

LEASING IN REAL ESTATE VALUATION - FUEL STATION CASE STUDY

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ARTICLE INFO	ABSTRACT
Keywords: real estate valuation, leasing, fuel station valuation, profits method	Leasing as a source of financing is used not only in the purchase of movable goods, but also machinery, equipment or constructions that are component parts of a real estate. Depending on the kind of leasing, it might be recognized differently from a tax or accounting perspective. The separate legal status of leased components of a real estate in relation to its main part poses a problem in valuation. As an example, one may mention a fuel station, the storage tanks, fuel dispensers or marketing visualization of which are often leased. The problem of proper leasing recognition has not yet been solved in both the theory and practice of real estate valuation. There are different regulations regarding leasing in every country, which makes it even more difficult to provide universal valuation guidelines. The authors of this article reviewed literature and practical studies on the mentioned subject and conducted a comparison of different types of lease agreements applied for fuel stations along with a qualitative analysis of their impact on the market value of such assets. Using a case study as the research tool, the article is an attempt to present the problem in a quantitative manner. In conclusion, the authors proposed their own solution to the described problem, based on the conducted scientific research. The topic may gain importance due to the recent popularization of the circular economy concept, which assumes leasing of durable component parts of buildings or constructions and their multiple use instead of one-off utilization and disposal. It sheds new light on real estate management and may influence its valuation methodology.
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1. Introduction

Leasing as a source of financing is used not only in the purchase of movable goods, but also machinery, equipment or constructions that are component part of a real estate. Depending on the kind of leasing and local country regulations, a leased object may be considered differently from an accounting, tax and legal perspective, either in a similar way to a bank loan, or closer to a rental or tenancy agreement (Korczyński, 2024; Cicirko, 2021; Michalak, 2007). However, in opposition to a bank loan, the property right of leased goods is legally always assigned to a lessor, i.e. financing party. As a consequence, the problem of the different legal status of assessed real estate and its leased component parts arises in real estate valuation.

As an example of such real estate, one may mention fuel stations, whose storage tanks, fuel dispensers or marketing visualization are often financed by leasing. The problem of proper leasing recognition has not yet been ultimately solved in the theory and practice of real estate valuation, which means that there is a research gap in this respect. However, the problem was noticed by authors of the International Financial Reporting Standards (IFRS), who introduced standard No 16 concerning leasing. The standard came into force in the European Union from 1 January, 2019 and changed the way of recognizing operational leasing in the financial statements of entities obliged to apply the IFRS. The main objective of the article is the assessment of possible valuation error resulting from incorrect

inclusion of real estate's leased parts in the valuation. The specific aim is an attempt to indicate a potential solution to the mentioned problem. The topic described in this article may gain importance in the near future due to popularization of various ecological innovations, including the so called circular economy concept, which assumes, *inter alia*, leasing of durable component parts of buildings or constructions and their multiple use in many constructions instead of one-off purchase, use and disposal.

2. Literature review

2.1. General considerations

The separate legal ownership of leased components of real estate poses an important methodical problem, as in the light of commonly used real estate valuation standards, market value of a real estate does not take into consideration any debt associated with it, e.g. mortgage bank loan. Such an approach is practical from the point of view of the marketability of this type of assets. It is also consistent with property rights associated with a real estate, which in the case of the real estate's sale is fully transferred (*i.e.* with reference to all its components) to the new owner, and is reflected in the market value of a property. The separate ownership of some components of real estate impedes application of these trading and valuation rules, which seems to be an important research gap. Research identified by the authors of this article, mostly refers to the leasing of real estate as a whole and focuses on valuation of lease fees regarded as revenue from such real estate ownership (e.g. Dong & Li, 2024; Raazi, 2022; Nwogugu, 2018; Hsieh & Lin, 2016). In opposition to that, lease value of real estate components represents the cost side of valuation, which needs special consideration. In order to stipulate any guidelines in this regard, the next sections focus on literature review in terms of leasing definition and its types, as well as their implications on the way leasing is considered from different legal perspectives. All those considerations are important for understanding the structure of the problem and contribute to its solution proposal, presented in Section 3.

2.2. Definition of leasing

Despite the variety of definitions, the general meaning of leasing is understood similarly among most researchers. It is commonly found that leasing as a

source of financing implies a situation in which the owner of an object (lessor, financier) makes it available for use by the lessee (user) for a definite period of time, in exchange of a flow of payments received in instalments (while the subject is precisely defined by the user before the transaction) (Grzywacz, 2019). The lessor is the legal owner of the object for the whole period of the lease agreement (Rutkowski, 2016) and the potential option of transferring ownership to the user might be foreseen for execution only at the end date of an agreement (Grzywacz, 2019). Therefore, leasing is a refined transaction which joins a variety of features specific for rental, tenancy and instalment sale agreements (Korczyn, 2024). One of the main characteristics differentiating leasing from rental and tenancy is its financing function, meaning that the financing of the purchase of goods by a lessor is intended by the parties to the transaction as its economic premise, and not as its necessary consequence (Cicirko, 2021; Gołda, 1999). This means that the lessor finances the purchase of goods precisely specified by the user, which is in opposition to rental or tenancy when goods are purchased primarily by the owner for future use by an indefinite customer (Grzywacz, 2019; Gołda, 1999). The financing function of leasing makes it similar to a bank loan, though it employs a different kind of capital, which is a tangible asset instead of financial resources (Michalak, 2007). Moreover, in the case of leasing, the user is liable for returning the same specific good to the lessor, not a good of the same kind, quality and quantity as it is defined by a loan (Grzywacz, 2019; Gołda, 1999). The described comparison of leasing to a loan, rental or tenancy clearly indicates that the main aim of leasing is to enable the use of goods in exchange for payments instead of buying it for its own (Kuzior, 2023; Cicirko, 2021). As a good generalization of this idea, one may mention an approach expressed by Italian legislation stating that the economic objective of leasing is financing the user's ability to use goods from external sources (Cicirko, 2021).

2.3. Types of leasing

Leasing transactions give much freedom in regards to how to draw specific terms of contracts, which is the reason for a multitude of different types of leasing (Czekaj & Dresler, 1998). The selected classifications are presented in the Table 1.

Table 1

Selected leasing classifications	
Criterion	Leasing types
Number of parties to the leasing agreement	direct leasing indirect leasing
Method of obtaining a leasing subject	investment leasing sale and lease back tenant leasing
Coverage of the purchase costs of a leasing subject	full payout leasing non-full payout leasing
Provision of additional services associated with a leasing subject by lessor	wet leasing (with additional services) dry leasing (without additional services)
Economic and business control of a leasing subject	finance leasing operational leasing mixed leasing

Source: own study based on Grzywacz (2019), Bednarz and Gostomski (2018), Okręglička (2005), Snopczyński (2000), Gołda (1999), Kruczałak (1996).

Regarding the subject of this article, the distinction between finance and operational leasing is the most important. This is also the most popular way of distinguishing between different types of leasing contracts in business practice (Grzywacz, 2019; Konieczny, 2002). The main difference is the economic and business aim of the transaction, which is determined by the three basic criteria including the duration of the agreement, total amount of lease payments and the business nature of lease liabilities (Cicirko, 2021). The objective of finance leasing is to enable the long-term use of an asset, i.e. for a period similar to the economic useful life of a leased good (Kuzior, 2023; Kruczałak, 1996). It mostly means full or almost full payout of capital expenditures incurred by a financing party (Kuzior, 2023; Gołda, 1999). Such terms of a leasing agreement mean that the main operating risk associated with the use of a leased asset, including expected benefits as well as bearing its maintenance costs, usually lies with the lessee (Cicirko, 2021).

Unlike finance leasing, operational leasing assumes that leased good could be sequentially used by several lessees (Kuzior, 2023; Kruczałak, 1996), which means that such transactions are concluded for relatively shorter periods than in the case of finance leasing (Jaworski, 2023), usually not longer than the economic useful life of a leased asset (Gołda, 1999). It is common that the financing party does not recover all incurred expenses along with a due profit in one transaction, which means that greater risk associated with maintaining a leased asset in proper condition lies with the lessor. This is the reason why the lessor is usually also responsible for maintenance, insurance and other services associated with the use of a leased asset (Cicirko, 2021). This is also justified by less problematic

and costly withdrawal from an operational leasing contract for a lessee, which usually requires the payment of several instalments, not the total unpaid part of the contract amount (Grzywacz, 2019) or high compensation fee (Jaworski2023; Bień, 2011) as in the case of finance leasing.

2.4. Economic ownership concept in leasing

The mentioned features of finance and operational leasing are crucial for the determination of the economic and business objective of every leasing agreement. The key notion associated with it is the so called economic ownership, which occurs independently from the fact that the legal owner of a leased asset is always the lessor (Korczyn, 2024; Cicirko, 2021). In legal meaning, it is also referred to as the concept of business ownership (Stecki, 1999). The concept stems from an idea that, even though the legal ownership belongs to a lessor, the real position of a lessee towards the lessor is similar to the legal owner in terms of a leased asset, especially in long-term leasing (Stecki, 1999). Therefore, the key difference between operational and finance leasing is not only the nature of leasing liability, but the issue of who effectively possesses an asset (Damodaran, 2009).

In case of finance leasing, the economic (business) ownership is featured by the user of a leased asset, whereas in operational leasing, the lessor is its business owner. It is reflected in different interpretations of leasing, depending on which part of law (tax, accounting, civil) it is attributed to (Cicirko, 2021). The comparison of the main attributes of economic ownership (determining finance leasing) and the occurrence of legal ownership in tax, accounting and civil law approach in Poland are presented in Table 2.

Table 2

Comparison of the main attributes determining economic ownership (financial leasing) and occurrence of legal ownership in tax, accounting and civil law approach in Poland

Feature	Tax approach <i>[requirement to meet all conditions together]</i>	Accounting approach <i>[requirement to meet at least one condition]</i>	Civil law approach
ECONOMIC OWNERSHIP			
Term of agreement	Indefinite term	Covers a major part of the expected economic useful life of an asset (not less than $\frac{3}{4}$ of the period)	No distinction between finance and operational leasing.
Total leasing payments	Corresponds to at least the initial value of a property	Exceeds 90% of the market value of a leased asset (net of related discount)	
Risk (incurring costs) of leased assets maintenance	Condition does not apply	Condition does not apply	
Bearing consequences of agreement termination	Condition does not apply	Any costs and losses incurred by a lessor related to agreement termination are covered by the lessee	Conditions for qualifying a contract as leasing are in general similar to selected conditions of finance leasing in a tax and accounting approach: - indefinite term of agreement, - total leasing payments not less than lessor's price and remuneration associated with acquiring of an asset, - lessee's responsibility for asset's maintenance.
Individualization of a leased asset	Condition does not apply	Yes, leased asset tailored to individual needs of a lessee	
Lessee's right to continue the use of asset after the end of agreement term	Condition does not apply	Yes: lessor's commitment to conclude with lessee a subsequent agreement or prolongation of the existing one under more favorable conditions than those specified in the existing agreement	
Right to acquire ownership of leased asset by lessee after the end of the agreement	Condition does not apply	Yes – several options: - commitment of a lessor to transfer ownership after the end of agreement term, - lessee's right to acquire ownership after the end of the agreement term for a price lower than its market value as at the purchase date	
Determination of the party depreciating the leased asset	Asset has to be depreciated by lessee (to be stipulated in the leasing agreement as a necessary condition to assess an agreement as finance lease)	Condition does not apply (the party depreciating leased asset determined as a result of the fulfilment of the above conditions)	
LEGAL OWNERSHIP			
Direct regulation of legal ownership belonging to a lessor	Yes - by referring to the provisions of the Civil Code	Not directly, but indirectly could be inferred from the provisions of the Accounting Act	Yes – due to Art. 709 ¹⁸

Source: own study based on Korczyn, 2024; Trzpiola, 2023; Cicirko, 2021; Bień, 2018.

Occurrence of economic ownership determines how leasing transaction is settled from the accounting and tax perspective. The main aspect of this settlement is the right to depreciate the asset's value over time by one party to the leasing agreement (Korczyn, 2024). Moreover, considering the financing nature of leasing, it is obvious that the lessor, as the financing party, expects a specific return on capital invested in acquiring the leased asset. For that reason, the calculation procedure of lease payments refers to the time value of money concept, which means distinction between the principal and interest part of lease payments, provided that there are several methods of their calculation (Gajdka & Walińska, 2000). These aspects are reflected in the way of lease payment settlement, depending on whether an agreement is recognized as finance or operational leasing. In the case of finance leasing, a lessee, as the economic owner of a leased asset, accounts depreciation write-offs, which are tax deductible along with the interest part of lease payments (interest part of payments is simultaneously tax revenue for the lessor) (Bednarz &

Gostomski, 2018). On the other hand, the principal part of lease payments is regarded as the lessor's return on capital employed in acquisition of a leased asset and it is recognized as receivables by a lessor and, simultaneously, liabilities by a lessee (Korczyn, 2024). The described mechanism is similar to a bank loan settlement. The opposite way of settlement applies to operational leasing, by which depreciation write-offs are accounted by a lessor. In such a situation, the total lease payments (including principal and interest) are regarded as tax deductible by the lessee and, at the same time, as tax revenue by the lessor (Grzywacz, 2019).

Although the basic Polish regulations applicable to leasing (except for the Polish National Accounting Standard No. 5) do not directly indicate finance and operational leasing by name, both notions are used in the relevant literature, as well as colloquially by business practitioners as names of different types of leasing, the distinction of which is based mostly on the way of depreciating leased assets and settlement of lease payments. It should be underlined that no matter

which party of the leasing agreement the economic ownership is assigned to, legal ownership always belongs to the lessor, which means that the right to depreciate leased assets is not directly related to their property right.

This problem seemed to be noticed by the authors of the International Financial Reporting Standard No. 16, which came into force on 1 January, 2019. The leasing settlement model included in the standard does not provide any distinction between finance and operational leasing. Additionally, it equalizes all agreements (including rental and tenancy) that contain any provisions specific to leasing (lease components) as one type of transaction, which (under certain conditions) shall be recognized and settled in the same

way as finance leasing. The aim of such an approach is to counteract the globally observed practice of recognizing economically similar transactions in a different manner from the accounting point of view (Bohušová et. al., 2014), which in turn results in the lack of transparency and hinders comparability of the financial statements of entities using such types of agreements (Chen & Wu, 2023; Slater et al., 2024).

2.5. Leasing in real estate valuation standards

In Poland, similarly to many other countries, the market value of real estate is not reduced by the debt connected with it, even that revealed as mortgage. This rule is applied by most of the regulations and standards used by property valuers, which is presented in Table 3.

Table 3

Debt recognition in real estate valuation – selected standards of valuation		
Legal regulation / valuation standard	Article No.	Debt recognition
European Valuation Standards 2020	7.52	In the case of the income valuation approach, operational expenses should not include loan/debt servicing
Professional Standards of the Polish Federation of Property Valuers Associations	4.1.8. b)	In market value assessment, operational expenses shall not include repayment of principal and interest of debt or loans
Regulation of the Minister of Development and Technology on real estate valuation	\$13	In the income valuation approach, income flows shall not include debt and its related cost
	\$34 ust.1	Mortgage is avoided in real estate valuation

Source: own study based on European Valuation Standards, 2020; Professional Standards of the Polish Federation of Property Valuers Associations. Interpretation Note. Implementation of income approach in real estate valuation, 2008; Regulation of the Minister of Development and Technology of 5 September 2023 on real estate valuation, Journal of Laws 2023, item 1832.

At the same time, regulations and standards mentioned in the Table 3 indicate the need to include any obligations or property rights that encumber the real estate if they significantly influence income flows from the real estate and are of material for its value. Notwithstanding, the regulations do not refer directly to leasing, so there are many doubts as to how it should be included in valuation. On the one hand, leasing is a source of financing similar to debt, but on the other hand, legal ownership of leased assets belongs to the lessor, and consequently leasing payments might be regarded as remuneration for the use of assets in the same way as by rental or tenancy.

3. Material and methods

In the light of the conducted literature review, the valuation problem of leased components of real estate arises regardless of the type of leasing and which party

to the leasing agreement has the right to depreciate leased assets. From the standpoint of real estate valuation, the civil law approach seems to be the most appropriate. As indicated in Table 2, the ownership of a leased asset belongs to the lessor during the whole period of the leasing agreement. When an agreement expires, lessees have the right but not the obligation to buy leased asset for themselves. On this basis, the conclusion can be drawn that owner of a real estate the parts of which are subject to leasing, is not the legal owner of these components. This seems to be in conflict with regulations concerning real estate ownership rights (e.g. in Poland).

As a result, there is a dilemma related to the valuation of real estate which includes such leased components. It seems that there are two possible solutions to this problem:

1. To regard leasing as a source of investment

financing (as in the case of debt) and to avoid its burden in the valuation assessment, simultaneously including a detailed description of the legal status of leased assets;

2. To regard leasing as an obligation right (as rental or tenancy of goods belonging to someone else) and consequently to include costs (rent) related to leasing in the valuation assessment or to avoid / reduce the leased assets' value in the real estate estimate (total amount of leasing liabilities).

It seems that the solution to this dilemma needs to be considered from the point of view of a potential, hypothetical buyer of a real estate, the parts of which are subject to leasing agreements. The consequence of the acquisition of such a property for a new owner, will be either the necessity to incur future leasing payments or the purchase of a property deprived of essential component parts, which were not effectively acquired because, as the subject of a leasing agreement, they were property of the lessor and not the seller of the property.

Keeping in mind the described issues and current considerations on leasing included in the International Financial Reporting Standards, as well as following the conservative valuation approach principle, we think that the second presented solution, regarding leasing as equal to rental or tenancy of goods belonging to someone else, is in principle an appropriate solution to this problem.

While proposing to include leased components of real estate as an obligation right in real estate valuation, the authors of the article made an attempt to assess the possible valuation error which may occur if leased components of real estate are not approached properly in the valuation process and, based on this research, accept or reject their own methodological solution to this problem.

The research covered the European Union, with special attention given to the Polish market. At first, a comprehensive review of regulations, standards and literature relevant to leasing and real estate valuation presented in Section 2 was conducted. Afterwards, statistic data presenting the importance of leasing as a financing source of new investments in Europe and Poland was analyzed, which was then followed by the presentation of most commonly used kinds of leasing and structure of commonly leased assets in Poland. The research covered the years 2016-2022 and was based on the data derived from Eurostat, Statistics Poland and Leaseurope (the European Federation of Leasing Company Associations). In the next step, the authors

prepared three case studies of fuel stations, where a portion of the necessary equipment was financed by leasing agreements. The aim of the studies was to illustrate the importance of leasing for the proper valuation of such types of assets. The studies also examined the possible escalation of the impact of leasing on valuation by using sensitivity analysis.

The relevant quantitative analysis on the importance of leasing is presented in section 4.1 of this article. The potential impact of the proposed means of leasing settlement in real estate valuation is presented in three case studies of fuel stations, the parts of which are subject to leasing agreements. The case studies are described in Section 4.2 of the article.

4. Results

4.1. Share of leasing in investment financing

In 2022, a total investment of 14.6 billion EUR was financed by leasing in Poland, which accounted for 14% of total capital expenditures on tangible assets (Statistics Poland; Eurostat), while the average for 2016-2022 amounted to 15%. Value of investment financed by leasing as a part of total capital expenditures in Poland in the analyzed period is presented in Fig. 1.

The quoted values for Poland are similar to those for the European Union, where the average share of leasing in the financing of investments amounted to 13% in 2016-2022 (Eurostat; Leaseurope Key Facts and Figures, Leaseurope). This means that, although leasing is not the main source of investment financing, it is still not deprived of any significance.

As far as the distinction between finance and operational leasing in Poland is concerned, 78% of the total value of leasing was associated with finance leasing, and respectively 22% with operational leasing (on average in 2016-2022) (Statistics Poland). The analysis of the operational leasing structure by the type of financed tangible assets illustrated in Fig. 2 indicates that 18.1% of total operational leasing value concerned industrial machinery and equipment, while only 0.2% was associated with real estate (Statistics Poland).

It may seem that leasing as a source of financing is not so important for the real estate sector, however it should be noted that not only the entire real estate properties but also their components could be subject to leasing and, in this respect, leasing might be of greater importance than expected. Therefore, it is scientifically interesting to review the regulations and standards used in real estate valuation in detail in terms of leasing and its possible recognition in the valuation process.

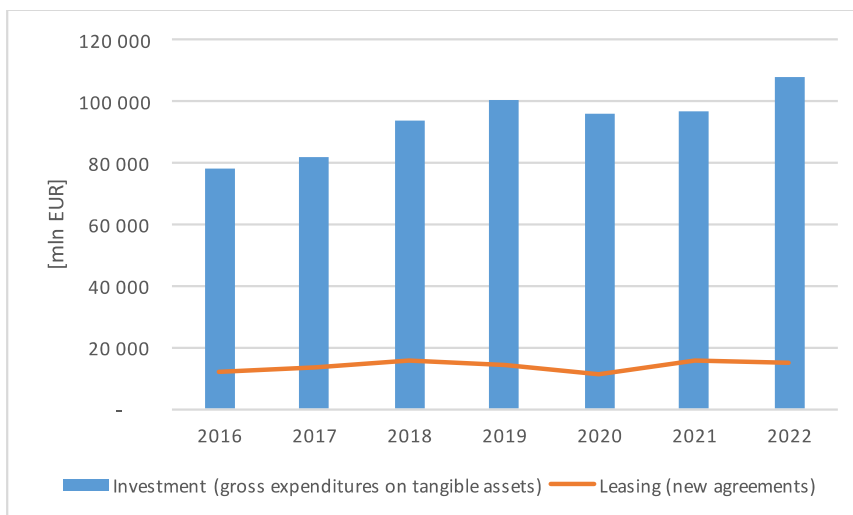


Fig. 1. Investment financed by leasing as part of the total capital expenditures in Poland in 2016-2022.
Source: own study based on statistical data (Statistics Poland, Eurostat).

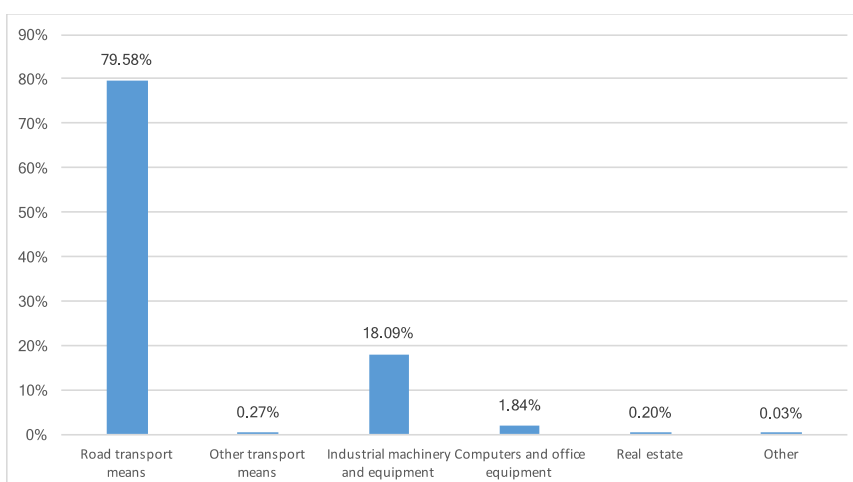


Fig. 2. Operational leasing financed investment by types of tangible assets in Poland (average 2016-2022).
Source: own study based on statistical data (Statistics Poland).

4.2. Case studies (fuel stations)

General approach

A practical example of a real estate, the components of which may be leased, is a fuel station. Fuel stations are regarded and valued as commercial real estate due to the nature of factors determining their value, which are particularly cash inflows from its business activity consisting of the sale of fuels and other non-fuel goods. The profits method within the income approach is regarded as the most appropriate way of valuating such type of real estate (Czaplińska, 2014). This method assumes that real estate value is based on the income from the business activity carried out on the property and that the kind of performed activity is closely related to specific features of the property, determining its ability to gain that income (Professional Standards of the Polish Federation of Property Valuers Associations,

2008). Such an approach means that the appropriate recognition of leasing liabilities is important for obtaining correct valuation results.

Case study 1

The first case study concerns an existing self-service fuel station, located in one of the Polish medium-sized towns with over 80 thousand inhabitants. The fuel station sells fuel 24 hours a day. Land where the station is located is build up with the following facilities: a shelter, fuel tanks, two fuel dispensers, two automatic payment machines, a paved drive area and a pylon. All facilities are integrated visually by marketing visualization components. Among the mentioned assets, there are several items that are subject to a 5-year operating leasing agreement. These are the fuel dispensers, automatic payment machines, and marketing visualization.

The valuation of the described fuel station was carried out in accordance with the guidelines included in the Professional Standards of the Polish Federation of Property Valuers Associations, and took into account the role of the fuel station's user (operator) (Czaplińska & Trojanowski, 2012; Cellmer, 2014), who makes a certain unit profit margin on every amount of fuel sold. In order to obtain the expected revenue, the operator incurs operating costs, such as electric energy consumption, waste disposal, payment card fees and commission, provision of materials and other services, concession fees, labor costs, as well as leasing payments for the mentioned assets. In the researched case, the cost of leasing amounted to 4.85% per year (before tax) and was based on the value of the leased

assets (30% of the total capital expenditures incurred for the fuel station, excluding land). In addition to the mentioned flows, the user of the station incurs indirect expenditures, comprising property tax, insurance, maintenance and repairs, as well as the replacement of fixed assets. The value of the station is the sum of the discounted cash flow for a 6-year forecasted operating period, including residual value, assuming further operations beyond the period of the detailed cash flow forecast (calculation of residual value based on perpetuity approach). The yearly discount rate applied to the valuation was 10%. Details of the calculation including leasing payments are presented in Table 4, with the calculation without leasing payments found in Table 5.

Table 4

Fuel station user's perspective valuation including operational leasing payments

No.	CALCULATION ITEM [PLN]	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
1.	Revenue [PLN]	560 500	560 500	560 500	560 500	560 500	560 500
2.	Operating costs (including operational leasing) [PLN]	296 364	296 364	296 364	296 364	296 364	199 764
3.	Operating expenditures [PLN]	71 000	71 000	71 000	71 000	71 000	71 000
4.	Net operating income [PLN]	193 136	193 136	193 136	193 136	193 136	289 736
5.	Discount factor	0.91	0.83	0.75	0.68	0.62	0.56
6.	Residual value [PLN]						2 897 356
7.	Discounted cash flows [PLN]	175 578	159 616	145 106	131 914	119 922	1 799 030
8.	Fuel station value [PLN]			2 531 166			

Source: own study.

Table 5

Fuel station user's perspective valuation excluding operational leasing payments

No.	CALCULATION ITEM [PLN]	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
1.	Revenue [PLN]	560 500	560 500	560 500	560 500	560 500	560 500
2.	Operating costs (excluding operational leasing) [PLN]	199 764	199 764	199 764	199 764	199 764	199 764
3.	Operating expenditures [PLN]	71 000	71 000	71 000	71 000	71 000	71 000
4.	Net operating income [PLN]	289 736	289 736	289 736	289 736	289 736	289 736
5.	Discount factor	0.91	0.83	0.75	0.68	0.62	0.56
6.	Residual value [PLN]						2 897 356
7.	Discounted cash flows [PLN]	263 396	239 451	217 683	197 893	179 903	1 799 030
8.	Fuel station value [PLN]			2 897 356			

Source: own study.

The fuel station value, excluding payments for the leased components of the property, was estimated at 2.9 million PLN. The value of the station reduced by the leasing payments amounted to 2.5 million PLN, i.e. about 13% less than the value including leasing (which should be regarded as a valuation error). Sensitivity analysis indicates that if the share of leased assets in total capital expenditures for the station increased by 5 percentage points, the difference between the station value without and with leasing would increase by 2.1 percentage points. In an extreme hypothetical case of

the whole real estate property (100% of capital expenditure) being financed by leasing the relevant valuation error would amount to 42%.

Case study 2

The second case study concerns an existing full-service fuel station, located in one of the Polish towns near Warsaw with c.a. 35 thousand inhabitants. The fuel station sells fuels, consumer goods and services 24 hours a day. The land where the station is located is build up with the following facilities: shop building

including social and sanitary facilities for employees, office and storage rooms, toilets for customers, shelter, three non-pressurized and two pressurized fuel tanks, three fuel dispensers, one LPG dispenser, a paved and fuel-tight drive area, fuel installation, a price pylon, and underground infrastructure: electrical, water and sewage, rain sewage, telecommunication and IT installations. The fuel dispensers, net valued at 188 746 PLN, are subject to a 5-year operating leasing agreement, however at the valuation date, the lease agreement was continued to be valid for a 4-year period.

Valuation of the described fuel station was carried out in accordance with the guidelines included in the Professional Standards of the Polish Federation of Property Valuers Associations, and it took into account the role of the fuel station's user (operator) (Czaplińska & Trojanowski, 2012; Cellmer, 2014), who makes a certain unit profit margin on every amount of sold fuels. In order to obtain the expected revenue, the operator incurs operating costs, such as electric energy

consumption, waste disposal, payment card fees and commission, provision of materials and other services, concession fees, labor costs, as well as leasing payments for the mentioned assets. In the researched case, the cost of leasing amounted to 5.17% per year (before tax) and was based on the value of the leased assets (6% of the total capital expenditures incurred for the fuel station, excluding land). In addition to the mentioned flows, the user of the station incurs indirect expenditures, comprising property tax, insurance, maintenance and repairs, as well as the replacement of fixed assets. The value of the station is the sum of discounted cash flow for a 5-year forecasted operating period, including residual value, assuming further operation beyond the period of the detailed cash flow forecast (calculation of residual value based on perpetuity approach). The yearly discount rate applied to the valuation was 8.5%. Details of the calculation including leasing payments are presented in the Table 6, while those of the calculation without leasing payments are noted in Table 7.

Table 6

Fuel station user's perspective valuation including operational leasing payments

No.	CALCULATION ITEM [PLN]	Year 1	Year 2	Year 3	Year 4	Year 5
1.	Revenue [PLN]	1 169 860	1 169 860	1 169 860	1 169 860	1 169 860
2.	Operating costs (including operational leasing) [PLN]	692 817	692 817	692 817	692 818	652 865
3.	Operating expenditures [PLN]	128 000	128 000	128 000	128 000	128 000
4.	Net operating income [PLN]	349 044	349 044	349 044	349 043	388 996
5.	Discount factor	0.92	0.85	0.78	0.72	0.67
6.	Residual value [PLN]					4 576 419
7.	Discounted cash flows [PLN]	321 699	296 497	273 269	251 860	3 302 227
8.	Fuel station value [PLN]			4 445 552		

Source: own study.

Table 7

Fuel station user's perspective valuation excluding operational leasing payments

No.	CALCULATION ITEM [PLN]	Year 1	Year 2	Year 3	Year 4	Year 5
1.	Revenue [PLN]	1 169 860	1 169 860	1 169 860	1 169 860	1 169 860
2.	Operating costs (excluding operational leasing) [PLN]	652 863	652 863	652 863	652 864	652 865
3.	Operating expenditures [PLN]	128 000	128 000	128 000	128 000	128 000
4.	Net operating income [PLN]	388 998	388 998	388 998	388 997	388 996
5.	Discount factor	0.92	0.85	0.78	0.72	0.67
6.	Residual value [PLN]					4 576 419
7.	Discounted cash flows [PLN]	358 523	330 436	304 549	280 690	3 302 227
8.	Fuel station value [PLN]			4 576 425		

Source: own study.

The fuel station value excluding payments for the leased components of the property was estimated at 4.6 million PLN. The value of the station reduced by the leasing payments amounted to 4.4 million PLN, i.e.

about 3% less than the value including leasing (valuation error). Sensitivity analysis indicates that if the share of leased assets in total capital expenditures for the station increased by 5 percentage points, the

difference between the station value without and with leasing would increase by 2.4 percentage points. If the total capital expenditure (100%) was financed by leasing, the relevant valuation error would amount to 48.5%.

Case study 3

The third case study concerns an existing self-service fuel station, located in one of the villages near Warsaw with c.a. 1 thousand inhabitants. However, the village is located near an important communication route running from Wołomin to Warsaw (agglomeration area of the Capital City of Warsaw). The fuel station sells fuels 24 hours a day. The land where the station is located is build up with the following facilities: two shelters, a fuel tank, two fuel dispensers, two automatic payment machines, a paved fuel-tight drive area, fuel installation, a price pylon and underground infrastructure: electrical, water and sewage, rain sewage, telecommunication and IT installations. Among the mentioned assets, there are several items that are subject to a 5-year operating leasing agreement, however, at the valuation date, the agreement was still valid for a 3-year period. The leased assets are fuel dispensers and automatic payment machines, net valued at 265,000 PLN.

Valuation of the described fuel station was carried out in accordance with the guidelines included in the

Professional Standards of the Polish Federation of Property Valuers Associations, and it took into account the role of the fuel station's user (operator) (Czaplińska & Trojanowski, 2012; Cellmer, 2014), who makes a certain unit profit margin on every amount of sold fuels. In order to obtain the expected revenue, the operator incurs operating costs such as electric energy consumption, waste disposal, payment card fees and commission, provision of materials and other services, concession fees, labor costs, as well as leasing payments for the mentioned assets. In the researched case, the cost of leasing amounted to 4.85% per year (before tax) and was based on the value of the leased assets (16% of the total capital expenditures incurred for the fuel station, excluding land). In addition to the mentioned flows, the user of the station incurs indirect expenditures, comprising property tax, insurance, maintenance and repairs, as well as the replacement of fixed assets. The value of the station is the sum the of the discounted cash flow for a 6-year forecasted operating period, including residual value, assuming further operations beyond the period of detailed cash flow forecast (calculation of residual value based on perpetuity approach). Yearly discount rate applied to the valuation was 10%. Details of the calculation including leasing payments are presented in the Table 8 and calculation without leasing payments in the Table 9.

Table 8

Fuel station user's perspective valuation including operational leasing payments

No.	CALCULATION ITEM [PLN]	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
1.	Revenue [PLN]	631 000	631 000	631 000	631 000	631 000	631 000
2.	Operating costs (including operational leasing) [PLN]	252 686	252 686	252 686	191 736	191 736	191 736
3.	Operating expenditures [PLN]	82 000	82 000	82 000	82 000	82 000	82 000
4.	Net operating income [PLN]	296 314	296 314	296 314	357 264	357 264	357 264
5.	Discount factor	0.91	0.83	0.75	0.68	0.62	0.56
6.	Residual value [PLN]						3 572 644
7.	Discounted cash flows [PLN]	269 377	244 888	222 625	244 016	221 833	2 218 331
8.	Fuel station value [PLN]			3 421 070			

Source: own study.

Table 9

Fuel station user's perspective valuation excluding operational leasing payments

No.	CALCULATION ITEM [PLN]	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
1.	Revenue [PLN]	631 000	631 000	631 000	631 000	631 000	631 000
2.	Operating costs (excluding operational leasing) [PLN]	191 736	191 736	191 736	191 736	191 736	191 736
3.	Operating expenditures [PLN]	82 000	82 000	82 000	82 000	82 000	82 000
4.	Net operating income [PLN]	357 264	357 264	357 264	357 264	357 264	357 264
5.	Discount factor	0.91	0.83	0.75	0.68	0.62	0.56
6.	Residual value [PLN]			-			3 572 644
7.	Discounted cash flows [PLN]	324 786	295 260	268 418	244 016	221 833	2 218 331
8.	Fuel station value [PLN]			3 572 644			

Source: own study.

The fuel station value excluding payments for the leased components of the property was estimated at 3.6 million PLN. Value of the station reduced by the leasing payments amounted to 3.4 million PLN, i.e. about 4% less than the value including leasing (valuation error). Sensitivity analysis indicates that if the share of leased assets in total capital expenditures for the station increased by 5 percentage points, the difference between the station value without and with leasing would increase by 1.3 percentage points. If 100% of capital expenditure was financed by leasing, the valuation error would amount to 26%.

Taking into account the presented figures, it should be concluded that operational leasing may be an important factor influencing value of a petrol station and that station's value may significantly differ depending on the way of leasing recognition in the valuation assessment.

5. Discussion

Because of the growing popularity of leasing as a source of financing, it has been gaining more and more importance in business, as well as in scientific research. This article could be a part of discussion on the topic by pointing out problems which may occur in the valuation of real estate if it includes components that are financed by leasing. The problems stem from the separation of the ownership of the leased assets and the main part of a real estate. The article identifies two possible approaches to solving these problems in valuation procedure, and it proposes one of them as the preferred solution, making an important contribution to the existing scientific research on real estate valuation. Notwithstanding the literature on the discussed topic which recognizes the distinction between acting as a real estate owner and its user, and draws the attention of valuers to specific parameters of such agreements as leasing, tenancy or rental ("lease agreement") (Morri & Benedetto, 2019), it may be stated that there is in fact no scientific research on the topic of valuation approach to a leased part of real estate. The article contributes to filling the research gap in this study area.

Even if there are studies referring to the leasing of real estate, they usually concern entire properties, and not their components. Moreover, due to the fact that the English word "lease" may have different meanings, including leasing (in its literary meaning) as well as tenancy or rental, unambiguous understanding of the existing international research literature is difficult, or in some cases impossible, without an in-depth review

of local regulations concerning leasing in the country that the given research concerns. In this respect, one of the main research topics described in the literature is the valuation and optimization of lease (rental) fees of real estate, such as offices or land properties (e.g. Dong & Li, 2024; Raazi, 2022; Nwogugu, 2018; Hsieh & Lin, 2016). This, however, is beyond the scope and interest of this article.

The subject of this article may be novel particularly in the context of the recently observed popularity of various ecological innovations, including the circular economy approach as the new sustainability paradigm in the field of real estate management. Preservation of the economic and environmental value of materials for as long as possible by lengthening the life cycle of products or looping them back to be reused (den Hollander et. al., 2017), e.g. by the repeated use of parts of buildings or constructions (Cruz Rios & Grau, 2019) in terms of circular economy, as well as the willingness of customers to transfer technical risk of new ecological solutions such as heat pumps or energy storage systems to suppliers (Côté & Pons-Seres de Brauwer, 2023; Abe & Ishida, 2022), could all mean that leasing may be applied more frequently as a source of financing real estate component parts. Although the use of operational leasing as a way executing the circular economy in the real estate sector is sometimes criticized because of the technical, financial and legal problems it encounters (Ploeger et. al., 2019), the possible development of this way of financing real estate components may strengthen the need to guideline it in valuation standards.

The importance of the problem raised in this article seems to be in line with the foreseen trends in the leasing sector in Poland, which gives priority to the mentioned circular economy, sharing economy or the product-as-service approach, and at the same time considers the leasing of the entire real estate as a market with lower prospects, mainly due to the long term period of depreciation and difficulties with estimating the cost of money as well as instability of regulations (Radło et al., 2024). In this respect, greater importance might be attached to the leasing of component parts of real estate in the future.

There is no doubt that the standardization of the mentioned issues would bring more objectivity and, in consequence, better comparability in the valuation process of such partly leased real estate properties, which is one of the main objectives and challenges of theorists and practitioners dealing with these issues (Kucharska-Stasiak, 2013).

6. Conclusions

Considering the conducted research, it should be noted that, while leasing is not the primary source of investment financing, it still plays an important role. In the European Union and Poland, leasing accounts for 13% and 14% of total investment outlays, respectively, during the analyzed period from 2016 to 2022. Therefore, the issue of valuation guidelines for leased components of real estate may be a substantial research topic, as it can have a significant impact on real estate valuation outcomes. The presented examples of petrol stations as commercial real estate valued using the profits method within the income approach proved this hypothesis. In the first case study, the 30% share of leased components in the total capital expenditures incurred on the petrol station (excluding land) corresponded to a 13% lower value of the station with leasing payments in comparison to the value excluding the leasing costs. In the second and third case study, the valuations with leasing payments were respectively 3% and 4% lower than without leasing (however, assuming a lower share of leased assets in the total asset value without land, these were respectively 6% and 16%). The literature on the subject indicates that the so-called acceptable margin of error amounts to 15% (meant as the difference between two valuations of the same object) (Kucharska-Stasiak, 2017). From this point of view, the valuation errors performed in the presented case studies are acceptable. However, it needs to be underlined that the valuation error depends on the share of leasing in financing capital expenditure (maximum share assumed in the case studies amounted to 30% of the investment). According to the first case study, if the share of leased components was changed by 5 percentage points, it would influence the valuation result by a further 2.1 percentage points (respectively for the second and third case study, by 2.4 p.p. and 1.3 p.p.). In extreme, hypothetical cases, when total capital expenditure was financed only by leasing, valuation error would amount to 42% in the first case study, and respectively 48.5% or 26% in the next two. In such a situation, the differences in valuations are significantly higher than the mentioned acceptable margin of error. The final conclusion which could be drawn on this basis states that the appropriate approach to leasing in valuation may have a significant impact on real estate value.

As a consequence, keeping in mind the commonly applied valuation standards which indicate the necessity to avoid any debt burdens, and on the other

hand to reflect any other obligation rights, valuers of such real estate face a dilemma on how to address the issue of leased assets, the ownership of which does not coincide with the owner of the main body of a valued property. It seems that the situation could be managed in two ways. The first possibility is to regard the leasing of components as a source of financing and to avoid its burden in the valuation. Secondly, leasing may be regarded as an obligation right and properly reflected in the valuation. Following the rule of conservative approach, the authors of this article believe that the second solution to the problem, i.e. regarding leasing as an obligation right in the same way as any other liabilities (e.g. tenancy), is the most appropriate valuation guideline in this respect.

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