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Investment in housing in the Slovak Republic

Abstract. Socio-economic task of housing after the performance of its basic function is to create conditions for the development of human potential, creative abilities and social activities of man. Housing is implemented in a residential environment that has a social component (social groups and relations between them), material (apartments and special equipment infrastructure) and the nature. From a sociological point of view, living also means living in a particular community, having a sense of belonging, confidence and safety. Housing can be seen as an evolving social process that has its own laws. It is a vast and varied set of basic and higher personal and social, spiritual and changing needs. Housing needs are constantly evolving and they are interrelated with global development, because the process of satisfying the needs of housing is conditioned by socio-economic development, on which feeds back and applies to all people and the whole area. Each country uses its own housing policy to address the problems related to housing, which are extended from social and historical conditions. Historical attitudes toward addressing housing issues have changed many times. This has also influenced the development of social theory, which was not easy because the development of each country is affected by social change, world wars, economic crises. In this scientific paper based on econometric modelling we analyse the relationships between selected indicators.
Keywords: Housing; Housing Policy; Economic Development; Quality of Life
JEL Classification: D11; D12

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Інвестування в об'єкти житлового будівництва в Словацькій Республіці
Анотація. Соціально-економічна значимість житла після виконання ним своєї основної функції полягає в тому, щоб створити умови для розвитку людського потенціалу, творчих здібностей і соціальної діяльності людини. Сутність житла реалізовано в середовищі, яке має соціальну (соціальні групи та відносини між ними) і матеріальну (квартири та спеціальне обладнання інфраструктури) складові, а також свою природу. З погляду соціології, жити також означає жити в певному співтоваристві, мати почуття причетності, впевненості та безпеки. Житлове будівництво може розглядатися як соціальний процес, що розвивається та має власні закони. це величезний перелік як основних, так і вищих особистих, соціальних, духовних потреб, а також потреб, що змінюються. Житлові потреби постійно розвиваються, з цим пов'язаний і диференційований глобальний розвиток житлового будівництва, оскільки процес задоволення житлових потреб обумовлений соціально-економічним розвитком, який дає зворотній зв'язок і має відношення до всіх людей та сфер їхньої діяльності. Кожна країна для вирішення проблем, пов'язаних з житлом, дотримується власної житлової політики, яка обумовлена соціальними, а також історичними умовами. Підходи до вирішення проблем, пов'язаних із житловими питаннями, багато разів змінювалися впродовж історії, що позначилося на еволюції соціальної теорії, яка не була простою, тому що на розвиток кожної країни впливають соціальні зміни, світові війни, економічні кризи.
У даній науковій роботі, в основу якої покладено принципи економічного моделювання, ми аналізуємо відносини між окремими показниками.
Ключові слова: житло; житлове будівництво; житлова політика; економічний розвиток; якість життя.

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Инвестиции в жилищное строительство в Словацкой Республике
Аннотация. Социально-экономическая значимость жилья после выполнения им своей основной функции состоит в том, чтобы создать условия для развития человеческого потенциала, творческих способностей и социальной деятельности человека. Сущность жилья реализуется в среде, которая имеет социальную (социальные группы и отношения между ними) и материальную (квартиры и специальное оборудование инфраструктуры составляющую), а также свою природу. С точки зрения социологии, жить также означает жить в определенном сообществе, иметь чувство сопричастности, уверенности и безопасности. Жилищное строительство может рассматриваться как развивающийся социальный процесс, который имеет свои собственные законы. Это огромный и разнообразный набор как основных, так и высших личных, социальных и духовных потребностей, а также потребностей, которые меняются. Жилищные потребности постоянно развиваются; с этим связано и дифференцированное глобальное развитие жилищного строительства, так как процесс удовлетворения жилищных потребностей обусловлен социально-экономическим развитием, которое дает обратную связь и имеет отношение ко всем людям и сферам их деятельности. Каждая страна для решения проблем, связанных с жильем, придерживается собственной жилищной политики, которая обусловлена как социальными, так и историческими условиями. Подходы к решению жилищных вопросов в много раз менялась в течение истории, что повлияло на эволюцию социальной теории, которая не была простой, потому что развитие каждой отдельно взятой страны было сопряжено с социальными изменениями, мировыми войнами, экономическими кризисами.
В данной научной работе, основанной на принципах эконометрического моделирования, мы анализируем отношения между отдельными показателями.
Ключевые слова: жилье; жилищное строительство; жилищная политика; экономическое развитие; качество жизни.

Introduction. Housing is dependent on the growth of household savings. As we know, private ownership of property prevails in the Slovak Republic. The role of the government is that their housing policies should meet the housing needs. In Slovakia, there are several tools to reduce the time to procure home ownership. At present, they relate mainly to mortgage loans, construction loans and loans or grants from the State Housing Development Fund. (Labaj, 1993) [3]. These programs are implemented through subsidies to secure the cost of housing, which should not exceed a reasonable level of household expenditure on housing. A massive use of these housing policy instruments is criticized for its small efficiency

in the provision of housing specifically for families with lower incomes as it is extremely difficult to ensure that the acquired apartments are always used by the families for which they are intended. These facts, contribute to the fact that countries seek to strengthen direct support to their citizens, who demand for a strategy to support housing. Also, it is important to single out efficiency which means a «reasonable» amount of public expenditure with the aim to meet the intended expenditure. A housing policy tool is effective if it is not possible to find anything cheaper and it does not distort the housing market. The economics of the welfare state distinguishes between vertical and horizontal effectiveness efficiency. Vertical efficiency is related to the degree of redistribution of income and wealth from rich to poor, consumption and measured to the extent to which housing policy tools help those who need them most. The rating of vertical effectiveness of public support is based on a comparison of rates of income inequality in the company prior to its introduction and after its introduction. If the inequality will support less support may be positive. Horizontal efficiency represents such a distribution of income and consumption, which corresponds to the principle of equal treatment, equal with regard to what extent a group is excluded from the possibility of obtaining some form of public support (Barr, 1993) [1].

Brief Literature Overview. The rate of distribution in revenues distribution is completely correlated with differences in the distribution of assets, mainly due to the so-called life cycle savings. It is a fact that Modigliani and Brumberg in 1954 [5] published a model depending on income and assets of age. Based on this model, it occurs that throughout the life cycle of an individual as the level of income and the amount of assets rise with age. Increases in both variables reach their peak at some point, but at different time, then we observe decreases. Young people may generally experience a sharp increase in revenue, but only a small group of them has assets to acquire housing. On the other hand, a substantial proportion of the elderly has a certain amount of savings and have already acquired housing. It follows that entry into the realm of reality is difficult for young people when they want to become independent or start a family. Therefore, the state must play its part. In recent years, many industrialized countries have experienced a period of unusually strong rates of money and credit to the accompaniment of a high increase in property prices. This observation raises a number of issues that are potentially important for monetary and regulatory policies. Does the observed concordance between property prices and monetary variables reflect only the effects of common driving forces, such as monetary policy or an economic cycle or a direct link between the two variables? Does the direct link exist and affect the price of either the real estate cash value or the monetary value of property, or both? Do fluctuations in real estate prices and monetary variables have an impact on macroeconomics, namely real GDP and consumer prices? And finally, which variable is more important in this respect, the one related to money or the other one related to credit, or both? From a theoretical point of view, the link between monetary variables, property prices and macroeconomics is versatile. An optimal portfolio adjustment mechanism, which is at the heart of the traditional monetarist view of the transformation process, indicates a bidirectional link between the real estate prices and money. The growth of the money supply changes the limit of usefulness of liquid assets and the marginal utility of other assets. The agents attempt to redress the balance by corrections spending and equity portfolios that compensate for all the assets and the ratio of utilities to limit the relative prices. This means that a price increase triggers an increase in a wide range of prices and a decline in assets in a wide range of interest rates and yields. In this sense, monetarists characterize the evolution of money as changes reflecting the whole spectrum of interest rates and price actives which are relevant for spending and investment decisions (Meltzer, 1995; Nelson, 2003) [4; 6]. For the same reason, a change in house prices changes inventory value of the housing stock, which raises the balance of the portfolio, which will involve the adjustment of demand for monetary assets (Greiber and Setzer, 2007) [2]. The link between credit and property prices may rise through housing wealth, and has an impact on credit demand and supply and, as a result, by the impact of the credit supply on fluctuations in property prices. According to the life cycle model of household consumption, continuous increase of household wealth leads to an increase in household spending when crediting.

Purpose and Results. Homeowners are trying to cope with consumption over the life cycle. In addition to this wealth effect, there is also a side effect of housing prices based on the fact that houses are commonly used as collateral for loans as they are immobile, and therefore it is not easy to get them out of reach of creditors. The greatest direct impact of fluctuations in house prices on economic activity is through residential investment. The increase in house prices increases the value of housing in relation to the cost of construction. According to Tobin's *q* for investment in housing, a new building becomes profitable when property prices are rising faster than the construction cost. Investment in residential property is thus a positive function of real estate prices. This collateral wealth, as well as property prices in consumption and investment, has resulted in adjustments in demand for loans and credit supply, which potentially leads to the causation of property prices towards credit aggregates. House prices affect the demand for loans through wealth effects on consumption and investment impact Tobin's *q,* while the effect of collateral affects the supply of credit.

Methodology. Other effects of lending with regard to buying property, are reflected on banks' balance sheets. Such an effect may lead directly through the ownership of bank assets, and indirectly through its impact on the value of loans secured on real property. These (very basic) theoretical considerations suggest that there exist a reason to believe that there is a multidimensional relationship between money, credit, property prices and the economy as a whole (GDP). However, while these theoretical considerations give tentative signs, it is not possible to shape the final conclusions. Therefore, we test the hypothesis that monetary shocks have a stronger impact on house prices at the time of the price boom of real estate on a dummy variable over an extended panel VAR. Taking into account that the credit and monetary shocks are stronger during the price boom, we evaluate the response obtained from a screenplay by comparing the pulses during the price boom with those outside it. We calculated this on the basis of fictitious variables, mechanically trapping the property price boom in the Slovak Republic, as well as on the basis of fictitious variables reflecting average inflation rates related to property prices during the period. The analysis is based on the panel VAR (1). The advantage of using a panel of modeling is that it significantly increases efficiency and power of analysis.

$$Y_{i,t} = A_i + A(L)Y_{i,t} + \varepsilon_{i,t}\,, \tag{1}$$

where: $Y_{i,t}$ *is the vector of endogenous variables and* $\varepsilon_{i,t}$ *is the vector of errors,* A_i *is the matrix of fixed effects for the country (in our case the Slovak Republic),* $A(L)$ *is a polynomial matrix lagging entity whose rank is determined by Akaike criterion information sloping rank to four.*

Vector $Y_{i,t}$ is defined as:

$$Y = [\Delta y, \Delta cpi, ir, \Delta hp, \Delta m, \Delta c] \tag{2}$$

Vector of endogenous variables $Y_{i,t}$ *includes logarithmic difference of real GDP (* Δy*), logarithmic difference CPI (* Δcpi*), the level of short-term nominal interest rate (IR), logarithmic difference of the nominal price of the property (* Δhp*), logarithmic difference of the nominal amount of money (* Δm*) and Logarithmic difference in nominal savings (*Δc*).*

Model (1) is estimated based on the fixed effects method of least squares (OLS) without time fictions. In typical panel data studies where intersectoral dimension is large and time dimension is small, the time dummy variables are usually

included. This causes only minor losses in efficiency, as only a small number of dummy variables must be added to the model so that the relationship should be revealed by the analysis, which is significantly affected by trans-sectoral dimension. In our case the flight is large in size, which means that the connection of the fictitious time variable would result in a considerable loss of efficiency. Ordinary time effects can substantially reduce the information content of the data set. If we wanted to ensure the correctness of the results, we replicated the next step calculations with a full set of variables of time and found that the results were qualitatively equivalent. The results are based on the panel VAR. Based on the estimated panel VAR, we first performed a standard test of Granger causality. The panel VAR was initially estimated for the longest possible sample period of Q1/1996 to Q2/2014.

The ARIMA Model apparatus consists of single-equation econometric models. From a methodological point of view, modelling of time series of dependent variable is based only on information obtained by analysing of the actual time series development. This is called the Box-Jenkins methodology of the analysis and modelling of time series, excluding economic theory. The primary purpose of its use is creating an effective model, therefore the created model provides the most accurate forecast. In this regard, ARIMA models are most frequently used as models of time series in statistical and forecasting practice.

The results of the Granger causality test reveal strong evidence of multivariate correlation between property prices, money supply, the volume of loans, GDP, consumer price index and interest rates. We have found that particular financial variables have a significant impact on the future price of property. Also we have found out that the price of real estate has a very significant impact on the future value of money and credit growth. Cash variables and housing prices also significantly affect the future growth of GDP, while future inflation (CPI) affects only the growth of the money supply.

Construction of ARIMA model to estimate the evolution of GDP, interest rate and real estate prices

The subject of modelling was the time series of GDP, the time series of interest rate and the real estate prices time series for which the data are available for the period from the first quarter of 1996 to the second quarter of 2014 totalling 76 observations. Due to the relative shortness of the time series the modelled results of the analysis and design of the ARIMA model to estimate the evolution of GDP, interest rates and immovable property can be considered only as an experimental.

Conclusions. 1. Based on econometric modelling, we have confirmed the results of the research conducted by Ortalo-Magne and Rady (2002) [7], the owner-occupied housing contributes to volatility of the housing market, which allows multiple relatively poor households to remain attractive locations at the expense of newcomers and strengthens the variance of income in the location. Although it is not possible to make clear the importance of structural shocks, the examined pulse samples, in some cases, allow a careful structural interpretation. **2.** The dynamic effects of GDP shock indicate that this particular shock captures the aggregate demand shock, the shock of real GDP, the shock of consumer prices and the increase in the nominal interest rate, although property prices and monetary variables are increasing both in nominal and real terms. It seems that the CPI shock mainly affects the fluctuations in the supply side, increasing the CPI, real GDP, growth in nominal interest rates and housing prices, money supply and savings to fall in real terms. Also, the response to interest rate shock is consistent with previous expectations. **3.** The increase in the nominal interest rate is temporarily observed, while all the other variables are declining. Price shock in property causes a significant increase in all variables in the economy. The same applies to the dynamic effects of shock and money credit shock. These results suggest that there is a strong and highly significant multi-directional relationship between monetary variables, property prices and development of macroeconomic variables (GDP).

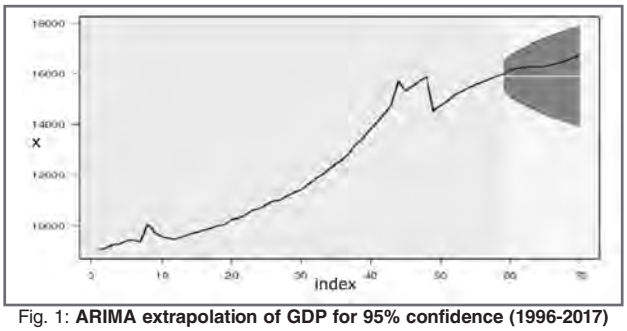

Fig. 1: **ARIMA extrapolation of GDP for 95% confidence (1996-2017)**
Source: Own calculations

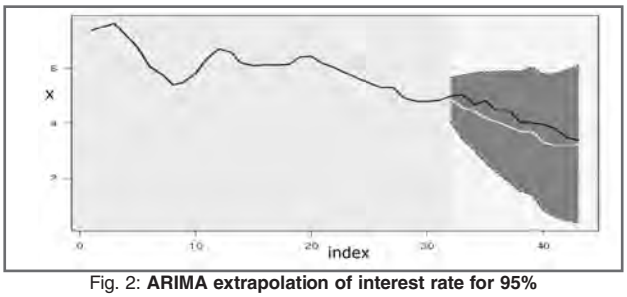

Fig. 2: **ARIMA extrapolation of interest rate for 95% confidence (1996-2017)**
Source: Own calculations

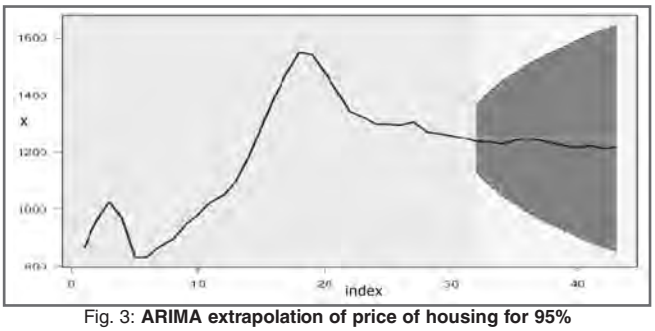

Fig. 3: **ARIMA extrapolation of price of housing for 95% confidence (Q1/1996-Q2/2017)**
Source: Own calculations

4. Unfortunately, such is the situation in the Slovak Republic, which currently indicated increased indebtedness of households in the forefront of home ownership. **5.** The future is expected to fall in real estate prices, interest rates on loans, leading to further household indebtedness is because they will try to cover more expensive loans cheaper. Therefore, when elaborating a new housing policy, we recommend to focus primarily on the support of rental housing.

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Received 20.09.2015