

Vadyba Journal of Management 2023, №2 (39) ISSN 1648-7974

THE IMPACT OF MACROECONOMIC FACTORS ON THE PERFORMANCE OF THE CONSTRUCTION SECTOR IN LITHUANIA

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Abstract

The construction sector is closely related to the economic situation in the country. The main products of this sector are residences, business structures. Demand for these products is highest when the economic situation in the country is good, but when the economy slows down, the demand for these products also falls. This is because when the economic situation is good the population has spare money, loans are cheaper and the risk of job loss is low. This leads to an increase in the rate of growth of residential construction, as there is more demand for this product. Similarly, businesses are expanding due to increased sales, higher demand, and the resulting increase in non-residential construction. Therefore, in order to maximize the performance of the Lithuanian construction sector, it is important to keep an eye on the macroeconomic environment and to understand when the economy offers opportunities and when it brings threats. To this end, the construction sector and the macroeconomic environment are analyzed, the theory of economic cycles and the impact of macroeconomic factors on the construction sector is analyzed, and an empirical study of the impact of macroeconomic factors on the construction sector is carried out. An analysis of the scientific literature on business cycles and the main macroeconomic factors that affect the performance of the construction sector. Economic cycles are closely linked to construction performance. The boom or peak phases of the economy provide opportunities for the construction sector, while the recession and crisis phases bring threats. Understanding potential threats or opportunities maximizes performance, and this understanding requires an analysis of macroeconomic factors. Therefore, the main macroeconomic factors to be taken into account when analyzing both the changes in economic cycles and the factors that directly affect the construction sector are identified. The main factors identified are: aggregate demand, employment levels, corporate profits, import levels, interest rates, gross domestic product. However, it is also very important to analyze the existence of a real estate bubble, especially in the construction sector. An empirical study has been carried out to analyze the relationship between the identified macroeconomic factors and the construction sector in Lithuania. For this purpose, the Eviews software is used to construct a correlation matrix, regression models, find the elasticity coefficient and forecast.

KEYWORDS: GDP, construction sector, economic fluctuations, economic cycles.

Introduction

The construction sector is an important driver of economic activity. In 2022, Lithuania's gross domestic product was EUR 66.8 billion and the construction sector's share of gross domestic product was EUR 4.7 billion or 7%. The sector also employed 106.9 thousand workers, which accounted for 7.5% of the total employment in Lithuania. Construction projects create jobs, encourage investment and contribute to gross domestic product (GDP) growth (Lewis & Hosein, 2004; Sun et al. 2013). The construction sector is directly linked to the development of a country's infrastructure, including the construction of roads, bridges, ports, airports and other infrastructure, i. e. it is very closely linked to the country's output, as the product created (buildings and infrastructure) is used by other sectors of the economy. (Taluntis & Lapinskienė, 2018; Correia et al. 2023) It is also highlighted that construction is also very "closely linked to the transport and manufacturing sectors, especially the technical, chemical production and wood processing sectors" (Averjanovienė et al, 2008). This is one of the main reasons why the sector is highly responsive to external factors. Macroeconomic factors can affect the demand for construction, which will have a direct impact on the profits of the construction sector. These factors cannot be influenced by the construction sector and the construction sector must adapt to them,

which is why it is important to analyze the situation of the Lithuanian construction sector in Lithuania and the external factors influencing this situation. An understanding of macroeconomic factors can help to understand the economic situation in the country and the construction sector can exploit opportunities when the economy is healthy and growing. Otherwise, in a worse economic situation, the construction sector would have to reduce the pace of construction, as there is a risk of a fall in property prices or a drop in demand. Efficient infrastructure is essential for a country's economic competitiveness and growth.

The construction sector is highly sensitive to economic fluctuations (dos Santos & Silva, 2019; Tserng et al., 2012). Recently, the economy has been in turmoil due to events such as the COVID-19 pandemic, the war in Ukraine and the resulting wave of inflation in Europe and beyond, and there is already talk of a recession in Lithuania. All of this is putting a strain on the business sector, which is why now is a particularly important time to keep an eye on developments in the economy. This is particularly important for the construction sector, as it is directly dependent on the economic situation in the country. Constantly changing economic conditions and global trends require constant monitoring and analysis in order to understand the impact of these factors on the construction sector and to implement appropriate measures. The aim of this paper is to analyze and assess the impact of macroeconomic factors on the construction sector in Lithuania.

Literature review

The construction sector is an important part of the economy and its performance is influenced by various macroeconomic factors. The growth rate of gross domestic product (GDP) has a positive impact on the profitability of firms operating in the construction sector (Sui Pheng et al., 2019). This is because an increase in the GDP growth rate leads to an increase in demand for construction services, which in turn leads to higher revenues and profits for firms in the sector. Every company wants to maximize its revenues and profits, but in order to do so, it is important to analyze the economic situation in the country at the time, to observe the state of the economy, and to take appropriate action based on this. The stage of the crisis is clear to everyone, and the population and businesses are well aware of this stage and are coming to terms with it. It is almost impossible to distinguish the peak stage, and at that time the performance of a company is excellent if it is operating efficiently. It is therefore most important to analyze the stages of recession and boom in an economy. Understanding these stages can help a company to ensure that it takes the best action and maximizes its profits, and to understand the risks and opportunities.

Economic growth is the most important factor in a country's development. The conventional measurement of economic growth is usually calculated in terms of gross domestic product (GDP). In a recessionary phase, demand for GDP falls, unemployment rises, corporate spending and profits fall, as do imports, and interest rates fall. Meanwhile, in an expanding economy, aggregate demand, consumption, employment, wages, corporate profits, imports and government revenues also rise as

more taxes are collected and investment grows (Zabarauskaitė & Blažienė, 2012; Fatmawati, 2022; Elbashbishy & El-adaway, 2023). In summary, in all phases of the economic/business cycle, macroeconomic factors such as aggregate demand, employment levels, corporate profits, import levels, interest rates and GDP determine the state of the economy. The change (increase/decrease) in these factors is the basis for determining the movement of the business cycle phase (Phatudi & Okoro, 2023). Understanding both phases is equally important, except that one phase presents opportunities, and the other phase presents threats. By understanding the opportunities, a business can exploit them to the fullest and thus earn the highest possible profit, while by understanding the threats, it can make intelligent decisions and thus maximize profits or minimize losses (Simaviečienė & Keizerienė, 2011; Morris, 2010). Some factors react faster to a changing situation, others more slowly. Therefore, it is important to analyze all of them together and not to focus on just one factor, because theoretically, if an economy is in recession, all or almost all factors should reflect it. GDP remains one of the most accurate indicators of the economic situation. It represents the value created in a country, thus reflecting the economy, but it changes relatively little and quite slowly, so that it is sometimes possible not to measure this factor in a meaningful way.

In analyzing academic literature, authors have identified the concept of a financial or real estate bubble. Zhao et al. (2017) agree, stating that financial bubbles result in a financial crisis, and that the focus should therefore be on so-called bubbles, and on real estate bubbles, as this directly affects the performance of the construction sector. The following definitions of a bubble can be found in the literature (see Table 1).

Author	Definition of the economic bubble
Garber (1990)	A situation where asset prices do not behave in a way that can be explained by economic principles.
Mayer (2011)	A bubble can occur when house prices are too volatile over the cycle, rising faster than fundamentals during a boom and falling faster than fundamentals during a bust.
Sornette, Cauwels (2014)	A period of unsustainable growth when asset prices are rising at an ever-faster rate. During the bubble phase, the price increases faster than the exponential power-law growth process.
Glaeser, Nathanson (2015)	Housing markets are subject to high price volatility, with short-term price appreciation and medium-term price appreciation. Together, these characteristics, especially at the most extreme, create the classic asset bubble.
Tien et al. (2019)	Real estate bubbles are a type of economic bubble that occurs periodically in local or global real estate markets, a rapid rise in real estate market prices until they reach an unsustainable level, and then a decline relative to fair value
Liu et al. (2023)	A bubble is a common economic phenomenon where speculation leads to a sharp increase in the money supply, leading to high property prices, a high vacancy rate and an increase in bank bad loans.

 Table 1. Definition of the economic bubble

A common view of bubbles is that they are a period in which asset prices rise faster than other economic indicators, and that it is quite difficult to explain these price increases in economic terms.

Bjorklund and Soderberg (1999) suggest using the gross income multiplier (GIM) to determine the state of the property market. The gross income multiplier is the ratio of the price of a property to its potential annual earnings (1). This multiplier is a simple and easy way to calculate the investment value of a property (Razali, Fachrudin, & Fachrudin, 2022):

Gross Income Multiplier = Current Value of the Asset/Gross Annual Income of the Asset (1)

Bjorklund and Soderberg (1999) provide criteria to determine whether an economy is in a bubble or a bubble in the making:

- The gross income multiplier has been rising for a long time, but this increase cannot be explained by a change in the interest rate.
- The gross income multiplier has been increasing over a long period of time, but this increase

cannot be explained by expectations of rising rental growth.

- The variables that should be the basis for the level of rental prices are more related to the gross income multiplier than to the level of rents or prices.
- Changes in fundamental factors cannot explain price increases.

If any one of these criteria is correct, then a financial bubble can be said to exist or to be forming. As can be seen, a lot of attention is being paid to rental prices. It can therefore be argued that it is also necessary to monitor rental prices for construction companies, even though their activities are not related to renting.

Tupėnaitė & Kanapeckienė (2009) also identify the characteristics of a real estate bubble, which are:

- Easily available loans, which allow to buy a home in instalments even for low-income earners.
- Low interest rates on loans, which allow large loans to be taken out for long periods.
- Rent equal to or close to the monthly mortgage payment.
- Profitability in the construction sector is clearly higher than in other sectors.

Thus, the key elements in the emergence of real estate bubbles are the easy availability and cheapness of loans, the high rental prices which are equivalent to loan repayments, and the increase in profitability in the construction sector, i.e., an increase in the share of profit in relation to the costs incurred.

To summarize the authors' description of the characteristics of a bubble, they can be reduced to a change in the rental price of real estate and the interest rate. These indicators are key to the formation of a bubble. It is therefore important in an emerging economy to monitor these indicators to ensure that the rate of increase is not too high, as this could mean that the phase of the economic cycle is about to change and things will turn around, and the economy will begin to shrink.

Krivka (2013) identifies ten indicators to assess the impact of the economic crisis on companies, the most important of which are profitability, liquidity, and turnover. These indicators not only allow the impact of

the crisis to be assessed, but also show the effects of the crisis on the performance of the firm. It was found that turnover was the first to be affected, followed by profitability, liquidity, and indebtedness, and finally revenue, number of employees and average wages. This means that not all indicators are affected immediately when the economic situation deteriorates. The real estate sector has been singled out as the sector most affected by the crisis. This therefore further highlights the importance of assessing the macroeconomic environment for the construction sector.

To summarize the whole chapter on the theoretical aspects of macroeconomic factors in the construction sector, it can be argued that economic cycles have a significant impact on all businesses and individuals in a country. This is a particularly important aspect when analyzing the performance of the construction sector, as it is directly dependent on the country's economic situation, the development plans of businesses and the population's access to real estate (Mach, 2019; Brzezicka & Wisniewski, 2023).

The analysis of the scientific literature allows us to identify six main macroeconomic factors that have the greatest impact on the performance of the construction sector: aggregate demand, employment rate, corporate profits, import levels, interest rates and gross domestic product. The importance of the property bubble is also highlighted, which inflates property prices, irrespective of economic factors, which can then lead to a sharp fall in property prices. The construction sector must therefore assess whether, even in a very profitable period, a bubble is forming, which could result in a very large drop in profits.

Methodology

The aim of the empirical study is to assess the impact of economic factors on the construction sector in Lithuania. To achieve this objective, a correlation analysis, regression analysis and forecasting of the performance of the Lithuanian construction sector were carried out. The logical progression of the study is presented in Figure 1.



Fig. 1. Logical framework of the research

Most time series in macroeconomics are trending and non-stationary. Using standard regression modelling to test for normality can lead to incorrect conclusions. The first step in model building should be to test for stationarity, thus avoiding spurious regression models with spurious results. Therefore, the first step is to check the stationarity of the time series to avoid obtaining a spurious regression model. Stationarity is checked by the Dik Fuler test. The probability values obtained show that if the probability is greater than 0.05, the time series is not stationary; if the probability is less than 0.05, the series is considered stationary.

A correlation matrix is constructed which shows how the dependent variable Y (construction works in the country at current prices) depends on the independent variables X (employment, imports, corporate profits, EURIBOR interest rates, wages, and GDP). The correlation matrix shows the coefficient of significance of the correlation and the probability value indicates whether the relationship is significant. A significant correlation is significant when the probability is greater than 0.05. Correlation is needed to determine whether a linear model or a non-linear model can be built between the dependent variable and the independent variables. A linear model is only possible with variables that have a significant dependence. Non-linear models can be constructed with both significant and nonsignificant dependent variables.

With significant variables, either a multivariate linear regression model (MLR) or a paired linear (PLR) or a paired non-linear regression model (PNR) is constructed (see Figure 1). A multivariate regression model is

constructed with more than one independent variable that is significantly correlated with the dependent variable. Paired regression models are constructed with only one independent variable that is significantly correlated. Only non-linear regression models can be built with independent variables that are insignificantly correlated with the dependent variable. The parameters of the regression model must be significant, and the likelihood of the parameters must not exceed 0,05. The model itself must also be significant, i. e., the probability of the Fstatistic must be less than 0,05.

Further, we need to assess the errors of the regression model, which will show whether the model is accurate enough for forecasting. The errors must satisfy the conditions of zero mean, normality, independence, and constancy of variance (Chatterjee, Hadi, 2013). Once the model meets these conditions, prediction of the dependent variable is possible.

The performance of the construction sector is characterized by the construction work done, and therefore the value of construction work done at thencurrent prices (S) is used as the dependent variable in the statistical analysis. In this study, the value of construction work is presented as the total output of all construction work. Therefore, the indicator reflects the total annual value of construction work for non-residential buildings, residential buildings, and civil engineering structures (in thousands of Euros).

The factors of the macroeconomic environment that have the greatest impact on the volume of construction work were selected following a literature review. These factors are aggregate demand, employment, corporate profits, the scale of imports, interest rate and gross domestic product (GDP) (Phatudi & Okoro, 2023; Zabarauskaitė & Blažienė, 2012; Fatmawati, 2022; Elbashbishy & El-adaway, 2023). For each of these factors, the indicator that best describes it is selected and used as an independent variable in the statistical analysis.

For the aggregate demand factor, net wages (average monthly wages for the year in question, in euros) was chosen as the indicator to reflect the aggregate demand factor, since consumption and aggregate demand are the most important determinants of personal income. Employment in the country is represented by the average annual employment rate (%), corporate profits are represented by the aggregate annual profits of the construction sector (thousand euro), imports are measured as the annual imports of the country (thousand euro) and GDP is chosen as the annual indicator of the country (million euro). The interest rate indicator chosen is the EURIBOR interest rate, as this interest rate has a significant impact on both the interest rates offered to businesses and the interest rates received by individuals. Annual data from 2000 to 2022 were chosen for the analysis. They are taken from the Lithuanian State Data Agency (State data agency, 2023). The econometric analysis of the data was carried out with the EViews software.

Results and Discussion

The analysis of the stationarity of the statistics shows that almost all the data analyzed are non-stationary, except for the EURIBOR interest rate. Data which are integrated processes of degree I (1) are differentiated once and integrated processes of degree I (2) are differentiated twice. This yielded stationary time series, which were used in the correlation analysis in the next stage of the study. The correlation analysis allowed us to assess the strength of the relationship between the dependent variable and the independent variables (see Table 2).

 Table 2. The evaluation of the correlation strength between construction activities conducted in the country and macroeconomic indicators.

Independent variable	Correlation coefficient	Size of the connection		
Net wages	0,88			
Import	0,70	- High positive correlation		
Employment	0,68	Moderate positive correlation		
GDV	0,67	woderate positive correlation		
Corporate profits	0,47	Low positive correlation		
EURIBOR interest rate	0,11	Negligible correlation		

High positive correlation is observed between wages and imports, suggesting that these independent variables move over time in a similar way to the dependent variable. A moderate positive relationship is observed between employment and GDP, low positive correlation and negligible correlation are observed between corporate profits and the EURIBOR interest rate, respectively. The significance of the correlation analysis shows that there is a significant correlation between construction works and corporate profits, GDP, net wages, imports, and employment. The only variable, the EURIBOR interest rate, does not have a significant linear correlation with the construction work carried out by construction companies in the country.

With significant linearly related variables, a multiple linear regression model is constructed, the parameters of which and the model itself must be significant. The analysis of the significance of the variables and the model and the removal of the non-significant parameters (firms' profits, GDP and employment) lead to a significant multiple regression model with the dependent variable being the construction work carried out in the country at the prices of the time (C), and the two independent variables being the average monthly net wage (W) and the annual import volumes (IM):

C=24666.83+14795.10 DU+0.036280 IM (2)

The parameters of the model and the model itself are estimated to be significant. In addition, attention should be paid to the absence of multicollinearity among the model parameters. It is found that there is no collinearity between wages and imports, so both variables are good parameters for the regression model.

Based on the resulting regression model, we can calculate the elasticity coefficients, which estimate the impact of the independent variables on the dependent variable. The resulting elasticity coefficients are presented in Table 3.

Table 3. Coefficient of elasticity

Independent variable	Coefficient of elasticity
Wage	0,45
Import	0,43

The elasticity coefficient shows that a 1% increase in wages will lead to a 0.45% increase in construction output, while a 1% increase in imports will lead to a 0.43% increase in construction output.

The coefficient of determination of the model (rsquared corrected) indicates that the model is sufficiently reliable for forecasting, with a confidence level of 80%. To ensure the quality of the forecasts, the residual errors of the model were checked, which fulfilled the conditions of zero mean, normality, independence and constancy of variance. The analysis of the model's errors showed that the model is suitable for forecasting the volume of construction work in Lithuania.

To forecast the volume of construction work for 2003, the first step was to forecast the independent variables (W and IM) by analyzing various exponential smoothing models and selecting the best one according to the criterion of the smallest error. The forecast showed that net wages are expected to increase in 2023, while import volumes are expected to decrease compared to the previous period. The data obtained for 2023 allowed to forecast the volumes of the Lithuanian construction sector in 2023 using a selected regression model. The results of the forecasts are presented in Table 4.

Table 4. Porecasted values of the variables in the regression mode.	Table 4.	Forecasted	values	of the	variables	in the	regression	model
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Year	Actual Net Wage (Euro)	Forecasted Net Wage (Euro)	Actual Import (thousand Euro)	Forecasted Import (thousand Euro)	Actual construction work (thousand Euro)	Forecasted construction work (thousand Euro)
2000	200,5		6046360		762425	
2016	602,3		24737298		2278909	
2017	660,2		28516178		2563712	
2018	720,0		30942631		2999593	
2019	822,1		31949100		3390534	
2020	913,1		29127104		3377640	
2021	1001,8		37690668		3769105	
2022	1119,0		52392133		4677751	
2023		1235,6		40809988		4273825

The resulting forecast shows (see Table 4) that the volume of construction work in 2023 is expected to decrease compared to 2022 by EUR 400 million or 8.6%. The projected decrease is significant and a very important indicator for the economy. The analysis revealed that the sector's decline would be mainly driven by a fall in imports. Higher wages are forecast to boost growth in the sector, but the sharp fall in imports has overturned the positive forecast.

Conclusions

An analysis of the theoretical aspects of the impact of economic cycles and macroeconomic factors on the construction sector has led to the conclusion that economic cycles have a strong correlation with the performance of the construction sector. The construction sector is highly dependent on the economic situation and the economic cycles are constantly changing this situation. It is therefore very important in time to understand when the economic cycle is changing or what stage of the cycle one is currently in, and thus to take advantage of this situation in business. Understanding the situation allows you to maximize performance in the peak or boom phases or avoid losses in the downturn or crisis phases. The main macroeconomic factors identified as influencing the cycle and the performance of the construction sector are aggregate demand, employment levels, corporate profits, import levels, interest rates, gross domestic product (GDP).

The study of macroeconomic factors influencing the construction sector in Lithuania shows that the macroeconomic environment affects the performance of the construction sector. The analysis showed that the construction sector indicator (construction works at current prices) moves in the same direction as the selected macroeconomic indicators in the time series, except interest rates. This means that, historically, as macroeconomic indicators increase or decrease, construction revenues are directly related to them. The study revealed that the most significant macroeconomic factors influencing the performance of the sector are imports and net wages. Although the construction sector's revenues are relatively inelastic for both of these indicators, a forecast of the sector's revenues in 2023 showed that there is a possibility of a significant decline in the sector's revenues, which will be mainly influenced by a decline in import volumes.

References

- Björklund, K., & Söderberg, B. (1999). Property cycles, speculative bubbles and the gross income multiplier. Journal of Real estate research, 18(1), 151-174.
- Brzezicka, J., & Wisniewski, R. (2023). The applicability of the speculative frame method for detecting disturbances on the real estate market: evidence from Poland. Journal of Housing and the Built Environment, 38(1), 467-495.
- Chatterjee, S., & Hadi, A. S. (2013). Regression analysis by example. John Wiley & Sons.
- Correia, L., & Ribeiro, M. J. (2023). Macroeconomics and the Construction Sector: Evidence from Portugal. Athens Journal of Business & Economics, 9(1), 9-26.
- dos Santos, A. R., & Silva, N. (2019). Sectoral concentration risk in Portuguese banks' loan exposures to non-financial firms. Banco Portugal Econ Stud, 1-17.
- Elbashbishy, T., & El-adaway, I. H. (2023). System Dynamic Modeling to Study the Impact of Construction Industry Characteristics and Associated Macroeconomic Indicators on Workforce Size and Labor Retention Rate. Journal of Construction Engineering and Management, 149(10), 04023100.
- Fatmawati, K. (2022). GROSS DOMESTIC PRODUCT: Financing & Investment Activities and State Expenditures. KINERJA: Jurnal Manajemen Organisasi dan Industri, 1(1), 11-18.
- Garber, P. M. (1990). Famous first bubbles. Journal of Economic perspectives, 4(2), 35-54.

- Glaeser, E. L., & Nathanson, C. G. (2015). Housing bubbles. In Handbook of regional and urban economics (Vol. 5, pp. 701-751). Elsevier.
- Krivka, A. (2013). Ekonominės krizės poveikio Lietuvos ūkio šakoms tyrimas. Verslas: teorija ir praktika, 14(3), 188-199.
- Lewis, T. M., & Hosein, R. (2004). Quantifying the relationship between aggregate GDP and construction value added in a small petroleum rich economy–a case study of Trinidad and Tobago. Construction Management and Economics, 22, 185-197.
- Liu, X. X., Liu, H. H., Yang, G. L., & Pan, J. F. (2023). Productivity assessment of the real estate industry in China: a DEA-Malmquist index. Engineering, Construction and Architectural Management, 30(3), 1243-1270.
- Mach, Ł. (2019). Measuring and assessing the impact of the global economic crisis on European real property market. Journal of Business Economics and Management, 20(6), 1189-1209.
- Mayer, C. (2011). Housing bubbles: A survey. Annu. Rev. Econ., 3(1), 559-577.
- Morris, M., Schindehutte, M., & Allen, J. (2005). The entrepreneur's business model: toward a unified perspective. Journal of business research, 58(6), 726-735.
- Phatudi, L., & Okoro, C. (2023). An exploration of macroeconomic determinants of real estate booms and declines in developing countries. Journal of Housing and the Built Environment, 38(1), 261-282.
- Razali, A., Fachrudin, K. A., & Fachrudin, H. T. (2022) Analysis of factors affecting gross income multiplier of warehouse property in Medan City and Deli Serdang Regency, North Sumatra Province. International Journal of Health Sciences, (I), 6710-6731.

- Simanavičienė, Ž., & Keizerienė, E. (2011). Makroekonominių veiksnių įtaka Lietuvos nekilnojamojo turto rinkos krizei. Ekonomika ir vadyba, (16), 323-329.
- Sornette, D., & Cauwels, P. (2014). Financial bubbles: mechanisms and diagnostics. arXiv preprint arXiv:1404.2140.
- Sui Pheng, L., Shing Hou, L., Pheng, L. S., & Hou, L. S. (2019). The economy and the construction industry. Construction Quality and the Economy: A Study at the Firm Level, 21-54.
- Sun, M. Y., Mitra, M. P., & Simone, M. A. (2013). The driving force behind the boom and bust in construction in Europe. International Monetary Fund.
- State Data Agency (2023): https://www.stat.gov.lt/
- Taluntis, R., & Lapinskienė, G. (2018, July). Statybų sektoriaus sukuriamos vertės ir ekonomikos augimo sąsajos. In 21st CONFERENCE" BUSINESS IN XXI CENTURY".
- Tien, N. H., Vu, N. T., Dung, H. T., & Duc, L. D. M. (2019). Determinants of real estate bubble in Vietnam. International Journal of Research Finance and Management, 2(2), 75-80.
- Tserng, H. P., Liao, H. H., Jaselskis, E. J., Tsai, L. K., & Chen, P. C. (2012). Predicting construction contractor default with barrier option model. Journal of Construction Engineering and Management, 138(5), 621-630.
- Tupėnaitė, L., & Kanapeckienė, L. (2009). Nekilnojamojo turto kainų burbulas ir jo pasekmės Baltijos šalims. Mokslas– Lietuvos ateitis, 1(5), 103-108.
- Zabarauskaitė, R., & Blažienė, I. (2012). Gyventojų pajamų nelygybė ekonominių ciklų kontekste. Verslas: teorija ir praktika, 13(2), 107-115.
- Zhao, S. X., Zhan, H., Jiang, Y., & Pan, W. (2017). How big is China's real estate bubble and why hasn't it burst yet?. Land use policy, 64, 153-162.

RECEIVED: 10 September 2023 ACCEPTED: 18 September 2023 PUBLISHED: 06 October 2023

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