

**UNIVERSITY OF ECONOMICS – VARNA
FACULTY OF ECONOMICS
DEPARTMENT OF “BUSINESS, INVESTMENTS, REAL ESTATE”**

Blagovest Plamenov Iliev

**IMPACT OF MAIN MACROECONOMIC FACTORS ON REAL ESTATE
INVESTMENTS IN BULGARIA**

ABSTRACT

of dissertation for acquiring an educational and scientific degree "doctor" in professional direction 3.8. "Economy", Doctorate program "Economics and Management (Construction and Real Estate)"

**Varna
2025**

The dissertation consists of 182 pages, of which:

- Introduction – 5 pages;
- Main text (three chapters) – 152 pages;
- Conclusion – 5 pages;
- List of literature sources – 116 titles;
- List of electronic sources (websites) – 33 websites;
- Tables – 56 pieces;
- Figures – 19 pieces.

The defense of the dissertation will take place on2025 from
..... in hall of the University of Economics - Varna at a meeting of the
Scientific Jury, appointed by Order of
the Rector of the University of Economics - Varna.

The materials on the defense are available to those interested in the University of
Economics - Varna, www.uevarna.bg.

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**Varna
2025**

The dissertation work was discussed at an extended meeting and referred for defense by the Department of "Business, Investments, Real Estate" at the University of Economics - Varna.

The author is a full-time doctoral candidate at the Department of "Business, Investments, Real Estate" at the University of Economics - Varna. Research and development were carried out at the same university.

Author: Blagovest Plamenov Iliev

Title: Impact of Main Macroeconomic Factors on Real Estate Investments in Bulgaria

I. GENERAL CHARACTERISTICS OF THE DISSERTATION PAPER

1. Relevance of the topic

Real estate plays an essential role in the lives and work of people and society as a whole. In addition to satisfying the existential needs for shelter and a home, real estate enables a variety of activities to achieve tangible and intangible goals. Real estate is fundamental to the market economy. Real estate holds a significant part of national and global wealth. Globally, its value exceeds the total value of investments in stocks and bonds, with over 62% of wealth concentrated in real estate. And at a national level, the country is at the top of Europe for property ownership, with over 85% of the population living in their own property.

The topic of the dissertation is related to the return on investment in real estate in Bulgaria and focuses on the relationship between selected macroeconomic factors and direct and indirect investments. In Bulgaria, real estate is perceived as a safe haven of invested funds and is a preferred asset for investment. The real estate market is one of the most dynamic in the country. However, the Bulgarian economy in general and the real estate market in particular are classified as emerging and therefore the impact of macroeconomic factors on the prices of investment assets does not always coincide with what is observed in developed markets.

Bulgaria is about to be admitted to the euro area, which brings with it concerns about increased inflation and rising prices. In turn, this expectation stimulates investment interest in the purchase of real estate to protect against inflationary consequences. By the end of 2023, real estate price growth in Bulgaria is at the top of the EU, where at the same time it is declining in many developed countries. The dissertation analyses the specific relationships between selected key macroeconomic factors and investment asset prices.

2. Object and subject of research

The research object of the dissertation work is direct and indirect investments in real estate in Bulgaria.

The subject of research is the relationship between selected macroeconomic factors and asset prices and, respectively, the capital return on real estate investments.

3. Purpose and tasks of the study

The aim of the dissertation is, after examining the theoretical foundations of real estate investment, to select key macroeconomic indicators to analyze their impact on

capital returns and propose a regression model for forecasting real housing prices in Bulgaria.

The following tasks are set to achieve the research objectives:

1. To clarify the economic nature of a number of concepts related to real estate and real estate investment and to select macroeconomic factors to reveal their potential impact on investment asset prices.

2. Study of direct and indirect investments in real estate in Bulgaria and highlighting the specific characteristics determining the chosen focus of the thesis on residential property prices and the BGREIT index.

3. Determining the macroeconomic factors influencing the return on capital of direct and indirect investments in real estate using appropriate statistical methods.

4. Creation of a regression model for the interaction between statistically significant factors and real housing prices in the country and formulation of a forecast for the residential property market in the short term, when Bulgaria's entry into the euro area is expected..

4. Dissertation research thesis

The research thesis of the dissertation is that there are differences between the macroeconomic factors that statistically affect asset prices in direct and indirect real estate investments in Bulgaria during the time period under consideration, although both types of investments are based on real estate. The following working hypotheses have been formulated to the thesis:

- The macroeconomic factors that influence direct and indirect investment are different, although both types of investment are based on real estate;
- It is possible to build a model calculating the impact of the significant factors on residential property prices and forecasting this market depending on macroeconomic trends in the country.

5. Research methodology

The dissertation is developed on a methodology detailed in chapter two. Through the application of the method of analysis, emphasis is placed on the macroeconomic factors that impact real estate investment. The methods of deduction, comparative analysis, statistical and mathematical analysis, empirical approach and others are strongly emphasized in the course of the research.

6. Limitations of the study

The dissertation was developed under the following constraints:

- Residential property is considered as a representative type of real estate for direct investment, allowing the use of national level data consistent with other macroeconomic data;
- The BGREIT Index is a sector index reflecting the price movements of securities issued by REITs on the Bulgarian Stock Exchange (BSE) that represent indirect real estate investment opportunities in the country;
- Time constraints of the study due to availability of statistical data. The data for the real house price index starts in 2005 and the BGREIT index was created in September 2007. Thus, the time period of analysis on direct investment is from 2005 to 2023 and for indirect investment is from September 2007 to 2023.

7. Approbation

The dissertation was discussed at meetings of the Department of Business, Investment, Real Estate. 3 publications (2 articles and 1 report) on its topic have been published in specialized scientific journals.

8. Content of the dissertation

INTRODUCTION

CHAPTER ONE

REAL ESTATE INVESTMENTS AND THEIR RELATIONSHIP WITH KEY MACROECONOMIC FACTORS

- 1.1 Nature and classification characteristics of real estate
- 1.2 Characteristics of real estate investments
- 1.3 Interaction of key macroeconomic factors with investment asset prices

CHAPTER TWO

METHODOLOGY OF CONDUCTING EMPIRICAL RESEARCH

- 2.1 Selection of key indicators for the study
- 2.2 Comparative analysis of the selected indicators for Bulgaria and the euro area
- 2.3 Statistical methods for constructing a regression model and forecasting real house prices

CHAPTER THREE
INTERRELATIONSHIP BETWEEN EQUITY RETURNS ON REAL
ESTATE INVESTMENTS AND THE SELECTED MACROECONOMIC
FACTORS IN BULGARIA

- 3.1 Granger causality results between macroeconomic factors and investment asset prices
- 3.2 A regression model for the impact of macroeconomic factors on real house prices
- 3.3 Validation of the regression model and forecast of real house prices in Bulgaria

CONCLUSION

BIBLIOGRAPHY

II. SUMMARY OF THE DISSERTATION

INTRODUCTION

The relevance of the topic is justified in the introduction. The object and subject of research are defined. Emphasis is placed on the research methodology, on the basis of which the main goal, tasks and research thesis are presented.

CHAPTER ONE REAL ESTATE INVESTMENTS AND THEIR RELATIONSHIP WITH KEY MACROECONOMIC FACTORS

Chapter one of the dissertation is devoted to the theoretical foundations of real estate and real estate investment. It explores the nature of these concepts and refines some basic concepts in this area. A classification of real estate is made that reflects various theoretical and practical aspects of its nature. The specificities of real estate investment in the real and financial sectors are highlighted, with an emphasis on the differences between direct and indirect investment. Chapter one concludes with a detailed analysis of research carried out on the interrelationship between key macroeconomic factors and the prices of investment assets on both international and Bulgarian markets.

The first paragraph of chapter one presents the theoretical foundations of real estate. In this paragraph, different definitions of Bulgarian and foreign authors for the concepts of “real estate” and “real property” are examined, which allows to identify the main aspects of these definitions and to analyse them in the context of the present study. In practice, these concepts are often used as synonyms, but in scientific, legal and economic terms, a distinction is made between them, with real estate referring to physical assets, and immovable property embodying legal rights over physical assets. Thus, the value of real estate is the aggregate of the value of physical assets and the associated rights¹.

This paragraph also presents a classification of real estate summarizing three main aspects: legal, financial and market (Figure 1). This classification is the basis for clarifying the characteristics of real estate by considering its physical characteristics as a real asset and its characteristics as an investment asset. On the basis of this research, an authorial refinement of the concept of “real estate” has been carried out for the purposes of the thesis, which defines it as “a particular type of commodity (investment asset), comprising tangible and intangible goods, which together or separately are the result or subject of an investment interest, where the

¹ Brueggeman, W. and Fisher, J. (2018) Real Estate Finance and Investments. 16 ed., *McGraw-Hill*, p. 2

purpose is to realise a return/benefit through own use, assignment of certain rights or transfer of ownership between interested parties.”

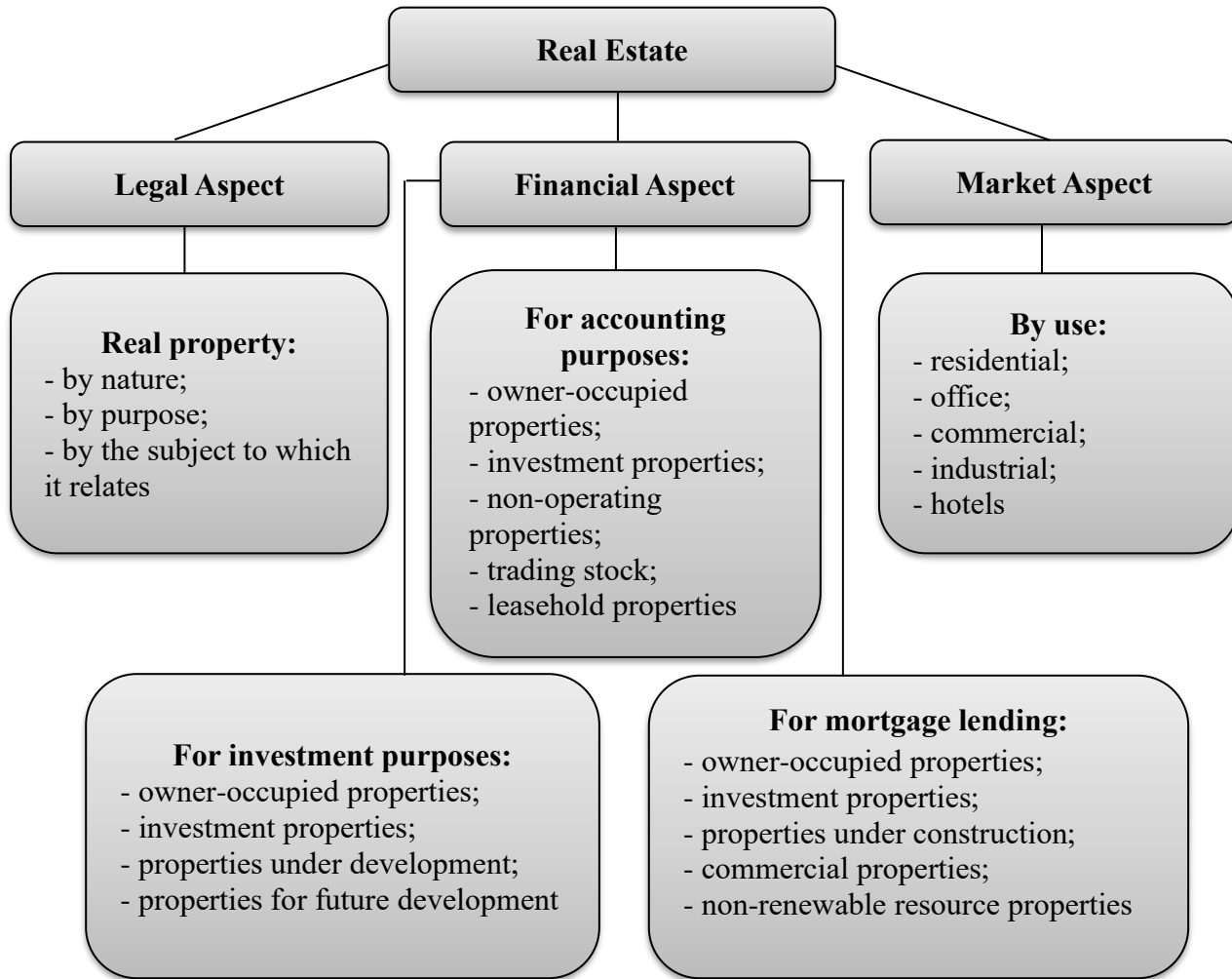


Figure 1. Classification of real estate

Source: Compiled by the author on the basis of researched specialized literature

At the end of the first paragraph of chapter one, the nature and role of the real estate market is discussed. Different definitions of Bulgarian and foreign authors are studied, the pricing process is analysed and the main characteristics of the real estate market are outlined. On the basis of the analysis made for the purpose of the thesis, the real estate market performs two main functions - it facilitates “the realization of the investment interests of its participants and the determination of a competitive price for real estate and related rights.” However, in terms of its efficiency regarding the pricing of real estate, the market can be described as substantially “imperfect”.

The main reasons for this are the heterogeneity of real estate, the rarity and complexity of real estate transactions, which contribute to the low transparency of pricing in their implementation, and the relatively high level of influence of sellers on price.

Based on the discussed nature and specifics of real estate and its market, we can summarize the following:

1. The theoretical knowledge of real estate and its classifications is expanded, based on which its role and characteristics as investment assets are identified. A refined definition of “real estate” is proposed by the author.

2. The nature of the real estate market and its pricing process is analyzed. The specifics of the real estate market are highlighted.

3. We consider real estate to be a dual investment asset, comprising tangible and intangible assets. The real estate market performs its main functions of real estate transactions and their pricing. In terms of its pricing efficiency, it is substantially ‘imperfect’. This is due to its specific characteristics arising from the characteristics of real estate as an investment asset.

The second paragraph of chapter one is devoted to real estate investment. It discusses the types of real estate investments and their characteristics that affect their performance..

Investing involves spending money to acquire an asset that will contribute to the investor's future well-being. In the case of investment in real estate, Yovkova defines it as the investment of “money to acquire real estate or real estate-based derivatives with the aim of the said assets bringing the owner, for a short time or for a relatively long period, income, profit or other beneficial effects”². The types of investors are examined and the characteristics of institutional investors specialising in real estate investment are highlighted. These are globally known as real estate investment trusts (REITs) and in Bulgaria they are special investment purpose joint stock entities (SIPJSEs) and their securities are traded on the Bulgarian Stock Exchange. Real estate investments that can be made in the country are mainly of two types:

1. Direct investments where property and ownership of it is acquired; and
2. Indirect investments where securities of SIPJSEs are acquired. The investor does not acquire ownership of the properties but of the securities of the company owning the properties.

The main characteristics of the two types of real estate investments are presented in Table 1:

² Yovkova, Y. (2014) Investments in real estate and aspect of their financing. *UNSS*, p. 10

Table 1.**Characteristics of direct and indirect investments in real estate**

	Advantages	Disadvantages
Direct	Full control over the investment	Require experience, skill and time to manage effectively
	Relatively high returns	Significant investment capital required
	Real estate can be used as collateral for lending	Low liquidity
	Opportunity to reduce the impact of certain risks	Difficult to access market information on completed transactions
Indirect	Access to real estate investments with lower investment capital	Lack of control over property management
	Income without the need to manage real estate	Risks tied to property types in the portfolio
	High liquidity	Higher level of volatility in security prices
	Market information is centralized and more easily accessible	Inability to fully diversify specific risk in investment portfolio

Source: Compiled by the author on the basis of researched specialized literature

Regardless of the type and method of investment, all investors seek to achieve the highest possible return on investment. It is based on two main elements - income return and capital return, the sum of the two representing the total return. In direct investments, income is likely to be earned by renting out the property, while in indirect investments the income is in the form of dividends. The capital return is determined by the difference between the acquisition price and the selling price of the asset at the end of the investment period. In the case of direct investments, it is also necessary to take into account the capital expenditure incurred in maintaining and improving the property during the period. These costs are not relevant for indirect investments.

Analyses and studies of markets in different countries and cities on the levels of income and capital returns from direct investments in real estate covering the period before and after the 2007 crisis and the post-crisis period after Covid 19 reveal that income returns are significantly more stable than capital returns, but it is capital returns that account for the majority of total returns.

At the end of the second paragraph of chapter one, the focus is on risk in investing. The types of risk - market risk and specific risk - and the possibility of reducing investment risk are discussed through the prism of modern portfolio theory. According to Yovkova³, the specific characteristics of real estate as an investment asset give rise to a unique risk in investing in it that cannot be eliminated through diversification. It is this unique risk that distinguishes them from the other most popular investment assets - stocks and bonds.

The results of analyses of the capital return and risk of direct and indirect real estate investments in different countries, including Bulgaria, show that the capital market for indirect investments is significantly more volatile than the real market for direct real estate investments, while its return does not exceed proportionally that of the real market. Studies of the risks of the two types of real estate investment reveal that their returns are affected by different risks. For direct investments, the state of the national real estate market and the country's economy determine the risk exposure, while for indirect investments, the main factor is the type and use of the property in which the investment is made.

Based on the discussion in the second paragraph of chapter one, the author draws the following conclusions:

1. The theoretical foundations of investment and the types of investors are explored, and for the purposes of the study real estate investment is considered.

2. Opportunities for direct and indirect investments in real estate in Bulgaria are presented, highlighting the main characteristics and differences between the two types of investments.

3. The performance of real estate investments is based on their return and risk. The leading role of the return on capital of investments, determined by the prices of investment assets, is highlighted. Of the risks in real estate investment, emphasis is placed on the importance of the economy for the real estate market. Macroeconomic factors appear to be a major risk element influencing the attractiveness of the market at national level and the performance of investments, while investors cannot control them.

4. Differences have been found between the return and risk of direct and indirect investments in real estate, including in Bulgaria, although both types of investments are based on real estate. This fuels the author's interest in the relationship between each of these markets and the economic situation in the country and the existence of potential differences.

In the third paragraph of chapter one, the focus is on macroeconomic factors and their relationship with investment asset prices. In the case of direct real estate

³ Yovkova, Y. (2014) Investments in real estate and aspect of their financing. *UNSS*, p. 37

investment, the prices of residential real estate are examined, and in the case of indirect investment, the prices of REITs securities are examined.

The relationship between various macroeconomic factors and real estate asset prices has been the subject of numerous studies on different groups of developed and developing economies. Moving from the general to the particular, the analysis begins with a review of broader studies that aim to determine whether a relationship between macroeconomic factors and real estate investment markets exists in practice. The results show that such a relationship exists in both direct and indirect investment markets. Comparing across economies, however, several key differences emerge at the national level:

- Changes in macroeconomic indicators can explain a significant part of the performance of markets, but the specific factors that have the strongest impact differ across countries; and
- For both types of real estate investment, the effect of economic performance on markets is stronger in developing countries with lower income populations than in developed countries.

The results of research covering a wide range of macroeconomic indicators support economic theory and confirm the relationship of factors determining economic activity, monetary policy and supply and demand. The main ones can be reduced to:

- Gross Domestic Product (GDP), inflation, unemployment and personal profitability, which are key indicators used to analyse economic activity;
- The interest rate and the quantity of money in the economy on which monetary policy is based;
- Demand factors - the volume of investment in real estate and supply factors - the volume of construction output, which determine the level of investment in the sector.

The analysis continues with a review of more specific research on each of these macroeconomic indicators, comparing their interaction with the performance of the markets for direct and indirect real estate investment:

1. **GDP** – the results reveal a two-way positive influence between house prices and GDP. In the market for indirect investment, GDP influences returns, but there is no evidence of influence in the opposite direction. A study by Case et al.⁴ shows that an increase in security prices is not associated with an increase in household consumption, while an increase in house prices leads to a significant increase in consumption (also called the “wealth effect”).

⁴ Case, K. & Quigley, J. and Shiller, R (2005) Comparing Wealth Effects: The Stock Market versus the Housing Market. *Advances in Macroeconomics, Berkeley Electronic Press*, Vol. 5(1), pp. 1235-1235

2. **Inflation** – a study by Demary and Voigtlander⁵ reveals that direct investments in residential real estate provide the best inflation protection compared to direct investments in other types of real estate, with returns positively affected by inflation, while returns to indirect investments in REITs are negatively affected by inflation. The direction of the influence between inflation and real market residential property prices varies across markets, but is positive, while for indirect investments inflation has a negative effect on returns.

3. **Unemployment** – the unemployment rate has an inversely proportional impact on the returns from direct and indirect real estate investment. In countries where the housing market has a significant impact on the business cycle, there is also an impact in the opposite direction - from the real market to the unemployment rate.

4. **Population income** – in direct investment, there is a relationship between incomes and house prices. The effect of changes in income on the performance of real estate investment funds is mainly reflected in changes in consumption and demand.

5. **Quantity of money in the economy** – direct and indirect investment is positively affected when the monetary aggregate increases and negatively when it decreases. Changes in the quantity of money in the economy combined with changes in interest rates determine liquidity and the availability of credit.

6. **Interest rates** – studies reveal an inverse relationship between interest rates and investment asset prices for direct and indirect investments, but the strength of the impact varies across countries. The difference between the two markets is the direction of the influence: direct investment exhibits a two-way relationship, while indirect investment exhibits a one-way relationship.

7. **Demand** – demand is influenced by a wide range of factors, such as some already discussed above (yields, interest rates, monetary aggregate). The volume of capital invested in construction expresses in monetary equivalent terms the overall changes in the level of demand. There is a long-term relationship with the real market. For indirect investment in some markets, there is an inverse relationship between the level of investment and the performance of REITs.

8. **Supply** – the level of construction activity is considered as a key factor tracking changes in the level of supply. Here again, there are differences between the two markets. For direct investment, we find a positive impact of construction activity on house prices, while for indirect investment, it has a negative effect on REITs' security prices.

Studies by Bulgarian authors of the Bulgarian market focus on the residential segment and residential property prices. Different methodologies have been used, finding relationships between house prices and GDP, inflation, unemployment,

⁵ Demary, M. and Voigtlander, M. (2009) The Inflation Hedging Properties of Real Estate: A Comparison between Direct Investments and Equity Returns. *Research Center for Real Estate Economics*, Institut der deutschen Wirtschaft Köln, Germany

population income level, monetary aggregate, housing lending and interest rates in the country.

In the third paragraph of the first chapter the following main conclusions are presented as a summary:

1. The results of the studies reviewed clearly demonstrate the relationship between the direct and indirect real estate investment markets and the underlying macroeconomic factors determining economic activity, monetary policy and the levels of supply and demand in the markets. Research on the Bulgarian market confirms the relationship between residential property prices and many of the macroeconomic factors considered.

2. There are differences between the direction and strength of influence between different factors in different countries and between direct and indirect investment markets. Developing economies are characterised by a stronger relationship between market performance and domestic economic conditions than developed countries.

3. We believe that the differences in markets and economics at the national level require the detailed study of a particular market to identify the specific interactions between macroeconomic factors and the performance of real estate investment markets. The designation of the Bulgarian economy as a developing economy reinforces the need for a detailed study of these markets in the country.

CHAPTER TWO

METHODOLOGY OF CONDUCTING EMPIRICAL RESEARCH

In chapter two of the dissertation the indicators to be studied are selected and the developed methodology is presented for conducting an empirical study of direct and indirect real estate investment markets and their relationship with key macroeconomic factors.

The first paragraph of chapter two of the dissertation is devoted to the selection of the main market and macroeconomic indicators that will be included in the study. The first part focuses on the direct and indirect real estate investment markets in the country. The real estate market globally and nationally represents the main investment asset in which the largest share of the value of all investment assets is concentrated. Residential real estate represents 76%⁶ and 77%⁷ of the value of all real estate assets, respectively, making it the leading segment by value. In Bulgaria, according to the National Statistical Institute⁸, the housing market also occupies the

⁶ Savills (2023) Total Value of Global Real Estate. Savills Research. [online] Available at: <https://www.savills.com/impacts/market-trends/the-total-value-of-global-real-estate-property-remains-the-worlds-biggest-store-of-wealth.html> [Accessed: 11.05.2024]

⁷ <https://www.statista.com/outlook/fmo/real-estate/bulgaria> [online] Available at: [Accessed: 11.05.2024]

⁸ NSI [online] Available at: <https://www.nsi.bg/bg/content/766/статистически-данни> [Accessed: 11.05.2024]

largest floor area. Some cultural factors also contribute to the leading role of the housing market. Bulgaria is one of the leading countries in Europe in terms of the percentage of the population living in their own home. It is not surprising that the demand for real estate is dominated by residential type. Even, the purchase of a home for one's own needs can be perceived as an investment, as the respective home serves to protect the invested capital and is used as a source of funds when purchasing a new one.

Special investment purpose joint stock entities (SIPJSEs) provide an opportunity for indirect investment in real estate in Bulgaria. At the end of 2023, the sector represents 11%⁹ of the total capitalization of all companies traded on the BSE. Since 2007, the BGREIT sector index has been established to reflect the change in prices of the SIPJSE segment's securities. This index consists of the quotes of 7 SIPJSEs that are eligible to be included in it. An analysis of their capitalization and the structure of their investment portfolios reveals that while residential real estate is present in some of them, it is not the primary type of real estate in which SIPJSEs invest. The BGREIT index analysis will therefore look at the performance of indirect investments primarily in non-residential property.

The second part of the first paragraph contains an analysis of developed institutional macroeconomic models that serve to track the state of the economy. It traces the creation and improvement of three main macroeconomic models - two for Bulgaria and one for the euro area. The indicators that aim to reflect the state of the economy are the “Indicator of Economic Activity” in Bulgaria (IEA) and the “eurocoin” in the euro area. They are calculated according to a similar methodology, incorporating a wide range of macroeconomic factors to justify the changing economic environment and to summarise the observed changes in a common indicator. The third macroeconomic model is a model for estimating effects on key macroeconomic and budgetary indicators in Bulgaria. The main objective of this model is to allow the estimation of effects on key economic indicators from potential shocks to the economy. The evolution of economic activity indicators in both Bulgaria (IEA) and the euro area (eurocoin) reveals the dynamic interconnectedness between the economy and the various factors that affect it. Table 2 presents the actual composition of the main groups of indicators included in each of the models, as well as those macroeconomic factors that influence asset prices in direct and indirect real estate investment, as evidenced by the literature review in the third paragraph of chapter one:

⁹ bse-sofia.bg/bg/market-segmentation [online] [Accessed: 12.05.2024]

Table 2.

Comparison between factors included in different economic models and factors influencing real estate investment

Model	Macroeconomic factors
Indicator of Economic Activity (IEA) ¹⁰	16 factors: GDP (Bulgaria), persons employed, industrial production index, producer prices, construction output index, retail turnover index, general business climate, industrial production order backlog, industrial price expectations, average capacity utilization, M2 monetary aggregate, credit (non-financial corporations and households), 3-month Euribor, international non-energy commodity price index, EU27 industrial production index and EU27 GDP
Eurocoin ¹¹	104 factors from the following groups: industrial production indices (1), service sector indices (5), exchange rates (3), price level (25), monetary aggregates (8), interest rates (17), financial variables (7), demand indicators (11), surveys (7), trade variables (8), economic indicators (6) and labour market indicators (6)
Macroeconomic model to assess effects on key macroeconomic and budgetary indicators ¹²	45 factors from the following groups: labour market (4), interest rates and credit volume (11), financial variables (1), GDP (10), exchange rates (4), price levels (2), house prices (1), budget data (5), monetary aggregates (1), macroeconomic aggregates (3) and forecasts (3)
Factors influencing	GDP, long-term interest rate and lending, monetary aggregate

¹⁰ Ministry of Finance (2024) Indicator of Economic Activity in Bulgaria. Issue 2/2024 [online] Available at: https://www.minfin.bg/upload/59219/EAI_2%2724_en.pdf [Accessed: 16.09.2024]

¹¹ Aprigliano, V., Emiliozzi, S. and Lippi, M. (2022) Tracking economic growth in real time during the pandemic: a rationale for a revision of €-coin. Occasional Papers 703 [online] Available at: https://www.bancaditalia.it/publicazioni/qef/2022-0703/QEF_703_22.pdf?language_id=1 [Accessed: 16.09.2024]

¹² Ganev, K., Vasilev A. and Ganeva, R. (2019) Technical documentation of the macroeconomic simulation model to assess effects on key macroeconomic and budgetary indicators. Ministry of Finance [online] Available at: https://www.minfin.bg/upload/46186/doc_minfin_sim_ed.pdf [Accessed: 16.09.2024]

prices of residential properties and shares of REITs	(amount of money in the economy), inflation, employment/unemployment, level of personal income, construction activity, level of investment and house prices themselves
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Source: Cited publications and literature review conducted by the author

In the context of real estate investment, the factors that influence its returns are also included in the various macroeconomic models. Their key role in the sector and the economy reinforces the need to examine their interconnectedness with investment asset prices at the national level in order to establish their impact on the returns of real estate investments in Bulgaria.

On the basis of what we have set out in the first paragraph of chapter two, we have drawn the following conclusions:

1. The residential real estate market is the leading segment of the real estate direct investment market in Bulgaria. The indicator that reflects their development and will be included in the study is the real house price index.

2. The BGREIT index will be included in the study as an indicator reflecting the development of the SIPJSE sector and the indirect real estate investment market in the country. In contrast to the real market, SIPJSE investments are mainly in non-residential properties.

3. After adapting three institutional macroeconomic models for Bulgaria and the euro area and comparing them with the results of the studies reviewed in the third paragraph of chapter one, the following main macroeconomic factors are selected to be included in the study: GDP, inflation, unemployment, average monthly wage, quantity of money in the economy (monetary aggregate M3), long-term mortgage interest rate, level of gross fixed capital formation in construction and level of output in building construction.

The second paragraph of chapter two contains a comparative analysis between Bulgaria and the euro area of the selected indicators for the study.

From the analysis made in the previous paragraph, a total of 10 indicators have been selected for the purpose of the research in this dissertation. Each indicator is presented separately in this paragraph. The comparative analysis between Bulgaria and the euro area is carried out on the basis of annual change. For the indicators presented as a percentage, the change in the respective levels (inflation, unemployment and interest rate) is compared. The value of the variables at the end of each year is determined using the value in the fourth quarter or the value in December, using annual data where necessary (e.g. for aggregates).

Real house prices are reflected in an index compiled by Eurostat (deflated HPI or real HPI), which uses the nominal house price index and adjusts it for inflation. For this purpose, an index of household and social expenditure is used (deflator for private final consumption expenditure (households and non-profit institutions serving households (NPISHs))). Data is collected from the creation of the index in 2005 to 2023.

The BGREIT index was created in 2007. The NAREIT Eurozone Index, covering the euro area, was selected for comparison with the performance of a similar class of investment assets. The data covers the period from 2007 to 2023.

GDP data is compiled in the form of an index that reflects changes in the value of GDP using a harmonised methodology for the European Union for the period from 2005 to 2023.

Inflation is the change in the level of consumer prices of goods and services. It is measured by a consumer price index using a European harmonised methodology. Data is collected for the period from 2005 to 2023.

Unemployment is calculated as the percentage of the number of people not in employment out of the total number of people of working age. Data on the population up to retirement age are used, as employment at retirement age is a matter of personal choice and will thus reflect more reliably the state of the economy. Data is collected for the period from 2005 to 2023.

The average wage is the median level of pay per worker per month. Available data for the euro area is published by Eurostat and is on an annual basis. For the purpose of comparative analysis, the same data is used for both Bulgaria and the euro area, as the same methodology is applied for the calculation. For the statistical analysis carried out in chapter three, quarterly data is needed to match the quarterly data for the other variables. Such data is not available from Eurostat and therefore data from Infostat is used, which combines private and public sector wage levels in the country. Data is collected for the period from 2005 to 2023.

The quantity of money in the economy represents the total amount of money available in the economy, and for the purpose of the analysis the broadest aggregate M3 will be used. It comprises M1 (money in circulation in the economy), M2 (M1 and funds on deposit) and monetary instruments such as shares and stocks, debt certificates with a maturity of up to 2 years and others. Data is collected for the period from 2005 to 2023.

The average annual mortgage interest rate tracks the average effective annual interest rates on new home loans to households. For the Bulgarian market, data from the Bulgarian National Bank (BNB), available from 2007 to 2023, and for the euro area, data from the European Central Bank (ECB), available from 2005 to 2023, is used.

Gross fixed capital formation - construction (GFCF) measures the value of real estate acquisitions and construction less the value of real estate written off. It is presented as gross value because it does not include allowances for the obsolete portion of the assets acquired, i.e. it does not take into account their depreciation. Data is collected for the period 2005 - 2023 and for the comparative analysis is used annual data, measured in Euros while for the statistical analysis is used quarterly data, measured in Bulgarian Leva.

Output in construction is measured by the Construction Output Volume Index (COVI) in buildings. It is measured by adjusting it to the price level and is an indicator of the business cycle in the building construction sub-sector. Accordingly, this index will be considered as a function of supply in the sector as it reflects the quantity of building construction output.

The comparative analysis between Bulgaria and the euro area reveals similar trends in the development of the indicators, but also some differences between their dynamics in the two regions. Real house prices in Bulgaria changed at a higher rate (positive and negative) before and after the global financial crisis in the range of +20% and -20%. In the euro area they are significantly more stable with changes ranging between +5 and -5%. Variation is observed between the price developments in the two regions after the Covid19 crisis - in Bulgaria real house prices are increasing in 2023, while in the euro area they are declining by 7%.

The REITs indices show a smaller difference between the correction and recovery in the aftermath of the global financial crisis in both regions, albeit with a small time difference. The performance of the Bulgarian BGREIT index after the stabilisation of the markets in 2013 is more gradual and positively trending until 2023. The NAREIT Eurozone index, on the other hand, is more volatile - after 2016, periods of positive and negative growth alternate, with a 40% decline in 2022, almost as much as in 2008.

The examined macroeconomic indicators show similar trends between the two regions, but several key differences stand out. The growth rates of GDP, inflation, average wages and the monetary aggregate M3 are higher in Bulgaria compared to the euro area. Unemployment is lower in Bulgaria during periods of economic stability and higher when economic conditions deteriorate. Mortgage interest rates are significantly higher in Bulgaria at the beginning of the analyzed period. With the development of the market and the absorption of European laws and practices, they are decreasing to their lowest levels and getting closer to the interest rates in the euro area. In 2022, the average level of mortgage interest rates starts to rise in the euro area, while in Bulgaria the low interest rates reached are maintained. Significant differences can be observed between the two regions in the dynamics of GFCF and COVI in buildings. In Bulgaria, changes are more volatile in both indicators, while in

the euro area they are smoother and resemble the stability observed in the trend of real house prices.

Based on the analysis carried out in the second paragraph of chapter two, we have drawn the following conclusions:

1. The results of the comparative analysis are consistent with the economic theory and findings of the studies reviewed in the literature review in chapter one. The Bulgarian economy is increasingly developing and integrating with the European economy, which explains the similar trends in the changes in the market indicators examined. The differences are largely due to the fact that the Bulgarian market and economy are still developing.

2. There are differences not only regionally but also between the direct and indirect investment markets in Bulgaria.

3. These differences between Bulgaria and the euro area, as well as the specific characteristics of the Bulgarian market, reinforce the need for a more detailed study of the relationship between the residential property and SIPJSE markets and the economic situation in the country. The following paragraph presents a statistical methodology to achieve this objective.

The third paragraph of chapter two presents the methodology for achieving the objective of the dissertation.

This part of the study is based on statistical methods of analysis. The data used is extracted from official statistical publications and is on a quarterly basis for each of the indicators selected in the previous paragraph. The statistical analysis was performed using Eviews econometric software. The empirical study consists of several stages:

1. Data transformation - in order for the results of the statistical analysis to be reliable, the time series must have certain statistical characteristics. Time series that do not have the necessary statistical properties as published need to be transformed to a state that allows them to be included in the relevant statistical study. Two types of data transformation have been applied:

- Logarithm - traditionally in econometric studies we work with a transformation to a natural logarithm - $\ln(x)$. It helps to normalize time series trends and facilitates modeling and reading of the results of statistical analysis.

- Differencing - this is required in cases where time series are not stationary, aiming to convert them to stationary. It is done by subtracting the previous value from the present value. Stationarity means that the values in the time series are independent of the time at which they are measured - i.e. the mean and variance do not change over time.

2. Granger causality test - examines whether one time series helps predict another by determining this causality through the ability of one time series and its past values to influence future values of another time series. The test is performed pairwise

between two time series, examining causality in both directions. Conducting this test follows the following steps:

i. Determination of the optimal number of lags - information criteria are used for the formulated vector autoregressive (VAR) model for each pair of variables - for the purpose of this study the Akaike information criterion (AIC) is used.

ii. Test for stationarity of data - Augmented Dickey-Fuller test (ADF) is applied to prove stationarity. In the presence of time series stationarity, the classical vector autoregression (VAR) model is applied. In the absence of stationarity, it is necessary to investigate the presence of cointegration between the two time series.

iii. Johansen's cointegration test - examines the presence and number of cointegrating relationships between time series. Depending on the result, two different Granger causality models are applied:

1) If no cointegration is found between the time series, then they need to be transformed by differencing until they become stationary, and then a VAR model is applied.

2) If cointegration between parameters is detected, the VAR model is not appropriate and a vector error correction model (VECM) is applied.

It is necessary to clarify that in this thesis the terms “causality” and “influence” are to be understood as Granger statistical causality, as absolute causality between two parameters is beyond the scope of the thesis. Based on the results of the Granger causality tests, a regression equation will be constructed to examine the effect of macroeconomic factors on real house prices. The factors that have been found to help predict prices (Granger cause real house prices) will be included in the equation. The regression equation will be doubly logarithmic, with real house prices as the dependent variable and the macroeconomic factors that affect them as regressors. It will take the following form:

$$\ln y_t = \beta_0 + \beta_1 \ln x_{1,t} + \beta_2 \ln x_{2,t} + \beta_n \ln x_{n,t} + \epsilon_t \quad (1)$$

3. The regression equation (1) will be estimated by the ordinary least squares (OLS) method. This method requires several basic principles to be satisfied in order for the estimated coefficients of the equation to be determined as the best linear unbiased estimator (BLUE):

i. The first principle refers to the relationship between the independent variables in the equation - they must be independent of each other. In our case, we study macroeconomic factors that are invariably related to each other. To deal with this problem, all factors that have shown Granger causality with house prices will be included in a correlation matrix. Based on the correlation coefficients between them, a decision will be made whether to keep them in the model or to exclude them.

ii. The second principle refers to the presence of autocorrelation in the residual. If the residual exhibits autocorrelation, it means that it is not independent,

i.e. there is a correlation between the residual and one or more of the variables included in the regression. This will be investigated mainly through the Breusch-Godfrey LM test.

iii. The third principle looks at one of the characteristics of the residuals of the computed model - they need to be homoskedastic. This is a statistical term that reflects the situation where the variance of the residuals is uniform over the analysed time period. If the variance is not static with respect to time, then heteroskedasticity is present. This will be investigated using White's heteroskedasticity test.

iv. The last fourth principle refers to the distribution of the residual - it is desirable that the values of ϵ have a normal distribution. This will allow the model to be reliably used to forecast real house prices in the country. The Jarque-Bera test will be applied here.

4. Validation of the optimal regression equation and development of a forecast for the real house prices in Bulgaria:

i. To validate the model, a hypothetical outcome will be estimated based on the observed changes in the relevant macroeconomic factors over a 12-month period following the introduction of the euro in other Member States that were admitted to the euro area during the period under consideration from 2005 to 2023. The result will be compared with the observed average change in real house prices in the other countries.

ii. The model is estimated with statistical data on the Bulgarian economy and market and its use for forecasting real house prices would be most reliable with specific forecasts of the relevant macroeconomic factors for the country. Therefore, a forecast for the next few years will be made based on the available forecast data for the macroeconomic factors in the model.

Based on the methodology outlined for conducting an empirical study in the third paragraph of chapter two, the following conclusions can be made:

1. In the context of the adapted macroeconomic models, the selected factors have a major importance and influence on the economy and the development of the markets for direct and indirect real estate investments.

2. The methodology adopted in this dissertation enables us to carry out an analysis to determine the macroeconomic factors that statistically influence the direct and indirect investment markets in Bulgaria.

3. The formulation of an optimal regression equation will help to determine the mutual influence of the significant factors as well as the degree of influence of each of them on real house prices. Achieving the best linear unbiased estimators in the regression model will allow its reliable use for forecasting real house prices in the country.

CHAPTER THREE

INTERRELATIONSHIP BETWEEN EQUITY RETURNS ON REAL ESTATE INVESTMENTS AND THE SELECTED MACROECONOMIC FACTORS IN BULGARIA

In chapter three are presented the results of the empirical study. The results of the statistical analysis are interpreted and the interrelationships between capital returns in the direct and indirect real estate investment markets and the selected macroeconomic factors in Bulgaria are compared. The mutual influence of the significant factors on real house prices in the short term is also investigated, and the regression model is used to construct a forecast of house price developments over the next few years.

In the first paragraph of chapter three, the results of Granger causality tests between investment asset prices and the selected macroeconomic factors are presented. This test also examines the presence of cointegration between each pair of parameters, which reveals an interrelationship in the long-run.

The results of the study on the long- and short-term interrelationship between asset prices in the direct and indirect real estate investment markets in the country and selected key macroeconomic factors reveal that there are differences between the two markets and their relationship with different macroeconomic indicators. Table 3 summarizes the results of Johansen (long-run cointegration) and Granger (short-run influence) tests between residential property prices, SIPJSE shares and the macroeconomic factors examined.

In the long run, real house prices are linked to the average monthly wage, the amount of money in the economy, the average mortgage interest rate, and the demand for real estate (as expressed by the GFCF in construction). The income level of the population is linked to the ability to accumulate savings and the credit capacity of households to finance direct real estate investment. Monetary policy determines the availability and cost of borrowed resources, affecting the economy as a whole.

SIPJSE share prices are related over the long term to unemployment, average monthly wages, the amount of money in the economy, real estate demand, and construction output. SIPJSEs contribute to the supply and demand for buildings as they finance the construction of new buildings, purchase existing buildings and improve them, then offer them on the rental market or for sale. The link to unemployment can be seen as a reflection of business attitudes and their needs to cope with the anticipated volume of work both in terms of labour and workspace. Population income level is related to demand. It determines the ability of individual investors to invest in SIPJSE securities. Higher wages contribute to higher contributions to pension funds, which belong to institutional investors investing in SIPJSEs.

Table 3.

Interrelationships between the direct and indirect real estate investment markets and the examined macroeconomic factors in Bulgaria

Macroeconomic Factor	Long-run cointegration with macroeconomic factors		Short-term influence from macroeconomic factors	
	Real House Prices (Direct Investments)	BGREIT (Indirect Investments)	Real House Prices (Direct Investments)	BGREIT (Indirect Investments)
GDP	✗	✗	✓	✗
Inflation	✗	✗	✗	✗
Unemployment	✗	✓	✓	✗
Average Monthly Salary	✓	✓	✗	✓
M3	✓	✓	✓	✓
Average Mortgage Interest Rate	✓	✗	✗	✓
GFCF in Construction	✓	✓	✗	✓
COVI Buildings	✗	✓	✓	✗

Source: Results of a statistical study by the author

In the short term, real house prices are influenced by GDP, unemployment, the amount of money in the economy and supply (as measured by output in the building sector). There is a relationship between GDP and unemployment, as they reveal the state of the country's economy and influence demand in the housing market. The amount of money in the economy contributes to both the supply and demand of the housing market. A larger amount of M3 means that the money supply is more accessible to buyers and investors. While the use of credit to buy a home is growing among the general population, investors are more likely to finance new construction projects with leveraged funds.

These are the income level of the population, the amount of money in the economy, the average mortgage interest rate and demand. Demand determines the volume of investment in real estate in order to meet the needs of the population and businesses for such assets. Income contributes to the ability of households to invest in SIPJSE securities, as well as institutional investors such as pension funds whose capital flows depend on pension contributions. The availability and cost of the borrowed resources affect SIPJSEs by determining their cost of servicing these resources. As institutional investors, they have greater creditworthiness than individual investors and usually can raise a larger volume of funds.

On the basis of the analysis carried out in the first paragraph of chapter three, the following conclusions can be summarised:

1. Economic activity influences residential property prices in the short run, and is linked to the performance of the BGREIT index through unemployment in the long run. Monetary policy affects both markets in the long and short term.

2. Population income level and GFCF in construction determine demand in both markets - they are linked to asset prices over the long term. But in the short term there is no impact on house prices. Supply influences house prices in the short run, confirming the low supply elasticity, the heterogeneity of real estate and the fragmentation of the market that allow sellers to influence prices and contribute to the oligopolistic specificity of the real estate market.

3. In the indirect investment market, the opposite relationship is observed - demand influences stock prices in the short term and supply in the long term. That is, investors have a stronger influence compared to the real market, and the construction industry determines in the long run the assets available for management and realization by SIPJSEs.

4. The results of the study support the economic theory and confirm the main characteristics and differences between the two markets in Bulgaria, while highlighting the specific macroeconomic factors that influence them. The research hypothesis about the existence of different dependencies between the two markets and the economic situation in the country is confirmed.

In the second paragraph of chapter three a regression model for the impact of macroeconomic factors on real house prices in Bulgaria is developed.

In order to use this model to forecast real house prices, it will focus on the impact of macroeconomic factors in the short term. Therefore, it will include the factors that influence residential property prices according to the results of the Granger causality tests. From Table 3, these are GDP, unemployment, the amount of money in the economy (M3) and the volume of output in building construction (COVI). These will be the regressors and real house prices will be the dependent variable in equation (1).

Before proceeding to the regression analysis, it is necessary to examine the correlation between the independent variables. For this purpose a correlation matrix

is used. Out of all the pairs, one stands out with an extremely high correlation coefficient - GDP and M3 have a coefficient of 0.975. It is necessary to exclude one of these factors. In order to make the study more objective, two regression equations will be analysed - one will include GDP as an independent variable and the second will include the amount of money in the economy M3 as an independent variable. The results of both equations identify these factors as statistically insignificant and they should be removed from the model.

The second principle of the ordinary least squares method described in the third paragraph of chapter two refers to the presence of autocorrelation in the residual of the regression equation. The results of the Breusch-Godfrey LM test support the existence of autocorrelation in the residuals (p is 0), which means that there is a relationship between the residuals and any of the parameters. To address this shortcoming, the regression equation is adjusted by including past values of real house prices as a regressor. The Breusch-Godfrey LM test was repeated on the modified regression equation and the results proved the absence of autocorrelation in the residual (p is 0.42). The modification of the regression equation to include the past value of house prices is successful and eliminates the autocorrelation in the residuals.

Checking for the remaining principles of the ordinary least squares method will continue on the modified regression equation. The next principle concerns the variance of the residual - it must be uniform, i.e. homoskedasticity must be present. According to White's test, the residual is homoskedastic and satisfies this principle for OLS analysis (p is 0.77).

The last principle concerns the distribution of the residual. For reliable use of the model for forecasting purposes, it is necessary that it is normally distributed. The result of the Jarquet-Bera test (p is 0) rejects the null hypothesis of a normal distribution of the residual. Since the data included in the study is relatively small in size and contain a limited number of observations, it is possible that the result of this test erroneously rejects the null hypothesis of a normal distribution. Therefore, the residuals were also tested graphically. The residuals distribution plot reveals that the concentration of residuals values is actually around 0, with the number of residuals decreasing away from this value. An anomaly in the distribution was noted in a single observation in the fourth quarter of 2020. A detailed analysis of the anomaly reveals that it is due to an unusual decline during this period in household consumption, most likely caused by the development of the Covid-19 crisis and the extension of the austerity measures at the end of 2020. In order not to penalize the database, instead of excluding the observation in question, an averaged value between the previous and the subsequent time record in the real house price time series is used. Re-running the Jarquet-Bera test confirms the result of the graphical analysis - p is 0.87 and the null hypothesis of a normal distribution of residuals can be assumed. The significant

change in the probability p -value from 0 to 0.87 as a result of changing only one record leads us to conclude that in our case this test was influenced by the small size of the data and gave the wrong result before the adjustment.

No significant changes in the regression coefficients of the regressors were observed when the regression analysis was conducted after the adjustment. The regression equation satisfies all the principles of the ordinary least squares method and the regression coefficients can be defined as the best linear unbiased estimators (BLUE). As a result, the regression model for the impact of macroeconomic factors in the short run can be formulated as follows:

$$\begin{aligned} \ln(\text{real house prices})_t = & 1.30109 - 0.088645 * \ln(\text{unemployment})_t \\ & + 0.173726 * \ln(\text{COVI}) + 0.595044 * \ln(\text{real house prices})_{t-1} + u \end{aligned} \quad (2)$$

Based on the regression analysis presented in paragraph two of chapter three, we have drawn the following conclusions:

1. There is a lack of statistical evidence that GDP and M3 affect real house prices in the country along with unemployment and COVI.

2. Past house price values (the dependent variable) are included in the model as a regressor. The results reveal that they are the factor with the strongest influence. This confirms one of the characteristics of the real estate market where a smooth change of market prices is observed (price stickiness).

3. Out of the macroeconomic factors, unemployment and COVI are statistically significant. The one with the stronger impact is COVI, with a 1% change in it leading to a 0.17% change in house prices, and the one with the weakest impact is unemployment, with a 1% change in it leading to a 0.09% change in the opposite direction in real house prices.

4. The regression model satisfies all the principles of the ordinary least squares method and the regression coefficients can be defined as best linear unbiased estimators (BLUE), which allows its reliable use for forecasting purposes.

In the third paragraph of chapter three a forecast of real house prices in Bulgaria for the next few years is developed based on the formulated regression model.

For the validation of the regression model, data on the included macroeconomic indicators - unemployment and COVI for all countries that have adopted the euro during the study period from 2005 to 2023 is obtained. In total for this period, these are eight countries - Slovenia (2007), Cyprus (2008), Malta (2008), Slovakia (2009), Estonia (2011), Latvia (2014), Lithuania (2015) and Croatia (2023).

Based on the observed changes over a period of 12 months after joining the euro area, the average changes in selected macroeconomic indicators are calculated for each country. Unemployment declined by 0.24% on average and COVI increased by

3.3% on average. Since the regression equation is doubly logarithmic, the regression coefficients can be interpreted as the percentage change in real house prices (the dependent variable) with a corresponding percentage change in each macroeconomic factor (the independent variables). Hence, the effect of a -0.24% change in unemployment would result in a 0.021% increase in real house prices ($-0.088645 * -0.24\%$), and a 3.3% change in COVI would result in a 0.573% increase in real house prices ($0.173726 * 3.3\%$) when the other independent variables are held constant. On average across the eight countries, real house prices have risen by 0.8% over the 12 months since they joined the euro area. The result of the regression model (2) of 0.6% is similar to the observed change in the other countries that have adopted the euro as their currency and it can be concluded that the estimated averages are reliable.

During the period around the global financial crisis (2007-2009) are observed the highest rises and the largest falls for all countries. This was one of the most significant economic crises during the period of the study and it had an enormous impact on the observed macroeconomic parameters. As a result, the changes observed in these countries will be affected by the global crisis, in addition to their inclusion in the euro area. To refine the validation of the regression model, the same calculations will be made for the period from 2011 to 2023, when economic conditions are more stable and economies are already recovering from the global crisis. The Covid-19 crisis also affected the whole world, but it was not an economic crisis, rather a health crisis. Therefore, the period from 2020 onwards will not be excluded.

The average change in unemployment in countries that have adopted the euro in this sub-period is a decline of 1.63%. This would lead to an increase in real house prices of 0.144% ($-0.088645 * -1.63\%$). The average change in COVI over the same period is an increase of 10.2%. This would lead to an increase in real house prices of 1.772% ($0.173726 * 10.2\%$). The cumulative result from the regression model (2), of a 1.9% increase is similar to the observed average increase in real house prices in other countries of 2.2%. It can therefore be concluded that the estimated averages from the regression model (2) are plausible for the selected sub-period of a more stable economic environment as well.

These averages are not appropriate to use for forecasting. Each country has a different economy and joining the euro area affects it and the real estate market differently. The model is calculated based on data for Bulgaria and should work best with forecasts of the unemployment rate, the development of the construction sector in the country and its output. The more specific the forecasts for these macroeconomic factors, the more reliable the model output would be.

Unemployment forecasts for the country are published by the Ministry of Finance. According to the latest published forecast for 2024, unemployment is expected to be 4.2 per cent at the end of the year and to decline in subsequent years - 4.1 per cent in 2025 and to hold at 4 per cent in 2026 and 2027. A detailed forecast

for COVI in buildings is not available, but forecasts of total construction output are being prepared. COVI in buildings is a major segment of the total construction output in the country - according to the latest annual report of the Bulgarian Construction Chamber (BCC) for 2023, building construction represents 58% and engineering 42% of the total output . Therefore, the Economic Policy Institute's forecast for the country's construction sector, published on the Eastern European Construction Forecasting Association (EECFA) website, will be used. According to the latest forecast from the summer of 2024, the volume of construction in Bulgaria is expected to grow by 3.5% in 2024, 2.3% in 2025 and 1.5% in 2026. The results of the expected impact of the projected change in macroeconomic indicators on real house prices are presented in Table 4.

Table 4.

**Forecast of real house price changes
in 2024, 2025 and 2026**

Macroeconomic Factor	Unemployment		Construction	
	Change	Effect on Real House Prices	Change	Effect on Real House Prices
2024	-0.1%	0.01%	3.5%	0.61%
2025	-0.1%	0.01%	2.3%	0.41%
2026	0%	0%	1.5%	0.26%

Източник: MF, EECFA and results of a statistical study by the author

Unemployment in the country is forecast to be stable, which combined with the regression coefficient of -0.09 leads to a minimal effect on real house prices in the coming years. According to the Economic Policy Institute forecast, a slowdown in output growth in construction is expected. The regression coefficient for this factor is 0.17, which reveals that, according to the model, growth in the construction sector is expected to lead to a rise in real house prices in the country of 0.6% in 2024, 0.41% in 2025 and 0.26% in 2026.

Based on the presented results in paragraph three of chapter three the following conclusions are summarized:

1. The validation of the regression model using the historically observed changes in the included macroeconomic indicators is successful, as the model results are

similar to the average change in real house prices in the countries adopting the euro over the study period 2005-2023.

2. According to the statistics published by the BCC for 2023, COVI in buildings occupies a major share of the total construction volume in the country, which justifies the use of forecast data for the construction sector in the country.

3. Based on official forecast data of unemployment and construction output in the country, the regression model estimates real house prices in Bulgaria to rise by 0.6% in 2024, 0.41% in 2025 and 0.26% in 2026, which is mainly due to expectations for growth in construction and the absence of significant changes in the unemployment rate.

CONCLUSION

The results obtained from the research carried out in this dissertation allow us to draw the general conclusion that the purpose and tasks set in the dissertation are solved.

The analysis of real estate investment in Bulgaria reveals that the residential sector is the leading sector for direct investment, while the opportunity for indirect investment in real estate is provided by SIPJSEs. It was confirmed that the direct and indirect real estate investment markets in Bulgaria are interlinked with the economic situation in the country. Given the established statistical influence of certain key macroeconomic indicators on investment asset prices, it is clear that they are influenced by different macroeconomic factors, both in the long and short term. The results of the empirical study also support some basic characteristics of the two markets in which they differ, with the oligopolistic nature of the real market and the handling of this shortcoming in the indirect investment market, where demand has greater influence on prices, standing out most clearly.

In view of the above interrelationships, a regression model was created to determine which macroeconomic factors affect the housing market in the country and to what extent. The strongest influence has the volume of construction output, followed by the unemployment rate. The regression analysis also confirmed the smooth evolution of house prices, with the observed trend in house prices having a significant impact. The regression model was also used to forecast the change in real house prices over the next few years, when the country is expected to be admitted to the euro area.

III. STATEMENT OF CONTRIBUTIONS OF THE DISSERTATION

The following theoretical and practical contributions can be highlighted in the thesis:

1. On the basis of theoretical studies, critical analysis of literature sources and in context of the study, the concept of "real estate" in its role as an investment asset is refined.

2. A systematic and analytical study is implemented of macroeconomic indicators and institutional models influencing and/or characterizing economic development and real estate investment in individual countries, Bulgaria and the euro area. On this basis, the main macroeconomic indicators affecting real estate investment in the country are selected.

3. As a result of statistical analysis of the data collected for the selected macroeconomic factors, the interrelationships between them and the direct and indirect investment markets in Bulgaria are identified. The factors influencing the prices of investment assets in the short and long term are compared, highlighting the main characteristics and differences between the two markets specific to the economic situation and real estate investment in the country..

4. A regression model for the analysis of macroeconomic factors has been developed and applied, as a result of which those that mutually influence in the short term the real housing prices in Bulgaria are identified. The model is used to forecast the change in house prices in the period 2024-2026, in the second half of which the country is expected to be admitted to the euro area.

IV. PUBLICATIONS ON THE THESIS

Articles

1. Iliev, B. (2025). Direct and Indirect Real Estate Investment Performance – Data from Bulgaria, the Eurozone, the UK and the US. *Business & Management Compass*. University of Economics Varna, 69(1), pp. 72-83. <https://doi.org/10.56065/trcxhg09>
2. Iliev, B. (2024). Relationship Between the Housing Market and Macroeconomic Factors in Bulgaria and the European Union. *Stroitelno predpriemachestvo i nedvizhima sobstvenost = Construction Entrepreneurship and Real Property*, 1(1), pp. 121-132. <https://doi.org/10.56065/CERP2024.1.1.121>

Papers

3. Iliev B. (2022). Is Property Investment A Successful Hedge Against Inflation – Data From Bulgaria. *Proceedings of the 37-th International Scientific and Practical Conference in November 2022 - Construction Entrepreneurship and Real Property*, Varna: Science and Economics, pp. 192-199