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Cost and Experience Based Real Estate Estimation Model

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Abstract

In many ways, Bosnia and Herzegovina, Croatia and Macedonia are specific countries. After the war and the breakup of Yugosavia their real estate market, especially the residential one, has been exposed to major changes. This paper presents both a comparative overview of the legislative regulations regarding the matter and an experience review with a special emphasis on data obtained in the real estate agencies and by independent surveyors – civil engineers. As a result of a comprehensive analysis, a model that can be applied in all three countries has been established and presented in this paper. The model, supported by MS Excel, is based on the cost method and depends on the real estate market current trends. The model can be easily applied and modified.
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1. Introduction

Real estate market value estimation is a procedure in which an assessor determines the real estate value in the present moment from the aspect of purchase and sale and takes possible influences into consideration (legal,

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economic, spatial planning, construction and other ones). The real estate market value is the amount of money for which the real estate can be passed along from the willing seller and the willing purchaser in a transaction where both the purchaser and the seller act independently after the real estate was marketing-promoted. Moreover, the purchaser and the seller act deliberately, independently and pursuant to gathered information.

The estimations are made with different purposes: to regulate a mortgage loan, for property transactions, for division of property, for taxation, investment decisions and feasibility studies, for determining the base stock of the company and other.

The real estate market value estimation also includes inspection of the legal status, that is, comparison of ownership and spatial documentation data with the real state, that is, the structure identification. Besides these data, the real estate estimation survey must contain the technical description, net area obtained by surveying on the site, market value estimation methodology and photo-documentation. In stable economies, the real estate estimation methodology is well known, unlike some other countries such as Bosnia and Herzegovina where this field is yet to be regulated.

Due to all the stated reasons, it is of outmost importance for the assessors to be highly professional and ethical persons and for the states to have valid regulations for this field. Besides high professionalism, the assessors must possess relevant experience from the civil engineering operational field in order to make the structure construction value estimation as realistically as possible. In their capacity as assessors the civil engineers must not only possess relevant experience in the construction operational field, but must constantly be informed about new construction technologies and construction material application in order to provide the technical description of the structure through its construction cost, that is, the percentage of specific works in the most expert manner. This enables the buyer to have access to the technical data about the real estate he wants to buy and to compare the real construction price to the purchase price. However, it must be pointed out that the proposed models have been created for civil engineers by civil engineers. This means that the model cannot be used by economists because they lack expertise to create the technical description of the structure and estimate its construction value.

Due to that, the aim of this paper is twofold: to improve the real estate market value estimation methodology with assessors – civil engineers and to help potential buyers gain access to the real structure construction price through the proposed model (the percentage of specific works: rough construction works, handicraft works, installation and other works).

The proposed model can be used:

- In the early stages of project planning (for estimation the cost for structure construction and the profit from the sale after construction) and
- During the usage of the structure (for estimation the cost of the structure, structure reconstruction, renovation, maintenance, market value of the property).

2. Defining the problems

The real estate market value estimation is an important segment of numerous investment projects in market economies. Adoption of a unique estimation methodology at the legal regulations level and clear definition of estimation models and parameters is mandatory for the real estate market value estimation to be realistically based, unique and acceptable for all process participants. Absence of such methodology opens the door to applying different methods, to doubts, suspicions, insecurities and even court procedures. One of the real estate market value estimation methods is usually applied in practice, especially with structures which make no income, e.g., residential structures and public infrastructure structures such as schools, hospitals, etc. Therefore, the here proposed model is based on real estate market value estimation.

3. Past research

The real estate (land and buildings) market value estimation can be made according to three market value estimation methods - the comparative, the cost and the income method. (Pavlovic, 2010).

From the risk analysis perspective, a property is typically treated as just another asset class. Some academics propose only a financial, not a physical or a functional, definition of valuation modeling. D'Amatoa, & Kaukob, have suggested a method which is based on the empirical relationship between discount cash flow (DCF) inputs and outputs and which can be based on the prices of comparable properties. (D'Amatoa, & Kaukob, 2012).

Commercial methods of real estate evaluation represent a mechanism which can enable the environmental and social aspects to be more included into the economic question. The perception of the real estate is changed if the structure characteristics are taken as main evaluation factors. (Lützkendorf, & Lorenz, 2005).

The idea that the location is important in real estate economics is not new. However, the spatial dimension of real estate data is not always taken into account in traditional real estate models. Spatial econometrics is a tool that could remedy this problem. Wilhelmsson is to review spatial models and apply them to typical hedonic real estate data. The conclusion is that spatial autocorrelation is present, least-square estimates may be biased and inefficient and spatial hedonic models do explain more of the price variation. However, the choice of spatial structure affects the interpretation of parameters for variables it is correlated with, i.e. it is a sort of multi-co-linearity problem. Hence, uncritical use of spatial econometrics may cause problems in the interpretation of individual parameters. (Wilhelmsson, 2002).

Some countries have introduced the so called mass appraisal for taxation purpose. The evaluation appraisal relates to real estate groups, not to a particular real estate. Mass appraisal system management is both a challenge and an opportunity. To resolve the task, the mass appraisal assessors use modern technology in form of a computer assisted mass appraisal – CAMA. These systems enable the possibility of increasing the efficiency and technical competence of state bodies and creation of a more accurate and fairer evaluation. (McCluskey, & Anand, 1999), McCluskey, Deddis, Mannis, McBurney, Borst, 1997).

In order to assess the environmental impact of the Swedish building and property (real estate) management sector, a new top-down life cycle assessment (LCA) method was used which was based on input–output analysis using national statistical data. Key implications will be on the selection of building materials, the construction process and the extension of building longevity. (Toller, Carlsson, Wadeskog, Miliutenko, & Finnveden, 2013).

Accession of China to the World Trade Organization (WTO) in 2001 resulted in a strict competition at the Chinese real estate market. A research was conducted dealing with the application of different renowned competitive evaluation methods and resulted in the creation of a model – a procedure for assessing the competition of real estate companies. (Zhang, Shen, Wu, & C.N. Fan, 2009).

By nature, people's tastes and preferences are unique and diverse so that a constant coefficient of each housing attribute produced by ordinary least squares (OLS) cannot fully describe the behavior of homebuyers of different classes. To complement the least squares, quantile regression is used to identify how real estate prices respond differently to a change in one unit of housing attribute at different quantiles.(H.T. Choy, K.O. Ho, & W.K. Mak, 2012).

The research which was conducted in Hong Kong from 2004 – 2006 has shown a significantly higher market price reaction and return association when changes in fair value of investment properties are presented in the income statement (in the profit and loss account). (So, & Smith, 2009).

Today, there are generally accepted local and global standards all over the world which make the starting point for procedure standardization and real estate value estimation methodology internationalization. The International Valuation Standards Committee – IVSC has passed the International Valuation Standards – IVS whose provisions define the best international practice in this field. At the same time, they have been passed as supplements to local standards (http://www.ivsc.org/). International and local standards include:

- Appraisal and Valuation Manual, that is Royal Institution of Chartered Surveyors (RICS "The Red Book"). RICS is the world's leading professional body for qualifications and standards in property. As people, governments, banks and commercial organizations continue to demand more assurance of certified standards and ethics, attaining RICS status is the recognized mark of property professionalism. Created in 1868 and with 91.000 members in 146 countries, RICS represents professionals working in property, land and the built environment all around the world (http://www.rics.org/),

- Uniform Standards of Professional Appraisal Practice - USPAP) of the American Appraisal Foundation (www.uspap.org),
- The Canadian USPAP – the Appraisal Standards Board of the Appraisal Institute of Canada [AIC]) (www.aicanada.ca),
- The Australian Property Institute's Professional Practice API) (www.api.org.au) and
- The European Group of Valuer's Associations - TEGoVA) which has Approved European Property Standards ("The Blue Book") (www.tegova.org).

Other local associations such as the Union of Pan-American Valuers – UPAV has also introduced recommendations with which a member state adopts the International estimation standards (www.upav.org).

4. The present situation in ex-Yugoslavian countries

4.1. The situation in Bosnia and Herzegovina

Real estate appraisal in Bosnia and Herzegovina is, realistically speaking, at its very beginning. It is expected that the adoption of Law will result in mass real estate appraisal and that this will be the landmark in this field which will initiate regulation of all other appraisal aspects. Nowadays, real estate appraisal in Bosnia and Herzegovina is performed by court experts of the civil engineering profession who have been appointed by the Ministry of Justice on public invitation. The experts are all of the civil engineering profession and are expected to show a high level of professionalism. However, in reality, they have no formal education from the real estate appraisal field or any standards or methodology to follow when performing their job.

In 2012 the Bosnian & Herzegovinian Property Association (BHPA) was founded in Sarajevo whose aim is to be the only organization in Bosnia and Herzegovina for certifying experts of the real estate field (www.bhpa.org.). BHPA is dedicated to creating and maintaining a strong base for future experts of the real estate field through knowledge and professionalism perfection of its members. BHPA certifies four professions: real estate market evaluation, real estate management, real estate development and real estate agent. BHPA will ensure integrity, credibility and ethical standards of the profession to be compatible to the global standards determined by the RICS in London (Royal Institution of Chartered Surveyors).

At the University of Sarajevo, for the first time in the region, the School of Economics and Business proudly presents Master of Property – Advanced Finance in cooperation with the University of Melbourne. The program aims at achieving specialist knowledge and professional standing in the field of property – applied finance. The Master of Property – Applied Finances focuses on activities encompassing the full property cycle. This professional course is intended for graduates keen to acquire an indebt understanding of the structure and operations of the property sector. It is rather popular because it encompasses a diverse range of skills. It enables students to develop / enhance expertise in professional fields such as property funding, valuation, management and development. The ethos of the course is to offer teaching which introduces underpinning theories and then through case study analysis underpin its practical orientation. The course has a strong commercial focus and a practical orientation and provides the student with the essential knowledge and necessary skills. (http://www.efsa.unsa.ba/ef/ba/property-applied-finances)

The University of Sarajevo, School of Economics and Business's partner for this master study is the School of Economics of University of Split.

4.2. The situation in Croatia

Until 1991 Croatia had provisions for real estate estimation based on then existing regulations on social ownership and land servitude. The Direction on expropriated structure construction value estimation method from 1984 must also be mentioned because it is still in use today when estimating the real estate market value.

After the Law on Spatial Planning and Construction (Official Gazette 76/2007) and the Law on Property and Other Real Rights (Official Gazette 91/96, 68/98, 137/99, 22/00, 73/00, 129/00, 114/01, 79/06, 141/06, 146/08, 38/09, 153/09, 143/12) were passed, no legal act has been issued which would uniformly define the real estate estimation methodology. However, in 1992, the Croatian government issued the Ordinance on Apartment and Garage Value Estimation Parameters (Official Gazette 35/92, 72/92, 83/93 and 110/93). The Agency for Restructuring and Development issued in 1992 the Manual for Socially-Owned Enterprise Transformation which determines the real estate value estimation procedure based on the construction value estimation. Moreover, pursuant to the Law on Compensation for Denationalized Property, the Regulations on Apartment Value Estimation Parameters (Official Gazette 66/98), Regulations on Denationalized Enterprise Value Parameters (Official Gazette 107/99, 76/00, 25/03, 36/03), Regulations on Denationalized Agricultural Land, Forest and Forest Land (Official Gazette 18/04) and Regulations on Denationalized Construction Land and Business Premise Compensation Parameters (Official Gazette 204/03 and 3/04) (Krtalic, 2009) were issued.

It can be safely concluded that the past experience in real estate market value estimation which is based on the aforementioned documents creates a starting point for defining a particular legal act which would uniformly define the real estate market value estimation methodology and significantly reduce doubts, occasional manipulations and disputes as well as differences in the estimated real estate value.

However, the present situation requires the estimation method according to the construction value to be applied in practice. Such construction value is calculated so that the structure construction cost value is reduced due to structure depreciation while the construction land value is usually estimated with the comparative value method. Thus, the price of the land in question is compared to the similar ones. This value estimation method is the only possible one for structures with no income (public infrastructure structures, residential structures). As far as this part of the estimation is relatively explicit and defined, the estimation of the market value by applying market value coefficient is subject to personal, professional estimation of the assessor and can cause the aforementioned doubts, disputes, problems and differences. What is usually taken into consideration are the coefficients of the location, closeness to appropriate facilities (schools, bus stops, catering facilities and other), the increased investment and every-day maintenance which was not included in the construction value estimation, the supply and demand relation, special structure shape, special structure significance if it is a cultural or historical monument and other.(Krtalic, 2007)

4.3. The situation in FYR Macedonia

In the FYR Macedonia there is the Chamber of Assessors of Republic of Macedonia. Its members are assessors who have successfully passed the exam after having completed the training for real estate assessors.

For real estate estimation the Methodology for Real Estate Market Value Estimation is applied. This Methodology was published in the Official Gazette 54/12. In 2013, at the Faculty of Civil Engineering in Skopje, as part of the TEMPUS Project: "Land Governance studies in Macedonia and Ukraine" the two-year master study for land management was introduced (http://lg.gf.ukim.edu.mk/).

5. Proposition of a cost and experience based real estate market value estimation model

In the independent real estate estimation, three estimation approach methods are applied, those being the following:

- The cost approach method which is based on construction cost calculation. It is applied very often as the dominant and the only method.
- The sales comparison approach which is applied when estimating such real estate units which are often in trade such as apartments and houses.
- The income capitalization approach which is based on the supposition that some real estate units were sold to the investors to make profit.

Based on the author's experience of a long-time assessor, the market value estimation model based on the cost approach method was proposed as the method which has been applied most often in this region. The model was created in Excel and is easily applied and prone to modification – see Table 1. It offers the possibility of estimation within a few minutes after the structure was measured on site. The input parameters are: the cost of the immediate structure construction (the so called structure construction value), the land value, the supply connection value, value of the plot surrounding the structure (if there is such), value of the design and supervision service, value of various fees (land use permit, building permit, other various fees and similar) and the estimated market factor. Moreover, the structure age is also one of the input parameters as well as the expected structure service life based on which depreciation value is calculated.

Table 1: Real estate market value estimation model

Market value of the structure – MV			
a) Estimation of the structure construction value			
NCV – new construction value of the structure			
PCV – present construction value of the structure			
R – reduction due to depreciation, Am=f(n,N) [%]		Y	
R=[0,8xn/Nx(n+N)/2N]x100=[0,8xX/100x(X+100)/2]x100			
n – structure age in years		X	
N – expected structure service life		X	
p – percentage of completed works		X	
f – estimated market factor		X	
f_1 – location			
f_2 – general impression of the surroundings			
f_3 – general impression of the real estate			
f_4 – expansion possibilities			
f_5 – infrastructure assessment			
f_6 – supply and demand relation			
Type of works	**percentage [%]**	**NCV [EUR/m^2]**	**R [%]**	**PCV [EUR/m^2]**
Rough construction works	X	Y	Y	Y
Handicraft works	X	Y	Y	Y
Installations	X	Y	Y	Y
Other works	X	Y	Y	Y
Total	Y	X		Y
	[m^2]	[EUR/m^2]		[EUR]

		[m²]	[EUR/m²]	[EUR]
	NCV =	X	Y	Y
	PCV =	Y	Y	Y
b)	Estimation of land value – LV	[m²]	[EUR/m²]	[EUR]
	LV =	X	X	Y
c)	Estimation of supply connection value – SCV	[m²]	[EUR/m²]	[EUR]
	SCV =	Y	X	Y
d)	Estimation of the surrounding plot value improvement – SPVI	[m²]	[EUR/m²]	[EUR]
	SPVI =	X	X	Y
e)	Estimation of design and supervision value – DSV	[m²]	[EUR/m²]	[EUR]
	DSV =	Y	X	Y
f)	Estimation of various fee values (land use permit, building permit, etc.) – VFV			
		[m²]	[EUR/m²]	[EUR]
	VFV =	Y	X	Y
	Total (a–f)			Y
g)	Estimation of the real estate market value – MV=(a-f)*f	[EUR]	f	[EUR]
	MV =	Y	Y	Y

Where:

X – is the value entered by the assessor

Y – is the value calculated by "Excel"

Example: Market value calculation of a 37-year-old residential structure with usable floor area of 130 m², located at a land parcel of 500 m² in the central city zone. The results are shown in Table 2.

Table 2: Example of a residential structure market value estimation

	Market value of the structure – MV	
a)	Estimation of the structure construction value	
	NCV – new construction value of the structure	
	PCV – present construction value of the structure	
	R – reduction due to depreciation, Am=f(n,N) [%]	20.28
	R=[0,8xn/Nx(n+N)/2N]x100=[0,8x37/100x(37+100)/2]x100	
	n - structure age in years	37.00
	N - expected structure service life	100.00

p - percentage of completed works   100.00

f - estimated market factor   1.20

   f_1 – location

   f_2 - general impression of the surroundings

   f_3 - general impression of the real estate

   f_4 - expansion possibilities

   f_5 - infrastructure assessment

   f_6 - supply and demand relation

Type of works	percentage [%]	NCV [EUR/m2]	R [%]	PCV [EUR/m2]
Rough construction works	47.00	235.00	20.28	187.34
Handicraft works	30.00	150.00	20.28	119.58
Installations	20.00	100.00	20.28	79.72
Other works	3.00	15.00	20.28	11.96
Total	100.00	500.00	20.28	398.60

	[m^2]	[EUR/m^2]	[EUR]
NCV =	130.00	500.00	65.000,00
PCV =	130.00	398.60	51.818,00

b) Estimation of land value – LV

	[m^2]	[EUR/m^2]	[EUR]
LV =	500.00	40.00	20.000,00

c) Estimation of supply connection value – SCV

	[m^2]	[EUR/m^2]	[EUR]
SCV =	130.00	15.00	1.950,00

d) Estimation of the surrounding plot value improvement –SPVI

	[m^2]	[EUR/m^2]	[EUR]
SPVI =	300.00	60.00	18.000,00

e) Estimation of design and supervision value – DSV

	[m^2]	[EUR/m^2]	[EUR]
DSV =	130.00	20.00	2.600,00

f) Estimation of various fee values (land use permit, building permit, etc.) – VFV

	[m^2]	[EUR/m^2]	[EUR]

VFV =	300.00	20.00	6.000,00
Total (a–f)			100.368,00

g)　Estimation of the real estate market value – MV=(a-f)*f

	[EUR]	f	[EUR]
MV =	100.368,00	1.20	120.441,60

6. Conclusion

The analysis of the present state in three ex-Yugoslavian countries has shown that Bosnia and Herzegovina has the worst situation in real estate estimation field. It is to be expected that the standard and regulations development in the real estate value estimation field in all three countries should be based on best experience and the aforementioned European standards, which will be of special significance for Croatia after the country becomes member of the EU.

This paper has proposed a simple and easily adaptable market value estimation model based on the cost approach method, this being the most frequently applied method in this region. The model was created in Excel and is easily applied and prone to modification. It offers the possibility of real estate market value estimation in a short period of time after the input parameters have been determined. The input parameters are: the cost of the immediate structure construction (the so called structure construction value), the land value, the supply connection value, value of the plot surrounding the structure (if there is such), value of the design and supervision service, value of various fees (land use permit, building permit, other various fees and similar) and the estimated market factor. Moreover, the structure age is also one of the input parameters as well as the expected structure service life based on which depreciation value is calculated.

The proposed model is useful for project participants, particularly for the project managers, both in the early stages of project planning (for estimation the cost of structure construction, profit from the sale after construction) and during the usage of the structure (the cost of reconstruction, renovation, maintenance, market value of the property).

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