

Contemporary Issues in Business, Management and Education 2013

Critical review of selected housing market models concerning the factors that make influence on housing price level formation in the countries with transition economy

Ligita Gaspareniene^a, Deimante Venclauskiene^a, Rita Remeikiene^{a*}

^a*Kaunas University of Technology, Laisves st. 55, Kaunas LT-44309, Lithuania*

Abstract

The article includes analysis of the models concerning the factors that make influence on housing price level formation in the countries with transition economy and presents the general principles of these models. The aim of the article was to compare selected models of the factors of housing market and to propose the principles of the model for housing price level formation in the country with transition economy. The chosen object housing market in country with transition economy. The paper was built on the analysis and synthesis of scientific literature on critical review of housing market models making influence on housing price level formation.

© 2014 The Authors. Published by Elsevier Ltd. Open access under [CC BY-NC-ND license](https://creativecommons.org/licenses/by-nc-nd/4.0/).

Selection and peer-review under responsibility of the Contemporary Issues in Business, Management and Education conference.

Keywords: housing market; country with transition economy; housing price level.

1. Introduction

Importance of the problem. “Real estate market is very important to every country since it guarantees the activity of structures and institutions that are necessary and vital for living and work; also, it makes strong and multiple impact on total economic development of the country” (Golob, Bastic, & Psunder, 2012, p. 366). According to Urbanavičienė, Kaklauskas, & Zavadskas (2009), the growth or decline of real estate sector considerably affects the general growth or decline of a country’s economy. Rapid environmental change, globalization, international trade in open economy markets make influence on housing market especially through influence on housing price level

* Corresponding author. Tel.: + 0-370-616-24114; fax: +0-370-837-208757.

E-mail address: rita.remeikiene@ktu.lt

formation. Real estate market share in the global economy suggests the important position of the real estate market in economic processes of major economies, especially in the processes of financing (Snieska et al., 2011). International capital flows, monetary policy changes and other factors influence real estate price forming as well as investor's in real estate behaviour. Little experience in real estate market investment process in the countries with transition economy leads to adequate investment decisions, though knowledge of processes in real estate market is very important to control the profit increase of investors as well as minimizing possible losses in trade and investment of real estate units. Therefore it is very important to know what type of risk can be met in real estate market and what main factors influence housing price level formation as well as what side factors make impact on real estate price changes. Up to now, numerous studies have revealed the main factors influencing housing price level formation. The results of the research carried out by Golob et al. (2012) in Slovenia showed that the volume of loans (credit conditions), interest rates, inflation, construction quality, type of location and property, speed of sales real estates have the biggest impact on real estate values and speeds of sales. The results of the research carried out by Šliupas & Simanavičienė (2010) in Lithuania revealed that housing credit, real wage, labour force, PPP per capita, unemployment, population, stock market index and real interest rates are the factors making the substantial effect on housing price level. According to Choy, Ho, & Mak (2012), high prices of real estate in Hong Kong are determined by physical housing attributes associated with an apartment, for example, higher floor level, better view or a flat of larger size. According to Choy et al. (2012), "close proximity to a transport station or to natural beauty has also been found to exert a positive influence on real estate prices". Living area, other area, lot size, quality and sea view are the willingness to pay for housing attributes (Wilhelmsson, 2002). Negotiations are an import issue having an impact on housing price level formation. Urbonavičienė et al. (2009) created the model which enables to analyze "a combination of real estate negotiation process, improvement of its efficiency through use of decision support and voice stress analysis technology, the participating stakeholder groups seeking their goals and the external macro and microenvironment affecting them". In China, housing price is determined by square meter of floor area, the distance to city centre, the distance to nearest subway station, complex size in land area, floor area ratio, green space ratio and etc. (Wu, Deng, & Liu, 2013). Another research (Yang, 2001) revealed that real estate market in China faced the problems of construction quality from building material, decoration quality and the practices of some irresponsible developers. According to Gelain & Lansing (2013) housing prices are largely determined by the consumers' expectations. As it can be seen from the studies mentioned above, there are many different factors influencing housing prices. Some scientists are inclined to group them by particular attributes while others go deep into the factors of supply or demand. There are also authors (Zavadskas et al., 2005) who focus on the factors that influence the efficiency of real estate market: legislation, taxes, liquid secondary market, market transparency, professional bodies, lending institutions, mortgage, the techniques of selling, property, insurance, ICT, education, valuer's liability, valuer's fee levels, contracts, investment instruments, credit access and etc. It proposes that all the factors mentioned above should be evaluated as a complex formulating the final housing price.

The scientific literature is very rich in the analysis of econometric models (the hedonic price model; ordinary least squares (OLS); non-linear specifications; Lucas-type asset pricing model and etc.) of real estate price formation (Lilien & Watson, 1985; Pain & Westaway, 1997; Malpezzi, 1999; Yang, 2001; Sirmans, Macpherson, & Zietz, 2005; Engle, Gelain, & Lansing, 2013) and the analysis of existing house price index construction methods (Wu et al., 2013). However, econometric models are limited to the analysis of the influence of particular variables on housing price formation, for instance, calculation of the influence of general microeconomic real estate elements on particular object (Malpezzi, 2003; Sirmans et al., 2005) or general macroeconomic factors determining housing price level formation (Engle et al., 1985; Case et al., 1987; Case et al., 1989; Muellbauer & Murphy, 1997; Quigley, 1999; Crawford & Fratantoni, 2003; Miles, 2008; Zietz, Zietz, & Sirmans, 2008), but lack a structural model which would enable determination of *general* housing price formation level in the countries with transition economy, and which would evaluate macroeconomic, microeconomic, psychological and other possible factors as well as peculiarities of the country market and its macroeconomic environment.

The aim of the article is to compare selected models of the factors of housing market and to propose the principles of the model for housing price level formation in the country with transition economy.

The object of the article – housing market in the country with transition economy.

The methods of the analysis. The paper is built on the analysis and synthesis of scientific literature and on critical review of housing market models making influence on housing price level formation.

The structure of the article is organized as follows: section 2 presents the systemic comparison of selected models of housing market related to determination of real estate pricing level. The advantages and disadvantages of housing market models have been accentuated as well as the principles of the housing pricing level formation models have been presented; section 2 provides conclusions.

2. Review of selected housing market models

The scientific literature is very rich in the analysis of econometric models of real estate price formation (Engle et al., 1985; Quan & Quigley, 1991; Pain & Westaway, 1997; Malpezzi, 1999; Sirmans et al., 2005).

However, econometric models are limited to the analysis of the influence of particular variables on housing price formation, for instance, calculation of the influence of general microeconomic real estate elements on particular object (Malpezzi, 2003; Sirmans et al., 2005) or general macroeconomic factors determining housing price level formation (Engle et al., 1985; Case & Shiller, 1987; Case & Shiller, 1989; Muellbauer & Murphy, 1997; Quigley, 1999; Crawford & Fratantoni, 2003; Miles, 2008; Zietz et al., 2008), but lack a structural model which would enable determination of general housing price formation level in the countries with transition economy, and which would evaluate macroeconomic, microeconomic, psychological and other possible factors as well as peculiarities of the country market and its macroeconomic environment. That is why it is important to critically evaluate housing, real estate investment decisions, real estate market as a system and structures of other models as well as highlight structural parts of these models, element succession and relations in order to establish the main principles that determine housing price level formation.

Having carried out the analysis of the scientific literature (Rutkauskas, 2001; Sing, 2001; Portnov, Odish, & Fleishman, 2005; Mu & Ma, 2007; Kvedaraviciene, 2008; Kaklauskas et al., 2010a; Kaklauskas et al. 2010b) the authors of the article selected two real estate market models, in their opinion, including the definite factors or circumstances that have the significant effect on real estate price level formation in the countries with transition economy.

Hedonistic real estate price model by Portnov et al. (2005) is oriented around the influence of microeconomic factors on particular housing price level increase and decrease (see Table 1).

The model includes the elements of physical properties and neighbourhood environment of particular housing, determining its price increase or decrease. Although the elements of neighbourhood environment are divided into the groups of social and physical elements, which enables estimation of the price of particular housing, disregard of the demand – supply balance as well as macro environmental elements impedes opportunities of housing market participants to evaluate market situation. What is more, these factor groups make significant impact on real estate price fluctuations (Miles, 2008; Hui & Jun, 2010; Venclauskiene & Snieska, 2010). Far more comprehensive grouping of the factors influencing real estate market has been presented in the model “Crisis management in construction and real estate sectors” (Kaklauskas et al., 2010). The authors distinguish 16 aspects of crisis management in the construction and real estate sectors. These factor groups have influence on real estate price level formation, but this model presents only the ones, where factors are not clearly defined whereas a detailed definition of the factors would enable easier evaluation of the situation in both cases – the crisis in real estate market and evaluating the tendencies of the real estate price level formation.

Far more detailed graphical structure of housing market elements has been presented by Sing (2001). Differently from model structures, proposed by other authors, this model presents wider variety of the elements and their groups: participants of housing market have been attributed to minor units: government, financial institutions, corporations, households and real estate developers; housing market divided into the groups of *Residential Space Market* and *Residential Capital Market*; housing supply divided into the groups of housing construction, completed new housing and others; the elements of housing market demand and supply have been presented in different levels, depending on the needs and characteristics of market participants. The model stresses macroeconomic shocks and reveals in which housing processes the impact of these shocks is possible. Advantages and disadvantages of the models have been presented in Table 1.

Table 1. Structural elements of real estate market models and their critical review. *Source:* prepared by the authors

Author, year	Advantage	Disadvantage	Structural Elements
Quan & Quigley (1991)	Model incorporates incomplete information; costly search; varying expectation.	Transaction price cannot be accurately evaluated leaning only on three factors.	Transaction prices, buyers and sellers
Sing (2001)	Detailed enumeration of the elements, clear exposition of relations, easily perceived.	Adapted to the particular country; unclear influence on housing price level requires additional calculations.	Government, households, corporations, developers, financial institutions, the group of macroeconomic shocks, supply factor group, demand factor group, housing for the end-users, housing for further development.
Portnov et al. (2005)	Enables estimation of the price of particular housing.	Underestimated demand – supply balance; the influence of general macroeconomic indicators is not considered.	Social and physical elements of neighbourhood environment.
Zavadskas et al. (2005)	The model enables to identify the areas where the real market situation in the country with transition economy is comparable, partly comparable or quite different from the level attained by developed countries. The model can be used in identifying real estate sector's development trends in developed countries.	The main peculiarities of the country with transition economy are not clearly highlighted.	Micro and macro environment factors
Venclauskiene & Snieska (2010)	Clear and comprehensive enumeration of the peculiarities of the country with transition economy.	The main peculiarities of the country with transition economy are not clearly highlighted.	Enumeration of peculiarities of the country with transition economy.
Kaklauskas et al. (2010 a)	Notably comprehensive grouping of the factors for the evaluation of the crisis in real estate market.	Laconic and simplified description; it is not clear what group is the most influential and how different factor groups interact with each other.	Institutional, Social, Cultural, Ethical, Psychological, Educational, Environmental, Confidence, Emotional, Managerial, Organisational, Technical, Technological, Legal/Regulatory, Political and Economical factors
Naderi, Sharbatoghlie, & Vafaeimehr (2012)	In the model, building, accessibility, residential, environmental and financial variables have been detailed into 38 attributes, enabling to establish the main factors that determine housing price.	It is not clearly stated which group of factors is the main. The model does not include such factors as psychological or political. The model is more oriented to the analysis of customer's behaviour while choosing the housing.	Building, accessibility, residential, environmental and financial variables
Chen et al. (2012)	The influence of demographic and economical factors on the final housing price is established.	Model takes into account only two groups of the factors are used to establish the housing final price.	Economic (labour market income and housing costs) and demographic (gender age, marital status and depended children) components

It needs to be noted that the countries with transition economy have their specific peculiarities (Venclauskiene & Snieska, 2010), for instance, high money supply in a short time, privatization process, developing tax and regulatory basis, financial system and so forth. That is why these countries are different from the countries of market economy, where the participants of real estate market have gained some experience and knowledge and the cycles of real

estate price formation have already been formed. Therefore, estimating the principles of real estate price level formation, it is purposeful to evaluate peculiarities, typical of the particular country.

Summarizing the analysis of the scientific literature and real estate market models, it can be stated that although scientific literature is rich in different real estate models, most of them, in spite of being comprehensive, have a narrow spectrum of application because they:

- research different elements during the defined moment in time in the defined region;
- include insufficient number of elements;
- reveal interrelations between the elements not clearly;
- fail to reveal the strength of the impact of the structural parts of the model on real estate price level formation.

Meanwhile, structure of the model of housing price level formation should be an integral multi-stage aggregate of microeconomic, macroeconomic and other elements, describing housing price level fluctuation.

3. Formation principles of the model of the factors of housing price level formation, environment and country peculiarities

With reference to the research of the structures and elements of housing price level formation models, the model of housing price influencing factors and peculiarities of the environment and the country has been designed. This model enables a complex evaluation of the classified factors of macro and micro environment, participants of real estate market and their influence on housing price level formation; it also enables systematic evaluation of real estate market as a part of country's economic system, which can be affected by several external environments at the same time.

Considering the research results, the authors propose a laconic and simplified structure of the model of the factors of housing price level formation; environment and country peculiarities (see Figure 1). However, it must be considered that each structural part is characterized by the quantitative factors which determine housing price level formation.

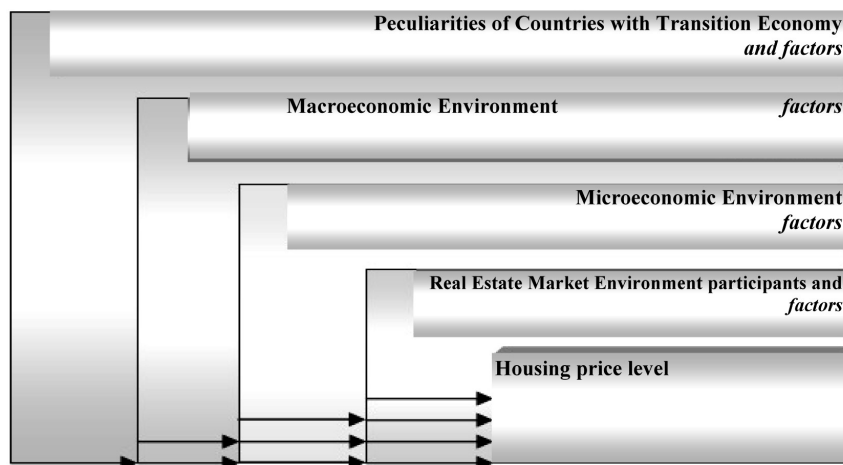


Fig. 1. Interaction between the factors of housing price level formation, environment and country peculiarities. *Source:* prepared by the authors

With reference to this model, it can be proposed that housing price level formation can be estimated following these principles:

1. Formulation of the aim and the objectives, following which housing price level formation is going to be carried out; definition of the geographical location and time interval for the research.
2. Establishment of the peculiarities, typical of the country with transition economy, and factors having the influence on real estate market processes.
3. Highlighting the main factors of macroeconomic environment having the influence on real estate market processes.
4. Highlighting particular microeconomic factors of the housing of selected category having the influence on final price formation.
5. Establishment of the main housing market environmental factors and participants as forming the balance of demand and supply which determines housing price level formation.
6. Establishment of the factors having no qualitative expression, but important and influencing housing price level formation: raise the hypotheses, carry out expert evaluation, select the calculation method and provide a quantitative weight for each qualitative factor or factor group of housing level fluctuation.
7. Joining of all overarching systems, determining housing price level formation, into one integral system, stressing both the factors that can have a quantitative expression and the quantitative ones that have a quantitative weight on housing price level formation in each overarching sub-system.
8. Considering the highlighted factors or their groups, having the influence on housing price level formation, the stages of the formation of this model can be revised and adjusted.

Summarizing the analysis of the scientific research and the principles of housing price level formation, the authors can propose a graphical model of housing price level formation in the country with transition economy, which includes the following main structural parts and factors (see Fig. 2).

The model of housing price level formation consists of these steps:

- determination of peculiarities of the country with transition economy from the point of view of housing market and evaluation of the impact of these peculiarities;
- determination of housing market participants and their interrelations;
- evaluation of general macroeconomic factors;
- establishment and evaluation of the main microeconomic factors;
- establishment of the equilibrium between supply and demand in the housing market;
- analysis of the investment decision;
- establishment of the final housing price level.

Model clearly highlights and groups the housing market factors and participants as well as their relations (the ones that make a direct impact on the final housing price are market with a straight line while the ones that increase or decrease housing price level are market with a dotted line).

The authors distinguish the groups of macroeconomic and microeconomic factors. General macroeconomic factors characterize housing price level while microeconomic ones characterize the features of particular housing and their impact on final housing price. Due to the importance of interest rate, this macroeconomic indicator has been separated from other macroeconomic factors and joined to unfavourable credit policy. The model stresses the impact of both macroeconomic and microeconomic factors on housing price because disregarding microeconomic characteristics of particular housing, this model would be unfinished.

With reference to the research and evaluation of the structures and elements of housing market models that have the influence on housing price level fluctuation, it can be proposed that the structure of the model of housing price level formation should be an integral multi-stage aggregate of microeconomic, macroeconomic and other elements, describing housing price level fluctuation in both ways directly and through investment decision making. What is more, it should follow this consistency and these main principles: integrate the four levels of the environment surrounding real estate market and influencing housing price level formation: real estate market environment, microeconomic environment, macroeconomic environment, peculiarities of the country with transition economy. Each environment is characterized by the main factors, determining housing price level fluctuation, which have to be detailed and grouped into easily statistically justified (quantitative) and hard statistically justified (qualitative) factors, considering the peculiarities of the country to be researched.

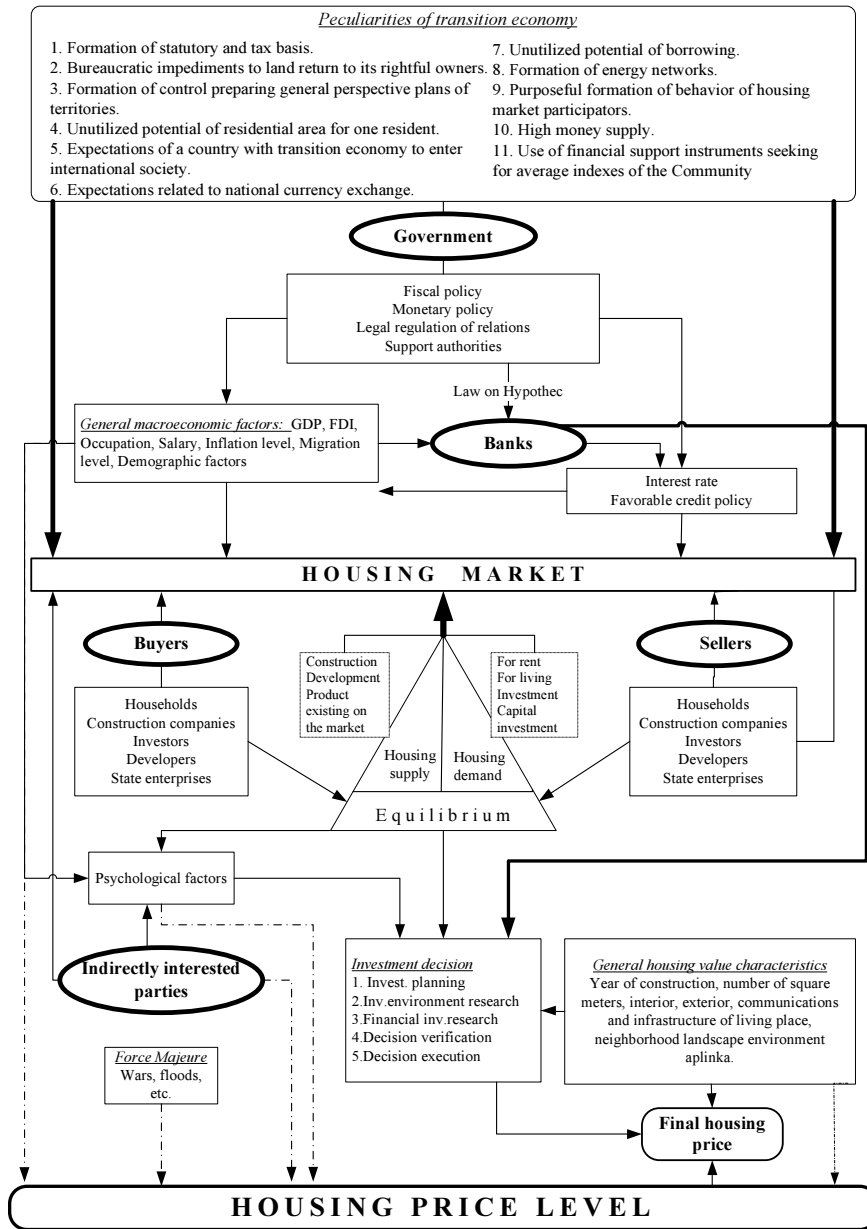


Fig. 2. Structural parts of the model of housing price level formation and their interaction in a country with transition economy
 Source: prepared by the authors

4. Conclusions

Summarizing, the following conclusions can be made:

Although scientific literature is rich in different real estate models, most of them, in spite of being comprehensive, have a narrow spectrum of application: research different elements during the defined moment in time in the defined region; include insufficient number of elements; reveal interrelations between the elements not

clearly; fail to reveal the strength of the impact of the structural parts of the model on real estate price level formation.

The results of the structural evaluation of housing market models, having the influence on housing price level fluctuation, propose that the structure of the model of housing price level formation should be an integral multi-stage aggregate of microeconomic, macroeconomic and other elements, describing housing price level fluctuation.

The model, determining housing pricing level formation, should integrate the four levels of the environment surrounding real estate market and influencing housing price level formation: real estate market environment, microeconomic environment, macroeconomic environment, peculiarities of the country with transition economy. Main factors of each level of environment have to be detailed and grouped into easily statistically justified (quantitative) and hard statistically justified (qualitative) factors, considering the peculiarities of the country to be researched.

References

- Case, K. E., & Shiller, R. J. (1987). Prices of Single Family Real Estate Prices. *New England Economic Review*, 45–56.
- Case, K. E., & Shiller, R. J. (1989). The efficiency of the market for single-family homes. *American Economic Review*, 79, 125–137.
- Chen, Y., Gibb, K., Leischman Ch., & Wright, R. (2012). The impact of Population Aging on House Prices: A Micro-simulation Approach. *Discussion Paper Series IZA DP No. 6668*. Available from: <http://ftp.iza.org/dp6668.pdf>
- Choy, L. H. T., Ho, W. K. O., & Mak, St. W. K. (2012). Housing attributes and Hong Kong real estate prices: a quantile regression analysis. *Construction Management and Economics*, 30 (5), 359–366. <http://dx.doi.org/10.1080/01446193.2012.677542>
- Crawford, G., & Fratantoni, M. (2003). Assessing the forecasting performance of regime-switching, ARIMA and GARCH models of house prices. *Real Estate Economics*, 31, 223–243. <http://dx.doi.org/10.1111/1540-6229.00064>
- Engle, R. F., Lilen, D. M., & Watson, M. (1985). A Dynamic Model of Housing Price determination. *Journal of Econometrics*, 28, 307–326. [http://dx.doi.org/10.1016/0304-4076\(85\)90003-X](http://dx.doi.org/10.1016/0304-4076(85)90003-X)
- Gelain, P., Lansing, K. J. (2013). Houses Prices, Expectations and Time-Varying Fundamentals. *Working Paper 2013-03*. Available from: <http://www.frbsf.org/economic-research/files/wp2013-03.pdf>
- Golob, K., Bastic, M., & Psunder, I. (2012). Analysis of Impact Factors on the Real Estate Market: Case Slovenia. *Inzinerine Ekonomika-Engineering Economics*, 23(4), 357–367.
- Hui, Y. J., & Jun, M. R. (2010). Research of Personal Investment Decision-Making on Real Estate Based on the Theory of Real Option. *EBM 2010: International conference on engineering and business management (1-8)*, 1525–1528.
- Yang, Z. (2001). An application of the hedonic price model with uncertain attributes. The case of the people's Republic of China. *Property Management*, 19 (1), 50–63. <http://dx.doi.org/10.1108/02637470110366202>
- Kaklauskas, A., Zavadskas, E. K., Bagdonavicius, A., Kelpsiene, L., Bardauskiene, & D., Kutut, V. (2010a). Conceptual Modelling of Construction and Real Estate Crisis with Emphasis on Comparative Qualitative Aspects Description. *Transformations in Business & Economics*, 1(19), 42–61.
- Kaklauskas, A., Zavadskas, E. K., Narimaviciene, J., Krutinis, M., Plakys, V., & Venskus, D. (2010b). Model for a Complex Analysis of Intelligent Built Environment. *Automation in Construction*, 19, 326–340. <http://dx.doi.org/10.1016/j.autcon.2009.12.006>
- Kvedaraviciene, I. (2008). Systematic Approach To Residential Property Market Functioning. *Management of Organizations: Systematic Research*, 46, 49–60.
- Lydeka, Z. (1999). Ekonominių sistemų gyvavimo procesų teorinis modeliavimas. Habilitacinio darbo santrauka. – Kaunas: VDU.
- Malpezzi, S. (1999). A simple error correction model of house prices. *Journal of Housing Economics*, 8, 27–62. <http://dx.doi.org/10.1006/jhec.1999.0240>
- Malpezzi, S. (2003). Hedonic pricing models: A selective and applied review. Housing economics and public policy: Essays in honor of Duncan Maclennan. Oxford, UK: Blackwell.
- Miles, W. (2008). Boom–Bust Cycles and the Forecasting Performance of Linear and Non-Linear Models of House Prices. *Journal of Real Estate Finance Economy*, 36, 249–264. <http://dx.doi.org/10.1007/s11146-007-9067-1>
- Mu, L., & Ma, J. (2007). Game Theory Analysis of Price Decision in Real Estate Industry. *International Journal of Nonlinear Science*, 3(2), 155–160.
- Muellbauer, J., & Murphy, A. (1997). Booms and busts in the UK housing market. *The Economic Journal*, 107, 1701–1727. <http://dx.doi.org/10.1111/j.1468-0297.1997.tb00076.x>
- Naderi, I., Sharbatoghlie, A., & Vafaeimehr, A. (2012). Housing valuation model: an investigation of residential properties in Tehran. *International Journal of Housing Markets and Analysis*, 5(1), 20–40. <http://dx.doi.org/10.1108/17538271211206644>
- Quan, D. C., & Quigley, J. M. (1991). Price formation and the Appraisal Function in Real Estate Market. *Journal of Real Estate Finance and Economics*, 4, 127–144. <http://dx.doi.org/10.1007/BF00173120>
- Quigley, J. M. (1999). Real Estate Prices and Economic Cycles. *International Real Estate Review*, 2(1), 1–20.
- Portnov, B. A., Odish, Y., & Fleishman, L. (2005). Factors Affecting Housing Modifications and Housing pricing: A Case Study of Four Residential Neighbourhoods in Haifa, Israel. *Journal of Real Estate Research*, 27(4), 371–394.
- Rutkauskas, A. V. (2001). *Nekilnojamojo turto plėtotė, investicijos ir rizika*. Monografija. Vilnius: Technika, 96 p.

- Pain, N., & P. Westaway. (1997). Modelling structural change in the UK housing market: A comparison of alternative house price models. *Economic Modelling*, 14, 587–610. [http://dx.doi.org/10.1016/S0264-9993\(97\)00007-2](http://dx.doi.org/10.1016/S0264-9993(97)00007-2)
- Sing, T. F. (2001). Dynamics of the Condominium Market in Singapore. *International Real Estate Review*, 4(1), 135–158.
- Sirmans, G. S., Macpherson, D. A., & Zietz, E. N. (2005). The composition of hedonic pricing models. *Journal of Real Estate Literature*, 13(1), 3–46.
- Šliupas, R., & Simanavičienė, Ž. (2010). The effect of real estate speculation on the growth of economics in transition countries. *Economics and Management*, 15, 295–301.
- Urbanavičienė, V., Kaklauskas, A., & Zavadskas, E. K. (2009). The conceptual model of construction and real estate negotiation. *International Journal of Strategic Property Management*, 13(1), 53–70. <http://dx.doi.org/10.3846/1648-715X.2009.13.53-70>
- Venclauskiene, D., & Snieska, V. (2010). Influence of peculiarities of transition economy on real estate market. *Economics and management* 15, 318–324.
- Zavadskas, E. K., Ginevicius, R., Kaklauskas, R., & Banaitis, R. (2005). Analysis and modeling of the Lithuanian real estate sector. *Journal of Business Economics and Management*, 6 (3), 135–143.
- Zietz, J., Zietz, E. N., & Sirmans, G. S. (2008). Determinants of House Prices: A Quantile Regression Approach. *Journal of Real Estate Finance and Economy*, 37, 317–333. <http://dx.doi.org/10.1007/s11146-007-9053-7>
- Wilhelmsson, M. (2002). Spatial Models in Real Estate Economics. *Housing, theory and society*, 19 (2), 92–101. <http://dx.doi.org/10.1080/140360902760385646>
- Wu, J., Deng, Y., & Liu, H. (2013). House price index construction in the nascent housing market: the case of China. *J Real Estate Finan Econ*. <http://dx.doi.org/10.1007/s11146-013-9416-1>