprehensive exploration of Hellwig's taxonomic measure of development and its modifications - A systematic review of algorithms and applications. *Applied Sciences*, 14(21), 10029. https://doi.org/10.3390/app142110029

Rsng.pl. (2025). Nieruchomości w małych miastach: Niszowy rynek inwestycyjny. Online, Retrieved on 25/04/2025. https://www.rsgn.pl/nieruchomosci - w - malych - miastach - niszowy - rynek – inwestycyjny

Ručinska, S. & Ručinsky, R. (2007). Factors of regional competitiveness. In *2nd Central European Conference in Regional Science – CERS* (pp. 902–911).

Schwab, K. (2017). *The Global Competitiveness Report 2017–2018*. World Economic Forum. Online, Retrieved on 25/04/2025. https://www3.weforum.org/docs/GCR2017-2018/05FullReport/TheGlobalCompetitivenessReport2017%E2%80%932018.pdf

Śleszyński, P. (2017). Wyznaczenie i typologia miast średnich tracących funkcje społeczno-gospodarcze. Przegląd Geograficzny, 89(4), 565-593. https://doi.org/10.7163/PrzG.2017.4.3

Tarczyńska-Łuniewska, M., & Tarczyński, W. (2006). *Metody wielowymiarowej analizy porównawczej na rynku kapitałowym*. Warsaw: Wydawnictwo Naukowe PWN.

Węcławowicz, G. (2017). Geografia społeczna miast w Polsce. *Przegląd Geograficzny*, 89(4), 535-563. https://doi.org/10.7163/PrzG.2017.4.2

Wolff, M., & Wiechmann, T. (2018). Urban growth and decline: Europe's shrinking cities in a comparative perspective 1990–2010. *European urban and regional studies*, 25(2), 122-139. https://doi.org/10.1177/0969776417694680

Wojewnik-Filipkowska, A., Gierusz-Matkowska, A., & Krauze-Maślankowska, P. (2024). Fundamental power of the city - A proposition of a new paradigm and index for city development. *Cities*, 144, 104630. https://doi.org/10.1016/j.cities.2023.104630

Wilczek, M. T. (2013). Wybrane czynniki popytowe kształtujące decyzje inwestora na rynku nieruchomości mieszkaniowych i źródła informacji o nich. *Studia Ekonomiczne*, 155, 175-188.

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# Green Covered Bonds as instruments for sustainable financing of the real estate market in Poland

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## Abstract

**Objective:** The purpose of this article is to identify factors influencing the development of green covered bonds in Poland. The domestic green covered bond market and PKO Bank Hipoteczny SA, as a pioneer of international green mortgage bond issuance, were chosen as a case study.
**Material and methods:** The study applies a case study approach to examine the green mortgage bond market in Poland and identify barriers to its development.
**Findings:** The development of the green covered bonds market will not be possible without the implementation of systemic solutions, including incentive schemes specifically designed for mortgage banks and other market participants. A significant barrier is the limited supply of environmentally friendly properties in Poland.
**Research limitations:** Insufficient legal and uniform terminology for green covered bonds. A clear limitation in the research is the lack of sufficient transparency and understanding of this topic in the Polish market, as well as the absence of uniform terminology and a legal definition of green covered bonds.
**Research implications:** There is a need to foster greater understanding of green financing mechanisms among regulators and policymakers in Poland. The development of the green covered bonds market requires a comprehensive systemic approach, including the creation of incentive schemes to promote green covered bonds (e.g., fiscal incentives). This includes support for mortgage banks as issuers of green covered bonds, investors purchasing these bonds (with the purchase of green covered bonds receiving particular encouragement), and borrowers seeking green financing for environmentally friendly and sustainable properties.

**Keywords:** Green covered bonds; Mortgage banks; Green financing; Energy efficient mortgage*; S*ustainable real estate
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## INTRODUCTION

Tackling climate change is essential for the future of Europe and the world. All EU Member States ratified in 2015 Paris Agreement (Paris Agreement, 2015), stating that the EU will take action to become climate neutral by 2050 (5 facts about ..., 2019). The European Green Deal is the EU's strategy for achieving this goal. One of its elements is the 'Fit for 55' package to achieve the EU's climate targets (European Green Deal, Brussels, 11.12.2019).

Buildings are the largest consumers of energy in Europe. Therefore, the building sector is crucial to achieving the EU's energy and climate targets. Buildings account for 40% of energy consumed and 36% of energy-related greenhouse gas emissions. Within the EU, heating, cooling and domestic hot water account for 80% of the energy consumed by households (*Key facts on energy...*. 2023). One priority is to reduce the energy demand of existing residential and public buildings. It is therefore necessary to renovate buildings to make them more energy efficient and thus less dependent on fossil fuels (*Proposal for a Directive...*, 2021).

The real estate market and its financing system therefore, deal with any environmental challenges and play a key role in the transition to a green and more sustainable economy. The role of financial institutions, including the mortgage banking sector, is to observe and constantly follow the demand of financial market participants. At the 2017 One Planet Summit, the European Commission emphasized the financial sector's role in creating a low-carbon future. It encouraged banks to finance projects that positively impact climate change and offer mortgages for energy-efficient buildings (The Network for Greening the Financial System, 2017. NGFS brings together central banks and supervisors, committed to taking due account of the climate risk to global financial stability. Green covered bonds (GCBs) are a response to this challenge from the banking sector. GCBs are based on green mortgages (energy-efficient mortgages) and are used to finance green and energy-efficient construction, aligned with the European Green Deal (*The European Green Deal*, 2019) and the Energy Performance of Buildings Directive (EPBD, 2024).

The purpose of this article is to make a general characterization and identify factors influencing the development of green covered bonds in Poland, issued by mortgage banks. The domestic green covered bond market and PKO Bank Hipoteczny SA, as a pioneer of international green covered bond issuance, were chosen to be described in detail. The issuance was also the first of its kind in

a European Union country where the European Bank for Reconstruction and Development (EBRD) has operations.

The publication also includes 3 specific objectives:

1. To describe the issues and define the concepts in the 'green' area, such as green real estate, green covered bonds (GCB), green mortgages (GM)
2. To approximate the legal conditions, including EU regulations affecting the process of real estate market transformation towards a green market
3. Indication of national legal regulations concerning the issuance of green covered bonds, as well as the current status and factors of development of these financial instruments in Poland

The article makes a new contribution to the literature on the subject and fills a knowledge gap in the field of green bonds. This subject area in Poland is not yet well recognized and described. Lastly there are a lot of publications connected with green finance, green bonds (Maltais & Nykvist, 2021; Gilchrist, Yu & Zhong, 2021; Sobik, 2023), but there is a limited publication about exactly green covered bonds (especially the publications European Covered Bonds Council, particularly specialist publications, Hypostat and EMF-ECBC statistical reports). Using the Polish green covered bonds market and PKO Bank Hipoteczny SA as a case study, this paper provides insights into the level of growth of the green covered bond market. The paper uses a literature research method, using national and EU legal regulations, reports of selected organisations of green financing banks and green covered bond issuers, and academic articles, the vast majority from the last 5 years, synthesizing the knowledge in the field.

## Literature Review

On 28 May 2024, the revised Energy Performance of Buildings Directive entered into force (Directive (EU) 2024/1275). This key piece of legislation introduces a new order to the real estate market and its financing in the EU.

The European mortgage and housing finance sectors face key challenges. From an environmental standpoint, European residential dwellings must adapt to rapidly changing climate conditions and comply with new building energy performance requirements to contribute towards meeting the EU's climate goals (Hypostat, 2024).

Construction is the sector that generates the most energy consumption. It accounts for more than 1/3 of total energy consumption, making it also a key source of CO2 emissions. Sustainable construction will be key to achieving the goal of net zero emissions by 2050, which should translate into greater interest in

'green' certificates. Green buildings (G.B's) should be seen as the practice of creating healthier and more resource-efficient models for construction in all its aspects (Zuo & Zhao, 2014).

According to the U.S. Environment Protection Agency (EPA, 2014), green buildings are designed to reduce the overall impact of the built environment on human health and the natural environment by efficient use of resources, protecting occupant health, improving employee productivity and reducing waste, pollution and environmental degradation. EPA uses the GreenCheck process like a reminder to all EPA architecture, engineering and real estate professionals to keep sustainability at the forefront throughout the project life cycle EPA uses green building and energy performance certifications such as ENERGY STAR® as part of its toolkit for acquiring high performance G.B's and ensuring their continued performance (United States Environmental Protection Agency, Last updated on November 5, 2024).

Green building certification schemes are a set of tools that are used to evaluate a building's performance from an environmental and sustainability perspective. The aim is to determine whether they are designed, built and operated in a sustainable manner. The rating of buildings is based on energy efficiency, water consumption, indoor air quality, material selection and sustainable location, among others.

Various green rating systems exist around the world. There are also studies that systematically review, review the effectiveness and development of green rating systems (Doan et al., 2017).

Certified buildings are considered to use less energy, provide better living conditions, and contribute to the reputation of the property (Yu& Tu2011).

The benefits of G.B. certification are pointed out, among others, by Ciora, Maier and Anghel (2016), who, in their study carried out in the US market, indicated that commercial buildings with a LEED or Energy Star label achieved a higher increase in the sale price of these properties (Ciora, Maier, and Anghel, 2016).

Brown and Watkins (2016) conducted a systematic review and meta-analysis of existing studies of the benefits of certified homes (single-family residential properties, LEED and ENERGYSTAR certified). They proved that purchasers of residential properties derive greater satisfaction from buying a certified and environmentally friendly house, despite spending more money (Brown and Watkins, 2015).

There are nearly 600 worldwide green product certifications with nearly 100 in use in the U.S., (Vierra, 2016) The sustainable design trend was initiated in the 1990s with the creation of Building Research Establishment's Environmental Assessment Method (BREEAM) in the U.K. One decade past also U.S created their own certification - the U.S. Green Building Council (USGBC), followed by the Leadership in Energy and Environmental Design (LEED) rating system for new construction (Vierra, 2016).

Key certification schemes in real estate include *WELL Building Standard*, *BREEAM (Building Research Establishment Assessment Method),* Green Globes, Living Building Challenge and LEED (*Leadership in Energy and Environmental Design) (*CFP Green Buildings, *The 5 most important green building certifications in Europe).*

*The WELL Building Standard* is a method for measuring and assessing the impact of G.B's on human health. WELL places a strong emphasis on human health outcomes as central to sustainable development (CFP Green Buildings, *The 5 most important green…).* Ildiri et al. (2022) proved the effectiveness of WELL certification and their positive impact on health of the employees of the building they use. The results showed that WELL certified offices had a positive impact on occupant satisfaction with the workplace and its health and productivity, with increases in means from pre-to post-occupancy being highly statistically significant (Ilidri et al., 2022).

*BREEAM*, on the other hand, is also now considered one of the strongest GB certification schemes (Doan et al., 2017). There are 3 areas in which BREEAM certification can be achieved: use, building and new construction and refurbishment. The score becomes higher as further sustainability criteria are met.

*Green Globes Certyfication* (GGC) is a three-in-one whole building certification system that evaluates the environmental sustainability, health & wellness, and resilience of all types of commercial real estate. Bible and Chikeleze (2018) explore favourable avenues of financing for real estate projects with GGC. They have demonstrated the significant financial advantage of obtaining the GGC and special Fannie Mae Programme (Bible and Chikeleze, 2018).

*The Living Building Challenge* is a certification program created by the International Living Future Institute in 2006. The LBC emphasises harmony between people and nature, is performance-based. Certifications are based on actual rather than expected performance and occur after the building's first operational year. ILFI has made it a strategic organizational priority to accelerate

access to the benefits of biophilic spaces (International Living Future Institute, 2006).

*LEED* is a G.B. certification program developed by the U.S. Green Building Council in 1998. It involves a series of rating systems that deal with the construction and maintenance of buildings, which encourages sustainable and environmentally-friendly design. The building is assessed on the basis of five main criteria, i.e. sustainable location of the investment, water efficiency, energy and atmospheric use, use of materials and resources, and indoor environmental quality (an additional criterion is innovation in design, Zhang et al., 2017).

HQE certification system (Haute Qualité Environnementale) is based on performance benchmarks established in the Centre Scientifique et Technique du Bâtiment(CSTB), created in 1947, in France. HQE applies to commercial and residential buildings (NF HABITAT HQE) and is awarded by external organisations accredited by HQE. The process is structured into two instruments: the enterprise management system (EMS) and environmental quality of the building (EQB, Vazque et al., 2011).

Kryvomaz (Kryvomaz et al., 2018) points to the flexibility of this certification, more adaptable to the specifics of the country. HQE has a better innovative extension of the concept to the urban planning operations (Kryvomaz et al., 2018).

The *German DGNB (Deutsche Gesellschaft für Nachhaltiges Bauen)* certification system was developed in Germany. Under the DGNB scheme, buildings are assessed in six main quality categories, i.e. environmental, socio-cultural and functional, technical, process and location. DGNB System is based on three essential paradigms: life cycle assessment, holistic approach, and performance orientation (Piętocha, 2024).

In conclusion, the use of multi-criteria building certification systems is becoming increasingly common in the building industry. Certifications such as BREEAM, LEED, and DGNB are among the most popular methods for assessing sustainable architecture (Piętocha, 2024).

All of GB certifications focus on environmentally friendly aspects, as well as creating a friendly working environment. It increases the market value of the property. It is best to start the certification process before buying a plot of land. Location should be sustainable, i.e. have close access to public transport, which reduces carbon dioxide emissions (*Certificates confirming green aspects of buildings increasingly popular*, 2024).

From the perspective of a mortgage bank, as an issuer of green covered bonds, green and low-energy buildings must comply with the Green Bond Principles (GBP). PKO Bank Hipoteczny (PKO BH), for example, developed criteria for energy-efficient buildings based on external consultancy advice, defining energy consumption thresholds for buildings among the top 15% most energy-efficient in Poland. Sustainalytics, an external consultant, confirmed that PKO BH's financing of energy-efficient properties has a positive environmental impact and aligns with the four core elements of the GBP 2018 (Second-Party Opinion, PKO BH ,2019).

It is recommended that issuers use an external assessment to confirm green bond compliance with the key elements of the GBP in the form of an external opinion (*second-party opinion*). PKO BH has obtained confirmation of GCBF compliance from the certified international firm Sustainalytics. In accordance with the principles adopted in the GCBF, PKO Bank Hipoteczny undertook to publish, within one year from the date of the issuance of the Green Lien Notes, a report on the allocation of the funds raised in the issuance on the Bank's website. The criteria for the evaluation and selection of green assets previously developed by PKO BH have gained acceptance by the Climate Bonds Initiative as Low Carbon Building Criteria and are now a benchmark for the energy-efficient residential property market in Poland (PKO Bank Hipoteczny press release: PKO Bank Mortgage will issue Poland's first green mortgage bonds worth PLN 250 million, 2019).

For mortgage banks, it is crucial that green covered bonds (GCBs) contribute to the UN SDGs, targeting sustainable development by 2030. For instance, PKO BH's GCBs issued in 2019 have financed or refinanced green housing supported SDG Goal 7 (affordable and clean energy), aiming to double global energy efficiency by 2030. Sustainalytics supports PKO BH's green building projects, citing their potential to reduce greenhouse gas emissions and help Poland meet its climate goals (Press information, PKO BH: Bank Mortgage will issue the first green mortgage bonds in Poland with a value of PLN 250 million,2019).

The buildings of the future will be ever more technologically advanced, taking into account the changing approach to sustainability and social needs. The World Economic Forum has developed a 'framework for the future of real estate', which indicates the desired direction of change (World Economic Forum, 2021).

Energy efficiency of the property has a significant risk-reducing effect for banks by improving the ability of borrowers to repay the loan and increasing the

value of the property. In conclusion, the future of the real estate sector and its financing is moving in a green and sustainable direction.

GCB are a type of green bond (G.bond) that is one of the innovative financial instruments responding to the current challenges of reality. G.bond make it possible to raise capital and invest in new and existing projects qualified as "green" with environmental benefits.

Green mortgage bonds are defined as mortgage bonds (securities), the proceeds of which are used exclusively to finance new or refinance existing long-term mortgages for energy-efficient residential properties. GCBs are virtually identical in design, the difference being that the capital raised from the GBS issue is used to finance energy-efficient mortgages. The difference is that the capital raised from the issuance of GBS is used to finance energy-efficient mortgages.

Restrictive guidelines for the qualification of this type of bond are set by the International Capital Market Association (ICMA) as the Green Bond Principles (GBP, 2021), which aim to unify the international green bond market. The rules for a set of guidelines for the use of issue proceeds, the project evaluation and selection process, resource management and reporting.

The ECBC Fact Book defines GCB as bonds, where the proceeds (or an equivalent amount) of which are used to (re)finance in part or in full eligible green projects that meet certain green standards. In practice, the most common format adopted is a structure in which mortgages are provided for the purchase of residential and/or commercial properties that meet certain sustainability criteria. Although, as noted, Schuller et al. (2023) currently, four exceptions have been found in the green covered bonds market, deviating from the general pattern. Two issuers refinance green public sector loan assets, one issuer refinances renewable energy loans in a green format below the benchmark of the Luxembourg program, and one Swedish issuer refinances sustainable forestry with green covered bonds (Schuller et al., 2023).

A similar approach is represented by the International Capital Market Association (ICMA), which considers as green bonds any type of bond instrument in which the proceeds or an equivalent amount will be used exclusively to finance or refinance, in part or in full, new and/or existing eligible green projects and which comply with the four basic elements of the so-called Green Bond Principles (GBP), Green Bond Principles, 2021)).

Green covered bonds enable capital-raising and investment for new and existing projects with environmental benefits. The GBP seek to support issuers in financing environmentally sound and sustainable projects that foster a net-zero

emissions economy and protect the environment (*Green Bond Principles Voluntary..., June 2021).*

The idea of creating uniform rules for green bonds is to help their widespread use by the market and its participants. Both by the issuers of green bonds, who, acting in a well-defined way, provide investors with the best product - a reliable and secure financial instrument. Promoting the availability of information enables green bonds investors to assess the environmental impact of their green bond investment. They also assist underwriters by providing support that facilitates the transaction, maintains market integrity. The GBP places a clear emphasis on the transparency, accuracy and reliability of the information that will be disclosed and reported by bond issuers to their stakeholders (Green Bond Principles Voluntary..., 2021).

According to Green Bonds Principles (GBP), there are currently four types of green bonds. New types of green bonds are continuously updated in the GBP publications, which include:

1. Standard Green Use of Proceeds Bond: an unsecured debt obligation with full recourse-to-the-issuer only and aligned with the GBP.
2. Green Revenue Bond: a non-recourse-to-the-issuer debt obligation aligned with the GBP in which the credit exposure in the bond is to the pledged cash flows of the revenue streams, fees, taxes, etc., and whose use of proceeds goes to related or unrelated Green Project(s).
3. Green Project Bond: a project bond for a single or multiple Green Project(s) for which the investor has direct exposure to the risk of the project(s) with or without potential recourse to the issuer, and that is aligned with the GBP.
4. Secured Green Bond (SGB): a secured bond where the net proceeds will be exclusively applied to finance or refinance either: The Green Project(s) securing the specific bond only (a "Secured Green Collateral Bond"); or The Green Project(s) of the issuer, originator or sponsor, where such Green Projects may or may not be securing the specific bond in whole or in part (a "Secured Green Standard Bond"). A Secured Green Standard Bond may be a specific class or tranche of a larger transaction.

This SGB category may include, but is not limited to, covered bonds, securitisations, asset-backed commercial paper, secured notes and other secured structures, where generally, the cash flows of assets are available as a source of repayment or assets serve as security for the bonds in priority to other claims. There should be no double-counting of Green Projects under a SGB with any other type of outstanding green financing and the issuer, originator, or sponsor

(as applicable) must ensure full alignment with all Core Components of the GBP [GBP, Appendix I (June 2022)].

Importantly, in ICMA's view, some qualifying 'green projects' may also have additional social benefits. In contrast, the classification of the use of a proceeds bond as a green bond should be determined by the issuer on the basis of its primary objectives (referring to bonds that intentionally combine qualifying green and social projects) (GBP, 2021).

By pursuing five presumed environmental objectives, green bonds are intended to contribute to: climate change mitigation, climate change adaptation, conservation of natural resources, as well as protection of biodiversity, and environmental pollution prevention and control. The design of green bonds, therefore, offers the opportunity to choose from a range of possible options. With regard to the universe of GCB the following categories of measures and objectives financed by GCB, issuance can currently be Energy efficiency of buildings, including new and renovated buildings, energy storage, district heating, smart grids, appliances, and products.

1. Pollution prevention and control: air emissions reduction, greenhouse gas control, soil remediation, waste prevention, waste reduction etc.
2. Green buildings, which must meet regional, national, or international standards or certifications;
3. Clean transport: electric, hybrid, public, infrastructure for clean energy vehicles etc.;
4. Environmentally sustainable management of living natural resources and land use (including environmentally sustainable agriculture; environmentally etc. (Schuller et al., 2023].

In addition, ICMA has published a framework that helps parties to appropriately 'translate' their investment objectives into the so-called UN Sustainable Development Goals (SDGs). Market analysis shows that the following categories are the most popular among GCB issuers.

As reported in the ECBC Fact Book 2023, the majority of GCB, issuers are primarily focused on meeting targets 7, 11 and 13, namely: "affordable and clean energy" (7), "sustainable cities and communities"(11) and "climate action" (13). While issuers of Green Public Secured Bonds also cover objectives 6,7, 9 and 12, categories such as: "clean water and sanitation" (6), "affordable and clean energy" (7) and "industry, innovation and infrastructure" (SDG 9) and "responsible consumption and production" Currently, almost all GCB on the market are based on the GBP standards (The components of the GBP, 2021).

GBC's issues are targeted at institutional investors who, by investing funds in this type of security, gain greater exposure of their portfolios to green assets, with relatively low risk. In summary, GCB have great potential in providing financing for green projects that meets the UN SDGs and the Paris Agreement. Wider use of green bonds can contribute to CO2 reductions in the construction industry.

The EU's *Horizon 2020* framework program points to the need for standards for a standardised European 'energy-efficient mortgage' (mortgages, EEM), which would encourage property owners to take action to increase the energy efficiency of their property or to purchase such properties using preferential financing conditions (preferential interest rates and/or increased mortgage credit value).

EEMs are intended to finance the purchase/construction and/or renovation of both residential (single family & multi-family) and commercial buildings where there is evidence of: (1) energy performance which meets or exceeds relevant market best practice standards in line with current EU legislative requirements and/or (2) an improvement in energy performance of at least 30%. This evidence should be provided by way of a recent EPC rating or score, complemented by an estimation of the value of the property according to the standards required under existing EU legislation. It should specifically detail the existing energy efficiency measures in line with the EEM Valuation & Energy Efficiency Checklist (Definition of an Energy Efficient Mortgage, 2018).

The EEM pilot program, was launched on 14 June 2018 and is divided into three parts. The first relates to credit institutions ('financial management'), the second to energy efficiency institutions ('energy saving management'), and the third is guidance for valuers (property value management). Under 'financial management', the European Mortgage Federation has provided the following guidelines for banks (Energy Efficient Mortgage Pilot Programme 2018):

- Guideline No. 1 - Green Mortgage: the loan should finance the acquisition/construction of an energy-efficient dwelling or allow for the thermomodernisation/renovation of an existing property;
- Guideline No. 2 - Green Mortgage Funding Mechanism: Make loans available on preferential terms due to the positive impact of the energy-efficient project on the borrower's risk profile and property.
- Guideline No. 3 - Leading the Investment: The loan should enable building performance improvements, including gradual energy improvements over the loan's life;

- Guideline No. 4 - Technical Experts: The lender should keep records confirming the qualifications of an energy efficiency expert involved in the property's design, renovation, or technical advice, who has issued an energy certificate for the property;
- Guideline No. 5 - Contractor/SME: The lender should maintain records confirming that all energy conservation work was performed by a qualified contractor using appropriate materials and tools;
- Guideline No. 6 - Access to Additional/Alternative Financing: The lender or third party should provide information on available support instruments and tax benefits for achieving energy efficiency, alongside mortgages offered for energy-efficient properties;
- Guideline No. 7 - Valuation Requirements: Lenders should instruct appraisers to consider property energy-saving indicators in appraisal reports;
- Guideline No. 8 - Customer Relationship Management: Banks should provide information on how loan conditions improve if used for energy-efficient properties or provide insight into other products that enhance savings;
- Guideline No. 9 - Optimising Relationships with Market Actors: Lenders should cooperate with entities specialized in energy-efficient construction to support borrowers;
- Guideline No. 10 - IT Systems: Loans granted per programme guidelines should be tagged in credit institutions' IT systems, as defined in an IT protocol. The portal will be linked to the recommendations arising from the requirements for Energy Certificates and subsequently to the EE passport of the building;
- Guideline No. 11 - Use of Data: Lenders should use data for risk analysis, especially for determining default probabilities, and provide this data to the EeMAP Programme Coordinator;
- Guideline No. 12 - Mortgage financing: when mortgage receivables are used in the collateral register for the issuance of mortgage bonds, they should be labelled Green Mortgages (EEMs) in order to refinance them with Green Bonds (covered bonds).

PKO Banki Polski and PKO Bank Hipoteczny were the first banks from Poland to join the Energy Efficient Mortgages Initiative (EEMI) pilot project. EEMI has been the catalyst for the growth of a new, integrated, multi-stakeholder energy-efficient mortgage ecosystem. The EEMI seeks to introduce a greener, more

sustainability-focused means of buying, renovating and living in our homes [Energy Efficient Mortgages Initiative 2015].

The project aims to create standardised, pan-European solutions for mortgages granted to finance flats and houses that incorporate energy-efficient solutions. Among other things, the EEM project aims to build a package of preferences for borrowers to encourage them to buy energy-efficient properties or to improve the energy efficiency of existing buildings. In the longer term, the program's activities may translate into lower risk weights for banks. This is intended to incentivise banks to play a key role in driving climate change action in the European construction sector. EEML reporting provides information on portfolios of energy-efficient mortgages in financial institutions' portfolios. The report provides comparability both between different players in the market and in relation to traditional real estate finance sources, and provides greater transparency on climate risk. Currently, 70 institutions from various European countries participate in the initiative (Energy Efficient Mortgage Pilot Programme, 2018).

The Energy Efficient Mortgage Label (EEML) is a clear and transparent quality label for consumers, lenders and investors, aimed at identifying EEM in lending institutions' portfolios, which are intended to finance the purchase/construction and/or renovation of both residential (single family & multi-family) and commercial buildings, with a focus on building energy performance.

The EEML is intended to scale up private market support for the NextGenerationEU vision, the EU Renovation Wave Strategy and the EU Green Deal, by acting as a catalyst for consumer demand and a driver of the qualitative upgrade of the energy profile of lending institutions' portfolios and of enhanced asset quality.

The objectives of the EEML are to maximise portfolio regulatory alignment with the main legal and policy developments, such as the EU Taxonomy, Mortgage Credit Directive (MCD), Capital Requirements Regulation (CRR) or equivalents at the international level [The Energy Efficient Mortgages Label].

Poland's largest issuer of green covered bonds - PKO Bank Hipoteczny - bases its criteria for assessing the energy efficiency of financed residential buildings on market data and the legal regulations in force in Poland. In addition, special criteria developed for the Bank by green building consultant Drees&Sommer were commissioned and approved by the independent

international organisation Climate Bonds Initiative as a benchmark for the assessment of green residential buildings in Poland (website PKO BH).

In summary, mortgage lending in Europe is equivalent to around 46% of the EU GDP. The development of green mortgage lending is crucial for the realisation of a climate-neutral economy. The mortgage industry plays an important role in efforts to tackle climate change by funding the home renovation programs needed to improve the energy performance of buildings in the EU. Since its inception in 2015, the EU's Horizon 2020-funded Energy Efficient Mortgage Initiative (EEMI) has catalysed the development of a new, integrated, multi-stakeholder energy efficient mortgage ecosystem. EEMI aims to bring greener, more sustainability-focused ways of buying, renovating and living in our homes (EMI, 2015). Such a huge potential of the mortgage market, including the green mortgage segment, requires instruments to refinance them, and green covered bonds provide such an opportunity.

On 25 September 2015, the UN General Assembly adopted the "2030 Agenda for Sustainable Development," establishing a new global framework for sustainable development. The agenda includes the UN Sustainable Development Goals (SDGs), covering economic, social, and environmental dimensions (*Transforming our world: the 2030..., 2015)*.

Effective transition towards net zero will require concentrated effort across the ecosystem. Central banks and financial regulators have an important role to play in this effort. Firstly, they must ensure that the financial sector stays resilient amid the physical and transition risks posed by climate change. Secondly, they must help mobilise the financing needed to decarbonise the global economy.

Therefore, the Network for Greening the Financial System (NFGS) brings together committed stakeholders, with central banks and supervisors aiming to step up their work on climate and environmental risk and on scaling up green finance. The NGFS, which was launched by its eight first members at the One Planet Summit in December 2017, now comprises 134 central banks and supervisors, together with 21 observers responsible for the oversight of: 100% of the global systematically important banks and 80% of the internationally active insurance groups The Network’s 89 members represent countries which together constitute of 85% of global GDP and 75% of greenhouse gas emissions (Network for Greening the Financial System, 2017). On 12 March 2024, the European Parliament adopted an amendment to the EU's Energy Performance of Buildings Directive (EPBD), which introduces new energy efficiency requirements for buildings across the EU from 28 May 2024 (EPBD, 2024). The intention of the EU

legislator was to achieve a fully decarbonised building stock by 2050. This process is to be achieved, among other things, through the renovation of buildings in each member state, in particular the buildings with the worst energy performance (Communication to MPs, Petition No. 0734/2023). From 2030, new buildings are to become zero-carbon, and the existing stock is to be progressively upgraded to achieve climate neutrality by 2050 (Proposal for a Directive of the European Parliament and of the Council on the energy performance of buildings, 2021). Achieving these ambitious targets will not be possible without adequate financing and the implementation of adequate financial instruments.

The introduction of minimum energy performance standards is a key stimulus for the successful energy transformation of the real estate sector. The Directive also normalizes requirements for the maintenance of national databases on the energy performance of buildings, access to these databases and the publication of information. The renovation of buildings will reduce the cost of energy consumption and contribute to reducing the negative phenomenon of energy poverty (Questions and Answers on the revised Energy Performance...). It will also increase the value of buildings with better energy performance. The studies on the subject show a strong trend towards an increasing gap between the market values of properties with different performance classes (Micelli et al., 2023).

For the domestic covered bond market, including green covered bonds, a positive development and a good prognosis for the future is the resolution adopted on 5 July 2024 by the Financial Supervision Commission (FSC) to issue a Recommendation on the Long-Term Funding Ratio (WFD, Resolution no. 243/2024 of the Financial Supervision Commission of 15 July 2024). This recommendation applies to domestic banks and the aim of it is to reduce the risks associated with the current mortgage funding structure and to change this structure by increasing the share of long-term debt instruments in banks' liabilities in relation to the value of mortgage loans granted. The supervisor expects that from the end of 2026, banks will be required to maintain this ratio at a level of at least 40 %. According to Scope Ratings Agency (2024), the introduction of the WFD will support the development of the Polish mortgage bond market, in particular green covered bonds. The FSC is the first national regulator to support climate transformation and green debt securities, converging with the EU Green Bond Standard or Green Bond Principles in this way. According to WFD- PAP calculations, debt securities that converge with these guidelines receive a 20 per cent higher weighting than standard debt (WFD will

help to develop the Polish mortgage bond market, including green bonds - Scope Ratings (opinion).

## CURRENT STATE OF THE MORTGAGE BOND MARKET IN POLAND – CASE STUDY

As a case study, PKO Bank Hipoteczny is presented as an example of the largest mortgage bank and issuer of mortgage bonds in Poland, which has completed the issuance of green mortgage bonds twice. An issue of green mortgage bonds, realised in 2022, in the amount of EUR 500 million, whose main buyer was the European Bank for Reconstruction and Development, was described.

The basic regulation that governs the activities of mortgage banks in Poland, including their issuing activities, is the Act of 29 August 1997 on covered bonds and mortgage banks [Journal of Laws 1997, consolidated text 2023, item 110]. A mortgage bank (M.B.) is authorised to issue covered (mortgage) bonds and public mortgage bonds (art.2b). Pursuant to Article 2a of the Act, a covered bond is defined as a debt security issued by a M.B. in accordance with the provisions of the Act, which is secured by assets pledged as collateral for mortgage bonds, against which mortgage bond holders have a direct claim both to a separate bankruptcy estate separated in accordance with the provisions of the Act of 28 February 2003. - Bankruptcy Law (consolidated text 2024, item 794), as well as to the Mortgage Bank. A covered bond is a registered or bearer security based on a mortgage bank's claims secured by mortgages, in which the M.B. undertakes towards the holder to fulfil certain monetary benefits (article 3.1, the Act on covered bonds and mortgage banks).

While the legislator does not specify what a GCB. is, the aforementioned definition also refers to a GCB. It does, however, indicate in Art. 7d. 1 of the covered bonds and M.B's act, that a covered bond may be designated as a "European covered bond" or a "European covered bond" with a translation of this designation into all official languages of the European Union. The mortgage bond meets the requirements set out in the Article 129, Regulation (EU) No 575/2013 Of The European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (Article 129, Regulation (EU) No 575/2013 Of The European Parliament and of the Council of 26 June 2013 *on prudential requirements for..., 2013)* may be designated as a "European covered bond (premium)" or a "European

covered bond (premium)" with a translation of this designation into all official languages of the European Union[article 7d covered bonds and mortgage banks act].

To the extent not regulated by the Covered Bonds and M.B.'s Act, the following provisions apply to the rules for the issue, trading and redemption of mortgage covered bonds: the Act of 29 July 2005. on public offerings and conditions for the introduction of financial instruments to the organised trading system and on public companies (consolidated text 2024, item 620), Regulation (EU) 2017/1129 of the European Parliament and the Council of 14 June 2017 on the prospectus to be published when securities are offered to the public or admitted to trading on a regulated market, and repealing Directive 2003/71/EC [55], the Act of 29 July 2005 on trading in financial instruments (consolidated text 2024, item 722); the Act of 15 January 2015 on bonds (consolidated text 2024, item 708). Mortgage Banks are required by law to maintain a mortgage bond collateral account. This account plays an extremely important role for the activities of a mortgage banks and, in particular, for monitoring the collateral status of mortgage bonds as essential instruments for refinancing its activities.

Another important safeguard for the issuing activities of a mortgage bank is the increased supervision and the institution of a trustee. The trustee is one of the most important elements of the system for protecting the interests of purchasers of mortgage bonds that a mortgage bond issues to refinance its lending activities. In conclusion, due to the stringent legislation in Poland, green mortgage bonds issued by domestic mortgage banks meet the highest safety standards.

The Polish mortgage bond market, despite the passage of twenty-six years since the entry into force of the Act of 29 August 1997 on mortgage bonds and mortgage banks (consolidated text Dz. U. 2023, item 110), which restored the possibility of issuing mortgage bonds in Polish law, is still at a limited stage of its development. This is influenced by a number of factors, including overly stringent legislation that blocked the issuing capacity of mortgage banks in Poland for a number of years.

According to the model of specialized mortgage banks adopted by the national legislator, covered bonds, also green covered bonds, are issued exclusively by these institutions. The mortgage mechanism is that these banks aggregate the aggregate demands of customers with the same interest rate, repayment term, and credit conditions and issue mortgage bonds on this basis.

The proceeds from the sale of these letters are used to finance lending activities (the Act of 15 January 2015 on bonds, consolidated text 2024, item 708).

In the case of GCBs, similarly, the proceeds from the sale of these letters are used to finance 'green' lending and refinance 'green' mortgages. Mortgage bonds are a type of bond secured by mortgage loans. The basis for the issuance of mortgage covered bonds are only selected housing loans in Polish zloty or Euro, which meet conservative criteria for their granting, both in terms of the assessment of the borrower's creditworthiness and the valuation of the property serving as collateral. Green mortgage covered bonds are secured by housing loans selected on the basis of the Green Covered Bond Framework adopted by the M.Bs. and certified by the Climate Bond Initiative.

At the end of June 2024, there were five M.Bs. operating in the domestic market: PKO Bank Hipoteczny SA, mBank Hipoteczny SA, ING Bank Hipoteczny SA, Pekao Bank Hipoteczny SA and Millenium Bank Hipoteczny SA. Two of them, PKO Bank Hipoteczny SA and ING Bank Hipoteczny have completed G.C.B issues. In contrast, all mortgage banks have been certified as 'green' by Climate Bond Certified, in which the guidelines for issuing green covered bonds are clearly specified. The criteria apply to properties located in the Republic of Poland. The criteria for financing and refinancing residential properties are based on the Climate Bonds Initiative's Low Carbon Certification methodology.

PKO Bank Hipoteczny SA is the largest mortgage bank and the most active issuer of mortgage covered bonds in Poland, specialising in the provision of PLN-denominated housing loans (PLN 8.4bn of covered bonds remaining to be redeemed, 50% of market as at 30.06.2024, Investor presentation PKO Bank Hipoteczny SA, 2024). PKO Bank Hipoteczny is a first-time issuer of EUR-denominated benchmark covered bonds supporting sustainable development in Poland and Central and Eastern Europe. Its main objective is to obtain long-term financing through the issuance of mortgage-covered bonds. The basis for the issuance of mortgage covered bonds are exclusively housing loans in Polish zlotys which meet conservative criteria for their granting, both in terms of the assessment of the borrower's creditworthiness and the valuation of the real estate constituting their collateral (bank-mortgage value of the real estate) (art.22, Act of 29 August 1997 on mortgage bonds and mortgage banks). GCBs. by PKO BH are secured by housing loans selected based on the requirements of the PKO BH Green Covered Bond Framework and certified by the Climate Bond Initiative.

As the only issuer from Poland, since November 2016, it has been conducting benchmark (with a minimum value of EUR 500 million) issues of

euro-denominated mortgage bonds, which are targeted at institutional investors from the international market (Press release from PKO Bank Hipoteczny SA, 2022). It is a pioneer in green mortgage bonds in Poland, having successfully completed its first issue in 2019. According to information from PKO BH Bank's prospectuses, green covered bonds were issued in accordance with the guidelines contained in the 'PKO Bank Hipoteczny SA Green Covered Bond Framework. PKO's compliance with the GBP, was confirmed by an opinion from Sustainalytics (*Second-Party Opinion, PKO Bank Hipoteczny SA Green Covered Bond, 2019)*. The funds raised from the covered bond issue were used in part for M.B. lending, based on the financing of low-energy housing projects. In addition, they made it possible to refinance the acquisition of receivables, in connection with the granting of mortgages for energy-efficient properties. Significantly, the GCB issue was distinguished by its oversubscription.

According to the authorities of PKO BH, the bank's involvement in the growing GCB market stems from the fact that it is the largest issuer of mortgage bonds in Poland and a leader in this market. This obliges it to introduce innovative financial products and set new standards (Green covered bonds *PKO Banku Hipotecznego,* 2024).

Another issue was completed on 27 June 2022, when PKO BH launched a €500 million GCB subscription for institutional investors, with a maturity date of 25 June 2025. Purchase declarations were collected from more than 50 investors for a total amount of more than €850 million. The issue was the bank's first GCB issue denominated in euros. The proceeds from the issue were used to finance and refinance low-carbon residential buildings. The GCBs were listed simultaneously on the Luxembourg and Warsaw stock exchanges. The securities bore a fixed interest rate in euros (Press release from PKO Bank Hipoteczny SA, 2022). PKO BH's G.C.B. -both denominated in PLN and euros, have been given an Aa1 rating by Moody's Investors Service. The level of rating assigned is the highest possible for Polish securities.

The issue of GCBs. carried out by PKO BH was not only the first international GCB issue carried out by a Polish bank, but also the first such issue in an EU country where the EBRD has operations. The EBRD invested EUR 65 million (13% of the issue amount) in PKO BH's GCB's. The issuance of the covered bonds complied with the rules for the issuance of GBP green bonds, the International Capital Market Association and the Climate Bonds Standard, as verified by an independent second-party opinion ("SOP") prior to subscription. The GCBs had a maturity of three years.

EBRD's activity as an investor in GCB was carried out within the framework of Project Jaspis, which aimed to promote sustainable financing by supporting the issuance of Green Lien Letters, in this case, the largest M.B. in Poland. The project stimulated the development of the capital market in Poland and increased the stability of this important financial institution. The project promotes the green transformation in Poland by supporting PKO BH's green agenda and further supporting the issuance of GCBs. According to the EBRD authorities, the use of GCB, is still at a limited level in EBRD countries of operation, including Poland. The project supports the stability of the financial system by developing the capital market by supporting the issuance of covered bonds, including GCB, and building the critical mass of outstanding Polish covered bonds needed to create price benchmarks, build the yield curve, develop market liquidity, and attract international and local institutional investors, and optimise the structure and diversify the bank's funding sources. The added value of the project stems from PKO BH's support in the issuance of GCBs in an environment of significant uncertainty in the capital market, diversification of the investor base, as well as the development of the market for these instruments (Yuspis Project, 2022).In summary, the successive issuance of green covered bonds by PKO BH and the involvement of the EBRD as an investor willing to purchase green covered bonds strengthened the mortgage bank's position as a trusted issuer of these instruments on the international financial market. Further proof of investor confidence was the more than 40 per cent reduction made in the subscriptions of the 2022 issue.

mBank Hipoteczny SA (formerly Rheinhyp-BRE Bank Hipoteczny), the second largest issuer of mortgage bonds and the longest-established MB. in Poland, has not yet completed green issues. The value of the Bank's issued mortgage covered bonds outstanding as at 31.12.2023 amounted to PLN 5.87 billion, representing 31.8 per cent of the total market (Investor presentation, 2024). As highlighted by the authorities of the mBank Group, the group aims to promote sustainable growth in its various areas of activity, taking into account the issuance of debt securities. To this end, it has developed a framework for issuing GCB, the mBank S.A. Group Green Bond Framework. The document contains the mBank Group's objectives and principles for supporting the EU environmental goals and the UN Sustainable Development Goals. The mBank Group Framework is in line with the GBP as confirmed by the international agency Sustainalytics (Information from website mBank Hipoteczny SA (2024): Green bonds, Green covered bonds).

ING Bank Hipoteczny SA 's first GCB issue was completed on 10 October 2019, when the bank issued a five-year GCB worth PLN 400 million. The nominal value of one mortgage bond was PLN 500,000. During the book-building process, declarations of purchase were made by 15 investors for a total amount of nearly PLN 600 million. The issued mortgage bonds are listed on the regulated market of the Warsaw Stock Exchange and the Luxembourg Stock Exchange. Moody's Investors Service has assigned ING BH GCB an Aa3 rating, The bank's prospectus was approved by the Commission de Surveillance du Secteur Financier in Luxembourg. The prospectus was also passported to the Financial Supervision Commission. The value of the entire programme amounted to €5 billion (ING Bank Hipoteczny SA press release, 11.10.2019).

The EBRD has acquired ING BH green mortgage bonds worth PLN 80 million. As argued by the EBRD authorities, the investment in ING BH's green mortgage bonds is a way to strengthen both the development of the green economy and the capital market. (...) The EBRD supports sustainability efforts and, through its investments, encourages issuers to be transparent and to adhere to high standards and to report on the environmental benefits and impacts of projects (Information press ING Banku Hipotecznego SA (11.10.2019). The funds raised from the GCB issue were used to finance energy-efficient 'green' mortgages. For ING BH, the rigour of the GCB issuance is based on four assumptions, including the assumption of a linear zero-carbon trajectory by 2050 (low-carbon trajectory) based on the CBI's Low Carbon Buildings Criteria (*Green Bond Criteria- ING- BH).* As justified by the M.B,. authorities, investor interest in green bonds is mainly driven by the desire to strengthen the development of a sustainable economy and the need to invest in safe and transparent products whose concept is based on high standards.

Pekao Bank Hipoteczny SA, which has been operating on the domestic market for 25 years, and Millenium Bank Hipoteczny SA, the 'youngest' in seniority, have not yet completed a green bond issue.

**Table 1. Green covered bond issues carried out by mortgage banks in Poland, as at 30.07.2024**

| Date of emission | The name of the emitent | Value | Currency | Maturnity | Rating | Ratings Agency |
|---|---|---|---|---|---|---|
| 30.09. 2019 | PKO Bank Hipoteczny | 250 mln | PLN | 5 years | Aa1 | Moody's Investors Service |
| 10.10. 2019 | **ING Bank Hipoteczny** | **400 mln** | PLN | 5 years | Aa3 | Moody's Investors Service |
| **27.06.2022** | PKO Bank Hipoteczny | 500 mln | EUR | 3 years | Aa1 | Moody's Investors Service |

Source: own compilation based on data published by mortgage banks

For the domestic covered bond market, including GCB, a very positive development and a good prognosis for the future is the adopted WFD Recommendation (Resolution No. 243/2024 of the Polish Financial Supervision Authority of 15 July 2024 on the issuance of the WFD Recommendation concerning the Long-Term Funding Ratio). National mortgage banks meet all the most restrictive criteria related to the issuance of GBC. The high standard of GMLs is confirmed by the ever-increasing interest of institutional investors in this project, as the EBRD is having a very positive impact.

An important role in the creation of the GCB market in Poland is played by the criteria these financial instruments meet, designated by the International Capital Market Association as the Green Bond Principles, which have a positive impact on the transparency process of the issue, making them credible in the eyes of investors. Another advantage of GCBs is their inclusion in the Climate Bonds Initiative agency certification system and their high ratings from rating agencies, which lend credibility to the high quality of these securities. GCB ratings are very often at triple A, and the ratings are stable over time.

An important factor influencing the success of a GCB issue is the credibility of the issuer, i.e. the domestic M.Bs. The investor expects that the funds raised by the issuer as a result of the issuance of G.M.B. will be used to finance sustainable activities. Therefore, it is desirable for issuers to use widely recognised standards such as the Green Bond Principles or the Climate Bonds Standard. This condition is met by Polish mortgage bond issuers.

The EBRD is among the investors investing spare funds in issued Polish covered bonds. This is one of the best recommendations for their safety and transparency. Poland is the largest recipient of EBRD financing in the EU. It is expected that in July 2024. The EBRD will announce a country strategy for Poland

for 2024-2029, declaring that one of its priorities will be to support the transition towards a green economy. Given the implementation of projects supporting the issuance of green bonds, it can be assumed that such activities will continue. This is another good prognosis for the future development of green bonds in Poland (Felcetti, 2024: The EBRD's new strategy for Poland is just around the corner, Rzeczpospolita). In 2023. The EBRD invested EUR 1.3 billion in Poland, the highest ever, compared to EUR 0.99 billion in 2022. 75 per cent of the investments undertaken in Poland were specifically in the green financing area. According to EBRD authorities, the green area will remain key due to the huge investment needs in decarbonisation, among others (Poland is the largest recipient of EBRD financing in the European Union, Bank.pl, 2024).

On the other hand, an important developmental constraint for the green covered bond market is an important developmental limitation is the lack of consistency in the definition of a 'green mortgage bond' and a 'green (low-energy) mortgage in Poland.

## Conclusions

The research questions posed at the outset have been answered, which indicates that green mortgage banks are an expression of the banking sector's involvement in the process of financing the transformation of the economy and the construction sector towards a more sustainable and greener one. The green covered bond market in Poland is a promising market, while its further development depends on a number of factors, including the development of the green residential real estate market and the green mortgage market. It is necessary to implement legislative and systemic solutions to promote green bonds. and its green financing, including the use of domestic green covered bonds.

It is important to remove the barriers that limit the activities of mortgage banks and mortgage bond issues. On 1 January 2016, an amendment to the Act on mortgage bonds and M.Bs came into force, which removed some of the barriers to the development of this market. One of the still-present demands made by mortgage banks is to improve the liquidity of the mortgage bond market in Poland through uniform treatment of mortgage bonds with treasury bonds and EIB securities when determining bank tax or the possibility to conclude CIRS transactions (used as a liquidity tool) with the National Bank of Poland (more information: Gorlecka-Łabiak, 2020, 2022).

Mortgage banks operating in Poland declare their readiness to carry out regular green covered bonds issues, which will be appreciated by investors and

rating agencies. On the other hand, the chance to implement effective measures to reduce the greenhouse gas emissions of the real estate sector depends on the close cooperation of all real estate stakeholders. Both state and local government representatives, the financial sector, representatives of the development industry, etc. The Ministry of Climate and Environment in 2023 completed a project aimed at: increasing the share of near-zero energy buildings in the total number of buildings; promoting pro-environmental solutions in construction and disseminating information on available forms of support for this type of investment; creating a fashion for eco-building in Poland and environmentally friendly building materials and construction methods, including in particular the use of wood in constructions (*Eco-building Project*, Ministry of Climate and Environment, 2023).

The GCB system stabilises the banking and financial system and its green transition. The secure, long-term nature of covered bonds contributes to financial stability and resilience to potential economic crises.

The OECD recognises green bonds as one of the most promising financial debt instruments for financing the energy transition and the transition to a low-carbon economy. Furthermore, a number of scientific studies prove the attractiveness of green bonds, their ability to redistribute the cost of financing. Therefore, their use can contribute to mitigating climate change over generations, attracting both private and public investors willing to invest spare funds in green investments.

Energy transformation and decarbonisation require a major transformation of the housing stock. GCB are the right financial instrument to achieve these intentions. GCB can make a significant contribution to achieve climate neutrality.

Ehlers and Pecker (2017) emphasized that favourable market conditions must exist for the development of green bonds. Both issuers and investors should be satisfied with the returns and security of such securities. Otherwise, this financial instrument will face challenges in the future (Ehlers, T., & Packer, F., 2017). The development of the green bond market, which requires not only favourable market conditions but also legislative and systemic support, should be approached in a similar way.

In conclusion, the subject area of green mortgage bonds on the example of Poland is very poorly recognised, therefore the conclusions of the study signal the problem but do not solve it, and require further observations.

## References


Bank.pl. (January 2024). *Poland the largest recipient of EBRD financing in the European Union*. Online, Retrieved on 7/11/2025 https://bank.pl/polska-najwiekszym-w-unii-europejskiej-odbiorca-finansowania-z-eboir/

Bible, D.S., & Chikeleze, M.C. (2018). Leadership in Sustainability a Case Study: Green Globe Certification and Financing and the Impact on a Multifamily Property's Rate of Return, *Journal of Sustainable Real Estate*, 10(1), 109-134. https://doi.org/10.1080/10835547.2018.12091906

Brown, M. & Watkins, T. (2016). The Green Premium for Environmentally Certified Homes: A Meta-analysis and Exploration. Unpublished paper. Online, Retrieved on 7/11/2025 https://martinjohnbrown.net/wp-content/uploads/2016/02/green-premium-metaanalysis-2015-10-24-for-researchgate.pdf

Certificates confirming the environmental aspects of buildings increasingly popular (2024), Online, Retrieved on 7/11/2025 https://www.cire.pl/artykuly/serwis-informacyjny-cire-24/139893-certyfikaty-potwierdzajace-ekologiczne-aspekty-budynkow-coraz-bardziej-popularne

CFP Green Buildings (June 2023). *The 5 most important green building certifications in Europe.* Online, Retrieved on 7/11/2025 https://cfpgreenbuildings.com/news-and-cases/the-5-most-important-green-building-certifications-in-europe/

Chamera, K. (2023). The development of the Polish green bond market in comparison to selected European countries. *Central European Review of Economics & Finance,* 45 (4A), 21-34. https://doi.org/10.24136/ceref.2023.032

Ciora, C.,Maier, G., & Anghel, I. (2016). Is The Higher Value of Green Buildings Reflected In Current Valuation Practices?, *Journal of Accounting and Management Information Systems,* 15(1), 58-71. https://hdl.handle.net/10419/310613

Council of the European Union. (2013). *Regulation (EU) 575/2013. Official Journal of the European Union*, L176/337.

Council of the European Union. (2016, October 5). *Council Decision (EU) 2016/1841 on the conclusion, on behalf of the European Union, of the Paris Agreement adopted under the United Nations Framework Convention on Climate Change*. Online, Retrieved on 7/11/2025, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32016D1841

Council of the European Union. (2017). *Regulation (EU) 2017/1129. Official Journal of the European Union*, L168/12.

Doan, T., Ghaffarian-Hoseini, A., Naismith, N., Zhang, T., & Tookey, J. (2017). A critical comparison of green building rating systems. *Building and Environment, 123*, 243–260. https://doi.org/10.1016/j.buildenv.2017.07.007

Ebbini, G. W. (2024). Transforming health: The WELL Building Standard's role in sustainable development. Cell Reports Sustainability, 1, 1–5. https://doi.org/10.1016/j.crsus.2024.100100

Ehlers, T., & Packer, F. (2017). Green bond finance and certification. BIS Quarterly Review, September. https://ssrn.com/abstract=3042378

Energy Efficient Mortgage Pilot Programme. (2018). *Energy efficient mortgage pilot programme*. Online, Retrieved on 7/11/2025 https://instrumentyfinansoweue.gov.pl/pilotazowy-program-energooszczednej-hipoteki/

Energy Efficient Mortgages Initiative. (2018, November 14). *Definition of an energy efficient mortgage*. Online, Retrieved on 7/11/2025 Online, Retrieved on 7/11/2025, https://energyefficientmortgages.eu/wp-content/uploads/2021/07/EEMI-Definition-14.11.18.pdf

Energy Efficient Mortgages Initiative. (2018, November 14). *Energy efficient mortgages initiative*. Online, Retrieved on 7/11/2025 https://energyefficientmortgages.eu/

Energy Efficient Mortgages Label. (2018, November 14). Online, Retrieved on 7/11/2025 https://www.energy-efficient-mortgage-label.org/

European Bank for Reconstruction and Development. (2022, June 9). *The JASPIS project: PKO Bank mortgage bonds No. 53779*.

European Commission. (2019, December 11). *The European Green Deal* (COM(2019) 640 final). Online, Retrieved on 7/11/2025, https://www.consilium.europa.eu/pl/policies/green-deal/

European Commission. (2019, December 11). *The European Green Deal* (COM(2019) 640 final).Online, Retrieved on 7/11/2025, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2019:640:FIN

European Commission. (2021, December 15). *Proposal for a Directive on the energy performance of buildings (recast)* (COM(2021) 802 final). Online, Retrieved on 7/11/2025

European Commission. (2023). *Key facts on energy and EU buildings: Energy Performance of Buildings Directive*. Online, Retrieved on 7/11/2025 https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/energy-performance-buildings-directive_en

European Commission. (2024, April 12). *Questions and answers on the revised Energy Performance of Buildings Directive (EPBD)*. Online, Retrieved on 7/11/2025 https://ec.europa.eu/commission/presscorner/detail/en/qanda_24_1966

European Council of the European Union. (2024, December 1). *5 facts about the EU's goal of climate neutrality*. Online, Retrieved on 7/11/2025 https://www.consilium.europa.eu/en/5-facts-eu-climate-neutrality/

European Mortgage Federation & European Covered Bond Council. (2023). *ECBC: European covered bond fact book 2023* (18th ed.). Online, Retrieved on 7/11/2025 https://hypo.org/ecbc/publications/

European Parliament, Committee on Petitions. (2024, May 13). *Communication to Members: Petition No. 0734/2023 by Alessandro Panza (Italy), concerning the implementation of the Energy Performance of Buildings Directive in Italy* (2019–2024). Online, Retrieved on 7/11/2025 https://www.europarl.europa.eu/doceo/document/PETI-CM-761156_PL.pdf

European Union. (2024). *Directive (EU) 2024/1275 of the European Parliament and of the Council on the energy performance of buildings (EPBD)*. Online, Retrieved on 7/11/2025 https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/energy-performance-buildings-directive_en

Falcetti, E. (2024, May 17). *The EBRD's new strategy for Poland is just around the corner*. Rzeczpospolita. Online, Retrieved on 7/11/2025 https://www.rp.pl/gospodarka/art40381331-elisabetta-falcetti-nowa-strategia-eboir-u-dla-polski-tuz-tuz

Gazeta Bankowa. (2019, June 7). *Green covered bonds PKO Banku Hipotecznego*. Online, Retrieved on 7/11/2025 https://www.gb.pl/zielone-listy-zastawne-pko-banku-hipotecznego,pnews,2097.html

Gilchrist, D., Yu, J., & Zhong, R. (2021). The limits of green finance: A survey of literature in the context of green bonds and green loans. *Sustainability, 13*(2), 478. https://doi.org/10.3390/su13020478

Gorlecka-Łabiak, E. (2011). Specyfika działania banków hipotecznych w Polsce. *Zeszyty Naukowe Uniwersytetu Ekonomicznego w Krakowie*, 870, 153–163.

Gorlecka-Łabiak, E. (2020). *Uwarunkowania rozwoju banków hipotecznych w Polsce*. Difin.

Gorlecka-Łabiak, E. (2022). Rola banków hipotecznych w procesie finansowania nieruchomości w Polsce. In B. Marona & M. Głuszak (Eds.), *Współczesne wyzwania gospodarowania nieruchomościami* (pp. 49–64). Difin.

Ilidri, N., Bazille, H., Lou, Y., Hinkelman, K., Gray, W. A., & Zuo, W. (2022). Impact of WELL certification on occupant satisfaction and perceived health, well-being, and productivity: A

multi-office pre- versus post-occupancy evaluation. *Building and Environment, 224*, 109539. https://doi.org/10.1016/j.buildenv.2022.109539

ING Bank Hipoteczny S.A. (2019, October 11). *ING Bank Hipoteczny wyemitował zielone listy zastawne o wartości 400 mln zł*. Online, Retrieved on 7/11/2025 https://media.ing.pl/informacje-prasowe/926/pr/466589/ing-bank-hipoteczny-wyemitowal-zielone-listy-zastawne-o-wartosci-400-m

ING Bank Hipoteczny S.A. (n.d.). *Green bond criteria – green bond methodology*. Drees & Sommer. Online, Retrieved on 7/11/2025 https://www.inghipoteczny.pl/_fileserver/item/1100152

International Capital Market Association. (2021). *Green Bond Principles: Voluntary process guidelines for issuing green bonds (June 2021, with June 2022 Appendix I)*. Online, Retrieved on 7/11/2025 https://www.icmagroup.org/assets/documents/Sustainable-finance/2022-updates/Green-Bond-Principles-June-2022-060623.pdf

International Capital Market Association. (2021). *Green Bond Principles: Voluntary process guidelines for issuing green bonds*. Online, Retrieved on 7/11/2025 https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/green-bond-principles-gbp/

International Living Future Institute. (April 2024). Online, Retrieved on 7/11/2025 https://living-future.org

Komisja Nadzoru Finansowego. (2024). *Resolution No. 243/2024 on the issuance of the WFD Recommendation concerning the Long-Term Funding Ratio*.

Komisja Nadzoru Finansowego. (2024). *Uchwała nr 243/2024 w sprawie Rekomendacji WFD*.

Komisja Nadzoru Finansowego. (2024, July 17). *Komunikat w sprawie Rekomendacji WFD0*. Online, Retrieved on 7/11/2025 https://www.knf.gov.pl/komunikacja/komunikaty?articleId=89848&p_id=18

Kryvomaz, T. I., Michaud, A., Varavin, D., & Parebynos, A. (2018). French green building rating systems. *Environmental Safety and Natural Resources*, 3(27), 40–48.

Maltais, A., & Nykvist, B. (2021). Understanding the role of green bonds in advancing sustainability. *Journal of Sustainable Finance & Investment, 11*(3), 233–252. https://doi.org/10.1080/20430795.2020.1724864

mBank Hipoteczny S.A. (2024). *Green bonds and green covered bonds*. Online, Retrieved on 7/11/2025 https://www.mhipoteczny.pl/relacje-inwestorskie/zielone-listy-zastawne/

mBank Hipoteczny S.A. (2024). *Investor presentation*. Online, Retrieved on 7/11/2025 https://www.mhipoteczny.pl/relacje-inwestorskie/prezentacja-inwestorska/

Micelli, E., Giloberto, G., Righetto, E., & Tafuri, G. (2023). The economic value of sustainability: Real estate market and energy performance of home. *Valori e Valutazioni*, 34, 3–16.

Ministry of Climate and Environment. (2023). *The Ecobuilding Project*. Online, Retrieved on 7/11/2025 https://www.gov.pl/web/klimat/domzklimatem

Ministry of Development and Technology. (n.d.). *Energy performance of buildings directive (EPBD)*. Online, Retrieved on 7/11/2025 https://www.gov.pl/web/rozwoj-technologia/dyrektywa-w-sprawie-charakterystyki-energetycznej-budynkow-epbd

Network for Greening the Financial System. (2017). Online, Retrieved on 7/11/2025 https://oneplanetsummit.fr/en/coalitions-82/network-greening-financial-system-ngfs-179

Network for Greening the Financial System. (n.d.). Online, Retrieved on 7/11/2025 https://oneplanetsummit.fr/en/coalitions-82/network-greening-financial-system-ngfs-179

Piętocha, A. (2024). The BREEAM, the LEED and the DGNB certifications as an aspect of sustainable development. *Acta Scientiarum Polonorum. Architectura, 23*, 121–133. https://doi.org/10.22630/ASPA.2024.23.9

PKO Bank Hipoteczny S.A. (2022, July 6). *PKO Bank Hipoteczny uplasował pierwszą benchmarkową emisję zielonych listów zastawnych*. Online, Retrieved on 7/11/2025 https://media.pkobp.pl/197294-pko-bank-hipoteczny-uplasowal-pierwsza-benchmarkowa-emisje-zielonych-listow-zastawnych-w-eur

PKO Bank Hipoteczny S.A. (2024, October). *Investor presentation: Issuer of mortgage bonds in PKO BP Group*.

PKO Bank Hipoteczny S.A. (n.d.). *Green covered bonds*. Online, Retrieved on 7/11/2025 https://www.pkobh.pl/listy-zastawne/zielone-listy-zastawne/

PKO Bank Hipoteczny S.A. (n.d.). *PKO Bank Mortgage will issue Poland's first green mortgage bonds worth PLN 250 million*. Online, Retrieved on 7/11/2025 https://media.pkobp.pl/70970-pko-bank-hipoteczny-wyemituje-pierwsze-w-polsce-zielone-listy-zastawne-o-wartosci-250-mln-zlotych

Schuller, M., Hoppenbrouwers, S., Berninger, R., & Eriksson, S. (2023). Green covered bonds – an important contribution to climate neutrality. In *ECBC: European covered bond fact book 2023* (pp. 59–67).

Scope Ratings. (n.d.). *WFD pomoże w rozwoju polskiego rynku listów zastawnych, również zielonych – Scope Ratings (opinia)*. Online, Retrieved on 7/11/2025 https://biznes.pap.pl/pl/news/pap/info/3633881,wfd-pomoze-w-rozwoju-polskiego-rynku-listow-zastawnych--rowniez-zielonych---scope-ratings-(opinia)

Sobik, B. (2023). Green bonds – financial innovation for sustainability financing: The case of the Polish green bonds market and their development barriers. *Central European Economic Journal, 10*(57), 287–303. https://doi.org/10.2478/ceej-2023-0017

Sustainalytics. (2019, June 4). *PKO Bank Hipoteczny S.A. green covered bond framework: Second-party opinion*. Online, Retrieved on 7/11/2025 https://mstar-sustops-cdn-mainwebsite-s3.s3.amazonaws.com/docs/default-source/spos/pko-bank-hipoteczny-sa-green-covered-bond-framework-second-party-opinion.pdf

United Nations. (2015). *Transforming our world: The 2030 Agenda for Sustainable Development* (A/RES/70/1).

United States Environmental Protection Agency. (n.d.). Online, Retrieved on 7/11/2025 https://www.epa.gov/greeningepa/new-construction-and-renovations-epa-

Ustawa z dnia 11 września 2019 r. – Prawo zamówień publicznych (Journal of Laws 2024, item 1320, as amended) [Public Procurement Law].

Ustawa z dnia 15 stycznia 2015 r. o obligacjach (Journal of Laws 2024, item 708) [Act of 15 January 2015 on bonds].

Ustawa z dnia 28 lutego 2003 r. – Prawo upadłościowe (Journal of Laws 2024, item 794) [Act of 28 February 2003 – Insolvency Law].

Ustawa z dnia 29 lipca 2005 r. o obrocie instrumentami finansowymi (Journal of Laws 2024, item 722) [Act of 29 July 2005 on trading in financial instruments].

Ustawa z dnia 29 lipca 2005 r. o ofercie publicznej i warunkach wprowadzania instrumentów finansowych do zorganizowanego systemu obrotu oraz o spółkach publicznych (Journal of Laws 2024, item 620) [Act of 29 July 2005 on public offerings and the conditions for introducing financial instruments into the organised trading system and on public companies].

Ustawa z dnia 29 sierpnia 1997 r. o listach zastawnych i bankach hipotecznych (Journal of Laws 2023, item 110) [Act of 29 August 1997 on mortgage bonds and mortgage banks].

Vázquez, E., Míguez, M., Alves, L., Valente, J., & Rossi, G. (2011). Certifications in construction: A case study comparing LEED and HQE. *WIT Transactions on Ecology and the Environment, 144*, 253–264. https://doi.org/10.2495/ECO110231

Vierra, S. (2016). *Green building standards and certification systems*. National Institute of Building Sciences. Online, Retrieved on 7/11/2025 https://www.wbdg.org/resources/green-building-standards-and-certification-systems

World Economic Forum. (2021, April). *A framework for the future of real estate: Insight report*. Online, Retrieved on 7/11/2025 https://www3.weforum.org/docs/WEF_A_Framework_for_the_Future_of_Real_Estate_2021.pdf

World Economic Forum. (2021, April). *A framework for the future of real estate: Insight report*. World Economic Forum. Online, Retrieved on 7/11/2025 https://www3.weforum.org/docs/WEF_A_Framework_for_the_Future_of_Real_Estate_2021.pdf

Yu, S. M., & Tu, Y. (2011). *Are green buildings worth more because they cost more?* NUS Institute of Real Estate Studies Working Paper (IRES2011-023).

Zhang, Y., Wang, J., Hu, F., & Wang, Y. (2017). Comparison of evaluation standards for green building in China, Britain, United States. *Renewable and Sustainable Energy Reviews, 68*(Part 1), 264–275. https://doi.org/10.1016/j.rser.2016.09.139

Zuo, J., & Zhao, Z. Y. (2014). Green building research – current status and future agenda: A review. *Renewable and Sustainable Energy Reviews, 30*, 271–281. https://doi.org/10.1016/j.rser.2013.10.021

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# The Impact of Lease Capitalization (IFRS 16) on Golden Financing Rules on the Example of the Polish Real Estate Sector

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## ABSTRACT

**Objective:** The article focuses on the impact of the International Financial Reporting Standard No. 16 on the golden financing rules ratios, commonly used in financial liquidity management, informing about the soundness of a company's financing structure. Implementation of the standard was an attempt to include in financial statements more lease-type economic relations that were previously regarded as off-balance sheet items. This, in turn, has a certain effect on enterprises' assets and capital structure.
**Material and Methods:** The study was conducted on a sample of real estate sector enterprises listed on the Polish stock exchange. The article includes a comparative calculation of the golden financing rules ratios computed without and with the application of the new accounting standard, and is based on the real data from financial statements.
**Findings:** The calculation proved a significant impact of the new standard on asset and capital structure and, as a consequence, on the golden financing rules within the analyzed sector.
**Research limitations:** Research is based on financial data at the transition date to IFRS 16 (1st of January 2019) when entities were obliged to implement the new standard and to reveal its impact in the financial statements. Due to that, the possibility of analysing the relevant data in a time series is limited.
**Research implications:** The obtained results may be substantial information for financial strategy makers in real estate companies, as well as for financial analysts involved in real estate sector research.

**Keywords:** Leasing; International Financial Reporting Standard No 16; Golden financing rules; Real estate; Financial liquidity; Financing strategy
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## INTRODUCTION

Effective from January 1, 2019, entities preparing financial statements in accordance with International Financial Reporting Standards / International Accounting Standards (IFRS/IAS) are obliged to apply the new standard IFRS 16, which covers leasing. IFRS 16 superseded the previously used IAS 17 and introduced significant changes in disclosure requirements for lessees' financial statements.

IAS 17 differentiated financial and operational leasing. The financial leasing settlement in line with IAS 17 assumed disclosure of lease liabilities by the lessee, but this standard allowed the inclusion of operational leasing in off-balance sheet records. IFRS 16 introduced an obligation to include liabilities arising from both of those kinds of lease contracts. Moreover, the new standard sanctioned an obligation to disclose agreements, which are not strictly lease agreements, but they grant a service recipient the right to use an identifiable asset in exchange for payment over the term of the contract (lease-type agreements). The mentioned changes in accounting rules impact asset and capital structure in the balance sheet and thus the way of calculating many commonly used financial ratios, including the golden financing rules' ratios, regarded as one of the most important areas of interest in enterprises' finance.

Taking into consideration the above-described implications of introducing the new accounting standard, the purpose of this article is to investigate the impact of IFRS 16 on enterprise liquidity ratios from a balance sheet perspective due to the reference to golden asset and capital structure rules, i.e. the golden balance sheet rule and golden banking rule. Identification of the mentioned dependencies was conducted by empirical research carried out on the basis of several companies from the real estate sector.

The real estate sector has been chosen due to high capital intensity and a significant share of fixed assets, such as properties, in the total asset amount. Even if such assets like dwellings are disclosed by developers in current assets (inventories), in an economic sense, they are regarded as relatively tough marketable goods, vulnerable to cyclicality and specific local real estate market conditions (Yousef, 2019). It means that special attention should be paid to the financing structure of such assets. The second reason for choosing real estate has been concerned with common use of lease-type rights in this sector, such as tenancy, rental, or perpetual usufruct of land. The above arguments suggest that IFRS 16 may have a significant impact on the asset and capital structure of

enterprises within the real estate sector. Selection of the period of financial statements used in the research is a natural consequence of the date of introduction of IFRS 16 – the research includes the last date before implementation of the standard (December 31, 2018) and the first day of its application (January 01, 2019). At this transition, balance sheet date entities were obliged to reveal the impact of the new standard on financial statements in specially dedicated notes to financial statements.

The article is an attempt to answer the question of whether the changes introduced by the standard are only of a reporting nature or, alternatively, the implementation of IFRS 16 was necessary because the previously used method of presentation did not properly reflect the real asset and capital structure in terms of liquidity assessment. The first specific hypothesis of the article assumes that, on average, the changes of asset and capital structure revealed as a consequence of IFRS 16 implementation were material for enterprises within the real estate sector. The second hypothesis assumes that, in general, the asset and capital structure of companies within the real estate sector is still kept at a sound level even after the new standard implementation.

Besides the introduction, the paper is structured as follows. The following section provides a brief review of the literature on leasing capitalization and golden financing rules issues. The next section presents the applied methodology of calculations, source of financial data, along with the theoretical base, essential for the research methodology. It outlines the expected impact of the new accounting standard on the golden financing rules, which might be regarded as the bridge between the theoretical and empirical parts of the article. The empirical part includes numerical results of the conducted survey and the main conclusion on the researched hypotheses. The paper is summarised in the conclusions section.

## LITERATURE REVIEW

The article combines two research topics undertaken in the literature, i.e., impact of leasing capitalization on enterprises' financial situation and golden financing rules as a tool of managing the asset and capital structure of enterprises.

Having in mind that the impact of leasing accounting rules might be an important issue from the point of view of a company's decisions affecting its financial position, it seems reasonable to briefly highlight the idea of corporate finance management, with special emphasis on financial liquidity, and characterize this article's research problem as one of the elements of this process.

In general, corporate financial management is a scientific discipline, which covers all financial decisions of a company, generally aimed at maximizing a company's market value for its owners (Damodaran, 2007; Czekaj & Dresler, 2005; Rutkowski, 2016; Madura, 2021; Chandra, 2011; Gajdka & Walińska, 2000; Baker & Powell, 2005; Keown et. al., 2004; Atrill, 2006; Szczepankowski, 2004; Fabozzi & Peterson, 2003; Jog & Suszyński, 1995). One of the tools to achieve this aim is value-based management concept (Dziawgo & Zawadzki, 2011; Krajewski, 2008), the usefulness of which in the real estate sector was also confirmed by several researchers (Uhruska, 2008; Kowalski & Kazak, 2020).

The three main components of corporate financial management are capital budgeting, capital structure decisions, and liquidity management (including working capital) (Chandra, 2011; Jaworski, 2017; Dębski, 2005). Financial liquidity is regarded as the most important, which reflects the view that no business is able to perform in long term if it has no effective working capital management plan (Jindrichovska, 2013).

However, financial liquidity is defined differently in the literature. One of the most common meanings is the ability of enterprises to pay current liabilities (Babuśka, 2018; Grzywacz, 2015; Jaworski, 2017). In the opinion of the author of this article, a company's ability to pay only current liabilities does not reflect the clue of financial liquidity management. In a broader concept, the financial liquidity could be defined as the element of financial management responsible for ensuring optimal structure and flow of cash in the whole cycle of company's performance, beginning from the investment stage, through the operational stage, ending at the company's liquidation, including at all those stages extraordinary, one-off events, on which the company has no influence. This is the reason financial liquidity should be measured not only at dynamic approach based on cash flow but also at a static one based on balance sheet statement (Jerzemowska, 2018; Wrzosek, 2007), which could be reflected in the golden rules of financing.

Golden balance sheet rule and the golden banking rule concern the problem of appropriate asset and capital structure from the risk of financial liquidity perspective.

The golden balance sheet rule recommends covering all fixed assets with equity (Sierpińska & Jachna, 2004). This is the most reliable way of financing of fixed assets because the time horizon of bringing benefits by the assets is of a long-term nature, and thus it is burdened by a high degree of operational and financial risk. Such specific features of fixed assets are well tailored to the nature of equity, which, as a rule, is capital with an indefinite maturity date. It might be stated that

the golden balance sheet rule adopts the degree of the asset's risk and profitability related to it as the leading criterion (Dudycz, 2011). This relation is illustrated by the following formula (1).

$$\frac{equity}{fixed\ assets} \geq 1 \tag{1}$$

Less restrictive is the golden banking rule (also called the silver balance sheet rule) (Sierpińska & Jachna, 2004), the golden financing rule (Wypych, 2000) or the banking balance sheet rule (Gawryś, 2008). The rule allows the financing of fixed assets not only with equity, but with a long-term financial debt as well (formula (2)), thus taking as the leading criterion the degree of property being tied-up and time horizon of capital (Dudycz, 2011). The sum of equity and long-term financial debt is referred to as long-term capital (Grzenkowicz, Kowalczyk, Kusak, & Podgórski, 2017).

$$\frac{long\text{-}term\ capital}{fixed\ assets} \geq 1 \tag{2}$$

Moving forward from the financing rules to the IFRS 16, the standard was introduced to the European Union law by the Commission Regulation (EU) 2017/1986 of 31 October 2017. It regulated accounting principles concerning leasing, applied to publicly listed companies (under a few conditions), and became effective for annual reporting periods beginning on or after January 1, 2019.

The new standard abolished the division into financial and operating leasing from the perspective of a lessee, which was intended to eliminate the previously existing practices of not recognizing operating lease contracts in the balance sheet (off-balance sheet records) (Pfaff, 2020). IFRS 16 went even further, because it applied not only to agreements being named as lease agreements, but to all contracts, whose economic meaning is analogous to lease agreements, i.e., assuming transfer of a specified asset for paid use for a specified period of time. Thus, the standard significantly tightened regulations with regard to the issue of the so-called hidden leasing, which capitalization is one of the topics commonly discussed in the relevant scientific literature.

M. Krawczak and R. Dyląg (2018) indicated that research on principles of operating lease capitalization has been conducted since the 1970s. In an article from 2018, the authors cited nine selected studies conducted between 1991-2016 in various countries, while their research focused on four selected companies listed on the Polish stock exchange. The general conclusion of the article stated

that capitalization of operating lease increased debt and return on equity ratios and reduced return on total assets.

Earlier than M. Krawczak and R. Dyląg, in 2016, S. Hońko undertook an assessment of the impact of IFRS 16 on financial statements of one hundred Polish listed companies. However, the research results did not confirm the research hypothesis of IFRS 16 significant influence on financial statements and analytical ratios of companies with the lowest tangible assets (supposedly using a wide range of operational lease). No confirmation of the hypothesis could have happened due to the sample selection method, lack of significant use of operating lease by the sampled companies, or unreliability of information consisting in the lack of disclosure of relevant data (Hońko, 2016).

In contrast to the mentioned study of S. Hońko, the expected (calculated ex-ante) impact of IFRS 16 on average EBITDA, financial leverage, and balance sheet sum for 40 Polish listed companies in a sectoral cross-section, including the real estate sector, was evidenced by T. Iwanowicz in 2018. Similar conclusions were pointed out in the study of I. Górowski, B. Kurek and M. Szarucki (2022), which was based on actual financial data of oil and gas, energy and mining Polish listed companies. The study evidenced that the impact of IFRS 16 on total balance sheet amount, debt to assets and debt to equity ratios is material in terms of materiality thresholds used in financial statements' auditing (0.5%-1.0%). Impact of IFRS 16 on leverage ratios was also confirmed in the recent study by A. Białek-Jaworska, J. Dobroszek and P. Szatkowska (2022), based on actual 2018-2019 financial statements of non-financial companies listed on the Polish stock exchange. However, the paper did not evidence a significant impact on profitability and liquidity ratios. The ambiguous results might have been concerned with the data set selected for statistical comparisons conducted in the paper, i.e. dates of compared financial data (December 31, 2019, vs December, 31 2018) and the division of the research sample into IFRS and Polish Accounting Act applying companies. Both comparisons were to demonstrate the IFRS 16 impact on financial position, but in fact, they might have been burdened by many factors other than the new accounting standard's implementation itself.

Foreign literature presents similar conclusions (i.e. confirmation of leasing capitalization's significant impact on key financial ratios) in comparison to research conducted on the Polish economy, e.g. compilation of 10 research from the years 1991 to 2012 collected by J. Morales-Diaz and C. Zamora-Ramirez (2018). The authors found that the remarkable impact of the new standard on financial statements could be expected to be seen in the case of sectors with high

intensity of operational leasing, such as retail (due to property rental), airlines (leasing of aircrafts), or hotels (property rental). Similar conclusions were pointed out in many other research, e.g. (Sari et. al., 2016) (for the Turkish retail sector); (Magli et. al., 2018) (for Italian listed companies, presented in sector breakdown); (Săcărin, 2017) (case study); (Tumpach et. al., 2021) (Slovak companies, presented in sector breakdown).

As mentioned earlier, studies on the golden financing rules are a separate field of research in contrast to the issues of leasing impact on financial statements and financial ratios. Available literature on the topic of the golden financing rules is primarily focused on the degree of compliance with these rules for a selected sample of entities, e.g., articles published 2011-2014 by M. Wypych, in which Polish listed companies from the manufacturing sector were surveyed. The studies proved a tendency of companies to maintain an appropriate proportion of the structure of assets and sources of their financing (Wypych, 2012), as well as interdependence between a company's financial situation referred to the golden financing rules and soundness of the economy (Wypych, 2011), (Wypych, 2014).

Worth mentioning is also an article of M. Gostkowska-Drzewicka (2017) which refers the real estate sector. The author proved that the golden financing rules were taken into account in business decisions concerning assets and capital structure by several Polish listed companies from this sector. In another article, M. Gostkowska-Drzewicka researched non-financial listed companies from the Visegrad Group countries. The study proved that asset and capital structure in every country differ significantly and that the companies "strive to synchronize the maturity of the financing sources with the useful life of the assets financed via those sources" (Gostkowska-Drzewicka, 2023, p. 303).

At the end of the literature review, it is worth mentioning an article of the Korean researcher H.J. Chung (2022), in which the negative impact of IFRS 16 implementation on company valuation was presented. That was due to worsening financial ratios, which might have had a negative impact on the value of future development opportunities requiring new financing.

Summing up the conducted literature review, this article could be seen as a continuation of the leasing capitalization topic but presented in a broader context of a company's long-term financial liquidity issue with reference to the fulfilment of the golden financing rules. Combining these two fields of research is a kind of novelty. Moreover, the article fills the research gap because it is based on actual financial data resulting directly from the implementation of the IFRS 16 (not impacted by other factors as mentioned in several studies). The ex-post

approach, instead of the ex-ante approach used in some studies, ensures a clear distinction between financial data with and without IFRS 16 adoption and limits problems with the reliability of data and solves the problem of influencing results by choosing different lease capitalization methods. Additionally, the article is a detailed analysis of one specified sector of the economy, i.e., the real estate sector, which might be an interesting issue for theoreticians and practitioners doing business in that part of economic activity.

## RESEARCH METHODOLOGY

To verify to what extent financial reporting was impacted by the new standard, financial statements of 25 Polish listed real estate companies were analyzed. The entities were included in the index WIG-real estate on July 21, 2022. WIG-real estate is a sub-sector index, which includes a portfolio of entities included in the main Polish stock exchange index called WIG and, in parallel represents the real estate sector. As of the date of collecting the data (July 21, 2022), the total capitalization of the WIG-real estate amounted to PLN 5.1 billion, which accounted for 1.80% of WIG capitalization.

In order to point out the impact of the new standard and to eliminate other factors that may cause changes in the amounts recognized in the financial statements, the analysis focused on December 31, 2018, as the starting point before the introduction of the standard and on January 1, 2019, as the first day of the standard's application. Such an approach limits problems of data reliability, often met in other research. Information on amounts recognized due to the new standard as of January 1, 2019, was obtained from additional information in the financial statements. The financial statements were obtained from the websites of the surveyed entities. It is to be mentioned that only eighteen entities out of the surveyed twenty-five disclosed general figures on implementing the new standard as of January 1, 2019, and only seventeen specified in detail what kind of rights it was concerned with.

The research methods used in the article include analysis of documentation in the field of accounting, regulating the issues of leasing settlement, the above-mentioned empirical research, including analysis of documentation in the form of financial statements of selected enterprises in terms of selected balance sheet data, as well as literature studies, with particular emphasis on the identification of research conducted in this area. The key methodical element of the article is comparative calculation showing the

difference in golden financing rules ratios calculated according to the old IAS 17 and in line with the new IFRS 16.

For a better understanding of the numerical data presented in research results, it is essential to outline the main principles referring to leasing settlement according to the new accounting standard and its possible influence on the golden financing rules. IFRS 16 requires a lessee to disclose liabilities and assets in the balance sheet at the date of first recognition of a given contract that meets the lease conditions. Lease liabilities are measured at the present value of outstanding lease payments using the lease interest rate and right-of-use assets at the amount equal to liabilities. Right-of-use assets may be disclosed both in the fixed and current assets and liabilities in the long-term and short-term parts, which may affect the change in relation between assets and capital used to finance them. As far as profit and loss account is concerned, disclosures in line with IFRS 16 should not significantly change the capital structure of a company because operating lease fees previously recorded as operational cost are currently disclosed as asset depreciation and financial cost resulting from discounting of liabilities (there might be only differences in timing of depreciation and financial cost in comparison to the invoiced lease fees).

The above information suggests that in the case of the golden balance sheet rule, the new standard should have, in general, a limited negative impact or be neutral as of the day of its implementation.

In the case of the golden banking rule, the direction of ratios' changes resulting from IFRS 16 implementation depends on if the percentage increase of long-term capital is higher than the percentage increase of fixed assets, and in turn, this is dependent on:

- amounts and proportion of IFRS 16 assets disclosed in fixed and current assets,
- amounts and proportion of IFRS 16 liabilities disclosed in the long-term and short-term parts of liabilities,
- amounts and structure of assets, equity, and liabilities at the starting point without IFRS 16 settlements.

Knowing the potential impact of the introduction of the new standard on the golden financing rules indicators resulting from theoretical considerations regarding both of these issues, in the next section of the article, it is verified on the basis of actual financial data collected for the selected sample of enterprises from the real estate sector.

## RESULTS & DISCUSSION

At the first stage of analysis, the basic balance sheet figures were verified in order to find out the magnitude of changes caused by the new standard. Figure 1 shows that the introduction of IFRS 16 resulted in an increase in balance sheet total of approximately 2.2%, which is an average value, while in some entities that percentage was much higher (individual results in the range of 0.0%-7.4%). In absolute values, the balance sheet total amounting to PLN 45.3 billion for all eighteen surveyed entities increased by PLN 1.0 billion.

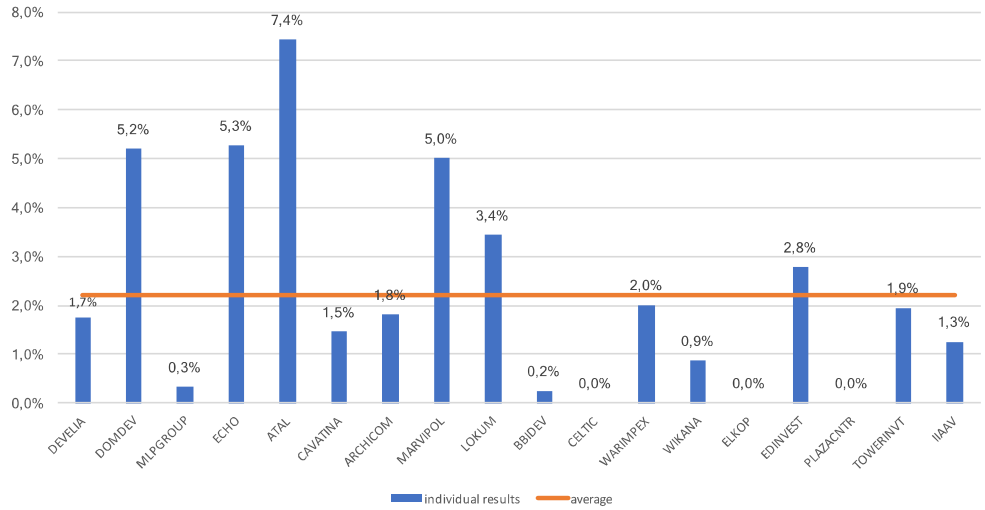


**Figure 1. Percentage increase of total balance sheet amount for the analyzed entities due to implementation of IFRS 16.**

Source: own study based on financial statements of analyzed entities.

Analyzing balance sheet structure in detail it should be noted that the described magnitude of changes was not the same for every balance sheet item, which is shown in Table 1.

**Table 1. Impact of IFRS 16 implementation on the main balance sheet items**

| IMPACT OF IFRS 16 IMPLEMENTATION ON THE MAIN BALANCE SHEET ITEMS [% of change] | Average | Individual results range | |
|---|---|---|---|
| | | min | max |
| TOTAL BALANCE SHEET AMOUNT | 2,2% | 0,0% | 7,4% |
| Fixed assets | 2,0% | 0,0% | 139,7% |
| Current assets | 2,6% | 0,0% | 16,2% |
| Long-term liabilities | 4,5% | 0,0% | 39,4% |
| Current liabilities | 3,0% | 0,0% | 15,5% |

Source: own study based on financial statements of analyzed entities.

For several items, dynamics of changes significantly exceeded the dynamics of changes in the balance sheet total: long-term liabilities increased on average by 4.5% (maximum at 39.4%), current liabilities by 3.0% (maximum at 15.5%), and current assets by 2.6% (maximum at 16.2%). Fixed assets increased by 2.0% (maximum at 139.7%).

Among economic activities that mostly contributed to the rise of assets' value due to IFRS 16 implementation (based on data of only those companies which presented detailed information on it), one can mention increase concerned with recalculation of value of the right of perpetual usufruct of land (76,96%) and disclosure of buildings' (including office) rental (22,29%). The remaining items, including means of transport and other rights (including those not assigned to specific items), amounted to a marginal share in the total increase of assets due to IFRS 16 (1.75%). The graphical abstract of the mentioned numbers is included in Figure 2. The dominant share of assets' increase due to reassessment of the value of the right of perpetual usufruct of land is fully understandable, because of its common use in the real estate sector, as well as due to the fact that this is a right between full ownership and limited property rights (Kwartnik-Pruc & Trembecka, 2012). Although the perpetual usufruct of land is a fully transferable right that could be purchased or sold, the lack of a definitive transfer of ownership indicates its quasi-leasing nature, which is in line with IFRS 16, stating that a contract contains a lease if it conveys the right to control the use of an identified asset for a period of time in exchange for consideration. In opposition to other obligation rights such as rental, tenancy or operational leasing, which in general could have been not disclosed in balance sheet previously (before IFRS 16), the perpetual usufruct of land as a marketable right could have been recognized as an asset (valued at historical purchase cost, reassessed at fair value or disclosed in accordance with financial leasing guidelines). After IFRS 16 implementation, the right is regarded as a contract containing a lease, and settled in line with the new standard rules, which may change its value revealed in the financial statement if it was previously valued at historical or fair value (rights disclosed as financial leasing in general should remain unchanged). Moreover, in such cases, perpetual usufruct of land was revealed only as an asset and after IFRS 16 adoption, it is measured as an asset and as a liability at its present value of future payments, which is a completely different valuation concept than before IFRS 16. This specificity of perpetual usufruct of land should be taken into account in any considerations carried out with regard to its capitalisation in financial statements as leasing-type

agreements. However, the analysis described in this article is based on additional notes to financial statements, which present a net effect of IFRS 16 implementation on the statements, so the analysis naturally avoids any comparison problems concerned with reassessment of assets associated with perpetual usufruct of land. Nevertheless, it should be noted that to get a full view on the transition of perpetual usufruct of land value due to IFRS 16 implementation, it should be subject to further, more comprehensive research.

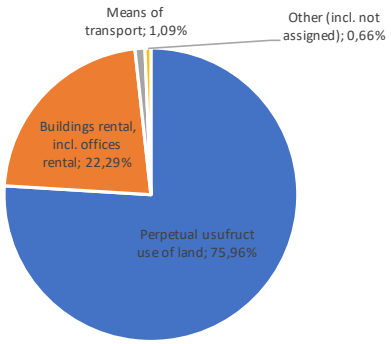


**Figure 2. In-kind structure of assets/liabilities disclosed in financial statements due to implementation of IFRS 16 as of January 1, 2019.**
Source: own study based on financial statements of analyzed entities.

Due to the above data, the magnitude of changes in the essential balance sheet figures resulting from the introduction of the new standard is significant from the perspective of enterprises' asset and capital structure research, and it may have a substantial impact on the fulfilment of the golden financing rules. To support (or reject) this hypothesis, average ratios of the golden financing rules for the examined entities before and after the introduction of IFRS 16 were calculated, which are presented in Table 2.

**Table 2. Average ratios of the golden financing rules before and after implementation of IFRS 16 for analyzed entities from real estate sector.**

| Weighted average ratios | 31.12.2018 (without IFRS 16) | | 01.01.2019 (with IFRS 16) | | Change | % change |
|---|---|---|---|---|---|---|
| | Ratio | Rule met | Ratio | Rule met | | |
| Golden balance sheet rule | 2,20 | YES | 1,68 | YES | -0,53 | -23,91% |
| Golden banking rule | 3,40 | YES | 2,74 | YES | -0,66 | -19,46% |

Source: own study based on financial statements of analyzed entities.

Average (weighted by total balance sheet amount) ratio of the golden balance sheet rule amounted to 2.20 (as of December 31, 2018, i.e., before IFRS 16

implementation), which means fulfilment of the rule. After implementation of IFRS 16 as of January 1, 2019, the rati”o of the golden balance sheet rule decreased to 1.68 (average weighted by total balance sheet amount including IFRS 16), i.e., by 23.91%. With reference to the golden banking rule, average ratios amounted to 3.40 (before the IFRS 16 implementation) and 2.74 (after IFRS 16 implementation), which means a drop of 19.46%.

Analysis of detailed numerical data confirms expectations considered in the theoretical part of this article. As far as the golden balance sheet rule is concerned, all entities showed worsening of the ratios, or the ratios remained the same. With reference to the golden banking rule, implementation of IFRS 16 had a different effect on indicators, and it was not possible to draw an unambiguous conclusion - the direction of the changes is dependent on the individual situation of the surveyed entities, i.e. on the starting balance sheet structure as well as the structure of assets and liabilities disclosed due to IFRS 16.

Nevertheless, several regularities characterizing the analyzed real estate sector might be noticed. Firstly, the implementation of the standard mostly impacted companies focusing on real estate development activity involving construction and sale of residential and service premises (average decrease of the golden banking rule ratio of 24.47%). Those entities were characterized by a high share of current assets in total balance sheet amount (73.19% on average, based on data without IFRS 16), which was the result of recognizing the premises held for sale as inventories. Simultaneously, as long-term capital (equity and long-term debt) played a significant role in their sources of financing (67.45% on average), these entities showed high ratios of the golden banking rule without IFRS 16 settlement (9,90 on average, with maximum of 30.01), which seems to be reasonable because residential and service premises are in general assets of limited marketability, and due to that their financing by stable sources of capital is in principle highly demanded. Due to the implementation of IFRS 16, developers usually recorded a substantial rise in current assets (4.33% on average), mainly due to the recalculation of previously obtained assets’ value, concerned with perpetual usufruct of land associated with the owned and held for sale residential and service premises.

Secondly, a group of entities focused on services within the real estate sector was identified. Those entities dealt mainly with services such as the rental of commercial premises1, as well as providing various services for the real estate

[1] E.g. rental of offices, commercial trade premises, hotels, or warehouses.

sector2. In some cases, these entities undertook development activity as well, but it was not their core activity. In principle (according to data without IFRS 16) this group of entities had a lower share of current assets in total balance sheet amount in comparison to developers (average of 19.52% in comparison to the mentioned 73.19% for developers), which combined with stable capital as majority of financing sources (87.29% of the total balance sheet amount) means that the golden banking rule average ratio amounts to approximately 1.18, and it is not influenced by implementation of IFRS 16 as intensely as developers (average decrease of the ratio of 5.23% to the amount of 1.12). The described considerations are summarized in Figure 3.

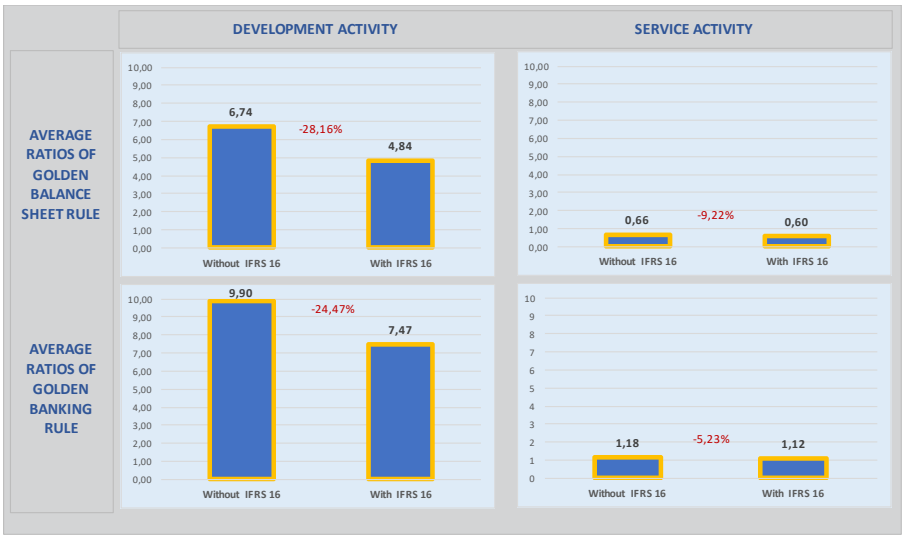


**Figure 3. Impact of IFRS 16 implementation on the average ratios of the golden rules of financing in development and service activity breakdown.**
Source: own study.

Referring to the literature on the subject of the research of this article, there are several studies on the impact of operational leasing capitalization (including due to IFRS 16) on financial statements; however, those studies have not concerned the golden financing rules so far. The studies were rather concerned with leverage ratios (debt to equity, debt to total equity and liabilities) or profitability ratios (return on equity, return on assets, return on sales), and they did not analyze in detail the real estate sector. As mentioned before, this was indicated, among others, by compilations of studies done by J. Krawczak and R. Dyląg (2018) on the

[2] E.g. preparation of design documentation, architectural services, asset management, project supervision, advisory in the field of real estate, purchase, and sale of land for development, multi-family housing construction on entrusted land etc.

Polish economy or J. Morales-Diaz and C. Zamora-Ramirez (2018) in foreign literature.

The real estate sector, due to the common use of such agreements as tenancy, rental, perpetual usufruct of land, as well as lease agreements, may be highly sensitive in terms of IFRS 16 impact on financial statements. Such consideration was confirmed on an ex-ante basis and on the sector-wide approach by the study of T. Iwanowicz (2018), which indicated that implementation of the new standard would have resulted in an increase of average EBITDA, financial leverage, and total balance sheet amount. Looking for studies based on actual data concerning the real estate sector in Poland, or in the broader approach in Eastern Europe, one may find a collective study of Slovak authors; however, it is only a data study, and it does not constitute a comprehensive analysis of the questioned issue (Tumpach et. al., 2021).

Results of the research conducted by the author of this article proved that the new standard on leasing caused an increase in the total balance sheet amount of the surveyed entities from the real estate sector by 2.2%, which should be regarded as a significant change. The average increase of the total balance sheet amount of 2.2% is similar to the level of 2% indicated in the study of T. Iwanowicz (2018). For comparison, the actual data collected for the real estate sector in Slovakia indicated an increase of total balance sheet amount caused by IFRS 16 of 0.612% (Section L representing “real estate activities” in accordance with the statistical classification of economic activities of the European Communities – NACE) (Tumpach et. al., 2021).

## Conclusions

According to the analysis of financial statements of publicly listed companies from the real estate sector in Poland, the changes in the balance sheet resulting from IFRS 16 implementation had a significant impact on the golden rules of financing. Results of this analysis indicated that implementation of the new standard caused an increase in the balance sheet total by 2.2%, mainly due to the new way of valuation and recognition of the existing perpetual usufruct of land and rental of buildings, including offices. The new standard also had a significant impact on the asset and capital structure of the surveyed enterprises. The golden balance sheet rule ratio decreased on average by 23.91% (decrease from 2.20 to 1.68), and the golden banking rule ratio decreased on average by 19.46% (from 3.40 to 2.74).

In the case of the golden balance sheet rule, the deterioration of the ratio value was common in the majority of entities within the researched real estate sector. In its best scenario, the ratio remained at an unchanged level. In relation to the golden banking rule, the impact on individual entities took a different direction, but it was evident that the ratio had deteriorated, which was reflected in the values of the ratios averaged for the sector. Whether the change was positive, or negative was dependent on the percentage changes of fixed assets and long-term capital caused by the new standard implementation, which in turn might have been connected with the kind of core activity of an entity.

The most significant changes of the golden banking rule (decrease of 24.47%) were recorded in the case of entities involved in the development activity, what is justified by high share of current assets (residential and service premises held for sale as inventories), which were subject to further increase mostly due to reassessment of perpetual usufruct of land value assigned to the premises in accordance with the regulations of the new IFRS 16. In contrast to the developers, a group of entities focused on services (rental, services for the real estate sector) had a more balanced proportion between fixed and current assets, what accompanied by long-term capital as the majority of financing sources, causing the impact of implementing IFRS 16 was less significant than in case of developers (a decrease of 5.23%).

It is worth emphasising that the companies' financial performance after the IFRS 16 application and the reduction of the ratios still meet assumptions of the golden banking rule, which means that the real estate companies, especially those involved directly in development activity, apply safe financing strategies also under the new standard.

Summarising, the new standard adjusted assets, and sources of financing amounts, making them more appropriate for the real situation of the researched companies, and, in this sense, it should be regarded as justified adjustment. The conducted analysis is in line with the general conclusions resulting from the literature on the impact of leasing capitalization on the financial situation of enterprises, among which one may mention increase of assets and liabilities, increase of leverage ratios, worsening profitability of total assets and liquidity ratios. The novelty introduced by this article is combining the subject of the impact of leasing on financial statements and ratios with the issue of a sound asset and capital structure affecting the long-term liquidity balance of enterprises. It should be noted that worsening the golden financing rules' ratios by IFRS 16 implementation might have a negative impact on the creditworthiness of the

analyzed companies, which could be an interesting topic for further research. Additionally, unlike most studies focusing on a sectoral cross-section, this article includes a detailed analysis of one specified sector of the economy. Such an approach is worth applying in case of other sectors of the economy as it may contribute to a better understanding of financing issues within them. What is equally important, the article is not based on leasing capitalization estimations, but involves the actual financial data obtained from financial statements and compares balance sheet figures before and directly after the introduction of IFRS 16, which significantly reduced the problems with the reliability and availability of data reported by many researchers in previous studies. Finally, as far as perpetual usufruct of land is concerned, as a leasing-type agreement recognized by IFRS 16 guidelines, it should be noted that due to its legal transferability (enabling sale and purchase of such right), its nature is a bit different from other obligation rights (e.g. leasing, rental, tenancy) in terms of its accounting settlement. That is the reason it would be scientifically valuable to perform further, comprehensive analysis, considering a full scope of changes in perpetual usufruct valuation due to implementation of the new standard, especially in the case of companies from the real estate sector that mostly use this type of rights. Further review of relevant literature and empirical research using additional data, performed as case studies of such companies, could examine a full scope of different effects of the introduction of IFRS 16 on perpetual usufruct.

## References

Atrill, P. (2006). *Financial Management for Decision Makers*. Harlow, England: Pearson Education.

Babuśka, E. W. (2018). Płynność finansowa jako istotne kryterium oceny przedsiębiorstwa. *Zeszyty Naukowe Uniwersytetu Ekonomicznego w Krakowie*, 2 (974), 97-116.

Baker, H.K., & Powell, G. (2005). *Understanding Financial Management*. Oxford, UK: Blackwell Publishing.

Białek-Jaworska, A., Dobroszek, J., & Szatkowska P. (2022). Does the IFRS 16 affect the key ratios of listed companies? Evidence from Poland. *International Journal of Management and Economics*, 58(3), 299-315. https://doi.org/10.2478/ijme-2022-0016

Chandra, P. (2011). *Financial Management. Theory and Practice*. New Delhi, India: Tata McGraw Hill.

Chung, H.J. (2022). The Effects of New Accounting Standards on Firm Value: The K-IFRS 1116 Lease. *International Journal of Financial Studies*, 10, 68. https://doi.org/10.3390/ijfs10030068

COMMISSION REGULATION (EU) 2017/1986 of 31 October 2017 amending Regulation (EC) No 1126/2008 adopting certain international accounting standards in accordance with Regulation (EC) No 1606/2002 of the European Parliament and of the Council as regards International Financial Reporting Standard 16 (Official Journal of the European Union L 291/1, 9.11.2017).

COMMISSION REGULATION (EU) 2023/1803 of 13 August 2023 adopting certain international

accounting standards in accordance with Regulation (EC) No 1606/2002 of the European Parliament and of the Council (Official Journal of the European Union, L 237/1, 26.9.2023).
Czekaj, J., & Dresler, Z. (2005). *Zarządzanie finansami przedsiębiorstw. Podstawy teorii.* Warszawa, Polska: Wydawnictwo Naukowe PWN.
Damodaran, A. (2007). *Finanse korporacyjne. Teoria i praktyka.* Gliwice, Polska: Wydawnictwo Helion.
Dębski, W. (2005). *Teoretyczne i praktyczne aspekty zarządzania finansami przedsiębiorstwa*. Warszawa, Polska: Wydawnictwo Naukowe PWN.
Dudycz, T. (2011). *Analiza finansowa jako narzędzie zarządzania finansami przedsiębiorstwa*. Wrocław, Polska: Wydawnictwo Indygo Zahir Media.
Dziawgo, D, & Zawadzki, A. (2011). *Finanse przedsiębiorstwa. Istota – narzędzia – zarządzanie*. Warszawa, Polska: Stowarzyszenie Księgowych w Polsce.
Fabozzi, F.J., & Peterson, P.P. (2003). *Financial Management and Analysis*. New Jersey, USA, John Wiley & Sons.
Gabryś, J. (2008). Struktura sprawozdania finansowego. In: Walczak M. (Eds.); *Sprawozdawczość i analiza finansowa w zarządzaniu przedsiębiorstwem*, tom 1. Łódź, Polska: Społeczna Wyższa Szkoła Przedsiębiorczości i Zarządzania w Łodzi.
Gajdka, J., & Walińska, E. (2000). *Zarządzanie finansowe. Teoria i praktyka*, Tom I. Warszawa, Polska: Fundacja Rozwoju Rachunkowości w Polsce.
Gostkowska-Drzewicka M., & Majerowska E. (2023). Capital structure vs financing rules - the Visegrad Group countries. *Zeszyty Naukowe Politechniki Śląskiej. Organizacja i Zarządzanie*, 169, 301-318. https://doi.org/10.29119/1641-3466.2023.169.17
Górowski, I., Kurek, B., & Szarucki, M. (2022). The Impact of a New Accounting Standard on Assets, Liabilities and Leverage of Companies: Evidence from Energy Industry. *Energies*, 2022, 15(4), 1293. https://doi.org/10.3390/en15041293
Grzenkowicz, N., Kowalczyk, J., Kusak, A., & Podgórski, Z. (2017). *Analiza finansowo-ekonomiczna jako narzędzie oceny kondycji przedsiębiorstwa*. Warszawa, Polska: Wydawnictwo Naukowe Wydziału Zarządzania Uniwersytetu Warszawskiego.
Grzywacz, J. (2015). *Finanse przedsiębiorstwa 4. Decyzje i efekty*. Warszawa, Polska: Oficyna Wydawnicza Szkoła Główna Handlowa w Warszawie.
Hońko, S. (2016). Ocena wpływu zasad ujmowania umów leasingowych według MSSF 16 „Leasing" na sprawozdania finansowe wybranych spółek notowanych na GPW. *Finanse, Rynki Finansowe, Ubezpieczenia*, 80(2), 41–51. https://doi.org/10.18276/frfu.2016.2.80/1-05
Iwanowicz, T. (2018). Wprowadzenie standardu MSSF 16 oraz jego przewidywany wpływ na sytuację majątkową i finansową spółek notowanych na GPW. *Zeszyty Teoretyczne Rachunkowości*, 97 (153), 45-56. https://doi.org/10.5604/01.3001.0012.0375
Jaworski, J. (2017). *Teoria i praktyka zarządzania finansami przedsiębiorstw*. Warszawa, Polska: CeDeWu.
Jerzemowska, M. (2018). *Analiza ekonomiczna w przedsiębiorstwie*. Warszawa, Polska: Polskie Wydawnictwo Ekonomiczne.
Jindrichovska, I. (2013). Financial Management in SMEs. *European Research Studies*, Volume XVI, Issue (4), Special Issue on SMEs.
Jog, V., & Suszyński, C. (1995). *Zarządzanie finansami przedsiębiorstwa*. Warszawa, Polska: Centrum Informacji Menedżera.
Keown, A.J., Martin, J.D., Petty, J.W., & Scott, D.F., JR. (2014). *Foundations of Finance. The Logic and Practice of Financial Management*. New Jersey, USA: Pearson Education.
Kowalski, M. J., & Kazak, J. K. (2020). Value-based management for real estate developers' activities. *Real Estate Management and Valuation*, 28(4), 48-62. https://doi.org/10.1515/remav-2020-0031
Krajewski, M. (2008). *Zarządzanie finansowe w przedsiębiorstwach (zasady – efektywność – narzędzia)*. Gdańsk, Polska: Ośrodek Doradztwa i Doskonalenia Kadr.

Krawczak, M., & Dyląg, R. (2018). Wpływ MSSF 16 na sytuację finansową i majątkową wybranych spółek z indeksu WIG30. In: *Zeszyty Teoretyczne Rachunkowości*, 97 (153). Warszawa, Polska: Stowarzyszenie Księgowych w Polsce.

Kwartnik-Pruc, A., & Trembecka, A. (2012). Użytkowanie wieczyste jako forma gospodarowania nieruchomościami publicznymi na przykładzie miasta Krakowa. *Studia i Materiały Towarzystwa Naukowego Nieruchomości*, 20(4), 101-110.

Madura, J. (2021). *International Financial Management*. Boston, USA: CENGAGE.

Magli, F., Nobolo, A., & Ogliari, M. (2018). The Effects on Financial Leverage and Performance: The IFRS 16. *International Business Research*, 11(8), 76-89. https://doi.org/10.5539/ibr.v11n8p76

Morales-Díaz, J. & Zamora-Ramírez, C. (2018). IFRS 16 (leases) implementation: Impact of entities' decisions on financial statements. *AESTIMATIO, The IEB International Journal of Finance*, 17, 60-97. https://doi.org/10.5605/IEB.17.4

Pfaff, J. (2020). (Eds.). *Rachunkowość finansowa z uwzględnieniem MSSF, Międzynarodowych Standardów Sprawozdawczości Finansowej*. Warszawa, Polska: Wydawnictwo Naukowe PWN.

Rutkowski, A. (2016). *Zarządzanie finansami*. Warszawa, Polska: Polskie Wydawnictwo Ekonomiczne.

Săcărin, M. (2017). IFRS 16 "Leases" – consequences on the financial statements and financial indicators. *Audit Financiar*, XV, 1(145), 114-122. https://doi.org/10.20869/AUDITF/2017/145/114

Sari, E.S., Altintas, T., & Tas, N. (2016). The effect of the IFRS16: constructive capitalization of operating leases in the Turkish retailing sector. *Journal of Business, Economics and Finance*, 2016, 5(1), 138-147. https://doi.org/10.17261/Pressacademia.2016116657

Sierpińska, M., & Jachna, T. (2004). *Ocena przedsiębiorstwa według standardów światowych*. Warszawa, Polska: Wydawnictwo Naukowe PWN.

Szczepankowski, P.J. (2004). *Zarządzanie finansami przedsiębiorstwa*. Warszawa, Polska: Wydawnictwo Wyższej Szkoły Przedsiębiorczości i Zarządzania im. Leona Koźmińskiego.

Tumpach, M., Juhászová, Z., Kubaščíková, Z., & Krišková, P. (2021). Datasets of impact of the first-time adoption of IFRS 16 in the financial statements of Slovak compulsory IFRS adopters. *Data in Brief*, 36, 106996. https://doi.org/10.1016/j.dib.2021.106996

Uhruska, M., (2008). Wykorzystanie koncepcji zarządzania wartością w sferze nieruchomości inwestycyjnych. *Studia i Materiały Towarzystwa Naukowego Nieruchomości*, 16(3), 7-18.

Wrzosek, S. (2007). Kilka uwag w sprawie analizy płynności finansowej. In: Duraj J. (Eds.) *Problemy współczesnej analizy ekonomicznej przedsiębiorstwa*. Łódź, Polska: Wydawnictwo Uniwersytetu Łódzkiego.

Wypych, M. (2000). (Eds.). Finanse przedsiębiorstwa z elementami zarządzania i analizy. Łódź, Polska.

Wypych, M. (2011). Spółki giełdowe w świetle reguł finansowania. *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu*, 172

Wypych, M. (2012). Struktura aktywów a złote reguły finansowania (na przykładzie spółek giełdowych). *Prace naukowe Uniwersytetu Ekonomicznego we Wrocławiu*, 261, 478-488.

Wypych, M. (2014). Równowaga finansowa przedsiębiorstw w warunkach niestabilnego otoczenia na przykładzie przemysłowych spółek giełdowych. In: Funkcjonowanie podmiotów na rynkach finansowych w warunkach zmian i niestabilności. *Przedsiębiorczość i Zarządzanie*, XV(6), 155-166.

Yousef, Y. (2019). The Determinants of Capital Structure: Evidence From GCC and UK Real Estate Sectors. *Real Estate Management and Valuation*, 27(2), 108-125. https://doi.org/10.2478/remav-2019-0019

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