A relationship between the value of the whole and separate parts

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Abstract. The aim of this article is to analyse the relationship between the open market values of real property when the real property is sold in various ways. What is considered is the sale of real property as a whole and by its separate parts. Our conceptions are reflected on a specific real property model. The open market value of the real property is set by a comparative and yield-basis method. The difference in established open market values of the real property when selling the real property in various ways equals to 32%. Individual internal and external value-setting factors that make the difference are indicated and discussed. The discussed value-setting factors are mostly as follows: imposing administrative and organizational duties, the nature of the model real property, a position of the real property market, the economic law of declining demand, a risk of rental losses and the situation in the construction industry relating to the new buildings. A further research might be focused on identifying other value-setting factors related to real property.

1. Introduction

The cornerstone of a highly specialized company and its economy is the exchange of possessions and services. This exchange can be either direct, i.e. a barter trade, or indirect using universal means of exchange (money). In the event of a business relationship, supposing a rational attitude, on the one hand, the seller strives to reach the highest possible purchase price and a willing-to-buy buyer, who, on the other hand, seeks for the lowest possible purchase price. However, both parties intend to make a deal within a reasonable time horizon. If a sale of real property, which can be sold either as a whole, or by its separate parts, is to be dealt with, both these attributes (the amount of the purchase price and time of the purchase) can be influenced by the decision-making of the seller whether he/she will be selling the real property as a whole or by its parts. The former supposes to make a deal by selling the real property within a longer horizon as it expects a lower demand on the part of investors for the real property than the demand for its separate parts. All the same, what a seller often regards as more important is to achieve the highest possible financial consideration related to selling the real property than the time period within which the deal of selling the specific real property is being made. There arises a question of how to maximize the purchase price of the real property; i.e. what its open market value for which it can be sold is with respect to the current situation of the reality market. To identify the open market value of the real property, several methods were devised; in specific cases, some of these methods are more convenient than others.

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The aim of this article is to analyse the relationship between an open market value of a real property when it is sold as a whole and the total of open market values when the real property being sold by its separate parts. In the event of different value-setting, an identification of internal and external factors that bring about this difference and their subsequent explanation will be offered. The analysis of open market values will be carried out on a real property model consisting of several housing units and other commercially used non-residential premises.

2. Literary research

The real property market has, together with other markets, its specifics which participate in setting values to individual kinds of real property. These are internal and external factors of a particular real property. Some external factors influence the value of several kinds of real property within a specific sphere. The influence of external factors is reduced by the distance of the real property from its source. Conway et al. [1] argue that one of these external factors is the presence of greenery in the vicinity of the real property. This was concluded by means of spatial autocorrelation with the implementation of a spatial delay model. They thereby declare that the presence of greenery in various town quarters may be a useful political tool to increase real property values in poorer town quarters.

The next attribute that may be reflected in the real property value is the social value of the locality of the particular real property. Gibbons and Machin [2] state that values of housing units cannot be determined only by physical characteristics, which either discriminate specific units from one another, or on the other hand, link them together. They thereby compared various prices of housing units and observed a correlation between these values and traffic availability, quality of schools and the degree of criminality in the adjacent locality.

On the other hand, there are a lot of external factors that reduce the value of the real property. Davis [3] carried out a spatial analysis focusing on the impact of the construction of a nuclear power plant on the value of the real property in its immediate vicinity. According to the results, the value of the real property decreased within two miles away from the nuclear power plant by 3-7% on average. Daniel, Florax and Rietveld [4] suggest that increased risks of flood in areas where dramatic climatic changes have taken place in the recent years negatively influence the trend of values of affected real property which had not suffered from the influence of this external factor in the past. A year-on-year increase in the risk of floods by 0.01 causes that the real property value in this area falls by 0.6% on average. Lin, Rosenblatt and Yao [5] aimed at determining a decrease in real property values in the vicinity of a locality in which investors lost interest and which subsequently became a centre of vandalism of maladjusted inhabitants. Their results show that like this destroyed locality influences values of adjacent real property within 5 kilometres. The value decrease ranges from 8.7% (in the direct vicinity of the troubled locality) to 1.2 and 1.7% on the border of the examined zone. Krulický and Horák [6] argue that by purchasing and subsequently renting the real property to third parties, potential investors may benefit from these valuable assets.

Owing to a large number of these factors, it is extremely difficult to predict the values of the real property, especially for a longer time period. Bourassa, Cantoni and Hoesli [7] therefore compared individual methods of predicting value trends of real property. All the methods demonstrated a weakness which was not possible to eliminate to some extent. Upon comparing several methods of predicting value trends of real property according to published works, they concluded that the most effective method of predicting value trends of is the method of the geostatic model with segmented variables of separate markets.

Goodhart and Hofmann [8] argue that dramatic changes in real property values are highly influenced by fluctuations of GNP and interest rates of loans. This has also a negative impact on the economic activity of the region and the overall price inflation. Brunnermeier and Julliard [9]
contribute that curbing inflation may influence the increase in prices of real property. They declare that at the moment of cutting price inflation, investors do not realize that to take a mortgage loan to purchase the real property will be much cheaper than the outright purchase from their own financial resources. Price inflation and the nominal amount of interest rates are thereby the main reasons for a poor assessment of the future value of the real property. Guo and Huang [10] argue that one reason for the price increase in real property values is the influx of substantial investment financial resources from abroad. Same applies to stock markets. A huge influx of financial resources from abroad can thereby result in a destabilization of both markets. Bekiros et al. [11] analysed the dynamics of the real property market with respect to its developmental stages (rise, stagnation and fall). In the event of the fall in trading on the real property market, its further trend may be reliably predicted by means of the WIX P500 Volatility of the stock market. They also identified individual factors which are responsible for unpredictable developmental trends of the real property market. These factors are amounts of state financial reserves and the unemployment rate.

An interesting result was achieved by Radonjic et al. [12]. According to their findings, GNP is the key factor that influences the developmental trend of the local real property market; however, it does not belong to specific value-setting factors in a particular moment. These factors include the number of net incomes, unemployment rate and mortgage interest rates. The trend of the real property market can also be accurately assessed by other factors. Ozturk, Kapusuz and Tanriversmis [13] declare that what belongs to these factors is the composition of inhabitants in regard to the size of household and future requirements for the standard of living. The financial literacy of these households can also furnish a clue as to investment decisions in the sphere of real property to satisfy housing needs.

Liow, Huang and Heng [14] examined the impact of macro-economic conditions in the USA on the trend of the real property market in the People’s Republic of China (PRC). The results showed no correlation between international factors which would influence the trend of the national real property market. The only fluctuation was detected in the time of the last global economic crisis owing to the American influence on Chinese real property market.

Mach [15] focused on the influence of the global economic crisis on real property markets of individual member states of the EU. He also strived for determining the intensity of the impact of the economic crisis on real property markets. It was tested on changes in the number of granted building permissions, a number of employees in building industry and production value. He concluded that as a result of the globalization of the market, real property markets of individual member states cope with the consequences of the global economic crisis in different time periods. He also mentions that some member states have been under the influence of this crisis within this sector even until now.

3. Materials and methods
The model real property that will be a subject of valuation and comparison consists of four residential units of different layouts and sizes of floor space and two non-residential premises used for commercial purposes. First, the open market value of the model real property as a whole will be determined using the comparative method. Individual differences of searched real properties, which will serve for comparison with model real property and are the reason for mutually different bid prices, will be correlated by correlation coefficients K1-K6. These are the following correlation coefficients: K1 – coefficient of price reduction will be used if it is a bid price of the real property, K2 – coefficient of location will represent similarity with the model real property under consideration in terms of their location, K3 – coefficient of construction and technical condition will represent a difference in the technical condition of the real property with the model real property, K4 – the built-up area coefficient will determine the degree of correlation between the floor areas between the compared real properties, K5 – the land / garden coefficient will take into account the characteristics of the land belonging to the model real property being compared and coefficient K6 – coefficient of
accessories will compare the equipment of the real property with accessories in the form of ancillary buildings, the equipment of the real property or the specifics of the land belonging to the buildings.

Subsequently, their individual parts will be valued. Residential units will again be valued using the comparative method. Non-residential premises are used for commercial purposes and therefore create value for their owners based on the yield they can generate by operating their business. These non-residential commercial premises are usually rather leased to a third party and will, therefore, be valued using the yield-basis method on the basis of the established open market rent per m². Subsequently, the amount of potential annual rent collected will be determined by multiplying the open market rent and the floor area of non-residential commercial premises, from which the costs associated with the lease of these premises to the landlord will subsequently be deducted. After deducting these costs, the potential net annual rent will be determined. In the next neck will be carried out a revenue valuation of commercial non-residential premises. The rate of the annual capitalization rate of commercial premises in buildings will be used for this purpose. The capitalization rate of commercial premises is set by a decree at 7% [16]. The values of the individual parts (residential units and non-residential commercial premises) will be added together to determine the resulting open market value of the real property in the case of its sale in parts (residential premises and non-residential commercial premises). If, after the sum of the open market values of the individual parts, the total open market value determined in this way differs by more than 10% from the open market value of the model real property determined in its valuation as a whole, this difference will be justified in the next part of this paper. Internal and external factors that influence the formation of the open market value of the real property as a whole, as well as the open market value of residential units and non-residential commercial premises, will be searched for.

4. Results

The model of the real property was initially valued as a whole using the comparative method. A number of similar real properties were found on real property advertising servers, which were in approximately the same technical condition, location and had approximately the same floor area. Also, a set of data on realized commercial transactions of comparable real properties was found. Significant value-setting factors of the real property being found were corrected using correction coefficients K1-K6. The open-market value of a model real property valued as a whole was set at CZK 7,595,000.

Next, the whole model real property was divided into individual parts, which represented individual residential units and non-residential commercial premises. Residential units were again valued using the comparative method on the basis of searched offers of similar residential units for sale through real property advertising servers. Found bid prices were again corrected by correction coefficients K1-K6. Table 1 gives an overview of the determined values of individual residential units with the dimensions of their floor areas located in the model real property.

| Unit number | Floor area [m²] | Determined value [CZK] |
|-------------|-----------------|------------------------|
| 1           | 111.83          | 2,011,000              |
| 2           | 154.44          | 2,500,000              |
| 3           | 87.7            | 2,594,000              |
| 4           | 83.89           | 2,157,000              |
| **Total**   |                 | **9,262,000**          |

The resulting open market value of all residential units located in the model real property was set at CZK 9,262,000.
The comparative method could not be used to determine the open market value of non-residential commercial premises because of the lack of a sufficiently broad sample of comparable real properties. The open market value of non-residential commercial premises was therefore determined by the yield-basis method. Non-residential commercial premises have the potential to generate income or, more precisely, yield to its owner, as a value-generating asset. Yield-basis method valuation reflects the yield potential of the valuation subject for the future. For valuation purposes, it was necessary to follow the rule of highest and best use, subject to known limit conditions. Based on these facts, after searching for offers for renting commercial non-residential premises via real property servers, the amount of potential annual rent collected from renting non-residential commercial premises located in the model real property was determined.

The set of these data was sufficient for the purpose of the yield-basis method. The bid prices were corrected by correction coefficients K2, K3 and K6. The unit price of commercial non-residential premises was set at CZK 103/m². The floor area of commercial non-residential premises was 76.6 m². The potential annual rent collected was set at CZK 94,700 (CZK 103 / m² * 76.6 m² * 12 months = CZK 94,700). To calculate the yield value of non-residential commercial premises, a possible rent outage of 15% (CZK 14,205) was considered. This risk is higher for commercial premises as the landlord partially shares it with the tenant. The costs associated with the lease of these non-residential commercial premises (insurance, real property tax, etc.) were set at 30% of the potential annual rent collected (CZK 24,150). After deducting the cost of renting commercial non-residential premises, the net annual income from these commercial non-residential premises was set at CZK 56,345. The 7% capitalization rate was used to determine the yield value of non-residential commercial premises using the yield-basis method of valuation, which corresponds to the capitalization rate of real property for trade-in buildings [16]. The yield value of non-residential commercial premises in the model real property was set at CZK 805,000 (CZK 56,345 / 7% = CZK 805,000). Finally, the value of the model real property was determined by the sum of the values of residential units and the yield value of non-residential commercial premises for CZK 10,067,000 (CZK 9,262,000 + CZK 805,000 = CZK 10,067,000).

When comparing the determined value of the model real property as a whole and the value of individual parts, it was found that by selling the model real property in parts it is possible to collect CZK 2,472,000 more, which is approx. 32% higher value than in the case of the sale of model real property as a whole. This relationship (difference) will be further discussed and clarified.

5. Discussions

The difference in the possibilities of the collected financial consideration from the sale of the model real property could be caused by a number of external factors.

The internal factors influencing the relationship between the value of the model property as a whole and the sum of its sub-parts include the methodology used to determine both values. However, this assumption can be rebutted in part, since both assumptions were for the purpose of sale by simulating an independent commercial transaction and the same methodological calculation was used using the comparative method, but the yield-basis method was used to determine the value of associated non-residential commercial premises for part of the paper. With a sufficient number of comparable samples, the comparison method is favoured by the expert community to determine the open market value of the valuation subject. The preferential use of this method is also supported by legislation on methods of valuation of assets and services [17]. The method used to determine the open market value for a model property in both sales variations was consistent with standard valuation procedures by expert institutes. It was a market research with subsequent use of correction coefficients as described in the methodological part of the paper. Ferlan, Bastic and Psunder [18] state that the use of correction coefficients should be used as low as possible when using the comparative method to
assess the property in question. Therefore, it is recommended to search for similar properties to carry out a comparison. The methodology used is therefore not an internal factor affecting the relationship between the resulting value of the property in the case of its valuation as a whole and the resulting value obtained by the sum of the values of its sub-parts.

Other internal factors affecting the value of the property or its sub-parts result from the chosen variant of the sale of the model property. In the case of selling the whole property at once, it would be necessary for the buyer to rent all four housing units in the shortest possible time horizon. This could lead to an increase in the supply of housing for rent in a given location which would outnumber the demand for the properties to rent. This implies the risk of the incomplete coverage of all residential units and non-residential commercial premises with tenants in the model property. This may deter some investors from buying a model property. This risk can be considered as an internal pricing factor in the case of the sale of the model property as a whole.

However, the sale of the model real property in parts also entails several inevitable obligations for the owners of individual units and non-residential commercial premises. This would involve certain duties of administrative and organizational nature. From an administrative point of view, individual owners would have to work together to create an organization to manage these units. In this particular case, it would be a community of unit owners. It would be necessary to establish a fund to retain financial means necessary for the usual repairs of shared areas or for dealing with sudden emergencies in the whole property; and to arrange the appropriate property insurance. For organizational reasons, it would be necessary to appoint at least one person to manage the funds earmarked and, if necessary, to be responsible for communicating with the insurance company, material and service providers. However, some of these obligations are not required in case of the sale of a model property as a whole to one investor.

The external factors undoubtedly primarily involve the state of the real property market at the moment of determining the value of the model real estate. Excess demand has been a trend in this market over the last few years. It primarily applies to the market of residential units. This economic “climate” allow sellers to demand high financial consideration for the properties they offer. The market with residential houses is on the contrary significantly different. It is caused by the lower demand than for the residential units. The set of demanders primarily consists of investors and legal entities. For this reason, the sum of housing unit values at the moment of their determination was higher than the value of residential houses which are of a similar type corresponding to the model property used in this paper. Guren [19] states that the demand curve has a concave shape on the property market. This is because individual property sellers try to adjust the bid price of their property in the course of time. Sun [20] states that price deviations from normal house prices may also have an effect on price shifts on both sides of the price scale across the property market.

Another external factor that may cause a difference between the determined levels of open market values of model real properties is based directly on one of the fundamental microeconomic theories that deal with the law of declining demand. According to this microeconomic law, an increasing price means decreasing the level of demand for a specific good and vice versa. The potential buyer is limited by the amount of disposable income, so as the price of the property decreases, the set of demanders in both variants of the sale of the model property will increase. In this respect, it is one of the rather significant value-generating factors that can influence the price of real property on the market. Another such factor is time over which particular properties are offered for sale on the real property market. In case of the sale of model real property by individual parts, their sale can be expected in a shorter time horizon than in the case of the sale of the model real property as a whole. The demand for the purchase of entire properties is generally lower on the property market than for individual housing units. This is due to the unequal ratio of demanding investors and units (families,
etc.) in the real estate market. The purchase of the model property as a whole is more attractive to the investor with the clear intention of achieving the maximum profit from the subsequent sale or lease to other individuals or legal entities. The purchase of individual housing units in the property market will have greater demand from families, etc. The purchase of individual housing units in the property market is more demanded by families, etc.

Another external value factor, which, from the seller's point of view, has a negative effect on the price of the property in question, may be the rate of risk in terms of loss of rent from non-residential premises if the property is sold in parts. To rent non-residential commercial premises is riskier than to rent residential units. It is primarily caused by sharing the business risk between a tenant and a landlord. If the tenant's business plan were inappropriate, the tenant's lease to non-residential commercial premises would be terminated. The risk ratio makes the open market values for the rent of such premises decreased. If the comparative method could be used to determine the value of non-residential commercial premises on the basis of the available data, this risk factor would already be taken into account when determining the value of the commercial non-residential premises located in the model real property. A prospective investor will therefore consider whether the lease of these non-residential commercial premises will generate a potential profit from the rent collected by the tenant. However, in a specific model case, this aspect is negligible, since even without non-residential commercial premises, the sum of the open market values for individual residential premises is higher than the open market value of the property in the variant of its sale as a whole. In this model case, in these modified conditions, the difference would be CZK 1,667,000.00 (CZK 99,262,000 – CZK 7,595,000.00 = CZK 1,667,000.00).

Kotíková [21] claims the Czech Republic has a high absorbing capital potential. It indicates that in the future a higher inflow of foreign funds can be expected in the form of investments. This high absorbing capital potential also means a high potential for intensive growth in many sectors.

Huang, Leung and Tse [22] searched for this model to describe the ratio of the rental to the property price. They state that the higher risk of losing the rent associated with a greater turnover of the tenants of the property reduces the profit for the investor. They also add that factors such as the popularity of the location and the long-term growth of rent are contributing to the increase in rent. In the case of new buildings or new residential properties, the state of the construction industry may be another external factor. The state of the industry is described using the Industrial Production Index. This index is used by the Czech Statistical Office (CSO). The calculation of its size is based on the revenues from products and services revalued at constant prices, in the case of selected sectors, the development of the sector is characterized by physical production volumes of product representatives [23].

Increasing production activity in the construction industry would increase this index. This would correspond to the accelerated construction of real properties, which would lead to an increase in supply on the real property market. According to Golob, Bastic and Psunder [24], the state of the construction industry of each state is the key to provide work for the labour force and ensuring the nation’s housing needs. Its conditions bear numerous impacts on the development of a national economy. The state of construction industry can therefore be regarded as one of the pricing factors in terms of real properties.

An, Wang a Dou [25] divide factors which cause the price fluctuations in the real property market into short-term and long-term. The long-term ones include land prices, the volume of investments made in real properties, GDP and interest rates on mortgage loans. The shot-term ones are population fluctuations. Vochozka and Machová [26] examined the identification of value generators in the construction industry, which was done by dealing with an average business operating in this area. The
following value generators have been identified in this key industry: economic growth for the current accounting period, equity, bank loans and borrowings, trade receivables and current assets.

6. Conclusions
The aim of this paper was to analyse the relationship between the open market value of a real property in the case of its sale as a whole and in the case of sale of its individual parts. After fixing the two open market values for a particular model of the real property, the difference was 32%. In the variant of the sale of the model real property as a whole, its open market value was set at CZK 7,595,000 by the comparative method. Another variant of the sale was the sale of model real property in parts. After the sum of the determined open market values of individual parts of the model real property, the total open market value was set at CZK 10,080,000. The difference was CZK 2,485,000.

This difference in determined open market values was further discussed. Both internal and external factors that affect the real property open market values in a specific model case have been identified and clarified. Other authors' views on this issue were also commented on. The aim of the contribution was thus fulfilled with the result of confirming the negative synergy of the value of the real property in different variants of its sale. However, this kind of relationship between the two values was not assumed. Therefore, the seller pays off to sell the model real property in parts with a significantly higher cash consideration. In this case, the seller would not benefit from the positive synergy of values.

In the event of a seller's indecision to choose a variant of the sale of a real property of a similar nature, it is necessary to take into account all these factors when determining the bid price for a particular real property. It is important to take into account the specific internal factors that may affect the value creation of the real property in question. However, the external factors can only be partially influenced by an individual. This area of the research is ideal for further investigation. In particular, other different internal factors may have different weights when determining the bid price of a particular real property, which must also be taken into account. However, the preferences of a particular potential buyer are not considered.

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