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ANALYSIS OF THE IMPACT OF MACROECONOMIC FACTORS ON REAL ESTATE PRICES IN BOSNIA AND HERZEGOVINA

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Review Article

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ABSTRACT

Economic theory and practice are not acquainted with any unique set of macroeconomic factors that affect real estate prices. The very complexity of this phenomenon relativizes any attempt to establish an unchanged list of macroeconomic factors in BiH. The aim of the research in this paper is to analyze the impact of selected macroeconomic indicators on real estate prices in BiH, in the period from 2007 to 2019. Out of numerous macroeconomic factors that affect real estate prices (real estate prices are viewed as: the value of construction works done and as the value of new dwellings - new construction), 12 macroeconomic factors were singled out: nominal gross domestic product, real GDP growth rate, industrial production growth rate, GDP per capita, average net wages, imports and exports, household deposits in commercial banks, interest rate (housing loans, annual, %), loans to households, household final consumption expenditure, gross fixed capital formation and government final consumption expenditure. Starting from the hypothesis that macroeconomic factors affect real estate prices, it has been concluded that the selected factors significantly determine real estate prices and that most of the predictor variables defined in the model are significant, in terms of impact on the movement of GDP and real estate prices in Bosnia and Herzegovina in the period analyzed. The greatest impact on real estate prices is by household final consumption expenditure, GDP per capita, nominal GDP, interest rate, household deposits and real GDP growth rate. The research used factor analysis (reduction of macroeconomic factors to the optimal number of factors that explain the analyzed phenomenon and its impact on real estate prices) and an extended multiple linear regression model with a statistical software program SPSS, version 21. Modeling the impact of macroeconomic factors on real estate prices has macroeconomic effects and benefits for the country and contributes to the growth and well-being of operators in the real estate market.

Keywords: *Real estate prices, GDP, Principal Component Analysis, Enter method, regression model.*

1. INTRODUCTION

The real estate market is an important market in modern market-oriented economies. The stability of the real estate market affects the state of a national economy, while, on the other hand, macroeconomic trends significantly affect the stability of the real estate market. The real estate market determines the economic well-being of a certain country. Although in most developed countries these markets have been functioning for decades and even centuries, transitional countries have put the real estate market issue on the back burner. Transition countries are still struggling with main economic problems, such as: growth, productivity, unemployment, efficient use of available resources, etc. Therefore, it is expressed the need for a country to efficiently manage this resource.

Global economic trends and/or economic instability have a strong impact on the real estate market. Macroeconomic problems and crises (as well as the current one in the form of a pandemic) are significantly reflected in the real estate market; crises have the greatest impact on real estate prices. The fiscal aspect is also important because fiscal revenues (national and local) depend on turnover on the real estate market. Real estate prices also determine the general well-being of citizens. They also affect the operations of banks (through mortgages, sales, etc.). Due to all of the above, it is extremely important to stabilize real estate prices and reach their real values, which can be achieved through economic growth and development of the overall economy of Bosnia and Herzegovina. Only in this way it is possible to implement policies and macroeconomic measures that will make the real estate market an efficient segment of the overall socio-economic system.

2. PREVIOUS RESEARCH

(Mastilo, Z. & Cickovic, R. 2017) believe that numerous macroeconomic factors are used to show the state and development of country's economy, and the most important is the gross domestic product (GDP). The GDP analysis serves to illustrate the state and trends of the economy of Bosnia and Herzegovina. The authors believe that growth rates are not sufficient to enable visible progress, as is the case in developed countries. Bosnia and Herzegovina should make maximum efforts to increase its value added in areas that quickly and strongly contribute to growth and development.
(Ćetković, J., Lakić, S., Lazarevska, M., Žarković, M., Vujošević, S., Cvijović, J., & Gogić, M., 2018) dealt with real estate price forecasting. The authors attempted to obtain accurate output data showing price predictions on the real estate markets of the observed EU member states. Through an artificial neural network, the authors see the possibility for precision of input data and determination of the dependence of prices on variable inputs. Such forecasts can be used for the purpose of accounting, sales, but also for the feasibility of constructions in order to predict the sales price. Therefore, the aim of this research was to create a forecast model of real estate market value in EU countries, depending on the impact of macroeconomic indicators.
(Boya, Z., 2019) uses a multiple regression analysis model to examine the impact of various factors on housing prices. There are many factors that affect housing prices, such as: money supply, population, investments in real estate development, supply and demand, as well as disposable income of households and their savings. All these factors have a significant impact on real estate price changes.
Recent research (Hacıevliyagil, Krzysztof and Ibrahim, 2022) analyzed the dynamics of the housing market in the Turkish economy and examined the impact of variables related to housing prices. The dynamic model averaging (DMA) methodology was applied in order to predict the monthly growth of house prices in the period 2010-2019. The research results show that some variables, such as bond yields, mortgage level, foreign direct investments, unemployment, industrial production, and exchange rates are the key determinants of the Residential Property Price Index.
From all of the above, it can be seen that there is no single set of factors that describe the impact and significance they have on real estate prices. It can be only identified some common characteristics (use of multiple regression analysis and factor analysis), that is, common factors that influence real estate prices, but the selection of factors itself is a subjective matter of the researcher who deals with this issue. Subjectivism is reduced by the application of very "powerful" statistical software, such as IBM SPSS, STATA and others.

3. RESEARCH METHODOLOGY

The paper analyzes the impact of selected macroeconomic indicators on real estate prices in BiH, in the period from 2007 to 2019. The analysis should show whether the variables defined in the model are significant, in terms of impact on real estate prices. In order to quantify these relationships,

Principal Component Analysis was used. As an objective method and a precursor to other methods, Principal Component Analysis proved to be relevant and credible to decrease a large number of variables and reduce them to an optimal number. Due to the specificity of the relations that prevail within BiH, as well as due to the available data, the analysis of macroeconomic factors that impact real estate prices is defined in such a way that real estate prices are understood as two separate entities. Under real estate prices (real estate value), in this paper, the following are defined as dependent variables: Value of works done and Value of new dwellings (New construction). According to the above, two models are defined:

1. *Model A: Value of works done.* The value of works done in construction represents the total value of works that the reporting unit (main contractor, subcontractor or subcontractor) performed in a certain country. It includes the value of work, materials installed and finished products for installation, fuel and energy, other costs incurred by the reporting unit and related to the performed (completed) works, as well as profit.

2. *Model B: Value of new dwellings (New construction)* is obtained as the product of the usable area of the dwelling and the average price per m^2. New construction means the construction of a new building in a place where there was no building, or a building already existed and was demolished.

The independent variables in the model were as follows:

1. *Nominal Gross Domestic Product.* Gross domestic product (GDP) is the most commonly used aggregate in macroeconomic analyses. Its importance lies in identifying the size, i.e. the strength of the national economy, through the amount of real GDP. It means that some of the countries may have a high GDP but not on a per capita basis, which means that they are significant markets, but with still weak personal consumption. In addition, the distribution of achieved GDP (i.e. wealth) by economic factors is also significant. Even higher GDP per capita, if it is unfairly distributed, does not have to be a guarantee for high and massive personal consumption.
2. *Real GDP growth rate.* The real GDP growth rate (%) enables comparison of the dynamics of economic growth and development both over time and between the economies of different countries.
3. *Industrial production growth rate.* The rate of industrial production represents the ratio of annual production and sales (sales value of each individual product, according to the code from the valid Classification of Industrial Products) and total value added.
4. *GDP per capita.* GDP per capita represents the ratio of total value added (GDP, created in the accounting period compared to the previous period) and the number of inhabitants. GDP per capita is a measure of national well-being.
5. *Average net wages.* Average net wages represent the ratio of total paid wages and the number of employees to whom the payments relate.
6. *Goods and services, import and export.* Export of goods and services consists of transactions of goods and services (sales, exchanges and gifts) from residents to non-residents. The import and export of goods occurs when the economic ownership of goods changes between residents and non-residents. This applies regardless of the corresponding physical movement of goods across borders.
7. *Gross fixed capital formation.* Gross fixed capital formation consists of acquisitions of resident producers, less depreciation of fixed tangible or intangible investments. It specifically includes machinery and equipment, vehicles, dwellings and other buildings.

8. *Household deposits in commercial banks.* Household deposits in commercial banks are household funds that banks and other depository institutions keep in their accounts.

9. *Interest rate (housing loans, annual, %).* The interest rate is the percentage of principal that the lender charges for the use of their money. Principal is the amount of money borrowed.

10. *Loans to households.* Retail loans are loans intended for individuals, usually without or with low collateral, for personal purposes. These loans have a great economic significance because they enable the consumption of households beyond their means, thus resulting in an increase in domestic demand.

11. *Household final consumption expenditure.* Household final consumption expenditure (according to the purpose of consumption, % of total consumption) refers to any consumption made by a person living alone or a group of people living together in shared accommodation and with shared domestic expenditures. It includes expenditures incurred on the domestic territory (by residents and non-residents) for the direct satisfaction of individual needs and covers the purchase of goods and services, consumption of own production and rent of dwelling owners.

12. *Government final consumption expenditure.* Government final consumption expenditures include the value of goods and services purchased or produced by the general government and which are directly delivered to private households for consumption.

The selection of indicators was made on the basis of macroeconomic factors that are available on the website of the Statistical Office of the European Commission (Eurostat).

4. APPLICATION OF PRINCIPAL COMPONENT ANALYSIS IN THE ANALYSIS OF THE IMPACT OF MACROECONOMIC FACTORS ON REAL ESTATE PRICES IN BOSNIA AND HERZEGOVINA

As an objective method and a precursor to other methods, Principal Component Analysis proved to be relevant and credible to decrease a large number of variables and reduce them to an optimal number. The analysis begins by defining the most important macroeconomic factors of the BiH economy (Table 1).

Table 1. Macroeconomic factors of the economy of Bosnia and Herzegovina, in the period 2007-2019.

Year	Nominal GDP (mil. EUR)	GDP per capita	Real GDP growth rate (%)	Indust. product. growth rate (%)	Household final consumption expenditure	Average net wages	Import and export (goods and services, mil. EUR)	Household deposits in commercial banks (mil. EUR)	Gross fixed capital formation (mil. EUR)	Interest rate	Government final consumption expenditure (mil. EUR)	Loans to households (mil. EUR)
2007	11,523.20	3,255	6.00	10.00	11,324.11	322	-3,204.40	2,622	2,934.20	7.17	2,867.90	315
2008	13,047.80	3,684	5.60	9.20	11,502.60	385	-3,178.90	2,633	3,150.90	6.98	2,898.10	330
2009	12,679.30	3,580	-3.00	-3.30	11,042.20	404	-3,008.60	2,793	2,593.70	7.93	2,974.80	366
2010	12,968,90	3,663	0.90	1.60	11,210.10	408	-2,798.30	3,251	2,321.60	7.89	2,999.30	410
2011	13,411,80	3,791	1.00	5.60	11,557.90	417	-3,187.30	3,605	2,539.40	7.43	3,096.80	439
2012	13,407.50	3,793	-0.80	-5.20	11,809.40	422	-3,143.20	3,914	2,541.20	7.20	3,132.70	470
2013	13,691.80	3,878	2.30	6.70	11,947.40	423	-2,799.30	4,276	2,486.40	7,23	3,125.30	482
2014	13,988.30	3,967	1.20	0.10	12,121.30	424	-3,157.70	4,623	2,760.70	6.32	3,197.90	479
2015	14,617.40	4,155	3.10	2.60	12,333.80	424	-2,667.10	5,044	2,660.90	6.16	3,215.50	480
2016	15,289.90	4,355	3.10	4.30	12,625.60	428	-2,534.00	5,451	2,727.40	5.98	3,205.20	463
2017	16,042.40	4,578	3.20	3.10	13,009.80	435	-2,601.00	5,763	3,030.20	4.24	3,253.10	458
2018	17,099.70	4,891	3.70	1.60	13,547.40	449	-2,561.60	6,210	3,349.00	3.17	3,380.50	466
2019	17,908.30	5,168	2.70	-5.5	14,218.60	471	-2,729.00	6,770	3,508.30	3.35	3,508.60	470

Source: EUROSTAT, Central Bank of Bosnia and Herzegovina, Agency for Statistics of Bosnia and Herzegovina.

4.1. REDUCTION OF THE LIST OF INDICATORS - PRINCIPAL COMPONENT ANALYSIS

In order to objectify the process of reducing the initial list of development indicators as much as possible, Principal Component Analysis was used. Factor analysis models are a good precursor to multiple linear regression models because, in addition to providing an objective list of the importance of indicators, there are also additional possibilities for analyzing the factor solution. The goal of factor analysis is to explain the interrelationship of observed indicators with a smaller number of variables called factors. It is about describing the large mass of information contained in the observed indicators with fewer factors without losing individual information. This goal is achieved by applying Principal Component Analysis. Let the key tables be analyzed. Table 2 provides key information on how many factors have been reduced (extracting significant representatives) out of our list of the initial 12 variables (Table 4). Table 2 (Total Variance Explained) presents the results of factor extraction.

Table 2. Total Variance Explained.

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.042	67.019	67.019	8.042	67.019	67.019	7.807	65.056	65.056
2	2.359	19.661	86.680	2.359	19.661	86.680	2.595	21.625	86.680
3	.923	7.688	94.368						
4	.409	3.412	97.780						
5	.155	1.294	99.074						
6	.062	.514	99.588						
7	.026	.220	99.808						
8	.013	.108	99.916						
9	.006	.053	99.969						
10	.003	.026	99.995						
11	.001	.005	100.000						
12	8.237E-7	6.864E-6	100.000						

Extraction Method: Principal Component Analysis.

Source: Author's calculation.

Characteristic values greater than 1 (8.042 and 2.359) were taken as the criteria for selecting the number of factors. The first two factors have characteristic values greater than 1, and the percentage of variance explained is high (86.680%). The table shows that the first factor explains as much as 67.019% of the total variability of all 12 original variables and the second factor 19.661%. Important information is that these two factors explain 86.680% of the total variability, which is enough to be "representative" of all the original variables. After selecting the factors, rotation and extraction of factors was done. Table 3 presents the results of factor rotation and extraction

Table 3. Factor rotation[a].

	Component	
	1	**2**
Household final consumption	.991	
GDP per capita	.986	
Nominal GDP	.985	
Interest rate	-.967	
Household deposits	.965	
Government final consumption	.930	.326
Average net wages	.757	.585
Import/Export	.723	
Gross investments	.720	-.494
GDP growth rate		-.901
Industrial production growth rate	-.304	-.779
Loans to households	.598	.616

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 3 iterations.

Source: Author's calculation.

The Rotated Component Matrix table shows that the first factor is most correlated with Household final consumption expenditure (0.991), GDP per capita (0.986), Nominal GDP (0.985), Interest rate (-0.967) and Household deposits (0.965). The second factor is most correlated with GDP growth rate (-0.901). Therefore, these variables were taken as indicators for examining the impact on the Value of works done. Therefore, by applying Principal Component Analysis, the initial 12 variables were reduced to six, without losing information that is essential for the description of the dependent variable (Model A; Value of works done). It has been obtained the main macroeconomic indicators relevant to the real estate market which will best explain the phenomenon analyzed. The Enter method was applied to this list of variables (inclusion of all independent variables in the model at the beginning of the analysis without any restrictions in the regression model).

4.2. MODEL A: APPLICATION OF THE ENTER METHOD IN THE ANALYSIS OF THE IMPACT OF MACROECONOMIC FACTORS ON THE VALUE OF WORKS DONE

Model A analyzed the impact of macroeconomic factors on the value of construction works done. The value of works (Statistical Yearbook of the Republic of Srpska, 2020., section: Construction) done includes all the built-in construction materials and labor used. The cost of land acquisition, design, supervision and VAT is not included in the value. Data on the value of works done refer to works done in a given year on completed and unfinished constructions.
The value of works done is given on the basis of annual accounting situations. It was analyzed the value of works done in construction as a dependent variable, and the household final consumption expenditure, GDP per capita, nominal GDP, interest rate, household deposits in commercial banks and the real GDP growth rate as independent variables. Table 4 shows the analyzed variables in the regression model.

Table 4. Dependent and independent variables.

Year	The value of works done in construction (000 EUR)	Household final consumption expenditure	GDP per capita	Nominal GDP (mil. EUR)	Interest rate	Household deposits in commercial banks (mil. EUR)	Real GDP growth rate (%)
2007	674,751.90	11,324.11	3,255	11,523.20	7.17	2,622	6.00
2008	882,189.66	11,502.60	3,684	13,047.80	6.98	2,633	5.60
2009	722,235.57	11,042.20	3,580	12,679.30	7.93	2,793	-3.00
2010	636,175.95	11,210.10	3,663	12,968,90	7.89	3,251	0.90
2011	689,468.92	11,557.90	3,791	13,411,80	7.43	3,605	1.00
2012	672,106.47	11,809.40	3,793	13,407.50	7.20	3,914	-0.80
2013	717,651.84	11,947.40	3,878	13,691.80	7,23	4,276	2.30
2014	802,038.01	12,121.30	3,967	13,988.30	6.32	4,623	1.20
2015	809,532.53	12,333.80	4,155	14,617.40	6.16	5,044	3.10
2016	823,927.95	12,625.60	4,355	15,289.90	5.98	5,451	3.10
2017	796,330.46	13,009.80	4,578	16,042.40	4.24	5,763	3.20
2018	840,017.80	13,547.40	4,891	17,099.70	3.17	6,210	3.70
2019	801,502.18	14,218.60	5,168	17,908.30	3.35	6,770	2.70

Source: EUROSTAT, Central Bank of Bosnia and Herzegovina, Agency for Statistics of Bosnia and Herzegovina.

Regarding the output results, attention should be paid to the key tables. Table 5, Model Summary, provides key information about the validity of the regression model.

Table 5. Model Summary[b].

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.899[a]	.809	.618	47610.95852	.809	4.234	6	6	.051	2.596

a. Predictors: (Constant), Real GDP growth rate, Household deposits, Nominal GDP, Interest rate, GDP per capita, Household final consumption expenditure

b. Dependent Variable: Value of works done.

Source: Author's calculation.

The analysis of these results showed that the multiple correlation coefficient of the dependent variable (Value of works done) and independent variables (Real GDP growth rate, Household deposits, Nominal GDP, Interest rate, GDP per capita, Household final consumption expenditure) is 0.899, which means that the strength of their bond is very strong. The coefficient of determination is 0.809, which means that 80.9% of the variability of the dependent variable (Value of works done) can be explained by the impact of the independent variables (Real GDP growth rate, Household deposits, Nominal GDP, Interest rate, GDP per capita, Household final consumption expenditure). This shows that the independent variables that explain the dependent variable are well selected. Table 6 presents ordinary regression coefficients – labeled *B* and standardized regression coefficients *Beta*.

Table 6. Ordinary and standardized regression coefficients[a].

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1489619.298	1132415.091		1.315	.236	-1281300.61	4260539.205					
	Household final consumption expenditure	-220.559	110.796	-2.735	-1.991	.094	-491.667	50.549	.563	-.631	-.355	.017	59.269
	GDP per capita	474184.218	163523.481	3.393	2.900	.027	74056.673	874311.763	.571	.764	.517	.023	43.002
	Nom. GDP	-.102	.035	-.649	-2.945	.026	-.187	-.017	-.550	-.769	-.525	.656	1.524
	Interest rate	10073.904	35345.566	.214	.285	.785	-76413.580	96561.387	-.610	.116	.051	.056	17.728
	Household deposits	-13177.740	42155.469	-.239	-.313	.765	-116328.457	89972.978	.499	-.127	-.056	.055	18.333
	GDP growth rate	20985.872	8130.329	.664	2.581	.042	1091.673	40880.071	.457	.725	.461	.481	2.079

a. Dependent Variable: Value of works done

Source: Author's calculation.

Based on the obtained regression coefficients, the regression model is presented as follows:
$Y = 1{,}489{,}619.298 - 220.559X_1 + 474{,}184.218X_2 - 0.102X_3 + 10{,}073.904X_4 - 13{,}177.740X_5 + 20{,}985.872X_6$.
It was concluded that out of the six observed independent variables, the variables with the greatest importance in relation to the dependent variable (Value of works done) are the following, in the order given: Household final consumption expenditure, GDP per capita, Nominal GDP, Interest rate, Household deposits and GDP growth rate.
Higher gross investments in the economy of Bosnia and Herzegovina, increase in GDP and thus in GDP per capita, interest rate as well as deposits (household savings) enable a higher Value of works done in construction.
The value of construction works done in Bosnia and Herzegovina tends to increase with some exceptions. The construction sector directly affects the entire economy. Many areas have developed and are developing alongside the growth of construction. Likewise, construction develops along with the development of some areas such as transportation. It can be seen that along with roads (urban and suburban) the construction sector is experiencing great growth. There are also problems that are solved systematically with the cooperation of institutions. The assistance of international organizations is also significant. Thus, there is a Project to improve the business environment and attract investments at the local level, which is financed by the Government of Great Britain and is carried out in cooperation with the International Finance Corporation (IFC), a member of the World Bank Group. This project will implement an Integrated system for the electronic issuance of permits in the construction industry, which will increase the Value of works done in the construction industry in the coming period.
Based on all of the above, it has been observed that the real situation in Bosnia and Herzegovina is such that a lot of attention is paid to construction. Bosnia and Herzegovina should continue to encourage investment in the construction industry as well as solving many property legal issues in order to simplify obtaining building permits and shorten the period to construct buildings.

4.3. MODEL B: APPLICATION OF THE ENTER METHOD IN THE ANALYSIS OF THE IMPACT OF MACROECONOMIC FACTORS ON THE VALUE OF NEW DWELLINGS

Model B presented an analysis of the impact of macroeconomic factors on the Value of new construction. The value of new dwellings (new construction, average price of completed dwellings)

is obtained as a product of the usable area (in m^2) and the average dwelling price in KM/m^2. Table 7 shows the variables analyzed in the model. New construction (According to the Classification of Types of Constructions in BiH-CC BiH, which is harmonized with the Classification of Types of Constructions in EU – CC, final version, Eurostat 1997) is the construction of a new building in a place where there was no building before or it existed but was removed. New construction is also considered the rebuilding of a building that was completely demolished due to war destruction or was so damaged that it had to be completely demolished. The Value of new construction (Average price of completed dwellings) was analyzed as a dependent variable, and Household final consumption expenditure, GDP per capita, Nominal GDP, Interest Rate, Household deposits in commercial banks, Real GDP growth rate were analyzed as independent variables (Table 7).

Table 7. Presentation of the variables analyzed in the regression model.

Year	Value of new construction (000 EUR)	Household final consumption expenditure	GDP per capita	Nominal GDP (mil. EUR)	Interest rate	Household deposits in commercial banks (mil. EUR)	Real GDP growth rate (%)
2007	96,183	11,324.11	3,255	11,523.20	7.17	2,622	6.00
2008	171,942	11,502.60	3,684	13,047.80	6.98	2,633	5.60
2009	148,904	11,042.20	3,580	12,679.30	7.93	2,793	-3.00
2010	158,273	11,210.10	3,663	12,968,90	7.89	3,251	0.90
2011	110,823	11,557.90	3,791	13,411,80	7.43	3,605	1.00
2012	105,682	11,809.40	3,793	13,407.50	7.20	3,914	-0.80
2013	84,133	11,947.40	3,878	13,691.80	7,23	4,276	2.30
2014	91,146	12,121.30	3,967	13,988.30	6.32	4,623	1.20
2015	86,215	12,333.80	4,155	14,617.40	6.16	5,044	3.10
2016	120,337	12,625.60	4,355	15,289.90	5.98	5,451	3.10
2017	93,440	13,009.80	4,578	16,042.40	4.24	5,763	3.20
2018	129,736	13,547.40	4,891	17,099.70	3.17	6,210	3.70
2019	155,260	14,218.60	5,168	17,908.30	3.35	6,770	2.70

Source: EUROSTAT, Central Bank of Bosnia and Herzegovina, Agency for Statistics of Bosnia and Herzegovina.

Regarding the output results, attention should be paid to the key tables. Table 8, the Model Summary, provides key information about the validity of the regression model.

Table 8. Model Summary[b].

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.910[a]	.828	.655	17.90413	.828	4.799	6	6	.039	2.958

a. Predictors: (Constant), Real GDP growth rate, Household deposits, Nominal GDP, Interest rate, GDP per capita, Household final consumption expenditure

b. Dependent Variable: Value of works done.

Source: Author's calculation.

The analysis of these results has shown that the multiple correlation coefficient of the dependent variable (Value of works done) and independent variables (Real GDP growth rate, Household deposits, Nominal GDP, Interest rate, GDP per capita, Household final consumption expenditure) is 0.910, which means that the strength of their bond is very strong. The coefficient of determination is 0.828, which means that 82.98% of the variability of the dependent variable (Value of works done) can be explained by the impact of the independent variables (Real GDP growth rate, Household deposits, Nominal GDP, Interest rate, GDP per capita, Household final consumption expenditure). Table 9 presents ordinary regression coefficients - labeled *B* and standardized regression coefficients *Beta*.

Table 9. Ordinary and standardized regression coefficientsa.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-549.475	425.845		-1.290	.244	-1591.481	492.531					
	Household final consumption expenditure	.005	.042	.143	.109	.916	-.097	.107	-.016	.045	.019	.017	59.269
	GDP per capita	207.372	61.493	3.749	3.372	.015	56.904	357.840	.081	.809	.572	.023	43.002
	Nom. GDP	7.927E-7	.000	.013	.061	.953	.000	.000	.215	.025	.010	.656	1.524
	Interest rate	13.313	13.292	.715	1.002	.355	-19.211	45.836	-.017	.378	.170	.056	17.728
	Household deposits	-71.409	15.853	-3.270	-4.505	.004	-110.199	-32.619	-.165	-.879	-.764	.055	18.333
	GDP growth rate	.644	3.057	.052	.211	.840	-6.837	8.126	-.066	.086	.036	.481	2.079

a. Dependent Variable: Value of works done

Source: Author's calculation.

Based on the obtained regression coefficients, the regression model is presented as follows:

$$Y = -549,475 + 0.005X_1 + 207,372X_2 + 13,313X_4 - 71,409X_5 + 0.644X_6.$$

Taking into account the values of the regression coefficients, it was concluded that out of the six observed independent variables, the variables with the greatest importance to the dependent variable, New construction, are the following, in the order given: Household final consumption expenditure, GDP per capita, Nominal GDP, Interest rate, Household deposits and Real GDP growth rate.

An increase in the household final consumption expenditure, a higher GDP per capita, an increase in the nominal GDP, a lower interest rate and a higher GDP growth rate enable greater New construction, i.e. sale of new dwellings.

Household deposits are one of highly significant factors that explain the dependent variable, New construction, which is a surprising fact. There were expectations that the purchase of new dwellings would be mostly financed by loans, but it is not the case. According to the data of the Central Bank of Bosnia and Herzegovina for 2019, total household deposits with commercial banks in Bosnia and Herzegovina have been EUR 6.7 billion, which is the highest recorded level. Household deposits have by far the largest share of total deposits with commercial banks, 55.4%, and therefore represent an important basis for financing and functioning of the real estate market. The population in BiH continuously increases deposits, so compared to the situation at the end of last year, they increased by 8.2%. The growth of household savings deposits is also influenced by the continuous decline in interest rates over the last few years. Interest rates on household deposits in EUR have

recorded a continuous decline during the last (analyzed) years, with minor fluctuations.
A stable domestic banking sector, along with a reliable system for deposit insurance, provides a guarantee to the population that they keep their financial assets in bank accounts, through which they perform current transactions or save for the purchase of real estate.
For the other factors, Household final consumption expenditure, Real GDP growth rate, GDP per capita, Nominal GDP, it was realistic to expect that they significantly explain the dependent variable.

5. CONCLUSIONS

Economic theory and practice are not acquainted with any unique set of indicators that affect GDP and real estate prices. The very complexity of this phenomenon relativizes any attempt to establish an unchanged list of indicators. Therefore, the author's subjectivism in the field of selecting these indicators is present. The actual number of indicators will be seen in the concrete analysis, where their interdependence and the appearance of duplication should be taken into account because these two facts directly affect the selection of the optimal number of indicators. Numerous studies confirm the positive relationship between the mentioned variables (factors) with GDP and the price of real estates. The results of the research show that the variables with the greatest importance to real estate prices, from the point of view of the value of works done in construction, are the following: household final consumption expenditure, GDP per capita, nominal GDP, interest rate, household deposits and GDP growth rate. From the point of view of New construction, the following are of greatest importance to real estate prices: household final consumption expenditure, GDP per capita, nominal GDP, interest rate, household deposits and GDP growth rate. Completely identical significance (order) is rare, and in our research it is confirmed by an adequate selection of analyzed factors.

The results of this research can be useful to economic policy makers for making right decisions in solving the structural problems of growth and development of a country, and in this way, more precisely directing their activities towards economic growth and progress of the overall economy of Bosnia and Herzegovina. Modeling the impact of macroeconomic factors on GDP and real estate prices will have macroeconomic effects and benefits for the country and contribute to the growth and well-being of operators in the real estate market. At the same time, it should be emphasized that the results of this research can be reflected on some segments of the future organization of institutions responsible for geodetic and property legal affairs in the Republic of Srpska, i.e. in Bosnia and Herzegovina.

The scientific and professional contribution of this paper is to show the possibility of applying factor and regression analysis in the analysis of the impact of relevant macroeconomic factors on GDP and the real estate market, as well as for economic policy makers to direct their activities while respecting the conclusions reached by the community of experts.

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