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Proposal for a new approach to the specific valuation of buildings on foreign land with a concrete example

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Abstract
The right to build on someone else's land is a novelty in the real estate market. If the land is encumbered with a building right, the owner of the land must, according to the Civil Code, tolerate construction on or even below its surface. Such types of land are rarely traded on the market. The commonly used valuation method (direct comparison method) cannot be applied here. This paper therefore proposes a combination of commonly used methods in the field of real estate valuation, the application of which leads to the valuation of real estate with different ownership. The combination of methods includes the direct comparison method, the Naegeli method and the cost method of building valuation. In these cases, the Naegeli method can be used for valuation, which is used to calculate the price of building land according to location class. The method tracks the dependence of the price of land on the value of the building standing on it. It also takes into account the efficiency of land use and the surrounding environment. The aim of this article is to describe the use of a combination of methods for the specific valuation of a building on foreign land, which is located on foreign land with an example.

Keywords
Valuation methods, Cost method, Comparative method, Income method, Naegeli method

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Introduction

According to Gabrielli & French (2021), valuation is a process in which movable or immovable property is assigned a monetary equivalent. The equivalent in valuation is the price or value. According to Act No. 526/1990 Coll. (Czech Republic, 1990), a price represents the monetary amount agreed upon in a purchase or sale transaction, or an amount determined pursuant to a special regulation, specifically Act No. 151/1997 Coll. (Czech Republic, 1997). The price can be divided into several categories, which are the usual price, the ascertained price, the market price, the reproduction price and the acquisition price

Lester et al. (2017) state that a price agreement is an agreement on the price or the method by which the price will be determined, so that this method sufficiently determines the price. In normal business transactions, a price agreement is reached between the buyer, who pays the agreed price for the goods or services, and the seller, who requested the price. Act No. 526/1990 Coll. (Czech Republic, 1990) further stipulates that neither the seller nor the buyer may abuse their more advantageous economic position to obtain an unjustified property advantage. The procedure under this Act also applies to transfers and transitions of rights to real estate, including rights of use to real estate.

According to Domanižová et al. (2021), value is another term that can be encountered in real estate valuation. According to Zachariáš & Cockshott (2020), value is not the amount actually paid or offered, but expresses the monetary relationship between goods and services that can be purchased; this relationship arises between the buyer and the seller. Olajide et al (2016) state that, according to the economic concept, value expresses the utility and benefit to the owner of the goods or services on the date on which the value is estimated. Kornberger (2017) divides value into further categories, which are intrinsic, income or market value.

According to French et al. (2021), market value is the estimated amount for which the property or service should be exchanged on the date of valuation between a willing buyer and a willing seller in a commercial transaction conducted in accordance with the arm's length principle, after proper marketing, where each party acted knowledgeably, prudently and not under duress. According to Malaitham et al. (2020), the arm's length principle is understood to mean that the parties to the exchange are persons who have no special relationship with each other and act independently of each other. According to Das & Thappa (2018), the difference from the usual price is an estimate of the realisable market price for the property offered. Krulický et al. (2020) state that, unlike the usual price, market value can be calculated by assessing the intrinsic value (cost valuation), income value and price determined by comparison with the prices of similar items – real estate.

According to Vrbka (2020), the usual price is determined by comparing realised sales. This definition correlates with the definition of the usual price according to the commentary of the Ministry of Finance (O16 2022/03). The difference between the usual price and the market value therefore lies in the question of comparable samples, which in the case of the market price may also be offer prices on the real estate market in a commercial transaction that has not yet been concluded. On the contrary, according to Vrbka (2019), the usual price is based only on a statistical evaluation of sales that have already taken place - historical prices. The reproduction price of a property is the price at which the property could have been purchased or built in the period for which the property is currently being valued.

Literature review

Hromada and Krulický (2021) state that assets or real estate are valued using valuation methods which, according to Bogdanova et al. (2020), can be divided into three categories: cost, comparative and income methods. Sedláková et al. (2019), who dealt with valuation for squeeze-out purposes, describe that the most preferred methods are based on discounted cash flows of various types, which are based on the principle of the present value of the expected benefits generated by the asset. In the case of real estate, different valuation methods are based on different approaches to price insight. The application of essentially any of these methods should respect the principle of "Highest and best use" (Walacik et al., 2020), i.e. the principle of the highest and best use of the asset.

The cost method or real value method according to Yalpir & Unel (2022) shows the amount of current total costs that have been incurred or would have to be incurred to build the valued asset (e.g., for any building, these costs include the input materials, labour, funds associated with the start of construction, etc.). It therefore represents the cost of acquiring the building less depreciation, e.g. wear and tear on the property. It also takes into account specific influences, e.g. functional deficiencies, property, as well as general market influences, e.g. economic deficiencies of the property. The intrinsic value assesses the technical condition of the property being assessed, the costs of acquiring and using the property, and the useful life of the property. The cost method therefore only very weakly captures the relationship between the usual/market price of the property as a whole on the market and the market situation for comparable properties. It creates a price or value that has been invested in the property in the past or represents expenditure in such an amount for the acquisition of the property in the future.

Miotti & Loch (2021), who studied the comparative method, state that this method involves comparing the property being valued with other comparable properties that have been sold or are offered for sale on the market.

Comparable properties are defined as properties with similar or identical characteristics to the property being valued. According to Su et al. (2021), this is the most commonly used method, the essence of which is based on finding similar or identical samples that relate to the property being valued. The information and samples sought are obtained from property listings offered on the property market and also from actual prices that have been realised in the past.

For the purposes of the most accurate approximation of the valued and compared properties, according to Krulický et al. (2020), correction coefficients can be used to compensate for the influence of the most important price factors. Comparisons can be made in the form of direct and indirect comparisons, with indirect comparisons using a simulated means (e.g. a model property) for valuation. Whereas in a direct comparison, the links between the compared and valued properties are simulated and corrected directly. In addition, the comparison can be made in absolute terms or in relative terms (e.g. using the unit price per unit - 1 m^2). The comparison method directly represents the market situation for a given property on market and is used in relation to "valued property X similar (comparable) property" to make the comparison as relevant as possible. However, when comparing, it depends on the battery of comparable properties used for the comparative method.

According to Pile (2016), income methods perceive property valuation as a "black box" investment, which is expected to bring both financial and non-financial benefits to the investor in the future non-financial returns in the future. They therefore reflect the belief in the future benefits of the property for the owner-investor. This method is used in particular when an investor needs to determine whether a planned future investment is the most suitable for them and whether the investment they have decided on will bring the desired/economic return. Every informed investor considers three basic pillars when making an investment decision: time, risk and liquidity associated with the investment. Although the future benefit that the investor will derive from the holding is based on a qualified estimate of the future use of the property, the actual amount of the benefit may vary or is not guaranteed. It is therefore possible to encounter both negative and positive deviations from the original expectations. Van Vuuren (2016) states that the income approach is most commonly used in the valuation of commercial buildings, precisely because of their profitability. The aim was to describe the individual valuation methods and their rationale using inputs from a theoretical analysis of property valuation issues and to describe the method of valuing buildings located on third-party land.

Materials and Methods

The choice of valuation method is crucial for determining and understanding the price. Given that the properties under consideration are specific in nature in the sense of a single functional unit (a multi-generational house - a house in several houses, with commercial premises and a large garden), the properties under consideration must be valued separately.

First, it is necessary to appraise the family house with a reasonable garden area. Furthermore, due to the large area of the garden belonging to the family house, it is necessary to appraise the remaining garden area as a separate property. For the purposes of these appraisals, the direct comparison method will be used, whereby a sufficient number of suitable samples will be sought by analysing the database of completed sales managed by the Land Registry and analysing the property market in order to determine the price of the properties under consideration. The land under the family house has only one owner. For this reason, the replacement cost (material value) of the family house will be determined to take into account the fact that the land and the family house on it will be valued separately. Therefore, the replacement cost (real value) of the family house will be determined using Decree No. 441/2013 Coll. (Ministry of Finance of the Czech Republic, 2013) via NemExpress software, and the price of the land intended for development will be determined using the direct comparison method or the Naegeli method. This valuation method, developed by Swiss architect Wolfgang Naegeli, is used to calculate the price of building land based on liquidity class. This method therefore tracks the dependence of the price of land on the value of the building on it, taking into account the efficiency of the land and thus considering the surrounding environment. The first step is to define the aforementioned location classes, then determine the "Naegeli percentage" as an extrapolation of each class, and finally, after taking into account the reproduction costs of the building, draw a conclusion about the price of the land under the building and the price of the land in the functional unit. The price determined in this way is then verified by direct comparison.

Krulický et al. (2020) state that individual differences in the properties sought, which are used for comparison with the property model and are the reason for relative differences in asking prices, should be correlated by correlation coefficients K.

In comparative property valuation, differences between comparable properties and the subject property are commonly addressed through the use of adjustment coefficients that modify observed prices to reflect heterogeneity in attributes influencing market value. These coefficients are applied flexibly and are not standardised across valuation practices, as their number, designation, and magnitude depend on the valuer's professional judgement and the specific characteristics of the local market. Adjustments are typically introduced when price information is derived from asking prices rather than realised transactions, in order to account for

potential deviations caused by negotiation margins or market conditions, as well as when comparable price data differ substantially in time from the valuation date, thereby reflecting expected changes in market price levels. Further adjustments commonly address locational differences, taking into account factors such as proximity to urban centres, accessibility, availability of civic amenities, and overall suitability for permanent residence. Physical and technical characteristics are also considered, particularly differences in structural condition and building quality, including elements with long service lives that are costly to replace, while qualitative features such as equipment, ancillary buildings, and external improvements are reflected through additional adjustment factors. Finally, proportional differences in built-up area and land size are commonly adjusted to account for non-linear relationships between property size and unit price, capturing economies of scale in construction and maintenance, whereby larger properties tend to exhibit lower unit prices.

To value real estate using the NemExpress programme, the following indices and coefficients must be used. In this context, market conditions are captured through a composite real estate market index. Real estate market index is performed according to the formula:

$$I_T = P_6 * P_7 * P_8 * P_9 * \left(1 + \sum_{i=1}^{5} Pi\right). \quad (1)$$

Where:
P_1 is situation on the sub-market for real estate
P_2 is ownership
P_3 is changes in the environment affecting marketability
P_4 is impact of legal relationships on marketability
P_5 is other n.a.
P_6 is flood risk
P_7 is economic and administrative importance of the municipality
P_8 is location of the municipality
P_9 is municipal amenities.

Location index is performed according to the formula:

$$I_P = P_1 * (1 + \sum_{i=2}^{11} Pi). \quad (2)$$

Where:
P_1 is type and purpose of building use
P_2 is predominant development in the vicinity of the site and the environment
P_3 is location of the land in the municipality
P_4 is possibility of connecting the land to utility networks
P_5 is civic amenities in the vicinity of the property
P_6 is transport accessibility of the land
P_7 is public transport
P_8 is location of the site in terms of commercial accessibility
P_9 is population
P_{10} is unemployment
P_{11} is other impacts, not specified in detail.

The *pp* coefficient was then calculated using the formula:

$$pp = I_T * I_P. \quad (3)$$

Where:
I_T is real estate market index
I_P is location index

The actual valuation was performed by calculating the base price adjusted according to the formula:

$$ZCU = ZC * K_{VP} * K_4 * K_5 * K_{ZCS.} \quad (4)$$

Where:
ZCU is adjusted base price
ZC is base price
K_{VP} is attic utilisation coefficient

K_4 is building equipment coefficient
K_5 is location coefficient
K_{ZCS} is construction price accounting coefficient.

A linear method of calculating wear and tear, which assumes that wear and tear increases in direct proportion to time, from zero for a new item to 100% for an item at the end of its useful life.

Total wear in % using the linear method:

$$A_L = S * P_r = S * \frac{100\,\%}{Z} = \frac{S}{Z} * 100\,\% = \frac{S}{S+T} * 100\,\%. \quad (5)$$

Where:
AL is depreciation, wear
Pr is annual depreciation (% per annum)
A is age
T is period from the date of the decision to the expected end of useful life
Z is lifespan.

Annual depreciation is calculated using the following formula:

$$Pr = \frac{100\,\%}{Z} = \frac{100\,\%}{S+T}. \quad (6)$$

Then it is calculated as the remainder up to 100%:

$$TH = \left(1 - \frac{S}{Z}\right) * 100\,\%. \quad (7)$$

When determining comparative values, the weighted arithmetic mean is used to calculate correction factors, with the sum of the weights of the individual values giving the total weight. The calculation is performed by multiplying each value by its weight and then dividing the sum of the results by the sum of the weights of all values according to the formula:

$$\bar{X} = \frac{\sum_{i=1}^{n} w_i x_i}{\sum_{i=1}^{n} w_i}. \quad (8)$$

Where:
$\bar{x}$ is depreciation, wear
w_i is annual depreciation (% per annum)
x_i is age.

Results

For valuation purposes, an analysis of the real estate market was carried out, both for properties with price data, i.e. the database maintained by the Czech Real Estate Association, and for the real estate market represented primarily by advertising servers. Analysis price database maintained by the Land Registry showed that it did not contain sufficient and necessary samples to determine the usual price. However, it found a sufficient data base in the offer prices of advertising servers, which led to the determination of the market value. Due to slight differences between the properties under consideration, especially between detached houses and comparable properties, these differences were offset by the use of correction coefficients that capture differences in the main price factors (Tables 1, 2 and 3). The basic unit of conversion was the price per m² of built-up floor area.

The results are first presented for family houses. When determining the comparative value of a family house, the following correction coefficients were applied to the comparable samples found: K_0 - price reduction, K_1 - location, K_2 - structural condition, K_3 - equipment and accessories, and K_4 - size of the garden and built-up area. Table 1 shows a price comparison of houses with gardens.

The comparative value of the assessed house was determined as the product of the built-up area and the average adjusted unit price (359 m² * CZK 10,589/m² = CZK 3,801,451; rounded to CZK 3,800,000). The actual valuation (full price) was determined as the product of the total built-up area and the basic adjusted price (1,523.13 m² * CZK 4,726.42/m² = CZK 7,198,952.09). The price was then determined by calculating depreciation using the linear method, which resulted in the final price (rounded according to Section 50 of the Act on the Valuation of CZK 4,973,040. A general verification of the determined reference value was also carried out by analysing the market with already completed house sales. Information on the interior fittings, structural and technical condition

of the properties at the time of handover and other details are not available. Therefore, this verification was carried out as a general one.

Tab. 1. Comparison of prices of houses with gardens

ID	Price [CZK]	Built-up area [m²]	Unit price [CZK/m²]	K_0	K_1	K_2	K_3	K_4	Adjusted unit price [CZK/m²]
1	2,450,000	315	7,778	0.9	0.9	1.25	1.15	0.9	8,151
2	3,200,000	486	6,584	0.9	0.95	1.2	1.2	1.2	9,728
3	6,000,000	656	9,146	0.9	0.8	1	1.1	1.2	8,693
4	3,185,000	274	11,624	0.9	0.8	1	1.2	1	10,043
5	4,600,000	230	20,000	0.9	0.8	1.05	1	0.8	12,096
6	2,988,000	370	8,076	1.49	0.85	1.2	0.95	0.8	9,357
7	4,600,000	284	16,197	1.36	0.85	0.85	0.8	0.9	11,448
8	5,640,000	282.5	19,965	1	0.95	0.85	0.8	0.9	11,607
9	8,150,000	337.5	24,148	1.13	0.85	0.85	0.9	0.8	14,187
Average									10,589

In the subsequent part of the results, the comparative value of the land (garden) treated as a separate property was determined. When determining the comparative value of the land (for the valuation of the garden as a separate property), the correction coefficients K_0 - price reduction, K_1 - location, K_2 - possibility of use and K_3 - size were applied to the identified comparative samples. Table 2 describes price comparisons for the valuation of the garden as a separate property.

Tab. 2. Comparison of land prices

ID	Price [CZK]	Area [m²]	Unit price [CZK/m²]	K_0	K_1	K_2	K_3	Adjusted unit price [CZK/m²]
1	1,420,000	2,963	479.24	0.9	0.9	0.95	0.85	313
2	900	6,006	150.00	0.9	0.8	1.15	1.05	130
3	330,000	813	405.90	0.9	0.9	1.03	0.7	237
4	1,999,000	3,343	597.97	0.9	0.85	0.8	0.85	311
5	2,710,136	6,578	412.00	0.9	0.7	1.05	1.05	286
6	365,800	1,529	239.24	0.9	0.85	1	0.73	134
Average								235

The comparative value of the assessed land was determined as the product of the registered area and the average adjusted unit price (5,311 m²* CZK235/m²= CZK 1,248,085; rounded to CZK 1,250,000). The price determined in this way was then deducted from the valuation of the entire house.

The last part of the results presents the valuation of developed land. Unlike previous valuations, the value of the developed land was determined using the Naegeli method. The reason for this was the specification of the land, or rather its development (100%), where the building was owned by another owner. Similar types of land are rarely traded on the market, so according to Krulický and Vochozka (2021), it is not possible to use the direct comparison method. For this reason, the land was alternatively valued using the Naegeli method, and this calculation was subsequently verified using the framework comparison method.

The Naegeli valuation method of Swiss architect Wolfgang Naegeli is used to calculate the price of building land according to location class. Bradáč (2016) states that this method tracks the dependence of the price of land on the value of the building standing on it, taking into account both the efficiency of land use and the surrounding environment ( ). The first step is to define the individual location classes, then determine the "Naegeli percentage" as an extrapolation of each class, and finally, after taking into account the reproduction costs of the building, conclude the value of the land under the building and the value of the land in the functional unit.

For the purposes of calculating the comparative value of the land, the "Small Towns" calculation model was chosen. This method was used to determine the Naegeli percentage value, which was 5.70%. The average price per 1 m² determined by the Naegeli method was CZK 577/m², with the price of the land under the building calculated as the product of the built-up area and the price per 1 m² of built-up area (202 m²* CZK 2,154/m²= CZK 435,108; rounded to CZK 435,000).

Finally, the price of buildable land was verified, which served as an appropriate verification of the Naegeli method. When determining the comparative value of the land (for the valuation of the garden as a separate

property), the correction coefficients K_0 - price reduction, K_1 - location, K_2 - possibility of use and K_3 - size were applied to the samples, as in previous cases where the value was determined using the comparative method. Table 3 describes price comparisons for the valuation of of developed land.

Tab. 3. Comparison of building land prices

ID	Price [CZK]	Area [m^2]	Unit price [CZK/m^2]	K_0	K_1	K_2	K_3	Adjusted unit price [CZK/m^2]
1	720,390	1,221	590	0.9	0.98	1	1	520
2	832,020	1,698	490	0.9	0.98	1	1.05	454
3	399,430	677	590	0.9	1	1	0.75	398
4	980,000	680	1,441	0.9	0.7	0.95	0.75	347
5	761,150	1,171	650	0.9	0.8	1.3	1	608
6	977,600	1,504	650	0.9	0.98	1.1	1.05	662
Average								548

The comparative unit value of the buildable land was set at CZK 548/m^2. The above framework confirms the correctness of the conclusions and prices determined using the Naegeli method.

The market value of the assessed properties was determined from the relationship between the sum of the comparative value of the assessed house and the comparative value of the assessed land - garden (CZK 3,800,000 + CZK 1,250,000 = CZK 5,050,000), the difference and the sum of the comparative values of the assessed house and land and the price of the land under the building (CZK 5,050,000 - CZK 435,000 = CZK 4,615,000). Finally, a risk adjustment was made by multiplying the difference between the sum of the comparative values of the assessed house and land and the price of the land under the building (CZK 4,615,000 * 0.9 = CZK 4,153,500). The market value of the assessed properties as at the valuation date, after rounding, was therefore CZK 4,150,000.

Discussion

In the Czech Republic, property valuation is not a new economic tool (Sedláková et al., 2019). As Kabourková & Stuchlý (2019) point out, the value of land continues to rise. This may be the reason for the increased demand for investment in real estate.

Minárik (2015) states that the term "ownership" means a set of rights, each of which represents a different aspect of ownership. According to Minárik (2017), property rights generally define who has the right to decide on the use of certain property. In the case of the right to build on someone else's land, it is necessary to refer primarily to the Civil Code, which defines how construction on someone else's land should be handled.

According to Section 1242 of the Czech Civil Code (Czech Republic, 2012), the right to build is immovable property, and the building corresponding to the right to build is part of it. This also applies to immovable property. The right arises upon entry in the public register, i.e. the Land Register. The law further stipulates that if the right in rem encumbers the building or land, the building does not become part of the land if the right in rem continues to exist and if its nature precludes this. In cases where the builder waives the right to build, the owner of the encumbered land may, on the basis of documents proving this fact, transfer the right to build for the period that has not yet expired to himself or to another person.

The builder has a right of first refusal to the land and the owner of the land has a right of first refusal to the right to build. If there is another agreement between the two parties, this agreement shall be entered in the land register. According to Section 1084 of the Czech Civil Code, a building erected on another person's land belongs to the owner of the land. The owner of the land is obliged to reimburse the person who erected the building on another person's land in good faith, the costs incurred for this purpose. A person who was not acting in good faith has the same rights and obligations as an unbound agent.

Conclusions

Buildings on someone else's land are rarely traded on the real estate market. Since in most cases the owner is a different person, there was a need to describe how to value these properties. For this reason, the determination of the market value of the properties under consideration was divided into two parts - a house with a reasonable garden area and then the remaining garden area as a separate property. The market value of the house under consideration was CZK 3,800,000 and the market value of the land under consideration was CZK 1,250,000. The valuation did not include the land under the building, which was valued at CZK 435,000. The direct comparison method was used to value part of the land (garden), and the price determined in this way was also verified by an expert opinion prepared in Naegeli method (price per 1 m^2 other areas). The prices of the plots of land using the

Naegeli method were also verified using the direct comparison method. The resulting market value of the land was set at CZK 4,150,000. A contractual lien was established on the properties under review, and there was a dichotomy between the owner of the land and the building on it. It can be stated that in the event of future unification of ownership of the land and the building on it, these are medium-risk factors for future disposal of the properties.

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