

OPINION

by Assoc. Prof. Eduard Vasilev Marinov, Ph.D., D.Sc.

on a dissertation submitted for the award of the scientific degree **“Doctor of Sciences”**
in Field of Higher Education 3. Social, Economic and Legal Sciences
Professional Field 3.8. Economics

Author: Prof. Andrey Boyanov Zahariev, PhD

Title: “Dwellings Revalorization in Bulgaria: Factors, Models, Trends”

1. GENERAL DESCRIPTION OF THE SUBMITTED MATERIALS

By Order No. 322 / 24 July 2026 of the Rector of the University of Insurance and Finance, I have been appointed as a member of the Scientific Jury for the procedure for the public defense of a dissertation entitled “Dwellings Revalorization in Bulgaria: Factors, Models, Trends” for the award of the scientific degree “Doctor of Sciences” in Field of Higher Education 3. Social, Economic and Legal Sciences, Professional Field 3.8. Economics. The author of the dissertation is Prof. Andrey Boyanov Zahariev, PhD, Professor at the Department of Finance and Insurance of the University of Insurance and Finance.

The submitted materials include the dissertation, abstract, reference on compliance with the minimum national requirements, author's reference on the scientific and scientific-applied contributions, list of publications on the topic of the dissertation, and the other documents required under the applicable legislation and the internal regulations of the University.

The dissertation comprises 390 pages, of which 328 pages constitute the main text and 30 pages are appendices. The main text contains 42 figures and 47 tables, while the literature used comprises 316 sources, including 47 in Cyrillic and 269 in Latin script. The dissertation is structured into an introduction, three main chapters, a conclusion and appendices. The study is supplemented by a detailed system of tables, figures, econometric results, diagnostic tests, and appendices containing the variables used and their data sources.

The submitted documentation demonstrates that the candidate formally meets, with a substantial margin, the minimum national requirements. According to the submitted reference, the candidate has accumulated a total of 1,134.87 points, against a required minimum of 350 points. A total of 234.87 points have been reported under Group G, against a minimum of 100, and 750 points under Group D, against a minimum of 100. A total of 32 publications have been submitted under the procedure, of which 6 are in publications indexed in Scopus and/or Web of Science.

I have not identified any missing documents that would prevent the assessment of the scientific results or the conduct of the procedure.

2. BRIEF BIOGRAPHICAL DATA ON THE CANDIDATE

Prof. Andrey Boyanov Zahariev, PhD, is Professor at the Department of Finance and Insurance of the University of Insurance and Finance. The candidate holds the educational and scientific degree “Doctor” in Economics, awarded in 2000. His doctoral dissertation was entitled “Financial Management of Human Resources.”

The candidate's scientific output demonstrates sustained research activity in the fields of finance, macroeconomics, economic policy, econometric modeling, and economic processes in Bulgaria and the European Union. The present dissertation represents a logical continuation of this research activity, focusing it on a specific and particularly topical issue – the dynamics and determinants of housing revalorization in Bulgaria.

3. CHARACTERISTICS AND ASSESSMENT OF THE DISSERTATION

3.1. Relevance and significance of the research problem

The dissertation addresses a topical and significant issue for both economic theory and economic and financial policy – the factors, mechanisms and trends determining the dynamics of house prices in Bulgaria. The relevance of the topic derives from the particular place of housing in the structure of household wealth, as well as from its simultaneous role as a consumer good, an investment asset and

collateral for credit operations. This multidimensional role makes house-price dynamics important not only for households and investors, but also for financial stability and macroprudential policy. The institutional transformation of Bulgaria – the transition from a prolonged currency-board regime to full membership in the Eurozone – provides an additional dimension of relevance to the study. The author appropriately considers the period 2015–2025 as a specific environment in which the processes of convergence and expectations regarding a change in the monetary regime can be examined. The research problem is clearly formulated as the identification of those determinants that retain their explanatory power for house-price dynamics in Bulgaria under conditions of prolonged monetary convergence.

3.2. Scope, structure and methodology

The dissertation is characterized by a broad research scope and a consistent logic of presentation.

Chapter One is devoted to a critical analysis of existing theoretical and empirical studies on the factors determining house-price dynamics. I positively assess the fact that the author does not limit himself to a bibliographic presentation, but develops a multicriteria analytical framework and systematizes the scientific findings both in an international context and with regard to Bulgarian research. Particularly valuable is the tracing of the methodological evolution of research – from early macroeconomic models, through the integration of monetary policy and credit effects, to contemporary approaches incorporating behavioral, regional and macroprudential aspects.

Chapter Two moves from the theoretical and bibliographic analysis to an empirical study of the factors underlying housing revalorization in Bulgaria. A broad set of variables is used, covering macroeconomic indicators, the labor market, construction, housing and utility costs, housing lending, and alternative investments. The appendices systematize 54 independent variables, as well as the three dependent variables – the General House Price Index (GHPI), the Price Index of Existing Dwellings (HPIED), and the Price Index of Newly Built Dwellings (HPIND). Chapter Two includes descriptive statistics, correlation analysis and parametric estimation of individual regression relationships. This approach makes it possible initially to establish the structure of the relationships and to select the factors to be subsequently incorporated into the dynamic models.

Chapter Three constitutes the core empirical component of the dissertation. It develops and applies a procedure for ARIMAX modeling of housing-price dynamics and acceleration. The methodological approach is particularly ambitious, as it involves 57 time series – three dependent variables and 54 potential predictors – for the period 2015Q4–2025Q4, with a total of 41 quarterly observations. ADF, PP and KPSS stationarity tests, seasonality tests, iterative predictor selection, and comprehensive diagnostic testing of the models are performed.

The choice of ARIMAX is justified by the limited number of observations and the need to avoid excessive complexity of the lag structure that would arise from the use of VAR/VECM approaches. Methodologically, this choice is well justified and corresponds to the objective of examining not only the level or rate of change, but specifically the acceleration of price dynamics.

3.3. Main results

The results obtained are substantial and go beyond the scope of a purely descriptive analysis.

First, through a comparative analysis of house prices in the 27 EU Member States, it is established that the increase in house prices in Bulgaria over the period 2015–2024 is 2.2 times higher than the EU27 average, while the average annual growth rate is 1.82 times higher than the European average.

Second, the developed alpha-beta comparative analysis represents an interesting methodological element. The two alternative models – with and without an intercept – are applied in parallel to the three indices and 54 predictors, making it possible to assess both the statistical significance and stability of the relationships, as well as the differences in the explanatory power of the models.

Third, a systematic regression-correlation framework has been developed, through which the 54 predictors are grouped into five thematic categories. Among the leading factors are household income, housing lending and labor costs in construction. A procyclical dynamics of the supply of newly built housing has also been established.

Of particular significance is the finding that, in the final selection, traditional aggregated macroeconomic indicators do not emerge as statistically significant direct predictors of price acceleration. The author interprets this as evidence of the operation of more specific sectoral channels through which macroeconomic processes are transmitted into housing-price dynamics.

Fourth, three sector-specific ARIMAX models have been developed and verified – for the General House Price Index (GHPI), the Price Index of Existing Dwellings (HPIED), and the Price Index of Newly Built Dwellings (HPIND). The resulting models reveal different factor structures and different dynamics across the segments of the housing market.

For the general house price index, the model identifies utility costs, household income and labor costs in construction as significant factors. For existing dwellings, household income, labor costs, newly constructed buildings and SOFIX stand out, while for newly built dwellings the significant factors include actual rents, household income, water-supply services and SOFIX.

The models have undergone comprehensive diagnostic testing, with the results indicating the absence of autocorrelation, normally distributed residuals, and the absence of ARCH effects. This increases the reliability of the estimated results.

In summary, the dissertation provides a convincing empirical explanation of the acceleration of housing revalorization in Bulgaria through three principal channels – the cost channel, the income channel, and the arbitrage channel between housing rents and alternative investment opportunities.

4. CONTRIBUTIONS AND SIGNIFICANCE OF THE STUDY FOR SCIENCE AND PRACTICE

The contributions presented in the author's reference are, to a significant extent, supported by the content of the dissertation and can be summarized in several principal groups.

First, a contribution to the development and systematization of scientific knowledge. The dissertation develops a multicriteria analytical framework for the critical synthesis of the scientific literature on housing-price formation. The factors and methodological approaches are systematized, and a chronological periodization of the development of scientific research is proposed. This result has independent scientific value, insofar as it does not constitute a conventional bibliographic review, but rather structures the available scientific knowledge and identifies contradictions and unfilled research gaps.

Second, a theoretical contribution. A theoretical framework is proposed for positioning housing within the structure of national wealth and household wealth. Particularly important is the distinction between housing as a consumption good, an investment asset, and collateral for credit operations. This makes it possible to integrate different transmission channels – interest-rate, credit, wealth and economic-agent expectations channels – within a common conceptual framework.

Third, a methodological contribution. A significant contribution is the development and application of an alpha-beta comparative approach for the parallel estimation of two alternative regression models. The methodological value of this approach lies in its ability to assess simultaneously the statistical significance, economic interpretation and stability of parameters under different model specifications.

Fourth, an empirical contribution. A comprehensive regression-correlation framework has been developed, comprising 54 predictors grouped into five principal areas, through which a hierarchy of the factors associated with housing-price dynamics in Bulgaria has been established.

Fifth, a comparative contribution. Positioning Bulgaria against the other EU Member States makes it possible to demonstrate the specific nature of the housing revalorization process in the country. Particularly significant is the finding concerning the substantially higher rate of house-price appreciation in Bulgaria compared with the EU27 average.

Sixth, an econometric contribution. In my view, the most significant scientific contribution is the development, application and diagnostic verification of the three sector-specific ARIMAX models. The author does not merely apply an existing econometric instrument mechanically, but develops a consistent five-step procedure for its application to a small sample of quarterly data.

Scientific and practical significance. The results have potential practical applicability in macroprudential policy, financial stability monitoring, analysis of the mortgage market, assessment of the risks associated with excessive housing-price dynamics, investment analysis, development of housing-market policies.

Of particular value is the conclusion that traditional aggregated macroeconomic indicators are not sufficient for directly explaining price dynamics and that specific sectoral and financial channels should also be monitored. In this respect, the study is relevant both to the development of econometric research on housing markets and to the practical monitoring of the housing and mortgage markets.

5. ASSESSMENT OF THE PUBLICATIONS RELATED TO THE DISSERTATION

The candidate's publication activity is substantial. A total of 32 publications have been submitted under the procedure, including 4 articles and papers in refereed and indexed publications under indicator G6, 22 publications under G7, 2 studies under G8, and 4 studies under G9. The total score under Group G is 234.87 points, against a required minimum of 100 points. Among the publications, particular attention should be paid to scientific works directly related to the topic of the dissertation, including publications from 2026 addressing the econometric assessment of the factors determining the prices of newly built dwellings, housing construction, real-estate transactions, and the determinants of house prices in Bulgaria. Of particular importance is the publication “House Price Determinants: Evidence from Bulgaria as a New Eurozone Member State”, indexed in Scopus/Web of Science, which is directly related to the research problem addressed in the dissertation.

At the same time, it should be noted that not all of the 32 publications included in the list have the same degree of thematic proximity to the dissertation. Some are more closely related to the candidate's broader research field – finance, macroeconomics, energy markets, infrastructure, and others. This does not diminish their significance for the assessment of the candidate's scientific output or compliance with the regulatory requirements, but in a strictly substantive assessment of the publications related to the dissertation, a distinction should be made between their direct and indirect contribution to the research topic. There is also significant scientific impact of the candidate's publication output. Under indicator D11, 50 citations/reviews have been reported, corresponding to 750 points, against a required minimum of 100 points.

Overall, the candidate's publication activity substantially exceeds the regulatory requirements and demonstrates sustained scientific activity and dissemination of the results of his research.

6. ASSESSMENT OF COMPLIANCE WITH THE MINIMUM NATIONAL REQUIREMENTS

According to the submitted reference on compliance with the minimum national requirements, the candidate meets all required indicators.

Against a minimum requirement of 350 points, the candidate has accumulated a total of 1,134.87 points, exceeding the requirement by 784.87 points.

The results by groups are as follows: Group A – 50 points against a required 50; Group B – 100 points against a required 100; Group D – 234.87 points against a required 100; Group E – 750 points against a required 100.

Therefore, the candidate meets the minimum national requirements for the award of the scientific degree “Doctor of Sciences” in Professional Field 3.8. Economics, with a substantial excess over the required total number of points.

7. ABSTRACT

The submitted abstract comprises 50 pages and reflects the structure, objectives, subject matter, methodology, main results, scientific and scientific-applied contributions, publications, and compliance with the regulatory requirements.

The abstract provides a sufficiently comprehensive overview of the content of the dissertation. I particularly appreciate the fact that it presents specific quantitative results from the econometric models rather than merely general statements concerning the results achieved.

Another significant strength is the inclusion of a dedicated section on the scientific and scientific-applied contributions, as well as a section outlining directions for future research.

The abstract also accurately presents the limitations of the study, including the limited number of observations and the constraints arising from the use of nationally aggregated data.

I consider that the abstract complies with the requirements regarding content and structure and adequately reflects the principal results of the dissertation.

8. CRITICAL REMARKS AND RECOMMENDATIONS

I have no critical remarks; nevertheless, despite my highly positive overall assessment of the dissertation, I would formulate the following recommendations.

1. The limited number of observations relative to the number of potential predictors represents the most significant methodological limitation. The study uses 41 quarterly observations and 54 potential predictors. The author has undertaken procedures for predictor selection and diagnostic testing, but the ratio between the sample size and the initial number of variables inevitably raises the issue of the risk of overfitting and the stability of the results beyond the observed period. This is an area that deserves additional verification as more data become available.

2. The thesis concerning the impact of accession to the Eurozone should be interpreted with caution. The period under study ends in 2025, while Bulgaria's membership in the Eurozone begins on 1 January 2026. Therefore, the dissertation can convincingly analyze ex ante expectations and the pre-accession premium associated with the anticipated membership, but it cannot establish the ex post effect of actual Eurozone membership. The author himself correctly identifies the empirical effects of Eurozone membership as an important area for future research.

3. I would recommend strengthening the regional dimension of the analysis in future research. The nationally aggregated level is appropriate for the objectives of the present study, but it conceals the considerable territorial heterogeneity of the Bulgarian housing market. Spatial econometric models and hedonic models based on the characteristics of individual dwellings would be particularly promising.

4. It would be useful for future research to incorporate behavioral factors and expectations more comprehensively. The author correctly identifies this research gap, as well as the need for models capable of accounting for nonlinear and asymmetric market responses.

5. I positively assess the fact that the dissertation itself identifies a significant number of directions for future research. Among the most promising are hedonic pricing, spatial econometrics, machine learning, analysis of energy efficiency, foreign demand, and ex post assessment of the effect of Eurozone membership.

The recommendations set out above do not alter my positive assessment of the dissertation. They are primarily intended to outline opportunities for further development of the research programme established by the author.

CONCLUSION

The dissertation submitted for evaluation by Prof. Andrey Boyanov Zahariev, PhD, entitled “Dwellings Revalorization in Bulgaria: Factors, Models, Trends”, represents a comprehensive, independent and in-depth scientific study of a topical and significant economic problem.

Based on my overall assessment, I consider that the dissertation **contains scientific and scientific-applied results constituting an original contribution to science** and meets the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria and the Rules and Regulations for its implementation. The submitted materials and results also comply with the specific requirements for the award of the scientific degree “Doctor of Sciences” in Professional Field 3.8. Economics.

The dissertation demonstrates that the candidate, **Prof. Andrey Boyanov Zahariev, PhD, possesses in-depth theoretical knowledge and professional skills in Professional Field 3.8. Economics**, as well as the necessary abilities to conduct independent scientific research and formulate original scientific results.

In view of the above, I give a **positive assessment** of the submitted dissertation, abstract, results achieved, and scientific and scientific-applied contributions, and I **recommend to the esteemed Scientific Jury that the scientific degree “Doctor of Sciences” be awarded to Prof. Andrey Boyanov Zahariev, Ph.D.**, in Field of Higher Education 3. Social, Economic and Legal Sciences, Professional Field 3.8. Economics.

Sofia,
24.08.2026

Reviewer:
Assoc. Prof. E. Marinov, Ph.D., D.Sc.