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HARMONIZED INDEX OF CONSUMER PRICES IMPACT ON REAL ESTATE MARKET IN BALTIC COUNTRIES

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Abstract. The real estate market is a significant component of the global economy, attracting the attention of both investors and economists. Its dynamic nature has made it a widely studied subject, especially concerning its impact on the market itself. Through comprehensive analysis of economic data and market trends, it aims to elucidate the extent to which changes in consumer prices influence various aspects of the real estate sector, including property values, investment patterns, and market dynamics, with a specific focus on nominal housing prices across Latvia, Lithuania, and Estonia. Nominal housing prices are selected as a key factor due to their direct reflection of market demand, investor sentiment, and overall economic conditions, providing a robust indicator of the underlying dynamics shaping the real estate market in the Baltics. Employing a combination of statistical methods and economic models, the study examines the interplay between HICP fluctuations and the key indicator of the real estate market across Latvia, Lithuania, and Estonia. By providing empirical evidence and theoretical insights, this research contributes to a deeper understanding of the complex interactions between macroeconomic factors and real estate dynamics in the Baltic countries.

Keywords: investment, investors' attitude, influencing factors economic conditions, real estate market, Index of Consumer Prices.

JEL Classification: F63, F62, E31, E22, G11.

1. Introduction

The real estate market in the Baltic region has attracted a lot of interest and attention in recent years, especially in terms of economic integration and changing consumer behavior. Since the real estate market is one of the most significant sectors promoting economic growth and stability, it is very important to understand the dynamics of the real estate market. Against this background, this study begins to examine the complex relationship between the Harmonized Index of Consumer Prices (HICP) and the real estate market in Latvia, Lithuania and Estonia. The main indicator is nominal housing prices.

This study aims to find out how much fluctuations in consumer prices influence various aspects of the real estate sector. Taking a closer look, this study aims to reveal the main mechanisms and factors shaping real estate value, investment patterns and market dynamics in the Baltic States. Nominal house prices are chosen as the main dependent variable because they directly reflect market demand, investor sentiment and broader economic conditions. That is why they are an excellent gauge of real estate market dynamics. Combining empirical analysis and economic modeling, this study aims to provide real-world insights and valuable advice to anyone analyzing aspects of the Baltic real estate market. For a deeper understanding of the interplay between macroeconomic factors and real estate dynamics, this study aims to contribute to existing knowledge and provide practical advice.

2. The real estate market and the harmonized consumer price index

2.1. Real estate market concept

Immovable property or in other words – real property, defined as a plot of land and its fixtures, cannot be

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moved from one place to another without altering its purpose and significantly diminishing its value. It also encompasses property (movable things) recognized as immovable by law (Valstybės žinios, 2000, Nr. 74-2262). Real estate comprises tangible assets such as land plots, buildings, and any associated resources, encompassing both residential and commercial sectors. The real estate market encompasses all transactions and activities related to real estate, including asset purchase and sale, financing, management, construction, and development (Liu & Xiong, 2018).

The concept of real estate comprises four elements: physical, economic, legal, and social. Each of these elements has specific characteristics that facilitate analysis. From a physical standpoint, real estate is categorized based on size, shape, location, environment, boundaries, and other physical attributes (Kowalczyk et al., 2019). In this context, property is viewed solely as a material entity. The legal aspect involves the classification and analysis of property rights, including ownership, use, operational management, security, servitudes, and more. Assets in this context encompass privileges and rights associated with physical real estate ownership (Ploeger et al., 2019).

Investors typically perceive real estate as an economic asset, divisible into subcategories such as price, liquidity, taxes, and profitability. Economically, real estate is often defined as an investment vehicle capable of generating financial returns for its owner (Li et al., 2022). The final element, social purpose, recognizes that real estate is constructed not only for profit or commercial purposes but also to serve social needs. Real estate with a social purpose is categorized based on its contribution to well-being, security, freedom, and independence – anything that enhances social welfare (Ersoz et al., 2018). While the four discussed elements offer varied interpretations of the real estate concept, common themes describing the real estate market can also be found in the literature.

All authors unanimously agree and country that the real estate market is a system in which various transactions circulate: sales, management, purchases, financing, covering objects of various purposes: residential, commercial, or transport.

In terms of previous studies, HICP as a factor and its correlation is little researched. Although, the CPI was mostly studied and its correlation with other macroeconomic factors was sought (Beck et al., 2024). Even though there were some studies that analyzed if HICP has a correlation with macroeconomic factors and if it is a significant factor or not. The studies showed that is significant factor and should be analyzed further (Dogan & Topuz, 2020).

2.2. The connection between the real estate market and the country's economy

The real estate market is a vital component of the country's economy, representing a significant portion of the national wealth (Kauškale & Geipele, 2016). Any changes occurring in real estate markets strongly impact economic activities, including but not limited to the construction sector, banking activities, production, country income, and expenses. All these activities contribute to the growth of the national economy and enhance purchasing power within the country, thereby significantly influencing demand and supply in the real estate market sector. Changes in the real estate market sector directly affect the country's gross domestic product (GDP), given its broad spectrum of economic activities (Golob et al., 2012).

Real estate often constitutes the most significant asset in an individual's or business's portfolio, with its value directly impacting owners' capital (Swinkels, 2023). Increasing real estate prices result in higher consumer spending, thereby fostering economic growth (Berger et al., 2018). In addition, the rising value of real estate can serve as collateral for future loans, stimulating the formation of new capital and investments in various sectors.

The real estate sector is also a major source of employment, including builders, developers, architects, estate agents and other workers, including those with less specialized skills. As real estate development progresses, job opportunities multiply, leading to a direct reduction in unemployment rates and bolstering economic resilience within the country (Dogan & Topuz, 2020). Furthermore, the real estate market itself can generate income: investors or other market participants garner returns through property ownership (e.g., by purchasing real estate), or through rental income. Subsequently, taxes are paid, funneling funds into a country's budgets, and thereby stimulating their economies.

Lastly, it's crucial to note that the expansion of the real estate market enhances country's capital. A robust real estate market attracts both domestic and foreign investments, catalyzing economic activity within the region (Rogers & Koh, 2017). For countries, the real estate market serves as a revenue source, yet as real estate develops, the country assumes a portion of the financial burden related to public sector and social welfare programs, such as creating new infrastructure (e.g., equipping public spaces, constructing roads, etc.). Taxes on real estate, capital gains, and transfer taxes collected during real estate transactions can be a financial lifeline for some countries (Chen et al., 2023). Such revenue supports social welfare initiatives, public sector progress and infrastructure development.

A thriving real estate market can significantly contribute to the country's budget, providing the country with financial resources. There exists a mutualistic symbiotic relationship between the real estate market and urban development, as burgeoning cities prompt increased investments from local governments in transportation and service sectors (Cai et al., 2020), thereby enhancing economic productivity and elevating the quality of life, which in turn fuels economic growth within the country.

It is necessary to remember that real estate is an essential human necessity, which is the basis of stability and economic functionality. Accessible and affordable housing

is a critical element in ensuring the region's workforce security and social well-being (Arundel & Ronald, 2021). However, it is difficult to find a balance in the real estate market to avoid crises such as homelessness or housing bubbles, which are particularly damaging to social welfare. A completely stable market is possible only in closed socialism. A historical example of closed socialism could be the Soviet Union. Socialism hinges on the principle of fundamental equality, wherein the right to reward for produced goods belongs to society. This implies that under socialism, everyone possesses the right to housing. Consequently, housing was allocated to all individuals, not with ownership rights, but with the right of use while serving the country (Kalyukin & Kohl, 2020).

In today's capitalist world, achieving socialism is arduous, thereby highlighting the necessity of a thriving real estate market to ensure citizens' access to secure and affordable housing, thus bolstering their overall well-being and capacity to positively contribute to the national economy (Chowdhury & Sogra, 2015).

2.3. Economic factors affecting the real estate market and he relationship between the harmonized consumer price index and real estate

Macroeconomic indicators, such as GDP growth, inflation, and interest rates, hold particular significance when discussing dynamics within the real estate market. At the core of economic expansion lies GDP growth, serving as a barometer of the real estate sector's vigor within a country (Grum & Govekar, 2016). A robust GDP signifies economic prosperity, fostering heightened consumer confidence and purchasing power, thereby bolstering demand for both residential and commercial properties. Conversely, during economic downturns, the real estate market typically contends with diminishing values and reduced investment activity (Hromada et al., 2023).

Inflation, as the formidable force behind escalating prices, wields a dual influence over the real estate market. Moderate inflation can elevate property values and rental income, whereas pronounced inflation or deflation can unsettle the market, sowing uncertainty among investors and property owners (Stiglitz & Regmi, 2022). Base interest rates, dictated by central banks like the European Central Bank and the Federal Reserve Bank, serve as the primary tool for inflation adjustment, while also impacting real estate availability, rental demand, and the overall cost of financing real estate transactions (Lepers & Thiemann, 2023).

Fluctuations within the housing market tend to manifest cyclically, with their recurrence frequency contingent upon economic shifts and adjustments. Analyzing housing market cycles is very important not only for investors, but also for prospective homeowners. These cycles, which are characterized by periods of fluctuation, have different characteristics, influences and resulting consequences. (Marzano et al., 2022).

A boom in the housing market correlates with economic prosperity. During an economic boom, real estate values soar, giving many the opportunity to realize their home ownership dream. Investors flock to the market during booms, enticed by forecasts of amplified returns (Zhang & Guo, 2018). Cities burgeon, cranes dot the skyline, and new constructions reshape the urban landscape, while renovations and fresh developments abound. As consumer confidence burgeons, the fervor for homeownership or real estate investment becomes contagious. This epoch, characterized by optimism and affluence, witnesses a buoyant real estate market al.ngside broad economic expansion (van Doorn et al., 2019).

However, economic prosperity does not last forever, and with economic changes come corresponding fluctuations in housing markets. The economic recession and financial crises worsened the real estate market situations in the states. During such periods, real estate values can rise or fall sharply, become unstable, and investment activity declines due to market uncertainty. For real estate owners, the recession presents challenges in selling real estate, mirroring the plight of financial institutions, in order to overcome the potential financial stress of default and the resulting debt collection efforts. At the same time as people look to more affordable housing options during a recession, real estate markets can experience shocks that could create a glut of rental properties in an overcrowded rental market (Aksoy Khurami & Özdemir Sarı, 2022).

The transition from boom to recession does not happen suddenly; rather, there are noticeable signs that herald the beginning of a recession. One of the most conspicuous indicators is the decline in housing prices, often accompanied by a disproportionate surge in the number of real estate properties on the market (Kohl, 2020). Prospective buyers anticipate and wait for price reductions, and sellers are generally reluctant to reduce prices, resulting in a slump in real estate transactions. Changes in mortgage terms, such as rising interest rates, are another harbinger of change. Layoffs and economic uncertainty add to the market's cooling trend (Tsou & Sun, 2021).

It is worth noting that these cycles are not eternal. After periods of cooling and recession, a phase of recovery begins. At this stage, housing market prices begin to stabilize and gradually rise. Investors are again seeing positivity in future forecasts and rekindling interest in home ownership. Government intervention, such as stimulus packages or pro-purchasing policies, can speed up the recovery process. It is a period characterized by hope and optimism, promoting positive transformations in the real estate market (Wu & Li, 2018).

A period of recovery usually precedes an expansion phase characterized by strong growth. Real estate market prices are rising, and the housing market is experiencing a boom. At the same time, the construction and development sectors are gaining momentum, opening up new opportunities and employment prospects, stimulating economic activity and increasing the country's income. But such periods of prosperity can lead to economic "bubbles" when demand exceeds supply (Ahmed et al.,

2021). This scenario leads to rapid increases in housing prices, which endangers individual homeowners and overall economic stability (Cevik & Naik, 2023).

The relationship between the Harmonized Index of Consumer Prices (HICP) and real estate is profound, as fluctuations in the HICP directly affect consumer purchasing power, financing costs, and general economic conditions, thereby shaping the dynamics of real estate markets. Changes in the HICP reflecting inflation or deflationary pressures can affect consumer confidence and affordability, as well as demand for real estate. In addition, the HICP guides monetary policy decisions and central banks adjust interest rates in response to inflationary trends, which influence borrowing costs and real estate investment decisions. Sustainable inflation as indicated by the HICP often correlates with economic growth, increasing demand for real estate as investors seek to hedge against inflation. Understanding and monitoring the relationship between CPI and real estate is essential to effectively navigate market movements and make sound investment decisions.

3. Methodology

During the research conducted in the Baltic countries, the selected dependent variable delineating the real estate market's status is the real estate value, colloquially referred to as the price. Nominal prices, extracted from the databases of the European Central Bank and the Organization for Economic Cooperation and Development within the timeframe spanning from 2005 to 2022, serve as the basis for analysis. The choice of nominal housing prices stems from their direct correlation with supply and demand dynamics in the real estate sector, as they clearly reflect market fluctuations (Ersoz et al., 2018). As economic conditions decline, the demand for housing changes accordingly, which has a tangible effect on housing prices. In addition, housing prices are a comprehensive barometer of the overall health of the economy (Asadov et al., 2023). A booming economy usually translates into increased employment levels and stronger consumer confidence, thus boosting demand for real estate and raising house prices. These prices include a number of economic factors, including inflation, interest rates and income levels, which together influence the attractiveness of mortgages, thus shaping demand and market prices for real estate. By focusing the analysis on prices, it becomes possible to dissect how economic fluctuations permeate the real estate market and interact with each other. (Liu, 2022). As for the independent variable under consideration, it is the harmonized consumer price index.

Research data analysis was performed with Microsoft Excel 365 and Statistical Package for Social Sciences (SPSS) programs after systematizing the data. The normality of the data was checked with the Shapiro-Wilk test, and if it was statistically insignificant ($p > 0.05$) and since the data were normal, one-way analysis of variance of independent samples (one-way ANOVA) was used to check the price averages between countries (see Equation 1).

$$W = \frac{(\sum_{i=1}^{n} a_i x_{(i)})^2}{\sum_{i=1}^{n} (x_i - \overline{x})^2}, \quad (1)$$

here, n – the number of observations, x_i – the sampling values arranged, and a_i – the coefficients.

The null hypothesis of the ANOVA method countries that the means of the compared groups are not statistically significantly different (see Equation 2).

$$H_0 : \mu_1 = \mu_2 = \mu_3 = \ldots = \mu_k, \quad (2)$$

here, H_0 – the null hypothesis, μ – the mean, and k – the sample size.

Pearson's r test was used to find the statistical dependence of the relationship between the nominal criteria. Statistical significance (by default) is selected when $p < 0.05$. The correlation was considered strong when p exceeded 0.7, and very weak when it did not reach 0.3. The formula for calculating the Pearson correlation coefficient is given in Equation 3 (see Equation 3).

$$r = \frac{\Sigma (x_i - \overline{x})(y_i - \overline{y})}{\sqrt{\Sigma (x_i - \overline{x})^2 \Sigma (y_i - \overline{y})^2}}, \quad (3)$$

here, r – the Pearson correlation coefficient, x_i – the sample x variables, y_i – the sample y variables, $\overline{x}$ – the mean in the x value of the variables, $\overline{y}$ – the mean in the y value of the variables.

4. Assessment of the impact of the consumer price index on the real estate market in the Baltic countries

After conducting the research, systematized data was obtained from 2005 to 2022 according to the independent variable – the harmonized consumer price index and the Baltic countries.

Consumer price inflation, or the adjusted consumer price index, exhibited the lowest rate in Latvia and the highest in Estonia. Notably, Latvia experienced the highest dispersion, attributable to significant deviations of consumer prices from the average. With Latvia's HICP averaging the highest, it suggests that the country likely endured the lengthiest period of elevated inflation (see Table 1).

Table 1. Statistical characteristics of the Harmonized Consumer Price Index in the Baltic countries (source: compiled by author)

Variable	Lithuania	Latvia	Estonia
Harmonized index of consumer prices (in percent) (HICP)			
The minimum	–0.7	–1.2	–0.6
The maximum	18.9	17.2	19.4
Mean	3.917	4.289	4.183
Standart deviation	4.572	5.205	4.653
Dispersion	20.906	27.089	21.650

After performing the ANOVA test, it turned out that the averages do not differ statistically, so a correlation analysis can be performed ($p > 0.05$).

Following the correlation analysis, it became evident that Lithuania exhibits the highest value for HICP, with a correlation coefficient of 0.700, signifying the strongest influence among the variables (see Table 2).

Table 2. Correlations between variables in the Baltic countries (source: compiled by authors)

Lithuania	Housing Prices	HICP
Housing Prices	1	0.496 ($p = 0.036$)
HICP	0.496 ($p = 0.036$)	1
Latvia	Housing Prices	HICP
Housing Prices	1	0.633 ($p = 0.005$)
HICP	0.633 ($p = 0.005$)	1
Estonia	Housing Prices	HICP
Housing Prices	1	0.700 ($p = 0.001$)
HICP	0.700 ($p = 0.001$)	1

Latvia follows closely behind with a correlation coefficient of 0.633, while Estonia lags slightly with a coefficient of 0.496, still indicating a considerable impact. In all three countries, the HICP demonstrates a statistically significant positive effect, directly influencing nominal house prices.

5. Conclusions

Real estate is tangible property that includes real estate that retains its purpose and value even after moving, together with property that is legally recognized as such. On the other hand, the real estate market is an arena in which transactions between buyers, sellers, tenants and landlords facilitate the exchange of ownership or management rights in real estate, which includes land, residential and commercial buildings, etc. Real Estate. Various economic influences affect this market. Throughout the study, one independent variable, the harmonized consumer price index, and one dependent variable, nominal house prices, were carefully examined, clarifying the complex relationship between economic indicators and real estate dynamics.

After the data normality check and ANOVA analysis, the correlation analysis revealed that HICP is most correlated with nominal housing prices in Lithuania, although it has a statistically significant positive effect in all countries. This shows that as the value of HICP increases, nominal house prices also tend to increase. On closer inspection, the harmonized consumer price index is a descriptor of the impact of inflation on consumers. Therefore, it is natural that the inflation experienced by the population affects housing prices, which leads to upward price trends. Moreover, the effects of inflation are embedded in a complex web of socioeconomic dynamics where disparities in income distribution and access to credit exacerbate the housing affordability crisis. These complex relationships underscore the need for comprehensive policy interventions to address systemic inequality to promote sustainable economic growth and social justice.

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