KAUNO TECHNOLOGIJOS UNIVERSITETAS

EGLĖ KEIZERIENĖ

NEKILNOJAMOJO TURTO KAINŲ „BURBULO“ KOMPLEKSINIS VERTINIMAS

Daktaro disertacijos santrauka
Socialiniai mokslai, ekonomika (04S)

2016, Kaunas

Disertacija rengta 2009-2016 metais Kauno technologijos universiteto Ekonomikos ir Verslo fakultete, Ekonomikos katedroje.

Mokslinis vadovas:
Prof. habil. dr. Žaneta SIMANAVIČIENĖ (Kauno technologijos universitetas, Socialiniai mokslai, Ekonomika, 04S).

Ekonomikos mokslo krypties disertacijos gynimo taryba:

Prof. dr. Vytautas SNIEŠKA, Kauno technologijos universitetas, Socialiniai mokslai, Ekonomika (04 S) – **pirmininkas**;
Prof. dr. Rasa KANAPICKIENĖ, Vilniaus universitetas, Socialiniai mokslai, Ekonomika (04 S);
Prof. dr. Rytis KRUŠINSKAS, Kauno technologijos universitetas, Socialiniai mokslai, Ekonomika (04 S);
Prof. dr. Maija ŠENFELDE, Rygos technikos universitetas, Socialiniai mokslai, Ekonomika (04 S);
Prof. dr. Dalia ŠTREIMIKIENĖ, Lietuvos energetikos institutas, Socialiniai mokslai, Ekonomika (04 S).

Redagavo:
Virginija Stankevičienė
Tony Bexon

Disertacija bus ginama viešame ekonomikos mokslo krypties disertacijos gynimo tarybos posėdyje 2016 m. birželio mėn. 17 d. 10 val. Kauno technologijos universiteto Disertacijų gynimo salėje.

Adresas: K. Donelaičio g. 73-403, 44249 Kaunas, Lietuva.
Tel. (370) 37 300 042; faks. (370) 37 324 144; el. paštas doktorantura@ktu.lt.

Disertacijos santrauka išsiųsta 2016 m. gegužės mėn. 17 d.
Su disertacija galima susipažinti internetinėje svetainėje http://ktu.edu ir Kauno technologijos universiteto bibliotekoje (K. Donelaičio g. 20, 44239 Kaunas), Klaipėdos universiteto bibliotekoje (K.Donelaičio a. 3, Klaipėda), Lietuvos energetikos instituto bibliotekoje (Breslaujos g. 3, Kaunas).

KAUNAS UNIVERSITY OF TECHNOLOGY

EGLĖ KEIZERIENĖ

THE COMPLEX EVALUATION OF THE REAL ESTATE PRICE „BUBBLE“

Summary of Doctoral Dissertation
Social Sciences, Economics (04S)

2016, Kaunas

Doctoral dissertation was prepared in Kaunas University of Technology, Faculty of Economics and Business, Department of Economics during the period of 2009–2016.

Scientific Supervisor:
Prof. Habil. Dr. Žaneta SIMANAVIČIENĖ (Kaunas University of Technology, Social Sciences, Economics, 04S).

Dissertation defence board of Economics science field:

Prof. Dr. Vytautas SNIEŠKA, Kaunas University of Technology, Social sciences, Economics (04 S) – **chairman**;
Prof. Dr. Rasa KANAPICKIENĖ, Vilnius University, Social sciences, Economics (04 S);
Prof. Dr. Rytis KRUŠINSKAS, Kaunas University of Technology, Social sciences, Economics (04 S);
Prof. Dr. Maija ŠENFELDE, Riga Technical University, Social sciences, Economics (04 S);
Prof. Dr. Dalia ŠTREIMIKIENĖ, Lithuanian Energy Institute, Social sciences, Economics (04 S).

Languages editors:
Virginija Stankevičienė
Tony Bexon

The official defence of the dissertation will be held at 10 a.m. on 17 June, 2016 at the public meeting of Dissertation defence board of Economics science field in Disertation defence Hall at Kaunas University of Technology.

Address: K. Donelaičio St. 73-403, 44249 Kaunas, Lithuania.
Tel. no. (+370) 37 300 042; fax. (+370) 37 324 144; e-mail doktorantura@ktu.lt.

Summary of doctoral dissertation was sent on May 17, 2016.
The doctoral dissertation is available on the internet http://ktu.edu and at the libraries of Kaunas University of Technology (K. Donelaičio St. 20, 44239 Kaunas, Lithuania), Klaipėda University (K.Donelaičio a. 3, Klaipėda), Lithuanian Energy Institute (Breslaujos St. 3, Kaunas).

INTRODUCTION

Relevance of the topic. The real estate (RE) market usually accounts for a very significant share of the country‘s economy and is directly linked to other economic sectors, while its cycle also has a deep and long-term impact on the country‘s economic viability. Despite the great significance of the RE market and close links with other economic sectors, fundamental and measurable factors can not only have an impact on market fluctuations, but also the expectations of market participants and other subjective factors. For this reason, the RE market analysis, using conventional economic indicators and logical links, does not always fully show the causes of changes or indicate the further development of the market. This becomes particularly evident during the sharp price rises and falls in the RE market, and the period between these two moments is often called a price “bubble”. It is often stated in the public space that the RE “bubble” is caused by inadequate expectations of market participants. However, given the fact that the market consists of 3-4 main groups of participants (RE developers, RE sales agents/brokers, financial institutions and individuals), it is impossible to identify at a first glance which group has caused the changes. In this case, a deeper market analysis and identification of causal relations is needed. Each participant of the RE market does this in its own way, in accordance with available data and taking into account the desired results of the analysis. In addition, there is no complex assessment methodology suitable for all market participants. The lack of studies of the causes and consequences of the RE market cycle and “bubble” prevents fully understanding and assessing the current situation, forecasting future trends and planning actions to protect against the effects of market fluctuations or boosting efficiency.

The RE “bubble” phenomenon still requires the attention of researchers, because of the disagreement on the causes of its formation, as well as the main features, indicating that there is a price “bubble” in the market. There is no consensus on which method is the best to identify and assess the housing price “bubble”. Some researchers use a variety of indicators and combinations of them, while others use consumer spending modeling (asset market approach) or a vector error correction model. Thus, when analyzing this phenomenon, none of the analyzed methods is universally recognized as providing the best and unquestionable results. Given the fact that the burst of the “bubble”, which is followed by a decline in the RE and related markets, does serious damage to the national economy and undermines the confidence of market participants in the long run, it therefore becomes apparent that it is particularly important to carry out detailed and timely analysis of market indicators and use the results of the analysis for taking reasonable actions to adapt to changes in the market.

Scientists, who analyze indicators and describe the formation of the RE “bubble”, do not always reveal the links between them, so it is not clear in advance

which of the indicators is the indicator of response, which of them reflects factors of the formation of RE prices or is a driving force, affecting the indicator of status. Several participant group positions are presented in the scientific work when analyzing the formation of RE "bubbles": the RE developer, the investor and the end user of the RE product – the buyer. The analysis and prevention of the formation of RE "bubbles", as well as a "healthy" RE market is a common interest of all these concerned parties.

All the indicators of the RE "bubble" selected by the author of the thesis (both reflecting the status, factors and response) are inter-related, so in order to identify which indicator is the cause, and which is a consequence, a comprehensive analysis of scientific literature, examining the price "bubble", the status of a specific RE market and the economic situation in the country, is needed.

The evaluation of the impact of subjective factors on the market prices is an even more difficult task when analyzing RE "bubbles". As for the RE "bubble", in addition to fundamental factors affecting the market, the impact of consumer expectations is always relevant. It should be noted that every market participant, no matter whether it is a construction company, financial institution or end-user, has certain expectations from each other and the value of RE objects, so these expectations can become an important force that drives or stops the market. Nevertheless, this phenomenon is usually only identified as existing, but a quantitative assessment of expectations is not performed for specific units of measurement and there is a lack of tools and methods. On this basis, there is no doubt that the modeling of the RE "bubble" and the assessment of the scale of the impact of subjective factors on it is a relevant object of the research.

The level of investigation of research problem

RE development and cycles are widely examined in the academic world, and in the last decade, researchers have focused on the problem of the RE "bubble". Theoretical assumptions for the formation of the RE "bubble" were analyzed in rational expectations (Lucas, 1972, 1988; Fama, 1965,1970; Blanchard, 1979; McCarthy & Peach, 2004; Brusco & Catiglionesi, 2007; Reinhart & Rogoff, 2008; Nneji, Brooks & Ward, 2011), irrational expectations (Kahneman & Riep, 1998; Kahneman & Tversky, 1973, 1979; Blanchard & Watson, 1982; Levin & Wright, 1997; Shiller, 2000, 2002; Pastor & Veronesi, 2006; Levine & Zajac, 2007; Dass, Massa & Patgiri, 2008), bounded rationality (Hommes, 2001; LeBaron, 2000; Allen & Gale, 2000; Brunnermeier, 2009; Sornette, 2010; 2014; Allen & Carleti, 2011; Allen, Babus & Carletti, 2009), several factors based (Farlow, 2004; Lind, 2008; Farmer, 2010), logistic capital management (Girdzijauskas, 2002, 2004, 2008; Girdzijauskas & Štreimikienė, 2010; Girdzijauskas & Mackevičius, 2009; Girdzijauskas & Dubnikovas, 2010) and other theories of economic thought.

Many foreign and Lithuanian scientists examine the causes of the formation of the RE "bubble" and distinguish the factors of the formation, as well as aiming

to determine the key features and indicators, showing that the "bubble" is forming in the RE market. However, they provide many different factors of the formation of the RE "bubble" and different indicators, allowing the assessment of the formation of the "bubble" in the market along with models of possible situations. Researchers (Bagus, 2010; Bocutoglu & Ekinci, 2010; Klagge, Fromhold-Eisebith & Fuchs, 2010) argue that RE "bubbles" occur for objective economic factors, such as economic cycles. Other economists (Lai, Xu & Jia, 2009; Venclauskienė & Snieška, 2009) stress a great influence of institutional investors on the formation of consumers' expectations and the growth of the number of speculators in the RE market, while authors (Kuodis, 2006; Zakalskytė 2006) argue that the country's economic growth, huge demand for housing, increasing investments in the RE market, high government spending, personal income growth and public confidence in the economic stability are the main factors of the formation of the RE "bubble". In addition, very good lending opportunities provided to market participants by financial institutions create favorable conditions for the "bubble" to grow (Gerlach & Peng, 2005; Glindro et al., 2008; Goodman & Thibodeau, 2008; Coleman, LaCour-Little & Vandell, 2008). Subjective factors such as optimistic expectations of market participants, decreased assessment of the market, herd mentality, where one follows the other, and the belief that RE is a reliable and safe investment also result in the formation of the "bubble" in the RE market (Aliber & Kindleberger, 2005; Malpezzi & Wachter, 2005; Kogan, et al., 2006; Milani, 2007; Belinskaja & Rutkauskas, 2007; Timinskaitė, 2011; Gritten, 2011). The main indicators of the RE "bubble" examined by researchers (Wang, Keswani & Taylor, 2008; Taipalus, 2006; Égert &, Mihaljek, 2006; Quigley, 1999; Smith & Smith, 2006; Case & Shiller, 2003a; Baker, 2002; Leika & Valentinaitė, 2007; Glaeser, Gyourko & Saiz, 2008; Jorda, Schularick & Taylor, 2013) allows the assessment of the situation in the RE market.

Factors and indicators of the formation of the RE "bubble" have been examined in these studies, but they lack; a complex evaluation that is relevant to today's RE market, a systematic aspect of the analysis, to which attention is drawn in some publications (Lind, 2008; Kaklauskas et al., 2010; Hou, 2010; Snieška et al., 2011; Chiang, Tsai &, Lee, 2011; Duch & Kellstedt, 2011; Suciu, Picorius & Imbrisca, 2011; Farmer, 2011; Rudzkienė & Azbainis, 2012; Korsakienė & Tvaronavičienė, 2014). It is difficult to set the exact time and size of the RE "bubble", but the possible formation of the "bubble" is often reflected by changes in certain indicators. Given the characteristics and multiplicity of indicators, it is possible to assess whether the results indicate short-term fluctuations or a long-term trend.

The topic of the RE "bubble" is relevant from both a theoretical and practical point of view, because there is no consensus on what factors and indicators cause the formation of the "bubble". In addition, the authors, analyzing indicators of the formation of the RE "bubble", do not reveal the link between

them, which is necessary in order to obtain reliable and accurate results in assessing the size of the housing "bubble". In order to determine whether there is a "bubble" in the RE market, researchers (Hering & Wacher, 2002; Kim, 2004; Hui, Liu & Shen, 2005; Wong & Hui, 2006; Coleman, 2008; Hott & Monnin, 2008) propose a number of methods, but do not create a general research methodology. Many Lithuanian authors focus on the analysis if individual indicators of the formation of the RE "bubble" and pay little attention to the economic impact of the housing "bubble" at the national level. Meanwhile, there is a lack of research of the impact of consumer expectations on the growth of RE prices.

Problem of the scientific work

The scientific problem: how to make a complex evaluation of the indicators of a country's economy and the RE market in order to determine the existence of the RE "bubble" and analyze its development.

The object of the scientific work

The RE "bubble" is the object of the thesis.

The aim of the scientific work

The aim of the scientific work is to create a complex evaluation model for the RE "bubble" by integrating fundamental and subjective factors and indicators reflecting them, which will then allow a quantitative assessment of the extent of the impact of the RE "bubble" on the RE price.

It should be noted that subjective factors interact with fundamental factors. The scientific work analyzes the origin and causality of subjective factors in the context of the interaction of fundamental factors, i.e., how the interaction of fundamental factors or domination of any other fundamental factor in the market development or public discourse for a period of time promote the genesis of subjective factors.

To achieve this, the following **theoretical and practical tasks are set**:

1. To perform an analysis of diversity of concepts and theories of the RE "bubble", summarize and clarify the concept of the RE "bubble".
2. To analyze the interaction of economic and RE "bubble" life cycles and identify the impact of RE indicators on cycle stages.
3. To examine factors of the formation of the RE "bubble" and their indicators, distinguishing the volume of subjective factors and the possible extent of the impact.
4. To develop a system of RE market evaluation indicators.
5. To analyze experience of economic modeling of RE "bubbles" and applicability of economic models, as well as to identify theoretical and practical modeling assumptions in the development of the RE market evaluation model.

6. To develop a complex evaluation model for the RE "bubble".
7. To empirically verify the effectiveness of the model, identifying the extent of the impact of subjective factors.

Defensive statements

- There is not a reliable way to assess the extent of the impact of subjective factors on the RE market price and determine their interaction with the fundamental factors characteristics, due to the lack of availability of Lithuanian real estate market data and the limitation of economic evaluation models for the RE "bubble".
- A system of indicators that allows the identification of the causal chain of factors affecting the RE price is needed for the complex evaluation of the RE "bubble".
- A model for the modeling of the RE "bubble" in the scientific work allows the checking of assumptions for the formation of the RE "bubble". In addition, the model can be used to calculate the extent of the impact of subjective factors and set the value of the RE "bubble", i.e. an overpayment for RE objects, which is due to the impact of subjective factors on the RE price.

Research methods

A systematic comparative and logical analysis of scientific literature, based on comparative, classification, systematization and generalization methods is used to examine theoretical aspects of the RE "bubble" and develop the research methodology.

Quantitative mathematical statistical methods are used to perform an empirical research of the model: statistical analysis and correlation-regression analysis. The empirical research data is processed using Microsoft Excel and Mathcad.

The scientific novelty of work

The scientific novelty and theoretical importance of this work is approved by the main results of the research performed:

- A system for the evaluation of the RE market indicators, which is based on a complex analysis of economic and RE market factors, was developed. The system was used to identify indicators, between which the causal chain was established. The indicators, which are entered into auto-regression equations, make it possible to identify a reasonable extrapolation of RE prices.
- A model for the complex evaluation and extrapolation of the RE "bubble", combining factors affecting RE prices and fundamental indicators, and highlighting the impact of subjective factors of market participants, was developed.

- Correlation and dynamics of economic indicators were identified and the opportunity to use the results for modeling of the RE "bubble" was created, which helps to assess the actual extent of the impact of subjective factors on RE prices.

Possible directions of practical application of the results of the scientific work

A system of indicators developed at the same time for the complex evaluation of the RE "bubble" allows observations of the interaction of individual pairs of indicators, which creates assumptions to compare the actual values of the individual components of the model with the desired ones, and identify the need for improvement or replacement of specific components.

The created model can serve as an economic analysis tool for the assessment of the effectiveness of the adopted regulatory measures and decisions at national or regional level.

The model can be used by representatives of the country's construction sector for taking more reasonable investment decisions and setting appropriate prices of developed RE projects.

Assessment tools of subjective factors could be used to identify the real estate market's product development and acquisition processes "places", where the incentives of market participants (both investors and end buyers) for making unjustified and irrational decisions, such as inadequate rapid and high earnings in the short term are forming (though the real estate market is a long-term product market). In this case, knowing the "problem" of those processes, construction sector developers and investors could foresee certain financial and control protection measures, which might minimize the probability of the occurrence of adverse economic consequences.

Structure of the dissertation

The scientific work consists of an introduction, 3 parts and a conclusions. The volume of work is 145 pages without annexes. 17 tables, 27 figures and 20 annexes are provided in the work. 214 scientific references in the work have been used. The logical structure of the thesis is structured according to the aim of the scientific work and tasks set to achieve it.

CONTENT OF DISERTATION

GENERAL REVIEW OF THE CONTENT

IN THE FIRST PART "THEORETICAL ASPECTS OF THE REAL ESTATE PRICE "BUBBLE" FORMATION", the real estate concept is provided, economic theories for the formation of the "bubble" are examined, as well as the main concepts of the RE "bubble" are distinguished through the prism of the economic theories already analyzed. Finally, a historical development of RE "bubbles" that caused the economic crisis on a global scale is overviewed.

Chapter 1.1. "Real estate market concept" presents the real estate concept and essential characteristics of RE. Real estate is registered in the state registry, based on this, the RE market can be defined as a certain set of mechanisms by which property rights and related interests are transferred, prices are set and different options of the use of the land are provided. Summarizing the opinions of the authors, three main characteristics of RE can be distinguished: physical, economic and legal. Economic characteristics are particularly important. The dividing line between physical and economic characteristics of RE is sometimes difficult to establish. This is because the physical aspects of RE has a significant impact on a households' economic approach to the property. Four main economic characteristics are presented: rarity, priority to location (layout), investment durability and modification. RE markets are divided into categories based on differences between types of property and their attractiveness for different market participants. The various categories of RE markets are divided into sub-markets, which coincide with preferences of market participants (buyers and sellers). Categorization of the market facilitates the analysis. Researchers identify five categories of property that could represent the following RE markets: residential (individual one-family, semi-detached, multi-apartment houses), commercial, industrial, agricultural and special purpose. It should be noted that the thesis analyzes the first category of property, which represents the residential RE market.

Chapter 1.2. "Economic theories of the "bubble" formation" presents not only the two main theories of the RE "bubble", but also new ones, revealing the recently analyzed aspects of the formation of the "bubble". Theory of rational expectations, irrational expectations, bounded rationality and several factor based economic theories have been analyzed. The most famous analysis of theories of the economic "bubble" revealed that in most cases, the research and experiments carried out by representatives of the theory of rational expectations did not provide an unambiguous and specific explanation(-s) for the formation of price "bubbles", although rational individuals without irrational expectations are acting in the market. It has been proven empirically that there are many non-standard situations in the financial markets, which are contrary to the paradigm of rational expectations, so the theory of irrational expectations has been developed. The theory provided many insights into the complexity of human behavior, but its assessment is problematic because the more assumptions that are made, the more

explanations of each phenomenon are needed. Although this school, combining several sciences – economics, psychology and sociology – has improved the understanding of what is happening in the financial markets, definitions of the price "bubble" provided by its representatives do not reveal the reason why the value of property deviates from the fundamental value. It should be noted that the term "fundamental" is the largest uncertainty. For example, it is not clear whether the analysis should use actual nominal interest rates or current or expected interest rates. The uncertainty of fundamental factors is probably the main problem of the concept, because the changes of various macroeconomic factors may become the main cause of the increase in housing prices in the future. In addition, the logistic capital management theory should be distinguished among other new economic theories, because it defines the limits of economic growth and the possible causes of the formation of the "bubble". According to the theory, two conditions are necessary for the formation of the price "bubble": fundamental and psychological. The first condition is linked to the exhaustion of growth resources, while the second – to the psychological attitude of market participants to earn increase wealth.

Chapter 1.3. "Real estate "bubble" concept" presents the results of the comparative analysis of RE "bubble" concepts. Summarizing the results of the analysis, it can be noted that researchers of RE "bubbles" identified short-term and long-term impacts of the growth of construction on the population, as well as the assessed impact of fundamental factors and more favorable credit conditions. However, based on scientific articles analyzed, it can be stated that reticence of the RE market and limited capacity of the investment market have not been assessed. Many authors emphasized the expectations and psychological reasons, arguing that this is the main engine of rising prices, but did not provide a clear explanation of when and why these expectations appear. The expectations lead to the formation of the RE "bubble" and the deviation of prices from the fundamental value of RE.

According to the analysis and some important insights of the logistic capital theory, an adjusted RE "bubble" concept is presented. It shows the fundamental and other reasons for the formation of the RE "bubble". The RE "bubble" is the increase in RE prices to an economically unjustified and unstable level that is due to the high saturation of capital in the market, which leads to the increasing return on investment, attracting even more investors who want to take advantage of rising prices. Some investors believe that the prices will continue to rise, and some take a "bigger fool" concept, hoping to sell the property at a higher price than the purchase price before the burst of the "bubble".

Chapter 1.4. "Analysis of real estate "bubbles"". Following a comprehensive analysis of scientific literature on the most important price "bubbles" that had the largest negative consequences on a global scale, it can be

stated that all the RE "bubbles" analyzed were characterized by irresponsible bank lending policy, facilitated lending conditions and increased speculation in the RE market when housing was bought focusing on the desire to earn as much as possible in the belief that RE prices will continue to rise, rather than rational factors. All these factors led to the formation of the price "bubble" in each of the discussed countries. As the demand for RE exceeded the supply (the initial stage of the formation of the "bubble"), RE prices continued to rise, which led to the emergence of new investors in the market. In the next stage, when housing prices reached the highest level and the "bubble" burst, the prices began to fall and investors aimed to sell RE as soon as possible, which in turn led to an even greater fall in prices. Finally, RE depreciated, many companies went bankrupt, and the banking sector faced crisis.

THE SECOND PART "MODELING METHODOLOGY OF THE REAL ESTATE "BUBBLE" INDICATORS" provides the most important concepts of economic and RE cycles, and defines the main features and characteristics of cyclical fluctuations. In addition, the second part assesses the aspects of the interaction of economic and RE cycles, analyzes factors of the formation of the RE "bubble" and their indicators, which could show the formation of the "bubble" in the market. In the last part, a complex evaluation model for the RE price "bubble", which can also be adapted to other European countries of similar size and/or economic maturity as Lithuania, is developed.

Chapter 2.1. "Aspects of interaction of economic and real estate cycles". According to the analysis of scientific literature carried out in this chapter, cyclical fluctuations can be seen as fluctuations of economic activities in the economy, which appear in a regular, repeated and systematic process. Although many variables are constantly changing, the overall growth trend persists, in other words, the stage of the "bottom" of the economic cycle is replaced with the recovery period. Since the waves in the RE market cycle varies in length and other parameters, qualitative factors that show complexity of cyclical fluctuations should be taken into account when dividing them. It is noted that the RE cycle does not coincide with the economic cycle, but they are both generally moving in the same direction. It can be stated that the RE market is described as an indicator of the economic situation: if the market situation worsens, an economic downturn can be expected, and if the situation in the RE market improves, an economic recovery can be expected.

Generally, it can be said that RE cycles affect the country's entire economy, regional economies, and sometimes the world economy. Depending on the prevailing situation, the cycles can be divided into "good" – unpredictable and inevitable – and "bad" – partly unpredictable, theoretically avoidable and politically influenced. Economic and RE cycles are inseparable from the economy, so the economic system should be seen as an organism rather than a mechanism.

Technological advancement and innovation development result in long-term fluctuations in economic cycles, due to the time lag between the creation and introduction of new technologies and refusal of outdated technological infrastructure. All this leads to an economic slowdown, during which the redistribution of resources and capital re-investment take place.

The opportunity to gain higher profits attracts new investors to the RE market. Later, certain processes are taking place in the RE market, related sectors and the whole economy, which are reflected in economic and RE market cycles. The cyclical nature of the RE market is influenced by direct and indirect factors that show not only the internal situation in the market, but also possible developments. These are the main direct factors (Jorda, Schularick, Taylor, 2013):

- The number of objects built;
- The level of prices of various types of RE objects;
- The number, structure and dynamics of RE transactions;
- Construction and reconstruction costs;
- The time of the display of sold objects in the market.

Meanwhile, these are the main indirect factors:

- Changes in legislation related to management and taxation of RE objects;
- Changes in state monetary policy;
- Changes in activities of commercial banks, providing housing loans;
- Seasonal fluctuations in activity.

Inflation, interest rates, investment flows, the unemployment rate and the application of innovation in the country are among the main macroeconomic factors that affect RE market cycles. Customer expectations, which have an indirect impact, are among the secondary factors. All these factors affect the RE cycle, which is reflected by the RE value or the price in the market. RE value is determined by a supply and demand ratio. The price falls in cases of excess supply, and increases in cases of excess demand. RE supply and demand curves intersect and reach equilibrium in two stages: in the "bubble" and during the recession. Thus, it is concluded that the significant growth of the RE market attracts more investors and leads to the formation of the price "bubble" because the system becomes unstable, and the "bubble" bursts because of the over investment niche in the RE market, in other words too many investors in the market and consequently too much supply.

Chapter 2.2. "Causes of real estate "bubble" formation". An analysis of factors affecting the RE "bubble" showed a large variety and variance, consequently the factors can be classified in various ways. However, in most cases, they are divided into fundamental factors and all others, usually derived ones. It should be noted that there is no accurate list of fundamental factors that

fully reflects the current situation in the RE market and allows the various groups to predict the correct trends and make appropriate development projections. In most cases, they are classified as factors with a direct impact on the RE market, in other words, factors affecting supply and demand. Given the fact that a sharp rise and fall in RE prices cannot always be explained by the analysis of fundamental indicators, there was therefore a need to assess subjective factors. A grouping, allowing the identification of five main groups of factors, was carried out after taking into account the essence, origin and causal links of the factors:

1) Global/systemic economic.
2) Market investment.
3) Institutional/legal.
4) Political and public relations.
5) Subjective.

In order to simplify the classification of factors of the formation of the "bubble" in the RE market, two groups can be identified: objective and subjective factors. Evaluation of objective factors is often justified by quantitative development trends, which lead to the early stage of the formation of the "bubble", with subjective reasons determining the size of the "bubble" and its growth potential. Following the analysis of various RE market studies, it seems obvious that the formation of the RE "bubble" is due to the interaction of unreasonable expectations and fundamental factors.

Chapter 2.3. "Modeling of real estate "bubble" formation in the market". In this chapter, the comprehensive methodology for the evaluation of the formation of the RE "bubble" in the market, along with a logical scheme for model design is provided. *It covers 4 main stages:*

1 stage. Identification and systematization of the main indicators of the formation of the "bubble" in the RE market.

2 stage. Selection of the methods for the complex evaluation of the formation of the "bubble" in the RE market.

3 stage. Development of a system of indicators, defining the mutual interactions and relations.

4 stage. Development of a complex evaluation model for the RE "bubble".

The following indicators were analyzed: housing prices and personal income ratio, housing price growth and GDP growth ratio, RE investment growth and GDP growth ratio, housing rent and housing price ratio, construction sector activity indicators, housing cost indicator, relative financial availability or credit market indicators, housing supply and demand, household expectations on housing prices, impatience of RE buyers, financial risk-taking and speculative behavior.

In summary, it can be said that the most important and the most difficult objective is to try to create the warning signals that would act as indicators,

showing whether there is a likelihood that the sharp increase in housing prices may lead to a decline in the near future, in other words, indicators that would help to determine whether the RE "bubble" is forming in the market. Following the analysis of factors of the formation of the price "bubble", as well as the review of the main evaluation methods, indicators were selected to determine whether there is a "bubble" in the Lithuanian RE market. It can be reasonably argued that the indicators themselves do not reflect market development trends, so a system for the identification of relations between them and modeling of certain scenarios by the results obtained, was developed.

The system includes indicators that show macroeconomic factors, structural changes, credit conditions and expectations among market participants: interest rate costs related to household income, housing price expectations, housing affordability indicator, construction input price index change and housing price change ratio, profitability of the construction sector, the share of tangible investments in the RE market, loan availability indicator, RE demand elasticity for housing price, the level of RE market saturation, construction confidence index, consumer confidence index and others.

Having established mutual relations between the selected fundamental and subjective indicators, the formation of the "bubble" can be identified more accurately. However, the most important aspect is the opportunity to quantitatively assess the impact of consumers' irrational expectations on RE prices, in other words, to calculate the extent of the impact of consumer expectations (fig. 1).

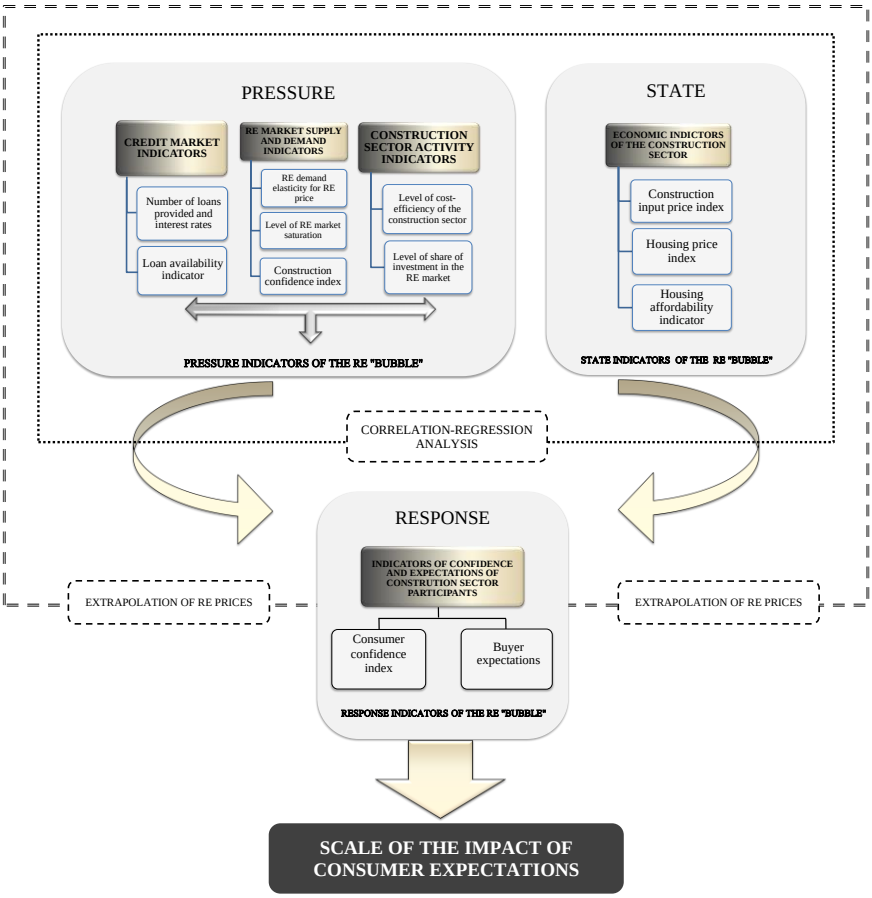

Figure 1. Complex evaluation model for the real estate price "bubble"

The assumption of the causal chain between indicators would be made in this model, but the key indicators of factor, status and response were identified. Indicators of factors reflect the main factors of the formation of the RE "bubble", while indicators of status reflect fundamental indicators or their relationship. It should be noted that factors of the formation of the RE "bubble" affect the status of sensitive economic conjuncture receptors, which is reflected by indicators of status, and changes in this status encourage responses such as consumers' irrational expectations and actions.

Linear regression analysis is performed to assess indicators specified in the model. The regression model is used to calculate relationships and directions, as well as the nature of factors. In addition, there is the opportunity to model the status

of the RE "bubble" under different conditions during the entire period analyzed. After the correlation-regression analysis and the assessment of response indicators by the same principle, extrapolation of RE prices is performed and then the RE "bubble" is identified in the market. In the case of the presence of a RE "bubble" in the market, the size of the "bubble" is calculated.

THE THIRD PART "APPLICATION OF THE REAL ESTATE "BUBBLE" COMPLEX EVALUATION MODEL IN THE LITHUANIAN REAL ESTATE MARKET" aims to confirm the existence of the price "bubble" in the Lithuanian RE market and identify its genesis period and the scale of consumer expectations. Therefore, an empirical study of the application of the RE "bubble" complex evaluation model was carried out using Lithuania's economic and RE market, along with the demographic and economic well-being data of 2004-2014.

Chapter 3.1. „Study of economic indicators, affecting the real estate market, during the period of 2004-2014". Two hypotheses are raised in the chapter to achieve the aim of the scientific work:

1. Hypothesis 1 (H_1): between 2004-2008, there was a RE "bubble" of the certain size in the Lithuanian residential RE market, one of the reasons for the formation of this was consumer expectations that were not based on fundamental economic factors.
2. Hypothesis 2 (H_2): between 2010-2014, the development of the Lithuanian residential RE market is based on fundamental economic factors.

In the analysis of statistical data of the Lithuanian economic and RE market-related sectors, the period of 2004-2014 is divided into several separate periods with different characteristics:

- The first period covers 2004-2008 and, taking into account hypothesis H_1, it is considered to be the period of the formation of the "bubble" and the country's economic and RE market boom.
- The second period covers 2008-2010 and can be described as the period of the sudden downturn in the economy and the burst of the RE "bubble".
- The third period covers 2010-2014 and can be described as the period of the economic recovery and stabilization of the RE market and, according to hypothesis H_2, is based on fundamental factors.

It should be noted that this division is conditional, and the limits of the periods are not clearly defined, therefore the periods overlap in some calculations. However, it only highlights the development of the country's economic and RE market cycles and demonstrates the relationships between certain indicators of the analysis, which are interrelated and correlate with a certain time delay. In addition, limitations arise from the limited Lithuanian economic and RE market data.

In summary, the analysis of fundamental and subjective indicators affecting the RE market was carried out in this chapter. Firstly, housing affordability and loan market indicators were analyzed and the empirical study of indicators, affecting the balance of the RE market, was carried out. Then indicators of factors and status, identified in the RE "bubble" complex evaluation model, were analyzed in detail. RE demand elasticity for the price and dynamics of the level of RE market saturation were analyzed, as well as correlation between tangible investments of residential RE market construction companies and the housing price. In addition, relative changes in the construction input price index and RE prices and changes in profitability and cost-efficiency indicators of construction companies were also considered.

Chapter 3.2. "Empirical study of the extent of the impact of consumers' expectations on real estate price growth factors". The results of the analysis of trends of RE market indicators and their links to the loan market, economic well-being and economic indicators are assessed according to H_1 and H_2 hypotheses in order to determine their accuracy and validity. This interim assessment enables the analysis of the RE "bubble" and measure the expected price of consumer expectations, in other words, the overpayment for residential RE. This price of consumer expectations or overpayment can be defined as part of the price that has increased for the impact of consumer expectations on the RE market. The table below (table 1) provides a summary of how the result from the analysis of RE and loan markets, economic well-being and economic indicators meets the hypotheses raised.

Table 1. The result of the analysis of analyzed trends of RE market indicators and their links with fundamental indicators.

Indicators analyzed, their links or causal relations	Hypothesis H_1	Hypothesis H_2
1. Dynamics and links between the number of mortgage loans provided and loan availability indicators	The result confirms the hypothesis	The result confirms the hypothesis
2. Dynamics of indicators of interest rates of mortgage loans and the number of loans provided	The result confirms the hypothesis	The result confirms the hypothesis
3. Interaction of loan price and loan availability indicators	The result confirms the hypothesis	The result confirms the hypothesis
4. Dynamics and links between household income and housing prices	The result confirms the hypothesis	The result confirms the hypothesis
5. Dynamics and links between indicators of consumer expectations and housing prices (graphical and standardized indicators comparisons)	The result confirms the hypothesis	The result confirms the hypothesis

Indicators analyzed, their links or causal relations	Hypothesis H1	Hypothesis H2
6. Analysis of RE demand elasticity for prices and comparison with dynamics of housing prices	The result does not confirm the hypothesis	The result does not confirm the hypothesis
7. Dynamics and links between indicators of RE market saturation and changes in housing prices (graphical and standardized indicators comparisons)	The result confirms the hypothesis	The result confirms the hypothesis
8. Comparison of tangible investments in the construction sector and the country's economy	The result confirms the hypothesis	The result confirms the hypothesis
9. Comparison of dynamics of tangible investments of construction sector companies and housing prices and juxtaposition with the construction confidence index	The result does not confirm the hypothesis	The result does not confirm the hypothesis
10. Analysis of the construction input price index and changes in housing prices and links between them	The result confirms the hypothesis	The result confirms the hypothesis
11. Analysis of profitability indicators of construction companies and juxtaposition with the construction confidence index	The result does not confirm the hypothesis	The result does not confirm the hypothesis
12. Pre-tax profit dynamics of construction companies and all business entities	The result partly confirms the hypothesis	The result confirms the hypothesis

The results show that both hypotheses have been proven, which means that changes in the Lithuanian RE market in 2004-2008 cannot be explained solely by the impact of fundamental factors, while dynamics of indicators in 2010-2014 meets trends of the whole economy and related market changes that can be explained by the impact of fundamental changes. It follows that in 2004-2008, there really was a price "bubble" of the certain size in the Lithuanian RE market. Based on the results of the analysis, it can also be said that the burst of the "bubble" and the sudden decline in the RE market is clearly seen in 2009, so the decline phase to the stabilization moment should also be attributed to the period of life of the RE "bubble".

The residential RE "bubble" for the period of 2004-2009 is calculated according to the following algorithm:

1. the following calculation assumptions are made:
    a. demand and supply factors have the same impact on the housing price;
    b. based on the results of the linear correlation analysis, the household income indicator is chosen among all the factors, affecting the supply, to calculate the size of the RE "bubble" (the

indicator of Pearson's linear correlation with housing prices during the period of 2010-2014 is equal to 0.92);

c. based on the results of the linear correlation analysis, the construction input price index is chosen among all the factors affecting the supply to calculate the size of the RE "bubble" (the indicator of Pearson's linear correlation with housing prices during the period of 2010-2014 is equal to 0.86);

d. in order to better identify the functional link between the said variables, data of one period before the period of the beginning of the assessed RE "bubble" is additionally used for the calculations (housing prices, household income and construction input price index data for the year 2003);

2. With the help of the linear regression, a functional link between household income and housing prices, as well as between the construction input price index and housing prices is identified.
3. Significance of the linear correlation coefficient is verified.
4. In accordance with both linear regression equities, the extrapolation of hypothetical housing prices in 2004-2014 is performed.
5. On the assumption that demand and supply factors have the same impact on the housing price, the average housing prices in 2004-2014 are calculated, along with absolute and percentage deviations of these values from the actual data of the relevant period are identified.
6. The value of the RE "bubble" in each period of the "bubble" is calculated, as well as the relative share of this value in the total value of the RE market.

Based on the calculation results, a large difference between the modeled and actual prices is noticed during the period of the RE "bubble" in 2004-2009, while the modeled prices of the development period of 2010-2014, which is based on fundamental factors, do not differ much from actual values (deviation from the actual price does not exceed 6%). In order to determine the size of the RE "bubble" in financial terms and assess its share in the residential RE market (table 2), sold RE area statistics are used. It allows the calculating of the difference between the actual and modeled values in the residential RE market.

Table 2. The size of the modeled RE "bubble" and the share of its value in the RE market

	2004	2005	2006	2007	2008	2009
Actual area sold in residential RE transactions, m^2	443.080	497.245	441.381	569.487	400.316	242.258
Price of RE "bubble", M LTL	119,1	396,7	622,7	789,8	635,4	129,0
Total value of residential RE transactions, M LTL	976,5	1.540,3	1.855,9	2.858,2	2.195,0	926,1
Share of RE "bubble" value in RE market	12,2 %	25,8 %	33,6 %	27,6 %	28,9 %	13,9 %

Based on the calculation results, it is stated that the size of the RE "bubble" during the period of its genesis, peak and burst ranged from 12.2% to 33.6% of the total value of the RE market. This amounted increased from LTL 926.1 million to LTL 2.858,2 million per year, and during the whole lifetime of the "bubble", its "price" for buyers could be almost LTL 2.7 billion.

The figure below (fig. 2) shows the dynamics of actual (red line) and modeled (green line) residential RE prices, and the difference between these curves during the period 2004-2009 (the black area) is distinguished as the effect of the RE "bubble". Curves of dynamics of the main demand and supply elements used for the modeling of the RE "bubble" are also shown in the figure to juxtapose the trends of the RE market and fundamental economic factors.

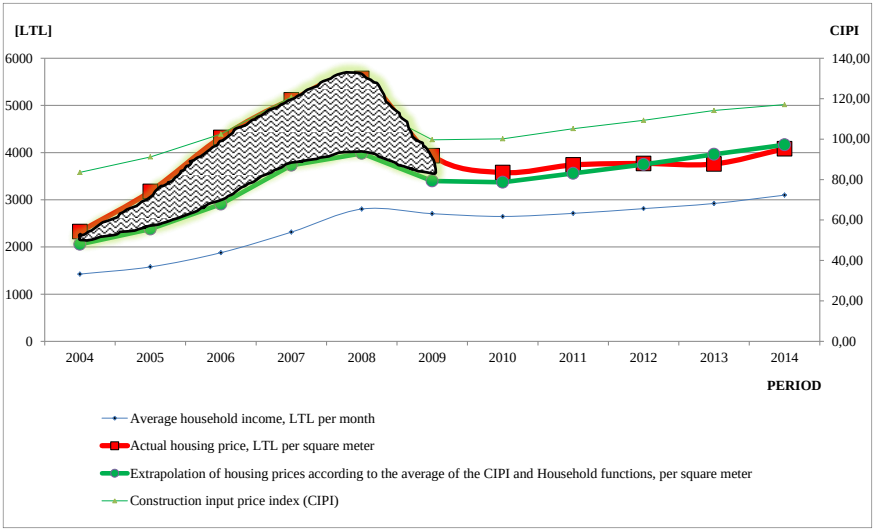

Figure 2. The extent of the impact of consumer expectations

Based on the graphical data analysis, it can be noted that the impact of irrational expectations increased gradually (fig. 2), thus, further promoting their fulfillment. The extent of these irrational expectations in financial terms can be called the value of the RE "bubble", which means the amount of money that is unreasonably paid by market participants, acquiring the residential RE for both investment and personal use. The peak of the size of the RE "bubble" was reached in 2008, during the period when the indicators of the sector's companies already showed clear signals of upcoming recession, and the expectations of market participants have become quite pessimistic, which led to the sharp decrease in tangible investments, cost optimization and other stabilization measures. Meanwhile, residential RE prices continued to increase, which further proves the existence of the RE "bubble" that encouraged representatives of the construction business to "skim the last cream" in the market before the recession.

CONCLUSIONS

1. The real estate market is diverse and depends on many objective and subjective factors, therefore the analysis of its situation and dynamics requires an integrated approach to market indicators and their causal relationships. Evaluation of real estate objects by physical, economic and legal characteristics makes it possible to use different criteria of market behavior modeling, but analytical data of the credit services market, the labor market and the effects of the inertia of markets and consumer expectations should also be assessed. The latter criteria are very important for the identification and analysis of "bubbles" in the RE market.
2. The analysis of scientific studies showed that RE "bubbles" are viewed ambiguously because of the disagreement on conditions and circumstances of the formation of the RE "bubble" that threatens the country's economy. The reason for this can be found by assessing the development of the RE "bubble": which is usually discussed retrospectively because it is difficult to say whether the "bubble" exists in real time, and it is usually assessed after the burst when RE prices begin to fall rapidly.
3. The analysis of scientific studies and publications showed that GDP growth, personal income growth and population change are the main macroeconomic indicators, affecting the demand for housing in the long term. The mere quantitative evaluation of these indicators does not explain the rapid growth of housing prices, so a qualitative analysis, allowing to identify the threat of overheating of the RE market, is needed. The main economic indicators are too general, so in order to systemize fundamental indicators of the RE "bubble", it's necessary to identify relative indicators,

reflecting relations between the most important factors of the formation of the RE "bubble".

4. The analysis of economic theories of "bubbles" revealed a variety of reasons for approaches to this phenomenon and the effects on the economy, but a reliable method for determining the economic value of the "bubble" is still an object of scientific debate and research. In many cases, studies carried out by representatives of the theory of rational expectations did not provide an unambiguous and specific explanation of the formation of price "bubbles". It was proven empirically that there are a lot of non-standard situations in the financial markets, which are contrary to the paradigm of rational expectations. On this basis, the theory of irrational expectations has been developed. The theory provided a lot of insights into the complexity of human behavior, but its assessment is problematic because the more assumptions that are made, the more explanations of each phenomenon are needed. Many authors emphasized the expectations and psychological reasons, arguing that this is the main engine of rising prices, but did not provide a clear explanation of when and why these expectations, leading to the formation of the "bubble" and the deviation of prices from the fundamental RE value, appear. In order to identify the RE "bubble", some researchers suggest choosing several indicators, which should include macroeconomic factors, structural changes, credit conditions and expectations among market participants to perform their complex analysis.

5. The RE "bubble" concept is clarified on the basis of the analysis of theories of economic "bubbles". The RE "bubble" is the increase in RE prices to an economically unjustified and unstable level. This is due to high saturation of capital in the market, which leads to the increasing return on investment, attracting even more investors who want to take advantage of rising prices. In the adjusted definition of the RE "bubble", a fundamental impulse, reflected by the decrease in investments in the RE market, is used as the basis, and facilitated credit conditions act as an incentive. Herd mentality is observed later and then the price "bubble" forms in the market.

6. Based on the analysis of scientific publications and studies, cyclical fluctuations in the economy can be seen as fluctuations of economic activities in the economy, leading to a regular, repeated and systematic process. Although many variables are constantly changing, the overall upward trend remains, in other words, the phase of the economic cycle "bottom" is replaced with the period of economic recovery. Since waves of the RE market cycle differs by their length and other parameters, qualitative factors, showing the complexity of cyclical fluctuations, should be taken into account when dividing them. It should be noted that the RE cycle does not coincide with the economic cycle, but both are moving in one direction.

In conclusion, it can be said that RE cycles affect the country's economy, economies of other countries, and sometimes even the world's economy. Depending on the situation, the cycles can be divided into "good", which are unpredictable and unavoidable, and "bad", which are partly predictable, theoretically avoidable and politically influenced. Activity of economic and RE cycles is an integral part of the overall economic performance, so the economic system should be seen not as a mechanism, but as a body. Technological progress and innovation lead to long-term fluctuations in economic cycles; as there is a time lag between the creation and introduction of new technologies and the refusal of morally outdated technological infrastructure. All this leads to an economic slowdown, during which the redistribution of resources and re-investment of capital are taking place in the market.

7. In order to simplify the breakdown of the formation of the price "bubble" in the RE market, two groups – objective and subjective factors – can be named. The evaluation of objective factors is usually justified by quantitative development trends, which lead to the rudiments of the formation of the price "bubble", and subjective reasons affect the size of the price "bubble" and its growth potential. Based on the analysis of various scientific studies in the RE market it can be confidently stated that interaction between irrational consumer expectations and fundamental factors leads to the formation of RE price "bubble".
8. Research has shown that the selection of the method for the identification of the price "bubble" can be determined by statistical information collected and provided in the country, however, sometimes it can be impossible to apply some methods due to the lack of data. Usually, two methods are used to measure the size of the RE "bubble": the indicator method and the simulation method. In order to conduct a complex assessment of the RE "bubble", assessment methods of housing prices and personal income, rational expectations, fundamental factors, which have an impact on demand and supply, as well as the vector error correlation model for the assessment of the RE "bubble" were analysed. It is not known which method is better or more accurate, since all of them have their own advantages and drawbacks. It can be said that there is no method that fits all cases, therefore in order to indicate the size of the price "bubble" as accurately as possible, all the methods analysed were modified.
9. After summarizing the results of the theoretical analysis and taking into account methodological insights, it was decided to assess the size of the RE "bubble" by using the complex evaluation model first of all reveals the most important indicators for determining whether there is a price "bubble" in the housing market and calculating its size, as well as also reflects the

links between the indicators through a causal chain. The model structure consists of three groups of indicators:

- *Indicators of Pressure*, reflecting objective factors of the formation of the RE "bubble".
- *Indicators of State*, covering fundamental indicators of the formation of the RE "bubble".
- *Indicators of Response*, reflecting the response of housing buyers to objective factors of the formation of the price "bubble".

10. The study of the Lithuanian RE "bubble" led to the following conclusions:

- During the lifetime of the RE "bubble", the interaction between market indicators is distorted, therefore it is only possible to adequately assess the situation in the market by comparing indicators with the situation before the price "bubble" or after it. Non-standard status of RE market indicators is characterized by the following "symptoms":
  - → the number of mortgage loans is growing despite rising interest rates and worsening loan availability;
  - → residential RE prices are growing despite the worsening housing affordability and loan availability indicators;
  - → residential RE prices are growing significantly faster than household income;
  - → RE market saturation indicator growth rate significantly lags behind that of RE prices;
  - → construction costs are growing at a much lower pace compared with residential RE prices;
  - → the volume of tangible investments in construction sector companies is based on irrational expectations (the same as the growth of housing prices), so their growth rates are significantly above tangible investment trends in other business sectors. The long-term result of this process is increasing business risk and decreasing efficiency;
  - → profitability indicators of construction companies are characterized by more sudden and larger changes than other business sectors.
- Demand for residential RE is relatively inelastic to the price in the long term, which means that even sudden or large-scale fluctuations in prices usually result in only short-term changes in demand, while the long-term trend remains stable. On this basis, it can be reasonably argued that the RE demand elasticity indicator is not suitable for the RE "bubble" analysis.

- Cost-efficiency indicators of construction companies can be seen as signal indicators in forecasting changes in RE prices and demand in 1-3 years.
- Construction input price index should be used and assessed with the provision, since it does not include land acquisition and preparation for construction costs.
- Consumer expectations are reflected in residential RE prices after about one year, which partly explains the principle of fulfillment of irrational expectations.
- Construction business expectations for business and market development determine their decisions on tangible investments after one year. The reflection of these decisions in RE prices is observed after one more year.
- When modeling the size of the RE "bubble", it is necessary to take into account indicators, affecting both supply and demand, since RE developers always want to get a higher price for housing than households can afford, while the price stabilizes for the impact of these two forces.

11. Summarized results of the analysis of trends of real estate market indicators, their relation to loan market, economic well-being and economic indicators show that the scientific hypothesis was confirmed. Changes in the Lithuanian RE market in 2004-2008 cannot be explained solely on fundamental factors, while the dynamics of indicators in 2010-2014 is in line with the trends of changes in the economy and related markets, which can be explained by the impact of fundamental factors. On that basis, it follows that there was a certain price "bubble" in the Lithuanian RE market in 2004-2008. The results of the analysis also show that the bubble "explosion" and a sharp decline in the RE market are clearly seen in 2009, therefore the decline phase is also attributable to the period of life of the RE "bubble" until the stabilization moment.
12. The result of the modeling of the size of the RE "bubble" is regarded as reliable, given the limits set. The two most significant indicators, on which the extrapolation of RE price is based under the *ceteris paribus* conditions, are identified during the modeling (based on Pearson's linear correlation analysis). Despite the possible modeling flows, it is believed that the result adequately reflects the size of the RE "bubble" that existed in Lithuania.
13. The study of the Lithuanian RE "bubble" and the assessment of its size revealed practical benefits of the model, which occur through the use of the model results and insights obtained in the changing economic and social environment in order to prevent recurrence of the real estate "bubble" or at least mitigate its impact. The complex evaluation model for the real estate price "bubble" could be used to identify the real estate market's product development and acquisition processes "places", where the incentives for

making unjustified and irrational decisions of market participants are forming. This means that knowing the "problem" of those processes may provide certain financial and control protection measures, which might minimize the probability of the occurrence of the adverse economic consequences.

14. The RE "bubble" complex evaluation model for the study of the RE "bubble" and the assessment of its size could be improved in the following aspects and directions:
    - Having ensured availability and reliability of RE market data, it would be possible to include RE price and rent income ratio in the model, which would provide additional information about the adequacy of RE prices for the country's economic situation, the population's purchasing power or the activity and financial capacity of business companies. When monitoring the secondary RE market, it would be useful to collect data about both residential and commercial RE prices and market activity. However, in order to have reliable data, tighter regulation of responsibility of market participants and obligation to register more details about RE transactions are needed.
    - More indicators, effecting demand and supply, could be used for the extrapolation of RE prices, which would result in an even more accurate assessment of the size of the RE "bubble". In order to achieve this, it is necessary to additionally study the impact of indicators of RE prices, which would become a basis for the classification of indicators by their degree of impact and give them certain weight ratios. In this way, it would be possible to select those indicators that are most significant for the specific market and reject those with a smaller impact.

LIST OF SCIENTIFIC PUBLICATIONS ON THE TOPIC OF DISSERTATION

ARTICLES

Articles published in reviewed scientific journals from the list of International databases

1. Simanavičienė, Ž., Keizerienė, E., and Žalgirytė, L. (2012). Lithuanian real estate market: the analysis of prices of real estate and construction costs. *Economics and management*, 17(3), 1034-1041. ISSN 1822-6515.
2. Simanavičienė Ž., and Keizerienė, E. (2011). Economic logistic evaluation of real estate price bubble in Lithuania. *International Conference on Business Intelligence and Financial Engineering (ICBIFE 2011)*, Hong Kong.
3. Simanavičienė, Ž., and Keizerienė, E. (2011). Impact of macroeconomic factors on the Lithuanian real estate market crisis. *Economics and management*, 16, 323-329. ISSN 1822-6515.
4. Simanavičienė, Ž., and Keizerienė, E. (2010). Influence of economical factors on price bubble formation in Lithuania residential real estate market. *Journal of Mangement*, 17 (1), 195-202. Vakarų Lietuvos verslo kolegija. Klaipėda: Klaipėdos universiteto leidykla. ISSN 1648-7974.

Articles published in other reviewed scientific journals

5. Simanavičienė, Ž., and Keizerienė, E. (2011). Impact of macroeconomic indicators on the change of prices in the Lithuanian real estate market. Towards increase of tourism attractiveness in Lithuania and Poland = Towards improving tourism attractiveness in Lithuania and Poland. Tarptautinės mokslinės konferencijos mokslo darbai / Kauno Technologijos Universitetas, Balstogės aukštesnioji vadybos mokykla, (pp. 299-309). Kaunas: Technologija, ISBN 9789955259312.
6. Simanavičienė, Ž., Keizerienė, E., and Vilkė, R. (2009). Influence of economic factors for real estate market price bubble formation in the Baltic States // Moderne pristupy k manažmentu podniku = Modern Approaches to Corporate Management. Proceedings of the 18th International Scientific Conference, 10-11 September 2009,

Bratislava, Slovak Republic, (pp. 396-404). Bratislava: Slovak University of Technology in Bratislava, ISBN 9788022731690.

7. Simanavičienė, Ž., and Keizerienė, E. (2009). Influence of economic factors for real estate market price bubble formation. RTU Starptautiskā zinātniskā konference: RTU IEVF Ekonomikas un uznēmēj darbības zinātniskā konference (SCEE'2009) = 50th International Scientific Conference of Riga Technical University: RTU FEEM Scientific Conference on Economics and Entrepreneurship (SCEE'2009), 15-16 October, 2009, Riga, Latvia, (pp. 357-364). Riga: Riga Technical University, ISBN 9789984321738.

INFORMATION ABOUT THE AUTHOR

Name: Eglė Keizerienė

Academic background: **2003 – 2007** Studies at Vilnius University: Bachelor degree in Management and business administration, Management and business administration
2007 – 2009 Studies at Vilnius University: Master degree in Management and business administration, International business
2009 – 2015 Doctoral studies at Kaunas University of Technology

Fields of scientific interest: real estate market, real estate market evaluation indicators, price "bubble".

REZIUMĖ

Nekilnojamojo turto rinka paprastai sudaro labai reikšmingą šalies ekonomikos dalį, yra betarpiškai susijusi su kitais ūkio sektoriais, o jos ciklas daro gilų ir ilgalaikį poveikį šalies ekonominiam gyvybingumui. Nepaisant didelio NT rinkos reikšmingumo ir glaudžių sąsajų su kitais šalies ekonomikos sektoriais, poveikį šios rinkos svyravimui gali daryti ne tik fundamentalūs ir išmatuojami veiksniai, tačiau ir rinkos dalyvių lūkesčiai bei kiti subjektyvieji veiksniai. Dėl šios priežasties, NT rinkos analizė pasitelkiant įprastus ekonominius rodiklius bei loginius ryšius ne visuomet iki galo atskleidžia pokyčių priežastis ar indikuoja, kaip toliau galėtų plėtotis rinka. Tai tampa ypač akivaizdu staigaus NT rinkos kainų augimo ir kritimo momentais. Laikotarpis tarp šių dviejų momentų dažnai vadinamas kainų „burbulu“. Susidarius tokiai situacijai rinkoje, viešojoje erdvėje dažnai tiesiog yra nurodoma, kad NT kainų „burbulą“ sukėlė neadekvatūs rinkos dalyvių lūkesčiai, tačiau, kai rinkoje dalyvauja 3–4 pagrindinės dalyvių grupės (NT plėtotojai, NT pardavimo tarpininkai/brokeriai, finansinės institucijos, fiziniai asmenys), neįmanoma iš pirmo žvilgsnio identifikuoti, kuri iš jų ir kokius pokyčius nulemia. Tokiu atveju neabejotinai reikalinga išsamesnė rinkos analizė bei veiksnių, priežastinių ryšių identifikavimas. Paminėtina tai, kad kompleksinio vertinimo metodikos, tinkamos visiems rinkos dalyviams, nėra sukurta. NT rinkos ciklo ir kainų „burbulo“ susidarymo priežasčių bei pasekmių tyrimų trūkumas neleidžia visapusiškai suvokti ir įvertinti esamą situaciją, prognozuoti ateities tendencijas ir numatyti veiksmus kaip apsisaugoti nuo rinkos svyravimo padarinių ar jų išnaudojimui siekiant veiklos efektyvinimo.

Šiuo metu NT kainų „burbulo“ reiškinys vis dar išlieka aktualus, kadangi nesutariama dėl jo susidarymo priežasčių, taip pat pagrindinių požymių, rodančių, kad rinkoje yra susiformavęs kainų „burbulas”. Nėra bendros nuomonės dėl to, koks metodas būsto kainų „burbului“ nustatyti ir įvertinti yra geriausias. Kai kurie mokslininkai taiko įvairius indikatorius ir jų derinius, kiti remiasi vartotojo išlaidų (turto-rinkos metodas) modeliavimu, o dar kiti naudoja vektorinį paklaidų korekcijos modelį. Tačiau reikia pabrėžti, kad tiriant šį reiškinį, nė vienas iš nagrinėtų metodų nėra visuotinai pripažintas kaip tinkamiausias ir teikiantis neabejotinų rezultatų. Atsižvelgiant į tai, kad kainų „burbulų“ sprogimas ir po jo einantis NT ir su tai susijusių rinkų nuosmukis daro didelę žalą šalies ekonomikai bei pakerta rinkos dalyvių pasitikėjimą ilgalaikėje perspektyvoje, tampa akivaizdu, jog ypač svarbu laiku ir kruopščiai išanalizuoti rinkos indikatorius, o analizės rezultatus panaudoti priimant pagrįstus prisitaikymo prie rinkos pokyčių veiksmus.

Mokslininkai, nagrinėjantys NT kainų „burbulo“ susiformavimą nusakančius indikatorius, ne visuomet atskleidžia jų tarpusavio ryšius, todėl dažnai iš anksto nėra aišku, kuris iš indikatorių yra atsako indikatorius, o kuris atspindi NT kainų formavimo veiksnius arba yra varomoji jėga, daranti įtaką

būklės indikatoriui. Analizuojant NT „burbulų“ susidarymą šiame moksliniame darbe pateikiamos kelios pozicijos – tiek NT plėtotojo, investuotojo, tiek ir NT produkto galutinio vartotojo – pirkėjo. NT „burbulų“ susidarymo analizė ir prevencija bei „sveika“ NT rinka yra abiejų šių šalių bendras interesas.

Visi disertacijos autorės atrinkti NT kainų „burbulo“ indikatoriai (tiek atspindintys būklę, veiksnius bei atsaką) yra tarpusavyje susiję, todėl siekiant įvardinti, kuris indikatorius yra priežastis, o kuris – pasekmė vienas kito atžvilgiu, reikia atlikti kainų „burbulus“ nagrinėjančių mokslinių publikacijų, tyrimų ir studijų analizę bei išsamią konkrečios NT rinkos būklės ir šalies ekonominės situacijos analizes.

Dar sudėtingesnė užduotis nagrinėjant NT kainų „burbulus“ – subjektyviųjų veiksnių poveikio rinkos kainoms įvertinimas. Kalbant apie NT kainų „burbulą“, greta fundamentaliųjų, rinką veikiančių veiksnių, visada įvardijamas ir vartotojų lūkesčių poveikis kainoms. Paminėtina tai, kad kiekvienas rinkos dalyvis, nesvarbu ar tai statybos bendrovė, finansų institucija, ar galutinis produkto vartotojas, turi tam tikrų lūkesčių vienas kito bei NT objektų vertės atžvilgiu, todėl lūkesčiai gali tapti arba svarbia rinkos varomąja ar stabdančiąja jėga. Nepaisant to, NT kainų „burbulas“ dažniausiai yra tik identifikuojamas kaip egzistuojantis, o tyrimų ir studijų dėl lūkesčių kiekybinio įvertinimo dažniausiai nesiimama dėl specifinių matavimo vienetų bei priemonių ir metodų nebuvimo. Remiantis tuo galima neabejotinai teigti, kad NT kainų „burbulų“ modeliavimas ir juos veikiančių subjektyviųjų veiksnių poveikio masto įvertinimas yra aktualus mokslinio tyrimo objektas.

Mokslinės problemos ištyrimo lygis

NT evoliucija ir ciklai yra plačiai nagrinėjami akademinėje visuomenėje, o pastarąjį dešimtmetį skiriamas itin didelis dėmesys nekilnojamojo turto rinkos kainų „burbulo“ problemoms tirti. NT kainų „burbulo“ susiformavimo teorinės prielaidos, susijusios su racionaliųjų lūkesčių tyrimais, analizuotos šių autorių darbuose (Lucas, 1972, 1988; Fama, 1965,1970; Blanchard, 1979; McCarthy, Peach, 2004; Brusco, Catiglionesi, 2007; Reinhart, Rogoff, 2008; Nneji, Brooks, Ward, 2011), susijusios su neracionalių lūkesčių tyrimais, analizuotos šių autorių darbuose (Kahneman, Riep, 1998; Kahneman, Tversky, 1973, 1979; Blanchard, Watson, 1982; Levin, Wright, 1997; Shiller, 2000, 2002; Pastor, Veronse, 2006; Levine, Zajac, 2007; Podolny, 2005; Dass, Massa, Patgiri, 2008), susijusios su riboto racionalumo tyrimais, analizuotos šių autorių darbuose (Hommes, 2001; LeBaron, 2000; Allen, Gale, 2000; Baddeley, 2005; Brunnermeier, 2009; Sornette, 2010; 2014; Allen, Carleti, 2011; Allen, Babus, Carletti, 2009), susijusios su kelių veiksnių tyrimais, analizuotos šių autorių darbuose (Farlow, 2004; Lind, 2008; Farmer, Roger, 2010, 2011), susijusios su logistinės kapitalo valdymo teorijos tyrimais, analizuotos šių autorių darbuose (Girdzijauskas, 2002, 2006, 2008; Girdzijauskas, Štreimikienė, 2010; Girdzijauskas, Mackevičius, 2009; Girdzijauskas, Dubnikovas, 2010) ir kitose ekonominės minties teorijose.

Daugelis užsienio ir Lietuvos mokslininkų nagrinėjo NT kainų „burbulo“ susidarymo priežastis ir išskyrė jų susidarymo veiksnius bei siekė apibrėžti pagrindinius požymius bei indikatorius, parodančius, kad NT rinkoje formuojasi „burbulas“. Tačiau pateikiama daug skirtingų NT rinkos kainų „burbulo“ susiformavimo veiksnių ir išskiriami skirtingi indikatoriai, leidžiantys vertinti būsto „burbulo“ susidarymą rinkoje bei modeliuoti galimas situacijas. Mokslininkai (Bagus, 2010; Bocutoglu, Ekinci, 2010; Klagge, Fromhold-Eisebith, Fuchs, 2010) teigia, kad NT kainų „burbulai“ susidaro dėl objektyvių ekonominių veiksnių, pavyzdžiui, ekonomikos ciklų. Kiti ekonomistai (Lai, Xu, Jia, 2009; Venclauskienė, Snieška, 2009) pabrėžia didelę institucinių investuotojų įtaką gyventojų lūkesčių formavimui ir spekuliantų skaičiaus NT rinkoje didėjimui. Autoriai (Kuodis, 2006, 2008; Nausėda, 2005; Zakalskytė 2006) teigia, kad šalies ekonomikos augimas, didžiulė būsto paklausa, augančios investicijų į nekilnojamojo turto rinką apimtys, didelės vyriausybės išlaidos, gyventojų pajamų augimas ir visuomenės pasitikėjimas ekonomika dėl jos stabilumo yra pagrindiniai NT kainų „burbulo“ susidarymo veiksniai. Be to, finansinių institucijų suteikiamos itin geros kreditavimo galimybes rinkos dalyviams, sudaro palankias sąlygas „burbului“ pūstis (Glindro *ir kt.*, 2008; Goodman, Thibodeau, 2008; Coleman, LaCour-Little, Vandell, 2008). Subjektyvūs veiksniai, tokie kaip optimistiniai rinkos dalyvių lūkesčiai, sumažėjęs rinkos vertinimas, „bandos jausmas“ bei įsitikinimas, kad NT yra patikima ir saugi investicija, taip pat sąlygoja NT kainų „burbulo“ formavimąsi rinkoje (Aliber, Kindleberger, 2005; Malpezzi, Wachter, 2005; Kogan, *ir kt.*, 2006; Milani, Fabio, 2007; Belinskaja, Rutkauskas, 2007; Timinskaitė, 2011; Gritten, 2011). Mokslininkų (Wang, Keswani, Taylor, 2008; Taipalus, 2006; Égert, Mihaljek, 2006; Quigley, 1999; Smith, Smith, 2006; Case, Shiller, 2003a; Baker, 2002; Leika, Valentinaitė, 2007; Glaeser, Gyourko, Saiz, 2008; Jorda, Schularick, Taylor, 2013) nagrinėjami pagrindiniai NT kainų „burbulo“ indikatoriai leidžia vertinti NT rinkos būklę.

Šiuose moksliniuose tyrimuose ir studijose nagrinėjami NT kainų „burbulo“ susiformavimo veiksniai ir indikatoriai, tačiau pasigendama kompleksinio vertinimo aktualaus šių dienų NT rinkai, be to, trūksta sisteminio analizės aspekto, į ką atkreipiamas dėmesys tik kai kuriose publikacijose (Lind, 2008; Kaklauskas *ir kt.*, 2010, 2011; Hou, 2010; Snieška *ir kt.*, 2011; Chiang, Tsai, Lee, 2011; Duch, Kellstedt, 2011; Suciu, Picorius, Imbrisca, 2011; Farmer, 2011; Rudzkienė, Azbainis, 2012; Korsakienė, Tvaronavičienė, 2014). Nustatyti tikslų NT kainų „burbulo“ atsiradimo laiką ir dydį yra sudėtinga, tačiau galimą jų susidarymą dažnai atspindi tam tikrų indikatorių pokyčiai. Atsižvelgiant į indikatorių charakteristikas ir daugialypiškumą, galima įvertinti ar gauti rezultatai rodo trumpalaikius svyravimus, ar ilgaikį trendą.

NT kainų „burbulo“ tematika yra aktuali teoriniu ir praktiniu požiūriu, nes nėra bendros nuomonės, kokie veiksniai ir jų indikatoriai sukelia bei skatina sunkiai valdomus būsto kainų „burbulus“. Be to, autoriai, nagrinėjantys būsto

kainų „burbulo“ susiformavimą nusakančius indikatorius, neatskleidžia jų tarpusavio sąryšio, kas yra būtina, siekiant gauti kuo patikimesnių ir tikslesnių rezultatų vertinant būsto „burbulo“ dydį. Norėdami nustatyti ar NT rinkoje susiformavo „burbulas“, mokslininkai (Hering, Wacher, 2002;Kim, 2004; Chi-man Hui, Liu, Shen, 2005; Wong, Hui, 2006; Coleman, 2008; Hott, Monnin, 2008) siūlo keletą metodų, tačiau bendros tyrimo metodologijos nėra. Daugelis Lietuvos autorių koncentruojasi į pavienių NT kainų „burbulo“ susidarymo indikatorių analizę, ir mažai vertina būsto „burbulo“ ekonominį poveikį šalies mastu. Ypač trūksta tyrimų, kuriuose nagrinėjama NT kainų augimą lemiančių veiksnių ir vartotojų lūkesčių sąveika.

Mokslinio darbo problema

Mokslinė problema – kaip kompleksiškai vertinti šalies ekonomikos ir NT rinkos indikatorius siekiant nustatyti NT rinkos kainų „burbulo“ egzistavimą ir analizuoti jo vystymąsi.

Mokslinio darbo objektas

Mokslinio tyrimo objektas – nekilnojamojo turto kainų „burbulas“.

Mokslinio darbo tikslas

Sudaryti nekilnojamojo turto kainų „burbulo“ kompleksinio vertinimo modelį, integruojantį fundamentaliuosius ir subjektyviuosius veiksnius bei juos atspindinčius indikatorius ir leidžiantį kiekybiškai įvertinti subjektyviųjų veiksnių poveikio NT kainai mastą.

Atkreiptinas dėmesys, kad subjektyvieji veiksniai pasireiškia sąveikaudami su fundamentaliaisiais veiksniais. Darbe analizuojama subjektyvių veiksnių kilmė ir priežastingumas fundamentaliųjų veiksnių sąveikos kontekste, t. y., kaip fundamentaliųjų veiksnių sąveika ar kurio nors atskiro, fundamentalaus veiksnio dominavimas rinkos vystymesi ar viešajame diskurse tam tikru laiku, skatina subjektyviųjų veiksnių genezę.

Siekiant mokslinio darbo tikslo, keliami tokie **teoriniai bei praktiniai uždaviniai**:

1. Atlikti nekilnojamojo turto kainų „burbulo“ sampratų ir teorijų įvairovės analizę, apibendrinti bei patikslinti NT kainų „burbulo“ sąvoką.
2. Išanalizuoti ekonominių ir NT kainų „burbulo“ gyvavimo ciklų sąveiką bei nustatyti nekilnojamojo turto indikatorių poveikį ciklų etapams.
3. Išnagrinėti nekilnojamojo turto kainų „burbulo“ susidarymo veiksnius ir jų indikatorius, išskiriant subjektyvių veiksnių apimtis ir potencialų poveikio mastą.
4. Sudaryti NT rinkos vertinimo indikatorių sistemą.
5. Išanalizuoti NT kainų „burbulų“ ekonominio modeliavimo patirtį ir ekonominių modelių taikymo galimybes bei nustatyti teorines ir

praktines modeliavimo prielaidas kuriant NT rinkos vertinimo modelį.

6. Sukurti nekilnojamojo turto kainų „burbulo“ kompleksinio vertinimo modelį.
7. Empiriškai patikrinti modelio veiksmingumą nustatant subjektyviųjų veiksnių poveikio mastą.

Ginamieji teiginiai

- Dėl ribotų galimybių gauti Lietuvos NT rinkos duomenis bei NT kainų „burbulo“ ekonominio vertinimo modelių ribotumo, nėra patikimo būdo įvertinti subjektyviųjų veiksnių poveikio NT rinkos kainai mastą bei nustatyti jų sąveikos su fundamentaliaisiais veiksniais charakteristikas.
- Kompleksiniam NT rinkos kainų „burbului“ vertinti reikalinga indikatorių sistema, leidžianti identifikuoti NT kainą veikiančių veiksnių priežastinių ryšių grandinę.
- NT rinkos kainų „burbului“ modeliuoti darbe pasiūlytas modelis leidžia patikrinti NT kainų „burbulo“ susiformavimo prielaidas. Be to, taikant modelį galima apskaičiuoti subjektyviųjų veiksnių poveikio mastą bei nustatyti NT kainų „burbulo“ vertę, t. y. NT pirkėjų permoką už NT objektus, susidariusią dėl subjektyviųjų veiksnių poveikio NT kainai.

Tyrimo metodai

Tiriant teorinius nekilnojamojo turto kainų „burbulo“ aspektus bei sudarant tyrimo metodologiją, naudojama sisteminė, palyginamoji ir loginė mokslinių publikacijų, tyrimų ir studijų analizė, grindžiama lyginamuoju, klasifikavimo, sisteminimo ir apibendrinimo metodais.

Atliekant modelio empirinį tyrimą naudojami kiekybiniai matematiniai statistiniai metodai – statistinių duomenų analizė bei koreliacinė-regresinė analizė. Empirinio tyrimo duomenys apdorojami pasitelkiant skaičiuoklę *Microsoft Excel* ir *Mathcad* programą.

Mokslinis darbo naujumas

- Sudaryta NT rinkos vertinimo indikatorių sistema, kuri grindžiama kompleksine NT rinkos ir ekonominių veiksnių analize. Pagal šią sistemą išskirti indikatoriai, tarp kurių nustatyta priežastingumo grandinė. Šie indikatoriai, įvesti į autoregresijos lygtis, sudaro galimybę atlikti pagrįstą nekilnojamojo turto kainų ekstrapoliaciją.
- Sukurtas NT kainų „burbulo“ kompleksinio įvertinimo bei ekstrapoliavimo modelis, jungiantis nekilnojamojo turto kainas sąlygojančius veiksnius ir fundamentaliuosius indikatorius bei išryškinantis rinkos dalyvių subjektyviųjų veiksnių įtaką.
- Nustatyti ekonominių indikatorių koreliaciniai ryšiai ir jų dinamika, sudaryta galimybė gautus rezultatus panaudoti

nekilnojamojo turto kainų „burbului“ modeliuoti, kas padeda įvertinti realų subjektyviųjų veiksnių poveikio nekilnojamojo turto kainoms mastą.

Darbo rezultatų praktinio taikymo kryptys

Kompleksiniam NT rinkos kainų „burbulo“ vertinimui sukurta indikatorių sistema taip pat leidžia stebėti atskirų indikatorių porų tarpusavio sąveiką. Tai sudaro prielaidas palyginti pavienių modelio komponentų faktines reikšmes su siektinomis ir identifikuoti pasirinktų komponentų tobulinimo ar keitimo poreikį.

Šis modelis būtų naudingas šalies statybos verslo atstovams, kuriems jo teikiami rezultatai padėtų priimti labiau pagrįstus investicinius sprendimus bei tinkamai nustatyti vystomų NT projektų realizavimo kainas. Subjektyvių veiksnių įvertinimo įrankiai leidžia identifikuoti NT rinkos produkto kūrimo ir įsigijimo procesų vietas, kuriose susidaro paskatos rinkos dalyviams (tiek investuotojams, tiek ir galutiniams pirkėjams) imtis nepagrįstų sprendimų, pavyzdžiui, siekiant neadekvačiai greito ir didelio uždarbio trumpuoju laikotarpiu (tuo metu, kai iš esmės NT rinka yra ilgalaikių produktų rinka). Šiuo atveju, žinodami tas „problemines“ minėtų procesų vietas, statybos verslo atstovai galėtų numatyti tam tikrus finansinius ir kontrolės saugiklius, kurie minimizuotų nepageidaujamų ekonominių padarinių pasireiškimo tikimybę.

Mokslinio darbo struktūra

Mokslinį darbą sudaro įvadas, 3 dalys ir išvados. Darbo apimtis – 145 psl. be priedų. Darbe pateikta 17 lentelių, 27 paveikslai ir 20 priedų. Darbe panaudota 214 mokslinės literatūros šaltinių. Disertacijos loginė struktūra sudaryta remiantis darbo tikslu ir jam pasiekti iškeltais uždaviniais.

Pirmoje disertacijos dalyje analizuojama ir patikslinama nekilnojamojo turto kainų „burbulo“ sąvoka, nagrinėjamos ne tik dvi pagrindinės ekonominės minties apie kainų „burbulus“ teorijos, bet ir naujos, atskleidžiančios pastaruoju metu plačiausiai analizuojamus „burbulo“ susiformavimo aspektus. Apžvelgiama nekilnojamojo turto kainų „burbulų“ istorinė raida. Pateikiami didžiausią įtaką šalies ekonomikai padarę „burbulų“ sprogimai, taip pat ir tie, kurie sukėlė globalią ekonomikos krizę.

Antroje disertacijos dalyje apžvelgiami ekonominio ir nekilnojamojo turto ciklų sąveikos aspektai, pateikiami nekilnojamojo turto gyvavimo ciklo etapai bei nustatyti svarbiausi NT ciklą lemiantys indikatoriai. Išskiriamos svarbiausios nekilnojamojo turto kainų „burbulo“ susidarymo priežastys, sudaroma indikatorių sistema, apimanti makroekonominius veiksnius, struktūrinius pokyčius, kreditavimo sąlygas bei lūkesčius tarp rinkos dalyvių parodančius indikatorius. Paskutiniame skyriuje pateikiamas NT kainų „burbulo“ kompleksinio vertinimo modelis. Reikia atkreipti dėmesį į tai, kad šiame darbe sukurtas NT kainų „burbulo“ kompleksinio vertinimo modelis gali būti pritaikytas kitoms, į Lietuvą panašaus dydžio ar panašios ekonominės brandos Europos šalims.

Trečiojoje disertacijos dalyje atliekamas empirinis modelio taikymo tyrimas. Analizei pasirinktas 2004–2014 metų laikotarpis. NT kainų „burbulo“ kompleksinio vertinimo modelis atskleidžia ne tik svarbiausius rinkos indikatorius, kurie leidžia nustatyti ar rinkoje yra susidaręs kainų „burbulas“, bet ir atspindi indikatorių tarpusavio ryšius per tarpusavio poveikio grandinę, kuri leidžia kiekybiškai įvertinti subjektyviųjų lūkesčių poveikio mastą. Taip pat aprašomi modelio apribojimai.

Disertacijoje naudota Lietuvos ir užsienio autorių mokslinė literatūra lietuvių ir anglų kalbomis, statistinių duomenų šaltiniai, moksliniai ir apžvalginiai straipsniai. Darbe daugiausiai dėmesio skirta užsienio autorių publikacijoms, nagrinėjančioms kainų „burbulo“ susiformavimo NT rinkoje priežastis ir jas sąlygojančius veiksnius, taip pat atliktiems tyrimams bei studijoms, kuriose analizuojamos NT rinkos kainų „burbulo“ vertinimo metodikos.

REFERENCES / LITERATŪRA

1. Aliber R. Z., and Kindleberger C. P. (2005). *Manias, Panics, and Crashes: A History of Financial Crises.* JAV: John Wiley & Sons, Inc.
2. Allen, F., and Carletti, E. (2013). New Theories to Underpin Financial Reform. *Journal of Financial Stability*, 9, 242-249.
3. Allen, F., Babus, A., and Carletti, E. (2009). Financial Crises: Theory and Evidence. *Annual Review of Financial Economics*, 1, 97-116.
4. Allen, F., and Gale, D. (2000). Bubbles and Crises. *The Economic Journal*, 110 (460), 236-255.
5. Baker, D. (2002). The Run-Up in Home Prices: A Bubble. *Centre for Economic and Policy Research Challenge*, 45 (6), 93-119.
6. Bagus, P. (2010). Austrian Business Cycle Theory: Are 100 Percent Reserves Sufficient to Prevent a Business Cycle? *Libertarian Papers* 2 (2), 1-18. [Accessed on 2014-09-17]. Available at http://libertarianpapers.org/article/2-bagus-austrian-business-cycle-theory/.
7. Belinskaja, L., and Rutkauskas, V. (2007). Būsto kainų burbulo sprogimas – problemos vertinimas. *Ekonomika* 79, 7–27.
8. Blanchard, O. J., (1979). Speculative Bubbles, Crashes and Rational Expectations. *Economics Letters*, 3 (4), 387-389.
9. Blanchard, O. J., and Watson, M. W. (1982). *Bubbles, Rational Expectations and Financial Markets*. In Crisis in the Economic and Financial Structure: Bubbles, Bursts and Shocks, Paul Wachtel

(editor), Lexington Books, 295-316. [Accessed on 2011-05-10]. Available at http://www.nber.org/papers/w0945.

10. Blanchard, O. J., Dell'Ariccia, G., and Mauro, P. (2010). Rethinking Macroeconomic Policy. *Journal of Money, Credit and Banking*, 42 (1), 199-215.
11. Bocutoglu, E., and Aykut Ekinci, A. (2010). *Austrian Business Cycle Theory and Global Crisis*. Ludwig von Mises Institute. [Accessed on 2011-05-10]. Available at http://mises.org/daily/4072
12. Bormotov, M. (2009). Economic cycles: historical evidence, classification and explication. *MPRA Paper*, 19660. Munich Personal RePEc Archive. [Accessed on 2015-02-12]. Available at http://mpra.ub.uni-muenchen.de/19616/1/MPRA_paper_19616.pdf
13. Brunnermeier, M. (2009). Deciphering the liquidity and credit crunch 2007-08. *Journal of Economic Perspectives*, 23, 77-100.
14. Brunnermeier, M., Papakonstantinou, F., and Parker, A. (2013). Optimal Time-inconsistent Beliefs: Misplaning, Procrastination, and Commitment. forthcoming at the *Management Science.* [Accessed on 2015-01-28], Available at http://scholar.princeton.edu/markus/publications/optimal-time-inconsistent-beliefs-misplanning-procrastination-and-commitment.
15. Brusco, S., and Catiglionesi, F. (2007). Liquidity coinsurance, moral hazard and financial contagion. *Journal of Finance*, 62, 2275-2302.
16. Chiang, M., Tsai, I., and Lee, C. (2011). Fundamental indicators, bubbles in stock returns and investor sentiment. *The Quarterly Review of Economics and Finance*, 51, 82-87.
17. Coleman, M., LaCour-Little, M., and Vandell, K. D. (2008). Subprime Lending and the Housing Bubble: Tail Wags Dog? *Journal of Housing Economics*, 17, 272-290.
18. Das, N., Massa, M., and Patgiri R. (2008). Mutual fuds and bubbles: the suprising role of contractual incentives. *Review of Financial Studies*, 21, 51-99.
19. Duch, R.M., and Kellstedt, P.M. (2011). The heterogeneity of consumer sentiment in an increasingly homogenous global economy. *Electoral Studies*, 1, 1-7.
20. Égert, B. and Mihaljek, D., (2007). Determinants of house prices in central and eastern Europe. *BIS Working Papers*, 236.
21. Fama, E. F. (1965). The Behavior of Stock-Market Prices. *The Journal of Business*, 38 (1), 34-105.

22. Fama, E. F. (1970). Efficient capital markets: a review of theory and empirical work. *The Journal of Finance*, 25, 383-417.
23. Farmer, R.E.A. (2010). Animal Spirits, Persistent Unemployment and the Belief Function. *NBER Working Paper*, 16522. [Accessed on 2014-04-06]. Available at http://www.nber.org/papers/w16522.
24. Farmer, R.E.A. (2011). Animal Spirits, Rational Bubbles and Unemployment in an Old-Keynesian Mode. *CEPR Discussion Paper*, 8439. [Accessed on 2014-04-06]. Available at http://ssrn.com/abstract=1871550.
25. Gerlach, S., and Peng, W. (2005). Bank lending and property prices in Hong Kong. *Journal of Banking and Finance*, 29, 461-481.
26. Girdzijauskas, S. (2002). Logistic (marginal) accumulation models. *Information Sciences*, 23, 95–102.
27. Girdzijauskas, S. (2004). Logistinis kritinių situacijų valdymas; burbulų fenomenas arba antrasis kvėpavimas. *Ekonomika ir vadyba*, 1 (7), 53-59.
28. Girdzijauskas, S. (2008). Logistic theory of capital management: deterministic methods: monograph, *Transformations in Business & Economics*, 7 (2) Supplement A, 15–163.
29. Girdzijauskas, S., and Štreimikienė D., (2010). Logistic Analysis of Business Cycles, Economic Bubbles and Crises. *Business Intelligence in Economic Forecasting: Technologies and Techniques*. Publisher in the USA by Information Science Reference, 45-64.
30. Girdzijauskas, S., and Dubnikovas, M. (2010). Logistic Analysis of Price Bubble and Current Situation in USA Real Estate. *Business Information Systems Workshops: BIS 2010 International Workshops, 3-5 May 2010, Berlin, Germany*, (pp. 13-18). Revised Papers: Lecture Notes in Business Information Processing, 57.
31. Girdzijauskas, S., and Mackevičius (2009). Kapitalo augimo modeliai ir logistinė kapitalo valdymo teorija. Naujas požiūris į ekonomines krizes. *Economics & Management*, 14. [Accessed on 2012-02-12]. Available at http://www.ktu.lt/lt/mokslas/zurnalai/ekovad/14/1822-6515-2009-757.pdf
32. Glaeser, E.L., Gyourko, J., and Saiz, A. (2008). Housing supply and housing bubbles. *Journal of Urban Economics*, 64, 198-217.
33. Glindro, E.I., Subhanij, T., Szeto, J. and Zhu, H. (2008). Determinants of house prices in nine Asia-Pacific economies. *Bank of International Settlements Working Papers*, 263, 1-48. doi: 10.2139/ssrn.1333646/

34. Goodman, A. C., and Thibodeau, T. G., (2008). Where are the speculative bubbles in the US housing markets? *Journal of Housing* Economics, 17 (2), 117–137.

35. Gritten, A. (2011). New insights into consumer confidence in financial services. *International Journal of Bank Marketing*, 29 (2), 90-106.

36. Hering, R., and Wacher, S. (2002). Bubbles in Real Estate Markets. *Prepared for the Federal Reserve Bank of Chicago and World Bank Group's Conference on Asset Price Bubbles: Implications for Monetary, Regulatory, and International Policies, 22-24 April 2002, Chicago*, (pp. 217-227).

37. Hommes, C. H. (2001). Financial markets as nonlinear adaptive evolutionary systems. *Quantitative Finance*, 1, 149-167.

38. Hou, Y. (2010). Housing price bubbles in Beijing and Shanghai. A multi-indicator analysis, *International Journal of Housing Markets and Analysis*, 3 (1), 17-37.

39. Hott, C. and Monnin, P. (2008). Fundamental Real Estate Prices: An Empirical Estimation with International Data. *Journal of Real Estate Finance and Economics*, 36 (4), 427-450.

40. Hui, E.C.M. and Shen, Y. (2006). Housing price bubbles in Hong Kong, Beijing and Shanghai: A comparative study. *Journal of Real Estate Finance and Economics*, 33, 299-327.

41. Jorda, O., M. Schularick and Taylor, A. (2011). Financial Crises, Credit Booms, and External Imbalances: 140 Years of Lessons. *IMF Economic Review*, 59 (2), 340-378.

42. Jorda, O., M. Schularick and Taylor, A. (2013). When Credit Bites Back: Leverage, Business Cycles and Crises. *Journal of Money, Credit and Banking*, 45 (2), 3-28.

43. Kaklauskas, A., Zavadskas, E.K., Bagdonavicius, A., Kelpsiene, L., Bardauskiene, D., and Kutut, V. (2010). Conceptual Modelling of Construction and Real Estate Crisis with Emphasis on Comparative Qualitative Aspects Description. *Transformations in Business & Economics*, 9/1(19), 42-61.

44. Kaklauskas, A., Kaklauskas, G., Zavadskas, E.K., Bagdonavicius, A., Kelpsiene, L., Bardauskiene, D., Urbonas, M., and Sorakas, V. (2011). Crisis management in construction and real estate: Conceptual modeling at the micro-, meso- and macro-levels. *Land Use Policy*, 28 (1), 280-293.

45. Kahneman, D. and Riepe, M., (1998) Aspects of investor psychology. *Journal of Portfolio Management*, 24 (1998), 52-65.

46. Kahneman, D., and Tversky, A. (1973). On the psychology of prediction. *Psychological Review*, 80, 237-251.

47. Kahneman, D., and Tversky, A. (1979). Prospect theory of decisions under risk. *Econometrica*, 47, 263-291.

48. Kim, K.H. (2004). Housing and the Korean economy. *Journal of Housing Economics*, 13, 321-41.

49. Kogan, L., Ross, S., Wang, J., and Westereld, M. (2006). The price impact and survival of irrational traders. *The Journal of Finance*, 61 (1), 195-229.

50. Korsakienė, R., and Tvaronavičienė, M. (2014). Processes of economic development: case of Lithuanian real estate sector. *Entrepreneurship and Sustainability Issues*, 1(3), 162–172. doi: 10.9770/jesi.2014.1.3(5)

51. Klagge, B., Fromhold-Eisebith, M. and Fuchs, M. (2010). The Return of Depression Economics and the Crisis of 2008. *Regional Studies*, 44 (3), 383-385. doi: 10.1080/00343401003707367

52. Kuodis, R. (2006). Ar buvo nekilnojamojo turto burbulas Lietuvoje? Bendrovės 2007-ujų biudžetas. Ką prognozuoja rinkos ekspertai. *"Verslo žinių" konferencija, 12 spalio 2006, Vilnius, Lietuva*. [Accessed on 2008-11-17]. Available at http://www.ekonomika.org

53. Lai, Y., Xu, H., and Jia, J. (2009). Study on Measuring Methods of Real Estate Speculative Bubble. *Journal of Service Science and Management*, 2 (1), 43-46. doi: 10.4236/jssm.2009.21006

54. LeBaron, B. (2000). Agent-based computational finance: suggested readings and early research. *Journal of Economic Dynamics and Control*, 24, 679-702.

55. Lind, H. (2008). Price bubbles in housing markets: Concept, theory and indicators. *International Journal of Housing Markets and Analysis*, 2 (1), 78-90. [Accessed on 2014-04-06]. Available at http://dx.doi.org/10.1108/17538270910939574

56. Leika, M. and Valentinaitė, M. (2007). Būsto kainų kitimo veiksniai ir bankų elgsena Vidurio ir Rytų Europos šalyse. Pinigų studijos. Ekonomikos teorija ir praktika, 2, 5-22.

57. Levin, E. J., and Wright, R. E. (1997). The impact of speculation on house prices in the United Kingdoom, *Economic Modelling*, 14, 567-585.

58. Levine, S. S., and Zajac E. J. (2007). The institutional nature of price bubbles. [Accessed on 2014-11-17]. Available at http://dx.doi.org/10.2139/ssrn.960178

59. Lucas, R. E. (1972). Expectations and the Neutrality of Money. *Journal of Economic Theory*, 4 (2), 103–124.

60. Lucas, R. E. (1988). On the Mechanics of Economic Development. *Journal of Monetary Economics*, 22 (1), 3–42.

61. Malpezzi, S., and Wachter, S. M. (2005). The role of speculation in real estate cycles. *Journal of Real Estate Literature*, 13 (2), 143-164.

62. Milani, F. (2007). Expectations, Learning and Macroeconomic Persistence. *Journal of Monetary Economics*, 54 (7), 2065-2082. doi: 10.1016/j.moneco.2006.11.007

63. Nneji, O., Brooks, Ch., and Ward, Ch. (2011). Housing and equity bubbles: are they contagious to REITs? *ICMA Centre Discussion Papers in Finance*, 11. [Accessed on 2015-02-12]. Available at http://ssrn.com/abstract=1858726

64. Quigley, J. M. (1999). Real Estate Prices and Economic Cycles. *International Real Estate Review*, 2(1), 1–20.

65. Pastor, L., and Veronesi, P. (2006). Was there a Nasdaq bubble in the late 1990. *Juornal of Financial Economics*, 81 (1), 61-100.

66. Rudzkienė V., and Azbainis, V. (2012). Vartotojų lūkesčių ir būsto kainų ryšys pereinamosios ekonomikos šalyse. *Business systems and economics*, 2, 1-17.

67. Shiller, R. J. (2000). Measuring Bubble Expectations and Investor Confidence. Journal of Psychology and Financial Markets, 1 (1), 49-60.

68. Shiller, R. J. (2002). Bubbles, Human Judgment, and Expert Opinion. *Financial Analysts Journal*, 58 (3). doi: 10.2469/faj.v58.n3.2535

69. Shiller, R. J. (2003b). From Efficient Market Theory to Behavioural Finance. *The Journal of Economic Perspectives*, 17 (1), 83-104.

70. Sornete D., and Cauwels, P. (2014). Financial Bubbles: Mechanisms and Diagnostics. *Swiss Finance Institute Research Paper*,14-28.

71. Sornete D., and Johansen, A. (2010). Shocks, Crashes and Bubbles in Financial Markets. *Brussels Economic Review*, 53 (2), 201-253.

72. Smith, M., and Smith, G. (2006). Bubble, bubble, where is the housing bubble? *Brookings Papers on Economic Activity*, 1, 1-67. doi: 10.1353/eca.2006.0019

73. Snieška, V., Venclauskienė, D., Vasiliauskienė, L., and Gaidelys, V. (2011). The Influence of Transition Economy Pecularities on the Formation of Housing Price Level. *Engineering Economics*, 22 (5), 494-500.

74. Suciu, M. Ch., Picorius, L., and Imbrisca, C. I. (2011). Implications of Asymmetric Information in the Real Estate Crisis in US. *Theoretical and Applied Economics*, 1 (554), 173-188.

75. Taipalus, K. (2006). A global house price bubble? Evaluation based on a new rent-price approach. *Bank of Finland Research Discussion Paper*, 29. [Accessed on 2009-04-06]. Available at http://dx.doi.org/10.2139/ssrn.1018329

76. Timinskaitė, V. (2011). Statybos ir nekilnojamo turto rinka ekonominių krizių kontekste. 14-osios Lietuvos jaunųjų mokslininkų konferencijos „Mokslas – Lietuvos ateitis“ 2011 metų teminės konferencijos straipsnių rinkinys. *Statyba*, 1-7.

77. Venslauskienė, D., and Snieška, V. (2009). Real estate market and slowdown interaction in countries with transition economy. *Ekonomika ir vadyba*, 14, 1026-1031.

78. Wang, Y. H., Keswani, A., and Taylor, S. J. (2006). The relationships between sentiment, returns and volatility. *International Journal of Forecasting*, 22, 109– 123.

79. Wong, J. T. Y., and Hui, C. M. E. (2006). Research notes – power of expectations. *Property Management*, 24 (5), 496-506.

80. Zakalskytė, I. (2008). Nekilnojamojo turto kainų „burbulas“ Lietuvoje. Ar tikrai? [Accessed on 2008-07-24]. Available at http://www.straipsniai.lt/nekilnojamasis_turtas/puslapis/9735.

UDK 332.6/.7(043.3)
SL344. 2016-04-27, 2,75 leidyb. apsk. l. Tiražas 50 egz. Užsakymas 181

Išleido Kauno technologijos universitetas, K. Donelaičio g. 73, 44249 Kaunas
Spausdino leidyklos „Technologija“ spaustuvė, Studentų g. 54, 51424 Kaunas