

METHODOLOGY FOR DETERMINING THE RATE OF RETURN ON RENTAL OF BUILT-UP LAND

^aJAROMÍR VRBKA, ^bPETR JUNGA, ^cTOMÁŠ KRULICKÝ

Institute of Technology and Business, School of Expertness and Valuation, Okružní 517/10, 37001 České Budějovice, Czech Republic

email: ^avrbka@mail.vstecb.cz, ^b22879@mail.vstecb.cz, ^ckrulicky@mail.vstecb.cz

Abstract: Establishing the usual rent for a built-up land with different landowners and owners of the buildings standing on it is a very specific phenomenon that has been widespread in the past. The aim of our paper is to compile a valid methodology for determining the usual amount of rent for 2016 and verify this procedure on a model example. For the determination of the usual amount of rent for the use of built-up land in 2016, the so-called simulated rent method was used, which is based on the rate of performance of immovable properties. The immovable property performance for 2016 was set at 5%. The usual amount of annual rent for a model built-up land should be, according to the usual prices from 2016, CZK 33,809 according to the used method.

Keywords: usual rent, simulated rent method, built-up land.

1 Introduction

In the case of building that is classified according to section 2 and 3 (1) Act No. 183/2006 Sb. on land-use planning and building regulations, standing on land owned by a person other than the owner of the building, the rights of the land owner are restricted (Czech Republic, 2006). This contradiction in property rights arose on the basis of the old Civil Code No. 40/1964 Sb. which expired on January 1, 2014 and which allowed this different ownership without the need for mutual written agreement between the two parties (Czech Republic, 1964). In this case, the landowner is limited in the possibility of using his own property. The owner of a land cannot commence an activity in connection with his land which would give them any benefit from his property.

The new Civil Code seeks to significantly reduce this state of property relations, but refers to this possibility in Sections 1240-1256 by a regulation on the "right of construction". By this right the owner of the land allows the owner of the building to have this building located on his land. On the basis of this agreement, the landowner will allow the building on his land. When negotiating this agreement, the amount of compensation usually also in the form of a financial consideration corresponding to the rent for the land is usually negotiated. Also, this right to use the land through the right to build can be abandoned for non-financial consideration or completely free of charge. The construction right is negotiated for a definite period with a maximum duration of 99 years (Vrbka et al., 2019).

Usually, in the case of financial performance, the amount of compensation for the impossibility of using the land by its owner is determined by the comparative method. Today it is rather a rare case of ownership relations between the owner of the land and the owner of the building standing on it. For this reason, and also because of publicly unavailable information on this condition and other information on comparable lands under the building of another owner, it is very difficult to find a sufficiently large set of the same cases and thus determine the amount of consideration using the comparative method (Vochozka et al., 2019). In our paper we are therefore going to deal with the determination of rent for built-up land using the so-called Simulated Rent method, which should belong to the landowner as compensation for allowing the building on his land. In case of sale of this land, according to section 3056 Act No. 89/2012 Sb., the Civil Code, the owner of the building has the pre-emption right under the same conditions as any other candidate (Czech Republic, 2012). The aim of the paper is to compile a methodology on the basis of which it is possible to determine the amount of usual rent for built-up land for 2016. Pursuant to Section 629 (1) of Act No. 89/2012 Sb., the Civil Code, according to which the rent is subject to the statutory limitation period of 3 years, so 2016 is historically the latest

possible, when applying a retroactive claim for financial compensation for allowing the building of a foreign owner on his land. (Czech Republic, 2012).

Our methodology will then be applied to a model case where the rent for a built-up area of 90 m² will be determined. One of the requirements for the methodology is its applicability to the whole territory of the Czech Republic, possibly also to other countries of the world. Due to the possibility of comparison, the price per 1 m² of this land will be considered as the basic conversion unit, either in the form of rent or the usual price of the land. Subsequently, we are going to verify the correctness of the unit price per m² of land we have found by confronting with regulation No. 441/2013 Sb. to implement the Act on Valuation of Assets, which in Annex No. 22 sets the rate of return according to individual types of immovable property.

2 Literature research

Soil is a key factor in spatial planning (Honová, 2009). This is a very limited production factor, particularly in some suburban areas (Ding, Lichtenberg, 2011). For this reason, great attention should be paid to methods of determining its value, especially in urban areas. It is necessary to realize that land is not a product of any production process, and by placing a building for any purpose, the whole of these possession is consumed at least until the life of the building (Torres, 2015).

For any type of land use it is possible to rent or lease it. In the case of land lease, the landowner leaves the land to the tenant for use and he pays the rent for it or gives him part of the proceeds (Brabenec, 2010). It is possible to lease agricultural land, plant or inventory (Czech Republic, 2012). On the other hand, the building plots, which were intended for the construction of buildings by the city plans, are rented. According to Rymanov (2017), it is possible to reduce the financial compensation for the use of agricultural land by reducing taxes on labor and capital. A reduction in those taxes could, in his view, offset the differences in the amount of the rent between the different plots of land with different characteristics which contribute to the formation of the rental price.

According to annual reports on the land market from farmy.cz portal, the price of agricultural land has been increasing in recent years. Since 2016 its price per m² has risen from CZK 20.41 to CZK 24.1 (between 2016 and 2017, the price per m² of agricultural land increased by 15.2% and between 2017 and 2018 by 2.4%) (farmy.cz, 2017, 2018, 2019). This is positive for the landowner, but very negative for the landlord.

The increase in rent for agricultural land is also responsible for increasing its average productivity by applying fertilizers or making it more efficient using more modern technologies. At this point, its value will increase along with demand. This claim was confirmed by Schadeva et al. (2016), which followed the development of land rentals in 1997-1998 and 2010-2011.

According to a study conducted in one of the larger German cities, the post-fordist urban hierarchy allows landowners to treat the land as a net financial asset. In this respect, this German city is above the average of all European cities. Rental of these immovable properties ensures their owners above-average income. In particular, in this German city, the increase in the income from the rent of land in the boroughs began to be most pronounced in the early 1990s (Schipper, 2013).

Tideman and Plassman (2018) state a high-quality transport network increases the value of construction in an urban environment. In critical cases, according to the authors, it may happen that the value of the building falls below the cost of its construction, which is a very negative phenomenon. This is said to be the case when the owner and landlord of the space in a

particular building is forced, for example, due to the concept of the city development plan, which significantly affects the attractiveness of its building in terms of transport services, reduce the amount required for selling or renting the building.

Krulický and Horák (2019) determined the rate of return on investment into an immovable property in the Czech Republic through long-term lease. They set the return on this investment into an immovable property to 3.58%, which does not include expected inflation as well as the potential increase in property value over time. With the usual expected annual rate of inflation in the Czech Republic, they set the overall rate of return at 5.58%. It is important to note that the immovable property itself does not lose its value in regular and proper maintenance, but its value is increasing. If such an immovable property is used by the owner for rent, its revenue from that property together constitutes two components. The first component is the financial performance received from the tenant for its use. The second and often neglected part of the return is the increasing value of this immovable property over time. This statement is supported by the fact that if a landowner owning a building has acquired its immovable property in the past and suddenly decides to sell it all over time, it would collect a higher amount of money for it than its purchase price. It is the difference between the purchase price and the subsequent sale of an immovable property that forms its second income component (Jakoubek and Brabeneč, 2012).

Demetriou (2016) used an automatic valuation method for land valuation. It is a method that determines the value of a plot based on an artificial neural network (ANS). Based on the input data, the market value of a particular valued land is then determined. The real benefit of this paper is the connection of this artificial neural network with GIS systems. On the basis of that interconnection, the market value of any land can be determined by that method. Also Tayfur et al. used ANS to determine the amount of rent for land or building. (2014). ANS created by him estimates real the prices of immovable properties on the basis of natural disasters affecting the area of interest (earthquake, typhoon, etc.). It is clear from these claims that these disasters have a very significant impact on the level of rents. He also reminds that this ANS is also useful in designing the expansion of urban areas. With this approach, further urban development can be streamlined so that in the event of a natural disaster, the collapse of one building does not cause the collapse of other surrounding buildings, thus minimizing the financial and life losses of the affected population.

According to Yaygir and Hacikoylu (2018), the provision of revenue-generating services in commercial buildings increases the attractiveness of the entire site for entrepreneurs, investors and, last but not least, for clients using these services. These services usually help to expand the locality's civic amenities. At the same time, the attractiveness of a particular site will increase the value of neighboring plots. If this happens, the landowner should be entitled to a higher financial benefit from the lease of the land. Usually, however, the amount of the lease is fixed for a certain period of time and cannot be manipulated by the owner in any way. In this context, there is also the question of the course of use of buildings in the city center in the longer term. Chang (2016) recalls that with evolution, the society is demanding more and more new types of services and, as there is no more space for the construction of other buildings in the urban area, the existing building needs to be refurbished to provide other (new) kind of services or production of modern products.

Rebelo (2009) discussed the value of land on the basis of the usual selling prices of land by the municipal authorities. She subsequently modified these required amounts on the basis of the decision on the location of public and private activities on neighboring plots according to the city's development plan. She also observed the mutual characteristics between the building and land markets. Based on this, she prepared models that should be followed by real estate agents in determining the value of the land offered. Albouy et al. (2018) note the value of land in urban areas increases with the size of the city, as well as the value of agricultural land on the outskirts.

Kvíčalová et al. (2014) dealt with the economic level of households in various regions of the Czech Republic. In connection with this, the prices of rental and sale of immovable properties differ in particular regions and especially in their regional cities. Based on her findings, she states that using the Pearson correlation coefficient, she concludes that there is a high link between the various variables indicating the economic situation of the population in specific regions. She thus concluded that the GDP index has the greatest impact on the price formation of possession in the region. This is related to the difference in prices for the sale or rental of immovable properties.

Oertel et al. (2019) claims that, recently, due to the favorable economic environment in the US market with immovable properties, such properties have become the target of many European investors. The return on these properties is very lucrative for European investors. The European investor will earn more from renting an immovable property in the US than from an immovable property in Europe. It also appears that the risk of return on investment into an immovable property in the US is lower than in Europe. For this reason, they also claim that European investors are showing an increasing interest in investments in this direction. Srivatsa and Lee (2012) dealt with the convergence of rental and immovable property income in European countries. When the single currency (€) was adopted, it was possible to compare rental rates and rental income in different European countries. Sigma-convergence in rents and returns in individual European countries is very significant. Unfortunately, beta-convergence could not be determined. Lima Jr. and De Alencar (2008) conducted research in the same area. In their case, it was the attractiveness of investment for US investors in immovable properties in South American Brazil. Overall, they consider investment from the US as a very profitable type of investment. They add that in the Brazilian market with immovable properties, a US investor can earn higher returns than investment on the domestic real estate market.

Given the nature of the land as a specific production factor, special consideration should be given to its valuation when necessary. In many cases there is a high demand to determine its most accurate value. Over time, the value of this production factor also varies depending on many circumstances. The methods described above for determining the value of the land based on ANS and GIS (Demetriou, 2016), comparative methods based on data from various relevant sources (Rebelo, 2019; Albouy et al., 2018) and using the Pearson correlation coefficient (Kvíčalová et al. 2014) are not applicable to our specific case. These methods are always based on a large set of readily available data, from the perspective of the property relations of the land and the buildings on it. However, our specific case is rather rare, because at present we rarely encounter a situation in which a different landowner and an owner of the buildings standing on it are present. This type of ownership relationship is currently a remnant of the legislation that is no longer valid and therefore it is not possible to determine the value of our model land using any of the above methods. So we approach our very specific research question using our own land value method.

3 Materials and methods

Recent trends in the valuation field perceive valuation as a search for the shortest interval in which the resulting search value should fluctuate. The extent of the resulting interval then depends on the quality and quantity of the input data used, and ideally, it should be a determination of one particular value at a predetermined interval. At the beginning of any valuation, the searched value can range from $-\infty$ to $+\infty$ and by professionally selected methods, this interval narrows. The first step will be setting the lower and upper limits of the search interval.

The lower limit of the searched interval will be set at CZK 0 / m². It is not assumed that there will be a negative benefit to the landowner, that is, the landowner should provide the owner of the building some financial performance. The land would also

suffer from a negative benefit even if the land yielded less benefit to its owner than is spent on its ownership. This is the case, for example, when spending large amounts on greenery maintenance. However, it cannot be assumed that the land in question brings negative benefits to its owner if the land is in a single functional unit by its non-standard standard. On the other hand, because of the limited land in the vicinity (the city center of Pilsen), the land benefits its owner in the form of a free area (garden) to the house and brings the possibility of commercial use – for example establishment of an outdoor terrace, commercial and restaurant premises, etc.

The upper limit of the search interval will be determined in the amount of rent for commercial premises - restaurants in Pilsen. It is possible to assume that the rent for the use of these premises, ie the use of the building, already includes the rent for the use of the land under the building. In the vast majority of cases, the ownership of land and buildings standing on it is unified, and therefore a similar intellectual distribution of rent for construction is rather a neglected fact and the landlord (the owner of the building and land) requires a cumulative return on both immovable properties. However, if this ownership is different, it can be concluded that the upper limit of the sought interval is just the rent required for the use of the entire building, incl. land. The upper limit of the interval will be determined by the comparative method.

As mentioned above, the so-called simulated rent method will be used to determine the rent, which should be within a defined interval. For its application it is necessary to determine the usual price of the land in question and to set a reasonable rate of return. The usual price of the land will be determined by the comparative method. The rate of land yield will be determined using causally-intuitive methods.

To determine the upper limit of the search interval, we will have a set of data on renting buildings with the same type of use from the same location in Pilsen, where our model land is located. The data are going come from real estate advertising servers. It should be noted, however, that due to the availability of data, we are forced to work with data from 2019, so it is reasonable to assume that the rental prices were lower in 2016 which does not pose any problem for the determination of the upper limit of the search interval for the building lease. Since this will be a heterogeneous set of data, we will have to convert it to the unit price for renting 1 m² of space so that we can then use the comparison method to determine the upper limit of the search interval. Since it will be a fully built land, the amount of its rent will be based on the amount of rent for the building on it. For the final determination of the upper limit of the search interval we use the mean value of the obtained data. Table 1 represents the amount of monthly rent for immovable properties with the same use in this location and their area.

Tab. 1: The amount of rent for the use of buildings of the same type of use with floor area

Number of offer	Monthly rent	Area (m ²)
1	CZK 42,000	119
2	CZK 66,200	331
3	CZK 30,000	119
4	CZK 39,000	160
5	CZK 23,500	129
6	CZK 15,000	50

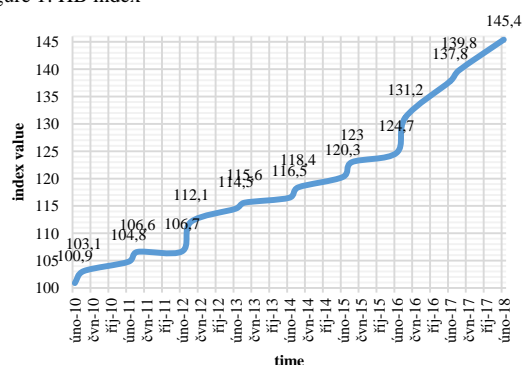
Source: Own

As outlined above, it will be necessary to determine the usual price of the land in question for the application of the simulated rent method. To determine the usual price of land, we will use a comparative method of all available data on the land sales made in this city. Since the data on land sales prior to 2016 represented a very small set of data to determine the usual price of the land in question, we had to base our data on sales made in the 2014-2018 period. This can only be assumed that data from years other than 2016 will be adjusted with regard to the development of the price of immovable properties which is expressed by the

HB index. After finding out the final prices for which the sale of land has been made in this period, the individual price per 1 m² will be calculated based on their area. Although the considered lands are located in the cadastral area of the city of Pilsen, their value will be influenced by other pricing factors. It will therefore be necessary to correct individual prices. This correction will be made by using four coefficients marked K₀ up to K₃. These coefficients are size coefficient (K₀), location coefficient (K₁), coefficient of utilization and utilization rate (K₂) and price adjustment factor (K₃). The size coefficient (K₀) expresses the influence of the size characteristics of the land on the unit price. In case of size characteristics, this is an expression of generally observed dependency according to which the unit price decreases as the acreage increases. The site coefficient (K₁) expresses the suitability and attractiveness of the location of the assessed and compared lands. The locations closer to larger settlements, with good transport links and civic amenities, are rated as more attractive. The coefficient of utilization and utilization rate (K₂) takes into account the possibilities of land use in terms of the documentation of territory planning, size and shape characteristics for the construction project.

The price adjustment coefficient (K₃) is applied when the sale of a comparable immovable property was made more than one year later than the year (2016) in any course of time, i.e. older or even younger business cases. In our case, we therefore have to use this coefficient, which reflects the development of the prices immovable properties and is based on the HB index. The HB index is based on real estimates of market prices of individual immovable properties that have been financed through the bank (hypotecnibanka.cz, 2019). The HB index is constructed using a hedonic model that monitors up to 30 different property parameters, dividing immovable properties into three groups, namely apartments, houses and lands. Figure 1 shows its development for land.

Figure 1: HB index



Source: Mortgage Bank, 2018.

After obtaining such adjusted prices for these lands, a median calculation will be made to remove the extreme values on both sides of the price scale. This median will therefore represent the usual price of the land in question by applying the comparative method. The list of completed sales of land is shown in Table 2.

Tab. 2: The list of usable lands for construction from the time period of 2014-2018 for the determining of the unit price for the land in question

Sale No.	Sale price	Acreage (m ²)
1	3,725,000 CZK	790
2	11,742,000 CZK	1,957
3	2,912,000 CZK	208
4	350,000 CZK	86
5	5,025,000 CZK	1,005
6	3,150,000 CZK	451
7	4,500,005 CZK	238
8	3,928,500 CZK	428

Source: Own

In total, eight cases of completed sales as well as currently offered lands for building on sale have been found, which we could use.

We will further discuss the determination of a reasonable rate of performance achieved by immovable properties in 2016. The performance of an immovable property is an annual percentage of the property's return in relation to its price, the so-called yield.

From a purely business point of view, renting a land means for a landlord a lower level of risk in comparison to renting a building. There are usually higher operational costs of buildings, while these costs are minimal in case of a built-up land. The same applies to the risk of damage or theft by the tenant. Yield values are published by international real estate agencies and consulting or investment companies. These companies usually report yield values for different types of immovable properties. As an example, we will show some of the graphs showing the development of the yield value in the Czech Republic (Figures 2 and 3).

Figure 2: the development of the yields of immovable properties in the Czech Republic in the period of 2005-2017 according to BNP Paribas

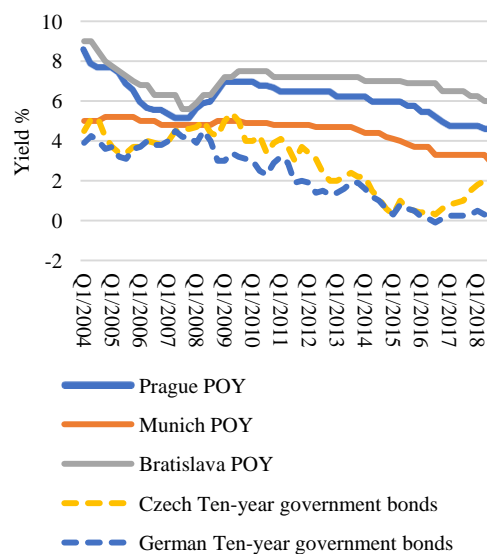


Source: BNP Paribas Real Estate, 2017

According to BNP Paribas (2017), prime yield in all real estate segments fell by 0.8 pp to below 5% for office space during 2016. The yield of shopping and retail space decreased by 0.4 pp to 5% during 2016, and the storage space yield fell by 0.75 pp to 6%.

REICO of Česká Spořitelna a.s. is a 100% daughter company of Česká Spořitelna a.s. that is a member of an multinational Erste Group AG. REICO deals with investments into immovable properties and property market analysis and publishes information about acquired yields of immovable properties. REICO holds CSNF – Česká Spořitelna property fund, which is one of the oldest immovable property funds in the Czech Republic, and registers properties in the Czech Republic, Slovakia and Poland. According to their study, “Prime Office Yield” was around 5.5% in the second half of 2016 and was in a decline. The historical development of Prime Office Yield is shown in Figure 3.

Figure 3: Development of property yield in the Czech Republic in the period of 2004-2018 according to REICO



Source: REICO, 2019

Another internationally recognized real estate agency is the CBRE multinational group. According to its report on the immovable property market in 2016, the yield of office space in Europe was around 4.5% (CEE, 2017). Moreover, companies such as the DRFG investment group, the Deloitte and KPMG advisory groups and Duff & Phelps are also involved in determining yield levels.

In terms of investment into an immovable property, the rate of business risk is of great importance to the investor. The business risk is determined by the Ministry of Industry and Trade for individual business activities in the Czech Republic. The data published by the Ministry of Industry and Trade (2017) are used to calculate the amount of costs using the modular method, one of the components of the cost of equity is a premium for a business risk. The premium for business risk (marked as r_{pod}) expresses the level of risk depending on the field of business activity or the prevailing field of business and is determined for individual branches of the economy classified by CZ-NACE. The activity of landlords, real estate agents or brokers is in the field of L – real estate activities. According to the Financial Analysis of the Corporate Sector for the year of 2016 in the section of CZ Nace L Group – real estate activities, the premium for business risk (r_{pod}) of the whole business sector was 4.19%.

At this stage of our research, all the necessary data are available to determine the simulated rent for this type of built-up land in the required year. The simulated rent reflects the assumption of validity of a certain link between the usual price of the object lease and the required rent. The simulated rent is calculated from the formula No. 1.

Formula No. 1: the calculation of simulated rent

$$\text{usual price} * \text{rate} = \text{simulated rent} \quad (1)$$

Subsequent multiplication of the calculated amount of simulated rent by the acreage of land gives the resulting amount of simulated rent for built-up land in 2016. This value will therefore correspond to the potential yield for the owner of the built-up land. It will be an adequate amount of financial compensation for preventing the disposal of their land for the purpose of generating revenue in 2016.

Since there is a regulation (Czech Republic, 2013) concerning the method of valuation of assets in the Czech Republic, we will use this regulation to verify the accuracy of the calculation

according to the methodology we propose. This regulation takes into account three indices when determining the usual price of land. The Real Estate Market Index (I_T), Land Position Index (I_p) and Restrictive Index (I_o), will be calculated according to the relevant formulas in this regulation. Pursuant to Section 4 (1) of regulation No. 441/2013 Sb. the basic price will be set for one m^2 of this type of land according to formula No. 2 (Czech Republic, 2013).

Formula No. 2: The total index I

$$I_T * I_p * I_o = \text{total index I} \quad (2)$$

4 Result

On the basis of the methodology, the upper limit of the rent valid for 2019 is set first. The resulting value is calculated according to Table 1 (see above). By dividing the required rent by the floor area of similar restaurant facilities, we have obtained the results shown in Table 3. A total of six offers have been found on the advertising servers of real estate agencies to rent similar buildings in the West Bohemian metropolis, where our model land is located.

Tab. 3: The evaluation of the rent in a restaurant facility

Offer No.	Monthly rent	Acreage (m^2)	Rent per unit (CZK/ m^2)
1	42,000 CZK	119	353
2	66,200 CZK	331	200
3	30,000 CZK	119	252
4	39,000 CZK	160	244
5	23,500 CZK	129	182
6	15,000 CZK	50	300
Mean value			255

Source: Own

The mean value of these rents is determined on the basis of the results of unit prices per m^2 of rented buildings used for restaurant and catering activities. On the basis of our calculation it can be stated that the upper limit of the rent per unit price per m^2 of our model land is 255 CZK / m^2 . Subsequently, eight plots of land have been found which were either sold in the past or are currently being offered for sale. The final sale price was monitored in case of already completed sales; the current sale price and the area of the land in offer were monitored as well. Using these two figures, the usual unit price per m^2 of land, which had been sold or offered, was determined again. Table 4 shows a list of completed sales and current offers of land. Table 4 also shows the correlation coefficients $K_0 - K_3$ used to correct the unit price of each land. The last column of Table 4 represents the adjusted unit price per m^2 of land according to the correlation coefficients. The last column of Table 4 represents the adjusted unit price per m^2 of land according to the correlation coefficients.

Tab. 4: The determination of the usual price of lands usable for construction

Sale price (CZK)	Acreage (m^2)	Unit price (CZK/ m^2)	K_0	K_1	K_2	K_3	UJC* CZK/ m^2
3,725,000	790	4,715	1.08	1	0.9	1	4,583
11,742,000	1,957	6,000	1.15	1	1	0.88	6,072
2,912,000	208	14,000	1	1.05	1	0.94	13,818
350,000	86	4,070	1	1.1	1	0.94	4,208
5,025,000	1,005	5,000	1.1	1.05	1	1	5,775
3,150,000	451	6,984	1.05	1.1	1	1.11	8,954
4,500,005	238	18,908	1	1.1	1	1.07	22,254
3,928,500	428	9,179	1.05	1.05	1	1	10,120
Median							7,513

*UJC – adjusted unit price

Source: Own

To remove the extreme values at both ends of the price scale, the median of all obtained adjusted unit price values per m^2 was calculated. The median was set at CZK 7,513 per m^2 .

On the basis of publications issued by domestic and foreign institutions, the percentage yield on an immovable property was determined. The yield of Czech immovable properties in 2016 ranging from 4-6% was consistently confirmed by the surveyed studies of investment and consulting companies. Based on the available data and economic theories we determined the yield value in this interval. According to ARTN (2017), publishing BNP Paribas results, the prime yield in 2016 fell to just below 5%. In 2016, the DRFG (2018) recorded a 5.04% yield on investment in immovable properties. According to REICO, the value of yield in the second half of 2016 was 5.5% and was in decrease (REICO, 2019). CBRE set the yield value in the Czech Republic for 2016 at approx. 4.5% (CBRE, 2017). The advisory group Deloitte and KPMG set the yield value in 2016 at 5.25% (Deloitte, 2019) and approx. 5% (KPMG, 2016). Duff & Phelps set the yield for 2016 at 4% (Duff & Phelps, 2017). These determined yield values are usually based on the rent of the building, including its land, where the risks from the rent are higher.

According to the Ministry of Industry and Trade (2017), the risk of own business activity in the economic sector of the business with immovable properties was assessed at 4.19%. Thus, the adequate business yield to cover the business risk in the sector, which the entrepreneur voluntarily undertakes to do business in this market, was just 4.19%.

Based on this data, using causally-intuitive methods and risk analysis for the owner of a land under construction, such as the risk of theft, destruction or depreciation of the land, which range from low to moderate in terms of probability and impact, we consider the mean value of immovable property yield of 5.0% for the final calculation of simulated rents. It is necessary to state that all companies dealing with yield values report that the value of the yield in the Czech Republic declined quite steeply in 2016 for all types of immovable properties according to their use.

The final amount of the usual rent for one m^2 of built-up land for the calendar year 2016 was determined by the use of a simulated rent according to the relation given in the methodological part of the contribution. The calculation according to the formula No.1 is the following:

$$7,513 \text{ Kč} * 5.0\% = 375.65 \text{ CZK} \quad (3)$$

Subsequently, it is necessary to multiply the determined value by the acreage of the land. The acreage is 90 m^2 . The final calculation is in the following form:

$$375.65 \text{ CZK} * 90 \text{ m}^2 \doteq 33,809 \text{ CZK/year 2016} \quad (4)$$

The usual amount of annual rent for a built-up land should be 33,809 CZK according to the usual prices from 2016 according to the simulated rent method.

However, it is necessary to realize that this yield at the value of the above mentioned 5.0% is only for the renting of the land itself, the value of which is determined by the building standing on it. The secondary yield from this land is an increase in its value for its owner in the long term. If the landowner decides to stop renting his land and sell it to the landlord under a pre-emptive right or to another person, he will undoubtedly receive a higher financial performance for it than he had paid when he initially acquired it. This fact is often neglected in the literature. The total economic return on the land is therefore greater in the course of time. It is mentioned for example by Krulický and Horák (2019).

In order to verify the accuracy of our calculation and the applicability of our proposed rent calculation methodology by the use of the simulated rent method, our results have been compared with regulation No. 441/2013 Sb. Pursuant to Section

4 (1) of this regulation, the basic price of this type of land was set at CZK 5,550. The immovable property market index was 1.010, the land location index was 1.340 and the restrictive index was 1.000. The total index is equal to the product of all three indexes. The calculation of the total index is done according to the formula No.2.

$$1.010 * 1.000 * 1.340 = 1.353 \quad (5)$$

Subsequently, the base price of this land was multiplied by the total index I to determine the land price. After multiplying by the total index we got the determined price of land in the amount of 7,509.15 CZK/m² (based on our methodology set at 7,513 CZK / m²). It can therefore be claimed that a very similar value of the land can be obtained by applying the procedure of the determining of the usual price of land that is usable for building when the correlation coefficients are employed.

The unit monthly rent for one m² of our built-up land is 31.3 CZK / m² (375.65 CZK / 12 = 31.3 CZK). Given the location of the compared lands, which are located in the wider centre of the West Bohemian metropolis, it can be stated that the amount of annual rent of the model built-up land set by us is adequate.

5 Conclusion

Our paper describes the methodology proposed by us for calculating the usual amount of rent for a built-up land with a different owner than the owner of the building standing on this land for the period of 2016. In our methodology we described all the steps that had to be taken before applying the simulated rent calculation method itself. This was a very specific case of determining the amount of rent for a land. Due to the nature of the model land it was not possible to use the standard comparison method to determine the rent. The whole methodology was applied to a model case that reflects the aforementioned ownership relationships. Our calculations were confronted with the regulation No. 441/2013 sb. (Czech Republic, 2013). Our proposed methodology is applicable throughout the Czech Republic. Unit monthly rent was also determined. All the objectives of the paper were thus met.

It is also worth remembering that institutions determining immovable property yield also monitor foreign markets with immovable properties. When obtaining this data for a particular country, it is certainly possible to apply our methodology to other countries. The paper thus significantly contributed to the professional discussion on the topic.

Literature:

- Albouy, D., Ehrlich, G., Shin, M.: Metropolitan Land Values. *Review of economics and statistics*. 2018, 100(3), 454-466. ISSN 0034-6535.
- ARTN, Analýza investičního trhu v roce 2016 [Analysis of the investment market in 2016]. [online] 2017. Available at: <http://artn.cz/analiza-investicniho-trhu-v-roce-2016/>
- BNP Paribas, Vývoj výnosových měr (%) [Yield rates (%)]. [online] 2017. Available at: <http://artn.cz/analiza-investicniho-trhu-v-roce-2016/>
- Brabenec, T.: Some entity-level discounts used in mergers and acquisitions. *Managing and Modelling of Financial Risks – 5th International Scientific Conference Proceedings*. 2010, 29-36.
- CBRE, CEE Research Retail Report. [online] 2017. Available at: <https://www.cbre.lv/wp-content/uploads/2017/06/CBRE-CEE-Research-Retail-Report.pdf>
- Czech Republic, Statute No. 40 ze dne 26. února 1964, občanský zákoník. *Sbírka zákonů České republiky*. 1964, part 19, 201-248. ISSN 1211-1244 [Statute No. 40 of 26 February 1964, Civil Code. Collection of laws of the Czech Republic. 1964, part 19, pp. 201-248. ISSN 1211-1244].
- Czech Republic, Statute No. 89 ze dne 3. února 2012, občanský zákoník. *Sbírka zákonů České republiky*. 2012, part 33, 1026-1365. ISSN 1211-1244 [Statute No. 89 of 3 February 2012, Civil Code. Collection of laws of the Czech Republic. 2012, part 33, 1026-1365. ISSN 1211-1244].
- Czech Republic, Statute No. 183 issued 14. March 2006, o územním plánování a stavebním řádu. *Sbírka zákonů České republiky*. 2006, part 63, 2226-2290. ISSN 1211-1244 [Statute No. 183 issued on 14 March 2006, on land-use planning and building regulations. Collection of laws of the Czech Republic. 2006, part 63, pp. 2226-2290. ISSN 1211-1244].
- Czech Republic, Statute No. 441 issued 17. December 2013, k provedení zákona o oceňování majetku (oceňovací vyhláška). *Sbírka zákonů České republiky*. 2013, part 173, 7422-7611. ISSN 1211-1244 [Statute No. 441 issued December 17, 2013, to implement the Act on Valuation of Assets (Valuation Decree). Collection of laws of the Czech Republic. 2013, part 173, pp. 7422-7611. ISSN 1211-1244].
- DELOITTE, Zpráva o transparentnosti za rok 2018 [Transparency Report 2018]. [online] 2019. Available at: <https://www2.deloitte.com/content/dam/Deloitte/cz/Documents/audit/Zprava-o-transparentnosti-Deloitte-Audit-2018-CZ.pdf?nc=1>
- Demetriou, D.: GIS-based automated valuation models (AVMs) for land consolidation schemes. *6th International Conference on Cartography and GIS*. 2016, 43-51. ISSN 1314-0604.
- Ding, C. R., Lichtenberg, E.: Land and urban economic growth in China. *Journal of regional science*. 2011, 51(2), 299-317. ISSN 0022-4146.
- DRFG, Investujte do komerčních nemovitostí v ČR [Invest in Commercial Real Estate in the Czech Republic]. [online] 2018. Available at: <https://czech-fund.cz/wp-content/uploads/2019/01/CREIF-report-2018-12.pdf>
- DUFF & PHELPS, European Real Estate Market 2016 [online] 2017. Available at: <https://www.duffandphelps.com/-/media/assets/pdfs/publications/real-estate-advisory-group/real-estate-market-report-2016-europe.ashx>
- FARMY.CZ, Zpráva o trhu s půdou [Land Market Report]. [online] 2017. Available at: <http://www.farmy.cz/dokumenty/ZPRAVA-o-trhu-s-pudou-FARMYCZ-leden-2017.pdf>
- FARMY.CZ, Zpráva o trhu s půdou [Land Market Report]. [online] 2018. Available at: <http://www.farmy.cz/dokumenty/ZPRAVA-o-trhu-s-pudou-FARMYCZ-leden-2018.pdf>
- FARMY.CZ, Zpráva o trhu s půdou [Land Market Report]. [online] 2019. Available at: <http://www.farmy.cz/dokumenty/ZPRAVA-o-trhu-s-pudou-FARMYCZ-leden-2019.pdf>
- HYPOTECNIBANKA.CZ, HB Index [online] 2019. Available at: <https://www.hypotecnibanka.cz/o-bance/pro-medi-a/hb-index/zvysovani-cen-bytu-zpomaluje-v-prvnim-letosnim-ctv/>
- Chang, T. C.: New uses need old buildings: Gentrification aesthetics and the arts in singapore. *Urban studies*. 2016, 53(3), 524-539. ISSN 0042-0980.
- Jakoubek, J., Brabenec, T.: Aspects of intangible property valuation in intra-group financial management. *Managing and Modelling of Financial Risks – 6th International Scientific Conference Proceedings*. 2012, 277-289.
- KMPG, European Real Snapshot! [online] 2016. Available at: <https://assets.kpmg/content/dam/kpmg/ch/pdf/ch-european-real-snapshot-autumn-2016-en.pdf>
- Krulický, T., Horák, J.: Real estate as an investment asset. *Innovative Economic Symposium 2018 – Milestones and Trends of World Economy (IES2018)*. 2019, 9. ISSN 2261-2424.
- Kvičalová, J., Mazalová, V., Široký, J.: Identification of the Differences between the Regions of the Czech Republic based on the Economic Characteristics. *Procedia Economics and Finance*. 2014, 12, 343-352. ISSN 2212-5671.
- Lima J. R., De Alencar, C. T.: Foreign investment and the Brazilian real estate market. *International Journal of Strategic Property Management*. 2008, 12(2), 109-123. ISSN 1648-715X.
- Mortgage Bank, HB index: Nemovitosti dále zdražují i přes klesající poptávku [Real estate prices continue to rise despite falling demand]. [online]. 2018. Available at: <https://www.hypotecnibanka.cz/o-bance/pro-medi-a/hb-index/nemovitosti-dale-zdrazuj-i-pres-klesajici-poptavk/>
- Ministry of Industry and Trade, Finanční analýza podnikové sféry za rok 2016 (tabulky) [Financial Analysis of the Corporate Sector for 2016 (tables)]. [online] 2017. Available at: <https://www.mpo.cz/assets/cz/rozcestnik/analyticke-materialy-a-statistiky/analyticke-materialy/2017/5/Tabulky2016.xlsx>

27. Oertel, C., Gütle, T., Klisa, B., Bienert, S.: US real estate as target assets for European investors: New empirical evidence of diversification benefits. *Journal of Property Investment and Finance*. 2019, 37(4), 398-404. ISSN 1463-578X.
28. Rebelo, E. M.: Land economic rent computation for urban planning and fiscal purposes. *Land use policy*. 2009, 26(3), 521-534. ISSN 0264-8377.
29. REICO, Realitní trhy & ČSNF: Aktuální situace a výhled 2019. XVIII. Ročník odborné konference Real Estate Market Spring 2019 [Current situation and outlook 2019. XVIII. Annual professional conference Real Estate Market Spring 2019]. [online] 2019. Available at: http://www.stavebni-forum.cz/cs/wp-content/uploads/1_kubricht.pdf
30. Rymanov, A.: Differential land rent and agricultural taxation. *Agricukultural Economics*. 2017, 63(9), 421-429. ISSN 0139-570X.
31. Schadeva, J., Singh, J., Romana, G. S.: Dynamics of Agricultural Productivity, Land Rent and Land Price Relations in Punjab. *India Journal of Economics and Development*. 2017, 13(1), 129-134. ISSN 2277-5412.
32. Schipper, S.: Global City formation, gentrification and the appropriation of ground rent in Frankfurt am Main. *Zeitschrift für Wirtschaftsgeographie*. 2013, 57(4), 185-200. ISSN 0044-3751.
33. Srivatsa, R., Lee, S. L.: European real estate market convergence. *Journal of Property Investment and Finance*. 2012, 30(5), 458-472. ISSN 1463-578X.
34. Tayfur, G., Bektas, B., Duvarci, Y.: Significance of rent attributes in prediction of earthquake damage in Adapazari, Turkey. *Neural network world*. 2014, 24(6), 637-653. ISSN 1210-0552.
35. Tideman, N., Plassmann, F.: The effects of changes in land value on the value of buildings. *Regional science and urban economics*. 2018, 69, 69-76. ISSN 0166-0462.
36. Torres, F. J. P.: Political Economy and Land Valuation Methods. *Equidad&Desarrollo*. 2015, 24, 53-95. ISSN 1692-7311.
37. Vochozka, M., Stehel, V., Rowland, Z., Krulický, T.: A review of the report on relations between the controlling and controlled party and between the controlled party and parties controlled by the same controlling party. *AD ALTA – Journal of Interdisciplinary Research*. 2019, 9(1), 321-325. ISSN 1804-7890.
38. Vrbka, J., Machová, V., Mareček, J., Horák, J.: Determining the market rent of a medical facility on a specific example. *AD ALTA – Journal of Interdisciplinary Research*. 2019, 9(1), 330-334. ISSN 1804-7890.
39. Yaygir, T., Hacikoylu, C.: Taxation of Urban Rents within the Scope of Financial Obligations for Land of Parcel. *Eskisehir osmangazi universitesii iibf dergisi-eskisehir osmangazi university journal of economics and administrative Sciences*. 2018, 13(2), 77-100. ISSN 1306-6730.

Primary Paper Section: A

Secondary Paper Section: AH