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Department of Finance and Credit

Ph.D. Doctoral Candidate Tsondyu Stoychev Tsondev

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ABSTRACT

of a dissertation for awarding the educational and scientific degree of "Ph.D" (in Economics) under the doctoral program "Finance, Money Circulation, Credit and Insurance" (Finance) on the topic of thesis::

REAL ESTATE INVESTMENT MANAGEMENT

Supervising Tutor:

Prof. Bozhidar Bozhinov, PhD

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CONTENTS OF THE ABSTRACT

I. GENERAL CHARACTERISTICS OF THE THESIS

1. RELEVANCE OF THE RESEARCH TOPIC

The management of real estate investments is a key aspect of contemporary investment practice, gaining particular importance in a dynamically changing economic environment. The COVID-19 pandemic, subsequent geopolitical developments related to the war in Ukraine, inflationary pressures in Bulgaria stemming from the European economy's stagnation, and the forthcoming introduction of the euro have created new challenges for real estate investors. The Bulgarian real estate market, as part of the European economic system, is affected by these global processes, which necessitates the development of new approaches to the analysis and management of investment decisions.

The increasing complexity of market conditions, heightened volatility in raw material prices, and changing consumer preferences require a deeper understanding of the factors that influence profitability and risk in real estate investments. Traditional methods of evaluation and management often prove insufficient to adequately reflect new market realities, where the concept of a “real estate bubble” acquires not only theoretical but also practical significance, often with painful consequences for property owners.

In the present study, the author adopts the view that the management of real estate investments should be understood as a complex process of strategic planning, implementation, and control of investment decisions related to the acquisition, development, maintenance, and sale of real estate with the aim of generating long-term returns and capital formation. This implies that a successful real estate investor must be well prepared in the field of legal regulations governing property transactions, methods of financial analysis and investment risk assessment, as well as the tax burdens associated with the wide range of real estate transactions and transfers of ownership.

2. OBJECT AND SUBJECT OF THE RESEARCH

Given the established relevance of the topic, the object of the present study is defined as real estate investments, a specific form of capital allocation, examined within the context of contemporary financial and economic processes in Bulgaria. The **subject of the research** comprises the managerial processes, methods, and tools used in investment decision-making in the real estate sector, including the analysis of price dynamics, risk assessment, and the optimization of geographically diversified portfolios and wallets of investment properties..

3. RESEARCH THESIS

The main research thesis states that the effective management of real estate investments requires an integrated approach that combines traditional financial analysis methods with innovative quantitative techniques, taking into account the specific characteristics of real estate as an investment asset and the legal particularities of real estate transactions.

4. AIM AND OBJECTIVES OF THE THESIS

The primary aim of the dissertation is to develop a comprehensive concept for the management of real estate investments and the motivation for acquiring real estate, based on an empirical study of the Bulgarian market while taking into account contemporary theoretical developments in the fields of finance and law.

The thesis sets out several main **research objectives**:

1. To systematize the theoretical foundations and socio-economic motivations for investing in real estate, including a critical analysis of existing approaches to their management, as well as the relationship between wealth and the quality of transport infrastructure that ensures accessibility to locations with real estate investments.

2.Developing a methodological framework for the analysis of real estate investment decisions, incorporating financial, statistical, and legal aspects.

3.Conducting an empirical research of the Bulgarian real estate market during the period 2020–2025, based on data from the National Statistical

Institute (NSI), and to make up and formulate practical recommendations for investors.

In view of the latter formulated tasks, **the following working hypotheses** have been set to be operationally solved within the thesis, namely:

Hypothesis 1: There are statistically significant relationships between real estate prices and macroeconomic factors, including the prices of key construction raw materials and labor costs in the construction sector, which can be used for forecasting and managing risks associated with real estate investments.

Hypothesis 2: Traditional methods of financial investment analysis can be adapted and improved through the inclusion of the specific legal and market characteristics of real estate in order to achieve more accurate assessments of risk and profitability.

Hypothesis 3: The integration of quantitative data on price dynamics, transaction volumes, and external factors allows for the development of an effective theoretical model for the management of real estate investments and the motivation for acquiring real estate, which goes beyond the capabilities of traditional approaches.

5. RESEARCH METHODOLOGY

The thesis employs traditional **scientific research methods** such as the historical method, the comparative method, inductive and deductive reasoning, the methods of analysis and synthesis, the descriptive method, the observation method, survey research, and other approaches combined with appropriate graphical and statistical tools. In analyzing the condition and trends in the real estate sector, publicly available data relevant to the research problem were used, together with results from a planned survey and information obtained from interviews and informal discussions with sector representatives in Bulgaria. Data processing and presentation were carried out using **MS Office Excel 365**. The

selected methodology aligns with the methods used in leading studies in the field, thereby ensuring the comparability of the obtained results.

6. RESEARCH LIMITATIONS

Issues related to public investments in real estate remain **outside the scope of this thesis** due to their specific regulatory, economic, and accounting characteristics. Purely technological issues related to the construction of real estate properties are also excluded from the scope of the study..

7. STRUCTURE OF THE STUDY

The dissertation is structured into three chapters**:**

Chapter 1. Theoretical Foundations and Socio-Economic Factors for Real Estate Investment examines the conceptual foundations of real estate investment and the basic theoretical models for evaluating it. Special emphasis is placed on the specifics of managing investment risk in real estate and on the legal aspects associated with this type of investment.

Chapter 2. Methodological Approaches and Evidence for the Analysis of Real Estate Investments focuses on the main tools for the financial analysis of real estate investment projects and the problems associated with their market analysis and price formation. Applicable models for price forecasting and portfolio management optimization are presented, together with related quantitative methods for risk assessment. The influence of labor remuneration in the construction sector on real estate pricing has also been analyzed.

Chapter 3. Empirical Study of Real Estate Investments in Bulgaria presents the results of an analysis of the dynamics of real estate prices in Bulgaria, with particular attention paid to the impact of the COVID-19 pandemic and the related national specificities. The market activity of the Registry Agencies in

Bulgaria has been analyzed, and the observed regional differences have been outlined. Special attention has also been given to the relationship between raw material prices and property prices. The author has also presented an original integrated theoretical model for the management of real estate investments.

8. APPLICABILITY OF THE RESEARCH RESULTS

The main results of the dissertation can be defined as **scientifically applied, with originality and scientific significance stemming** from the expansion of research in the field of **real estate investment management**. The dissertation advocates the author's view that real estate investment management should be understood as a comprehensive process of strategic planning, implementation, and control of investment decisions related to the acquisition, development, maintenance, and sale of real estate, **with the aim of generating long-term returns and capital formation**.

The practical significance and applicability of the research are related to both outlining the actual state of the country's real estate sector and identifying the leading factors that influence the effective management of investments in the sector. Based on the conducted analyses and summaries, the dissertation presents an **author-developed integrated theoretical model for real estate investment management**.

The results of the research have been disseminated within the academic community through the publication of a paper and two conference papers.

II. STRUCTURE AND CONTENT OF THE THESIS

The dissertation has been developed in compliance with the requirements of Art. 27, para. 2 of the Regulations for the Implementation of the Law on the Development of the Academic Staff in the Republic of Bulgaria. Its total length is 156 standard pages and structurally it includes as follows:

First. An Introduction of 5 standard pages.
Second. A main body consisting of three chapters with a total length of 127 standard pages.
Third. A Conclusion with a length of 2 standard pages.
Fourth. A list of 101 references, including both literature and internet sources. Of these, 48 sources are in English and 53 are in Bulgarian.
Fifth. The dissertation is illustrated with 13 figures and 6 tables.
Sixth. A Declaration of Originality in accordance with Art. 68, para. 2 of the Regulations for the Development of the Academic Staff at Academy of Economics "D. A. Tsenov".

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III. MAIN CONTENT OF THE THESIS

INTRODUCTION

In the introductory part of the dissertation, the relevance and significance of the selected research topic are substantiated. The object and subject of the study are defined. The aim and the research tasks to be addressed in the study are formulated. The defended thesis is presented. The research methodology has been outlined, and the study's limitations have been identified**.**

CHAPTER 1. THEORETICAL FOUNDATIONS AND SOCIO-ECONOMIC FACTORS FOR REAL ESTATE INVESTMENTS

Real estate investments are among the oldest and most significant forms of capital investment. They differ from traditional financial instruments in that they combine tangible assets with investment potential, making them a distinct and complex asset class. This dual nature necessitates a comprehensive approach to their acquisition, management, and realization. From an economic perspective, an investment in real estate involves committing financial resources to generate current income or capital gains. However, it is not limited to the purchase itself, but encompasses the entire life cycle of the asset—analysis, management, maintenance, improvements, and eventual realization. In this sense, real estate investment is a long-term and multi-stage process that requires specific financial, legal, and managerial competencies. Real estate investments can be classified according to purpose, investment strategy, and geographical scope. According to their purpose, the main categories include residential, commercial, office, industrial, and specialized properties, each characterized by a different profile in terms of return, risk, and liquidity. From the perspective of investment strategy, they range from conservative core investments with low risk and stable income to high-risk opportunistic investments with potential for high returns. The

geographical classification—local, regional, national, and international—determines the degree of diversification and the complexity of management.

Real estate possesses specific characteristics that distinguish it from other investment assets. Its physical substance requires continuous maintenance, yet it also allows for value enhancement through improvements. Its immobility leads to strong dependence on location and local market conditions, while its low liquidity necessitates long-term planning. High transaction costs and property heterogeneity further complicate valuation and limit speculative strategies. The regulatory environment also exerts significant influence, as does the sensitivity of real estate markets to macroeconomic factors such as interest rates, inflation, and economic cycles. Property management is active and resource-intensive, and managerial decisions directly affect investment returns. Socio-economic factors and transport infrastructure play a key role in investment decisions within the sector. Economic growth and public investment in transport networks increase the value and attractiveness of real estate assets. Empirical analyses indicate a positive correlation between transport accessibility and property prices, commonly referred to as the "transport premium." Proximity to transport hubs, public services, and social infrastructure increases both the market value and rental potential of properties.

Location is therefore regarded as a complex factor, encompassing prestige, environmental quality, safety, and access to educational and healthcare institutions. Successful investors analyze not only the current state of a given area, but also its future development, closely monitoring urban planning policies and infrastructure projects. Nevertheless, excessive concentration of investments in so-called "hot zones" may lead to market overheating and increased risk.

The income approach is based on the principle that the value of real estate is determined by its ability to generate future income. It is particularly suitable for

valuing income-producing properties, as it reflects their investment function and the relatively stable nature of rental revenues. According to the principle of substitution, a rational investor would not pay more than the present value of the expected future income from a comparable asset. The main source of income is rental revenue, supplemented by additional revenue from parking fees, advertising, and auxiliary services. The direct capitalization method determines value based on the relationship between net operating income (NOI) and the capitalization rate, which reflects risk, market conditions, and growth expectations. A key challenge lies in determining the capitalization rate accurately, as it significantly influences valuation results.

A more detailed variant of the income approach is the discounted cash flow (DCF) method, which accounts for changes in income and expenses over time. It requires forecasting cash flows, capital expenditures, and residual value, and selecting an appropriate discount rate that reflects the investment's specific risk. Sensitivity and scenario analysis are important tools for assessing the impact of key assumptions on the final valuation.

The market approach, in turn, is based on actual market transactions and on the principle that the value of a property is determined by the prices of similar properties in the same market. It directly reflects market behavior and is particularly relevant in an active, liquid market. Comparative analysis requires selecting appropriate transactions and applying adjustments to account for differences between the subject property and the comparable properties. These corrective adjustments include the transaction time, location, physical characteristics, and conditions of sale. The quality and completeness of market data are critical for the reliability of the valuation. Modern statistical methods, including regression analysis and automated valuation models, enhance the objectivity and accuracy of the market approach, particularly in mass appraisal

contexts. Nevertheless, expert judgment remains necessary when valuing unique or specialized properties.

The cost approach is based on the assumption that the value of a property cannot exceed the cost of acquiring the land and constructing an equivalent building, reduced by the accumulated depreciation. It separates the value of the land from the value of the improvements, with the land valued based on market evidence, while the building is assessed based on its replacement cost. This approach is most appropriate for new and specialized buildings, as well as for insurance valuations. The replacement cost includes all construction and related costs, while depreciation accounts for physical deterioration, functional obsolescence, and economic obsolescence. Determining depreciation is a key element, as it reflects the actual reduction in the building's utility and income-generating potential. Combining the cost approach with the income and market approaches enables a more reliable valuation and serves as a verification tool for market-based results.

Risk management in real estate investments is based on the distinction between systematic and unsystematic risks, as this classification allows for more effective portfolio planning and diversification. Systematic risks affect the entire market and cannot be eliminated through diversification, whereas unsystematic risks are specific to individual properties and can be managed through active selection and management.

Systematic risks arise from macroeconomic, financial, and regulatory factors. The economic cycle strongly influences property demand, prices, and occupancy rates, with real estate markets typically responding more slowly and often with more pronounced cycles. Interest rate risk is particularly significant due to the sector's dependence on external financing; changes in interest rates affect both debt servicing costs and property valuations. Inflation has a dual effect.

On the one hand, real estate can act as a hedge against inflation through increasing rents and property prices. On the other hand, inflation raises operating and construction costs and often leads to higher interest rates. Regulatory and tax risk arises from legislative changes that may significantly alter the conditions for property use and the profitability of real estate investments.

Unsystematic risks are associated with the specific characteristics of individual properties and tenants. Among the most significant are vacancy risk, tenant risk, and credit risk, which depend on the property's quality, location, contractual conditions, and tenants' financial stability. Technical and technological risks arise from the physical condition and functional suitability of buildings, while managerial and location risks are related to the quality of property management and changes in the surrounding area's attractiveness. These risks can be mitigated through active management, preventive maintenance, and diversification.

Contractual relations in real estate investments define the rights, obligations, and risk allocation among the participants and substantially impact investment outcomes. Proper contractual structuring enables the minimization of risks, optimization of tax effects, and provision of flexibility in management.

The primary legal form for acquiring property is the purchase and sale agreement, which requires notarial certification and careful planning of the transaction terms. Preliminary contracts provide protection and flexibility in future acquisitions. Lease agreements represent a key determinant of income generation, as their duration, indexation clauses, cost allocation, and performance guarantees directly affect both risk and income stability.

Property management agreements are becoming increasingly important in larger portfolios, as the quality of management directly impacts occupancy levels, operating costs, and asset value. Investment structures vary from direct ownership

to more complex corporate and collective forms, including joint ventures and investment funds. The choice depends on the size of the investment, tax considerations, and investors' objectives.

Financing real estate investments includes a range of instruments, from traditional mortgage loans to alternative financing options. The financing structure must balance the objective of enhancing returns while maintaining an acceptable level of risk. Tax and international considerations further complicate contractual structuring and require careful financial and legal planning.

Portfolio theory in real estate aims to achieve an optimal balance between risk and return through diversification. However, its application is constrained by the low liquidity, high transaction costs, and the heterogeneous nature of real estate assets. Combining properties with different characteristics and low mutual correlation allows for the reduction of overall portfolio risk without significantly lowering the expected return.

Diversification can be achieved through geographical allocation, sectoral diversity, variation in property size, temporal distribution of investments, and tenant diversification. International diversification offers additional benefits but introduces currency, political, and legal risks. An alternative approach for smaller investors is participation in real estate investment funds, which provide professional management and broader diversification. The effectiveness of diversification in real estate is difficult to measure due to limited data availability and specific market characteristics, which necessitate the use of adapted risk indicators. Dynamic portfolio management requires regular reassessment and adjustments, as correlations between different market segments change over time. Despite its benefits, diversification cannot eliminate systematic risks and therefore requires a balance between risk reduction and the associated costs.

CHAPTER 2. METHODOLOGICAL APPROACHES AND EVIDENCE FOR THE ANALYSIS OF REAL ESTATE INVESTMENTS

Chapter Two examines in detail the methodological approaches and evidence for real estate investment analysis. In terms of content, the following are discussed: analytical approaches for the financial analysis of real estate investment projects, market analysis and pricing, the modeling of investment decisions, quantitative methods for assessing risk in real estate investments, and the fundamental considerations for accounting for the impact of construction labor costs on real estate pricing.

The financial analysis of real estate investment projects is based on discounted cash flow (DCF) methods, which evaluate investment attractiveness by comparing initial costs with the present value of future benefits. These methods are based on the time value of money, which is particularly vital for long-term investments such as real estate. The analysis requires detailed modeling of cash inflows and outflows. Revenue primarily stems from rents, which depend on market conditions, occupancy rates, and contractual parameters. Expenses include operating costs, taxes, insurance, and capital expenditures for property maintenance and modernization. Capital costs require a technical assessment of the property’s condition and life cycle.

A key indicator in the analysis is Net Present Value (NPV), which measures whether the project creates or destroys value for the investor. A positive NPV indicates financial feasibility and allows for comparison between alternative projects. Determining an appropriate discount rate is critical, as it reflects both the risk-free rate of return and the project's specific risks.

The Internal Rate of Return (IRR) indicates the cost of capital at which a project is just profitable. Despite its widespread use, IRR can be challenging with

complex cash flows, necessitating modified variants (MIRR). Supplementary indicators include the Profitability Index and the Payback Period, though the latter is less applicable to real estate assets with a long economic life.

A critical element in the valuation is the Terminal Value, which often constitutes a significant portion of the total investment value. It is calculated by capitalizing future income or by estimating the market value at the end of the holding period.

Sensitivity analysis and scenario analysis complement the financial evaluation by examining the impact of uncertainty on outcomes. Sensitivity analysis identifies key variables—such as rents, occupancy, expenses, discount rates, and capitalization rates—and assesses their impact on profitability metrics. Scenario analysis simultaneously considers changes across several factors through base-case, optimistic, and pessimistic scenarios. More advanced approaches, such as stress testing and Monte Carlo simulations, enable investment appraisal under extreme conditions and provide a probabilistic picture of potential outcomes. These methods facilitate better risk management and informed investment decision-making.

Real estate price index analysis is a key tool for researching market dynamics and supporting investment decisions. Through this analysis, data from individual transactions are aggregated into indices that reflect general price trends, despite challenges arising from property uniqueness, low transaction frequency, and the lack of a centralized market. The simplest indices are based on average or median prices, but these do not account for qualitative differences between properties and can be misleading. More accurate results are provided by hedonic regression models, which adjust prices for property characteristics and enable analysis of market preferences. The repeat-sales method compares the prices of the same properties over time but is limited by the small number of suitable

observations. Hybrid methods combine various approaches to enhance the reliability of the indices.

Price indices may vary by calculation frequency, geographical scope, and market segment. National indices are suitable for macroeconomic analysis, whereas regional and segmental indices provide more practical information for specific investment decisions. Interpreting these indices requires accounting for seasonality, methodological constraints, and structural market changes; furthermore, their use in forecasting should be integrated with other analytical tools.

Correlation analysis examines the relationships between real estate prices and macroeconomic factors to better understand and predict market movements. Property prices are closely linked to economic growth, employment, income levels, interest rates, inflation, and demographic processes. Economic growth and rising incomes typically stimulate demand for real estate, while unemployment has a negative impact. These effects often manifest with a time lag due to market inertia. Interest rates are a particularly vital factor, as they influence the affordability of mortgage financing and the investment attractiveness of properties. Inflation can have either a positive or negative impact depending on its scale and duration. Demographic trends, urbanization, and migration act as long-term drivers determining demand across different regions and segments. Exchange rates and fiscal policy also exert influence through foreign investment, tourism, tax incentives, and infrastructure projects. International economic processes further amplify the significance of external factors, especially in open economies. Correlation analysis can range from simple correlation coefficients to multi-factor econometric models. More sophisticated methods allow for a more accurate capturing of interdependencies, though the interpretation of results requires caution, as correlation does not imply causation. Reliable conclusions

necessitate verifying statistical significance and the stability of these relationships over time.

Regression models are a fundamental tool for analyzing and forecasting real estate prices, as they enable quantitative investigation of the relationships between prices and their determinants. These models transform market information into measurable dependencies and support informed investment decision-making. In these models, the property price serves as the dependent variable, while the independent variables include property characteristics, locational factors, market conditions, and macroeconomic indicators. Linear regression models are the simplest and offer easy interpretation; however, they require verification of statistical assumptions, as violations can lead to inaccurate results. Non-linear models expand analytical capabilities by capturing more complex dependencies, including polynomial, logarithmic, and interaction forms. Of particular importance are hedonic pricing models, which view a property as a bundle of attributes and allow for price adjustments based on qualitative differences. For temporal analysis, time series models are used to account for trends, seasonality, and cyclicality. Autoregressive (AR) and Integrated Moving Average (IMA) models are suitable for forecasting price dynamics, particularly for nonstationary series. Combining pricing and time-series models through multi-factor and panel data approaches improves both explanatory and predictive power. A key element in the application of regression models is their validation. Out-of-sample testing provides a more reliable assessment of predictive accuracy than standard goodness-of-fit indicators.

Portfolio optimization management models adapt the principles of portfolio theory to the specific characteristics of real estate, supporting capital allocation decisions across a range of assets. The primary objective is to achieve an optimal balance between expected return and risk subject to multiple constraints. The classic mean-variance approach requires estimating the returns, risks, and

correlations between different property types or regions. In real estate, its application is hindered by low liquidity, high transaction costs, and minimum investment sizes (lumpiness), which limit portfolio flexibility. Alternative risk measures, such as **semi-variance, Value at Risk (VaR), and Conditional Value at Risk (CVaR)**, are more suitable for investors focused on downside protection. More advanced approaches include stochastic and multi-period optimization, which account for uncertainty and the dynamic nature of investment decisions over time. Practical optimization models incorporate various constraints—geographical distribution, property type, liquidity, and regulatory requirements. To enhance the robustness of these decisions, methods such as **optimization under uncertainty, Bayesian approaches, and Monte Carlo simulations** are employed. The performance of these optimization models is evaluated by comparing them against alternative strategies and backtesting through historical simulations, while acknowledging that past performance does not guarantee future results.

Statistical volatility indicators are a fundamental tool for quantifying investment risk in real estate. They convert uncertainty into measurable values, enabling comparability across different investments. Volatility reflects the variability of returns over time and is a key measure of risk, although its measurement in real estate is hindered by low transaction frequency and a reliance on appraisal-based data. The most commonly used indicator is the **standard deviation**, which can be applied to both rental income and total returns. In real estate, however, appraisal procedures often lead to **data smoothing**, which tends to underestimate actual volatility. To overcome this problem, corrections based on the **autocorrelation of returns** are employed. Additional insights into the nature of risk are provided by the asymmetry and excess of the income distribution. Asymmetry/Skewness/ indicates whether risk is more associated with extreme losses or with the potential for high gains, while Excess /kurtosis/

measures the probability of rare but significant market events ("fat tails"). **Conditional volatility models** account for the fact that risk changes over time, allowing for the identification of different phases of the market cycle. **Rolling** and **relative volatility** facilitate the analysis of risk dynamics and the comparison of individual properties or portfolios against market indices. Finally, the analysis of correlations between volatilities is essential for assessing diversification benefits and the risk contagion across segments and regions.

Stress testing serves as a complementary risk assessment method, focusing on investment behavior under extreme or crisis conditions. Unlike standard statistical measures, this approach assesses potential losses under adverse scenarios and supports the management of tail risks. **Historical stress tests** utilize data from past crises to simulate their impact on current portfolios, while **hypothetical tests** construct plausible but unrealized scenarios involving combinations of unfavorable factors. Developing such scenarios requires internal logical consistency and a profound understanding of the linkages between market and macroeconomic variables..

Monte Carlo simulations extend stress testing by generating a multitude of possible scenarios and analyzing extreme outcomes. **Reverse stress testing** identifies the specific conditions under which losses become unacceptable, revealing hidden portfolio vulnerabilities. Specialized forms of stress testing include macroeconomic, regional, sectoral, liquidity, credit, and operational tests, allowing for the assessment of specific risks. Interpreting results requires a balance between realism and decision-making utility; stress tests should be

viewed as strategic planning tools rather than precise forecasts. Dynamic stress testing, applied regularly, allows for tracking changes in the portfolio's risk profile and timely adaptation of the investment strategy.

Labor compensation in construction is a significant component of the cost of building real estate and directly impacts the prices of new developments. Unlike raw materials, whose prices are determined on global markets, labor costs are primarily shaped at the national and regional level and depend on the state of the labor market, workforce qualifications, and socio-economic policies. In Bulgaria, during the period 2020–2025, construction wages increased significantly, exerting a noticeable influence on the structure of construction costs and property prices. Construction is a labor-intensive sector, in which labor costs account for a substantial share of total production expenses. As a result, the sector is particularly sensitive to wage increases. During the period under review, construction wages grew more than overall inflation and the economy's average wage, mainly due to a shortage of skilled labor, emigration, increased construction activity, and higher quality and safety standards. Regional pay differences also affect property prices. The highest wages are observed in Sofia and in tourist regions, leading to higher construction costs and higher final prices. Interior regions record lower levels but still show steady growth. The transfer of higher labor costs to real estate prices occurs with a certain lag and depends on market conditions. Under strong demand, construction companies can more easily pass on increased costs to buyers, whereas in weaker market conditions, this puts pressure on profitability. The average time lag for this transfer is relatively short—around 3–6 months. Price sensitivity to labor compensation is highest for new construction, while the impact on existing properties, built in the past, is more indirect. The luxury segment shows lower price elasticity, whereas the mass market responds more strongly to changes in construction costs. Seasonality in

construction further complicates the analysis, as wages temporarily rise during peak periods. The quality and productivity of the workforce play an important compensatory role. Higher wages can be partially offset by greater efficiency, shorter project timelines, and higher execution quality. However, technological innovations in Bulgarian construction are implemented relatively slowly, maintaining a high degree of labor dependence. Social security and tax changes also affect overall labor costs and, indirectly, property prices.

At the international level, wage growth in Bulgarian construction follows European trends but at a faster pace, reflecting economic convergence processes.

Chapter 3.
EMPIRICAL STUDY OF REAL ESTATE INVESTMENTS IN BULGARIA

Chapter three presents an empirical examination of real estate investments in Bulgaria. It analyzes property price dynamics in Bulgaria, studies market activity using notarial transaction data, and examines in detail the impact of raw material prices on the construction sector.

In this context, the period 2020–2025 is characterized by a pronounced and sustained price expansion in the Bulgarian real estate market, despite successive shocks from the Covid-19 pandemic, geopolitical conflicts, and inflationary pressures. The overall price trend shows cumulative growth exceeding inflation, making real estate a tangible instrument for preserving and increasing value. The distinction between new and existing construction reveals significant differences in dynamics. New construction experienced higher growth rates (around 45% cumulative), driven by rising material and labor costs, while existing construction showed a more moderate but steady increase (around 35%), mainly due to location and market factors. After a brief slowdown at the start of the pandemic in 2020, the market quickly adapted and entered a period of accelerated growth in 2021, supported by low interest rates, high liquidity, and shifts in housing preferences. In 2022, inflation and the war in Ukraine had a dual impact—on the one hand, reinforcing real estate's role as an inflation hedge, and on the other, cooling demand through higher interest rates. From 2023 onward, the market entered a period of stabilization and more moderate growth, characterized by more mature, rational market expectations.

Price dynamics in Bulgaria show strong regional differentiation, highlighting the role of local economic, demographic, and infrastructural factors.

Sofia established itself as the leading market, with the highest prices and the strongest cumulative growth, exceeding the national average. The capital market is characterized by higher volatility, active investment flows, and marked internal segmentation between prestigious and peripheral areas. The Black Sea coastal regions rank second in terms of dynamics, with prices strongly influenced by seasonality, tourist activity, and mixed demand from local and foreign buyers. Plovdiv demonstrates more moderate but stable growth, while other regional centers exhibit slower growth. Small towns and rural areas remain structurally lagging, with limited or even negative price growth due to demographic decline and economic stagnation. Market segmentation by price and functional categories further deepens these differences. The luxury segment shows the strongest growth, the mass market exhibits more stable dynamics, and the budget segment lags behind. By property type, there is increased interest in houses and new residential complexes, while office and commercial properties face structural pressure due to remote/distance work and e-commerce.

Global and national data indicate that the pandemic did not cause a collapse in real estate markets; rather, it accelerated the long-term upward trend. Globally, housing price indices recorded significant growth, with Bulgaria ranking in the mid-range in terms of growth rate but maintaining stable positive dynamics. At the national level, analysis of housing price indices shows a clear “epidemic acceleration,” particularly during 2020–2022, when the effects of low interest rates, rising inflation, the energy crisis, and geopolitical uncertainty accumulated. Both new and existing construction recorded high growth rates, with existing housing occasionally outpacing new developments. A regional focus on the Southeastern region and the town of Sliven shows that, despite overall price increases, local markets can move counter to national trends. In the town of Sliven, relatively limited construction activity and a decline in the number of transactions are observed, explained by the redirection of investor interest toward

more promising regions such as Burgas. At the same time, infrastructure projects and urban development initiatives create conditions for future market activation.

The study of market activity through notarial transaction data from all 113 registration offices in Bulgaria provides the most accurate picture of real market behavior. Unlike listing or survey data, notarial registrations reflect actual completed transactions, allowing detailed spatial and temporal analysis.

The period 2020–2025 was characterized by high variability in transaction volumes, driven by the pandemic, economic stimulus measures, and changing expectations of market participants. At the beginning of 2020, activity sharply declined, especially in the second quarter, due to movement restrictions and heightened uncertainty. However, this decrease proved to be short-lived. By the third quarter of 2020, a rapid recovery began, leading to extremely high market activity in 2021. Transactions not only reached but exceeded pre-crisis levels. The main drivers of this boom were low interest rates, high liquidity, inflation expectations, and the perception of real estate as a safe asset.

The regional distribution of transactions is highly uneven. Sofia accounts for the largest share of transactions and demonstrates the highest transaction intensity per capita. This is followed by major cities and Seaside coastal regions, where activity is boosted by investment and vacation demand, as well as pronounced seasonality. Interior regional centers show more stable and predictable dynamics, while small towns and rural areas have lower absolute volumes, with occasional local peaks linked to inheritance, restitution, and migration processes. Seasonality remains clearly expressed, with the highest activity in spring and early autumn months. The pandemic temporarily disrupted these patterns in 2020, but in subsequent years, traditional seasonal cycles gradually recovered, albeit with higher overall intensity.

The analysis of the relationship between real estate prices and transaction volumes reveals a complex, dynamic dependence that varies over time, across regions, and across market segments. The correlation between these indicators is not constant and varies with the market cycle and overall macroeconomic conditions.

At the beginning of the pandemic, in the first half of 2020, a weak negative correlation was observed—transaction volumes declined while prices remained relatively stable due to sellers' reluctance to make concessions. In the second half of 2020 and throughout 2021, the relationship became clearly positive: rising prices were accompanied by increased market activity, driven by expectations of future price increases. Regional analysis shows the strongest and most consistent positive correlation in Sofia, where the market is most developed and highly integrated with investment flows. Seaside coastal regions show variable correlations with pronounced seasonality, while interior regions exhibit weaker, less stable relationships between prices and volumes. By market segment, the mass residential segment shows the strongest correlation, due to buyers' high price sensitivity. The luxury segment shows a weaker relationship between prices and volumes, as purchases in this segment are more influenced by individual preferences than by short-term price fluctuations. A particularly important finding is the identification of a time lag between volumes and prices. Data indicate that changes in market activity often precede price changes by one to two quarters, making transaction volumes a potential leading indicator of future price trends. A decline in transaction numbers may signal an upcoming market slowdown, whereas increasing activity often precedes price growth.

Iron ore and steel prices have a significant impact on the construction sector and, indirectly, on real estate prices, as steel is a key input in modern construction. Changes in raw material prices propagate throughout the entire value chain—from extraction and metallurgy, through the production of construction materials, to

construction companies and final buyers. Therefore, the dynamics of raw-material commodity markets are an important factor in understanding and forecasting property prices. Empirical analysis for the period 2020–2025 shows a positive correlation between global iron ore/steel prices and real estate prices in Bulgaria, with the relationship being more pronounced for new construction. For existing properties, the dependency is weaker, since their prices are mainly determined by market demand, location, and comparative valuation rather than current construction costs. The strength of this correlation varies over time and tends to increase during periods of global economic turbulence. The Covid-19 pandemic and subsequent recovery, as well as supply chain disruptions in 2021–2022, led to synchronized movements in raw-material commodity and real-estate prices. Geopolitical events, particularly the war in Ukraine, further amplified this effect by restricting steel supplies and sharply raising prices, directly impacting construction costs in Bulgaria. Regional analysis shows a stronger dependency in Sofia and other major cities, where construction activity is highest, and the market is more integrated with international raw-material commodity markets. In less developed interior regions, the correlation is more moderate due to lower construction intensity and a more limited transmission of global price signals.

The relationship between raw material prices and real estate prices is characterized by a distinct time lag. Analysis indicates that changes in iron ore and steel prices affect property prices with a lag of approximately one to two quarters. This delay is attributed to the lengthy construction cycle, phased material purchase and procurement, and long-term supply contracts with fixed pricing. Lag effects are shorter in new construction, where the link between current costs and selling prices is more direct, and longer for existing properties. Significant regional disparities persist: the capital city's market reacts more swiftly, while smaller cities exhibit greater inertia. There is also an asymmetry in price transmission: increases in raw material costs are passed on to property prices more

rapidly and fully than decreases. This reflects the behavior of construction companies, which adjust prices quickly when costs rise but act more cautiously during downturns due to uncertainty regarding the sustainability of the price drop. Price elasticity analysis shows that new construction is more sensitive to raw material price fluctuations than existing housing. Short-term elasticity remains relatively low due to pricing inertia and contractual constraints, whereas long-term elasticity is significantly higher, allowing all members to fully adapt across the entire construction supply chain. Furthermore, non-linear effects are observed: while moderate fluctuations in raw mnaterialn commodity prices have a limited impact on real estate, elasticity increases substantially during sharp and large-scale shifts.

The development of Bulgaria's real estate market over the past decade has been characterized by deepening regional disparities, reflecting the country's uneven economic, demographic, and infrastructural growth. Despite theoretical expectations of regional price-level convergence, empirical analysis reveals a predominance of divergent processes, in which regions with initially higher prices—primarily major economic hubs—continue to grow faster than peripheral areas. The methodological approach, based on beta- and sigma-convergence tests, spatial econometric models, and cluster analysis, reveals a clearly structured territorial hierarchy. Sofia emerges as a standalone high-value cluster, characterized by outsized price growth, high investment activity, and strong resilience to market shocks. Secondary urban centers—Varna, Burgas, and Plovdiv—form an intermediate price belt with moderate but steady growth, supported by a diversified economic base, infrastructure connectivity, and sustainable demand. In contrast, many interior and peripheral regions are characterized by weak price dynamics, stagnation, or even decline, driven by adverse demographic trends, limited economic activity, and low investment attractiveness.

Spatial analysis confirms strong geographic dependencies in the price dynamics; neighboring regions often exhibit similar development patterns, leading to well-defined regional clusters. The most pronounced are the Sofia and Black Sea coastal clusters, where price effects extend beyond administrative borders. At the same time, conditional convergence processes indicate that, when controlling for socio-economic factors, there is partial convergence across separate groups of regions, underscoring the role of fundamental structural determinants. The socio-economic consequences of these divergent dynamics are significant. In large cities, housing affordability is worsening, with high prices outpacing income growth, increasing financial vulnerability for households, especially young families. In peripheral regions, despite lower prices, low incomes and limited access to mortgage financing also create serious barriers to housing affordability, deepening demographic outflow and social marginalisation. Investment activity follows the same spatial logic – concentrated in several leading centers and highly limited in the periphery. This gives rise to a self-reinforcing mechanism in which capital, jobs, and population are concentrated in large cities, while less developed regions fall into a cycle of economic and social backwardness. At the same time, social segregation is intensifying within large cities, where "premium" residential zones with high prices and high-quality environments are emerging, in contrast to depreciating residential areas in the periphery.

The development of an integrated theoretical model for the management and forecasting of real estate investments in Bulgaria is a logical summary of previous empirical analyses. The aim of the model is to integrate the key factors influencing price dynamics – property prices, market activity, and construction costs – into a single analytical framework that provides short- and medium-term forecasts and supports investment decision-making. The model is based on a vector autoregression sub-approach, which allows simultaneous reporting of dynamics and interrelationships between the main market variables. Internally,

the system models the prices of new and existing construction, the volumes of notary transactions, and indicators of market activity, while external factors include the prices of the main construction raw materials, macroeconomic indicators, and seasonal effects. This approach combines analytical depth with practical applicability, balancing between the complexity of real market processes and the need for interpretable results. The empirical specification of the model accounts for nonstationarity and non-availability of time-series data, as well as long-term equilibrium dependencies among key variables. This allows for the inclusion of correction mechanisms that explain how the market adapts to short-term deviations. The results show that prices of new construction react more strongly and more quickly to changes in raw-material prices, while prices of old, existing construction exhibit weaker sensitivity and longer lags.

Transaction volumes play a dual role—in the short term, they often limit price growth, but in the long term, they signal sustainable demand and support price increases. Regional specificity is a key element of the model. The capital market is characterized by faster adaptation and a stronger connection to global factors. Seaside coastal regions exhibit pronounced seasonality, while inland areas remain more dependent on local economic conditions. Diagnostic tests confirm the model's relative stability, with only temporary structural deviations observed during strong external shocks, necessitating a flexible forecasting approach. From a practical perspective, the model provides a basis for formulating specific investment strategies. The analysis of seasonality enables optimization of purchase and sale timing, as lower activity during the autumn–winter months creates better opportunities for market entry. Monitoring raw material prices is established as an early indicator of future changes in new construction prices, enabling proactive investment management.

Regional and sectoral diversification emerge as key tools for risk mitigation. Sofia offers high liquidity but also greater volatility; Black Sea coastal regions offer

opportunities in tourism but carry seasonal risk; and inland regions offer more stable, though more limited, returns. Combining residential, commercial, and office properties enables further balancing of risk and return. Transaction volumes can also serve as an indicator of market sentiment and for early identification of potential price corrections. In conditions of limited instruments for directly hedging raw-material risk, investors should rely on strategic planning, long-term contracts, and diversification over time. The financial structuring of investments should take market cyclicality into account, applying more conservative leverage at high price levels and a more flexible approach during market downturns.

CONCLUSION

In conclusion, the thesis summarizes the primary findings and results derived from the theoretical research and practical analyses conducted. The core theoretical and empirical outcomes of the dissertation research carried out are presented in a synthesized manner, demonstrating that the established research goals and objectives have been successfully achieved

IV. GUIDELINES FOR FUTURE RESEARCH ON THE TOPIC OF THE THESIS

With the main research directions outlined within the scope of this dissertation, the issues related to the factors and management of investments in real estate are by no means exhausted. The topic remains relevant, and the following directions for future research on the subject can be identified.:

First, expanding the analysis by incorporating data from a larger number of European markets would enable comparative studies and the identification of common patterns at the regional level. Of particular interest would be comparisons with the markets in Romania, Greece, and Serbia, which share similar economic characteristics .

Second, the development of specialized models for different market subsegments (office properties, retail spaces, and industrial real estate) would enable a more detailed analysis of the specific risks and opportunities within individual sectors and could serve as a basis for the development of specialized financial instruments for hedging risks associated with real estate investments in the Bulgarian market.

Third, further expansion of analyses related to the effective management of real estate investments should incorporate climate risks within the context of European green transition policies and the ESG criteria applied by institutional investors.

V. REFERENCE FOR SCIENTIFIC AND APPLIED SCIENTIFIC CONTRIBUTIONS IN THE THESIS

Theoretical and methodological contribution

First. Real estate investment is defined as a long-term management process requiring specific financial, legal, and managerial competencies, and on this basis, a comprehensive, conceptual theoretical framework of real estate investments has been built, integrating the economic, financial, socio-economic, and institutional determinants of the sector and building on the traditional interpretations of property as a passive investment asset.

Empirical-diagnostic contribution

Second. The classical explanatory framework of the dynamics of real estate prices has been expanded through the construction of an integrated methodological system for analysis and evaluation of investments, which synthesizes financial, econometric, and risk approaches, by introducing wages in construction as an independent, quantitatively measurable, and empirically verifiable explanatory variable in price modeling.

Prognostic and analytical contribution

Third. An integrated forecast model has been constructed, designed for strategic management and optimization of investment decisions in the real estate sector in the conditions of increased macroeconomic and spatial heterogeneity, which, on the basis of an in-depth empirical analysis for the period 2020-2025, captures lag, asymmetric and non-linear dependencies between property prices, market activity and construction costs and provides a reliable analytical basis for forecasting, risk management and long-term investment positioning.

VI. REFERENCE LIST TO THE DOCTORAL CANDIDATE'S PUBLICATIONS

Articles

Tsondev, T. (2022). The impact of the COVID-19 pandemic on real estate prices – global evidence and national specificities. *Annual Almanac "Doctoral Scientific Research"*, Vol. XV,-2022, Book 18 - Studies and Paper, pp. 529-540. Available at: https://almanahnid.uni-svishtov.bg/title.asp?title=2962; URL2: https://www.researchgate.net/publication/389043689

Conference Papers

Tsondev, T. (2023). Evidence of regional price divergence in Bulgarian real estate through the prism of the transport logistics network. *Scientific Conference "Logistics and Public Systems"*, March 16-17, 2023, Vasil Levski National Military University, Veliko Tarnovo, pp. 327-335. ISSN 2738-8042. Available at: ResearchGate Link; URL: https://www.researchgate.net/publication/371081908

Tsondev, T. (2024). Regional convergence and divergence of real estate price levels in Bulgaria: Dynamics and trends. *International Scientific Conference "Problems and Challenges for Economic Science and Education in the 21st Century"*, Svishtov, November 22, 2024, Conference Paper Proceedings, pp. 169-180. ISBN 978-954-23-2522-2 - Printed ISBN 978-954-23-2523-9. Available at: ResearchGate Link URL: https://www.researchgate.net/publication/389044117

VII. REFERENCE FOR COMPLIANCE WITH THE NATIONAL REQUIREMENTS UNDER THE REGULATIONS FOR THE IMPLEMENTATION OF THE ACADEMIC STAFF DEVELOPMENT ACT IN THE REPUBLIC OF BULGARIA

National minimum requirement in points: 30.00

Number of studies published in non-indexed peer-reviewed journals or in edited collective volumes: **0**

Points awarded to the author: 0 points

Number of articles published in non-indexed peer-reviewed journals or in edited collective volumes: **1**

Points awarded to the author: 10 points

Number of conference papers published in non-indexed peer-reviewed journals or in edited collective volumes: **2**

Points awarded to the author: 20 points

Total number of points: 30.00 = minimum required points: 30.00

VIII. DECLARATION OF ORIGINALITY OF THE DOCTORAL THESIS

DECLARATION OF ORIGINALITY OF THE DOCTORAL THESIS

The dissertation, consisting of **155 pages**, entitled **"Management of Investments in Real Estate"**, represents the author's own scientific work. The dissertation uses the author's original ideas, texts, and visual materials including graphs, diagrams, tables, and formulas. All requirements of the **Copyright and Related Rights Act** have been observed through proper citation and referencing of other authors' ideas and data, including the following:

1. The results achieved in the dissertation and the contributions derived from it are original and have not been borrowed from studies and publications in which the author has not participated.
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3. The scientific results obtained, described, and/or published by other authors are duly and thoroughly cited in the bibliography.

Date: 20 January 2026 Doctoral Candidate:

/ Tsondyu Tsondev/

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