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## **ANALYSIS OF THE DYNAMICS OF THE CZECH PROPERTY MARKET: TRENDS IN PRICING, ENERGY EFFICIENCY AND OWNERSHIP**

### **Abstract:**

This paper examines the evolving landscape of the real estate market in the Czech Republic from 2018 to 2023, focusing on apartment pricing trends, the impact of socio-economic factors, apartment sizes and layouts, energy efficiency in residential buildings, and distinctions between ownership types. The study categorises Czech cities into different price tiers and discusses the implications of these categories for potential investors, homebuyers and policymakers. It also examines the standardisation of apartment layouts across cities, the gradual improvement in energy efficiency ratings, and the shift from co-operative and state-owned/community owned to private ownership. The results show a general upward trend in house prices, interrupted by a slight decline in 2023 due to higher mortgage rates triggered by the Czech National Bank's anti-inflationary measures. The expected future easing of these rates should stimulate the market's recovery. This comprehensive analysis helps to delineate key trends and offers a deeper understanding of the factors shaping the Czech Republic's real estate market, providing valuable insights for stakeholders in the sector.

### **Keywords:**

Real estate market, pricing trends, apartment layouts, energy efficiency, property ownership, socio-economic factors, market analysis, housing affordability, investment opportunities.

**JEL Classification:** O18, R31, R21

## Introduction

The real estate market is a key component of the national economy. In the Czech Republic, the real estate sector has undergone significant changes over the past decade, influenced by economic policies, demographic changes and evolving consumer preferences. This study aims to dissect these changes and provide a clear picture of the current state and trends of the Czech Republic's real estate market from 2018 to 2023.

The study examines multiple dimensions of the real estate market, including pricing trends, apartment layouts, building energy efficiency, and ownership patterns. Such analysis is essential because understanding these aspects can help stakeholders - from potential homeowners and investors to policymakers - make informed decisions. It is also crucial for anticipating future trends and developing strategies that are in line with both market expectations and regulatory frameworks.

The primary objective of this study is to provide an in-depth analysis of the real estate market in the Czech Republic, focusing on how various factors interact to influence market dynamics. This includes an analysis of the tiered pricing structure in different regions, the standardisation and differences in apartment layouts and sizes, improvements in the energy efficiency of residential buildings, and shifts in ownership types in recent years.

In addition, the study examines the impact of these market dynamics on the broader economic landscape and the living standards of the Czech population. By providing a detailed snapshot of the real estate sector's current status and potential trajectory, this research aims to contribute to a nuanced understanding of the complex factors at play in one of the most important sectors of the Czech economy.

## 1 Methodology

The article uses input data from EVAL software, an advanced tool designed to collect, analyse and evaluate property price data from Czech online property listings. Developed by one of the authors of this paper, EVAL has been in operation since 2007 and has significantly facilitated the aggregation of real estate data in the Czech Republic for academic and governmental use.

EVAL works through an automatic system with periodic data collection, which requires high-speed internet, Windows 10 or later, sufficient storage space, a high-performance CPU and at least 32 GB of RAM. It consists of several modules that handle different aspects of data processing, from collecting links to extracting and evaluating detailed property information.

The software EVAL is capable of detailed temporal and spatial analysis of property prices for all Czech municipalities and provides a comprehensive database with over 300,000 records in the first half of 2023 alone. EVAL plays a crucial role in the real estate sector, improving policy making and economic analysis. Its outputs are available for academic and research purposes, although the software itself is not publicly available.

## 2 Literature Review

Holcman's (2021) study examines the correlation between real estate and stock markets in the Czech Republic during the coronavirus crisis, highlighting the impact of government policies and

economic indicators such as mortgage rates and unemployment on the house price index and stock market indices. The research sheds light on their interconnectedness during crises and discusses long-term strategies for economic resilience.

Holcman and Kozel (2020) discuss the importance of thorough financial planning and cost assessment when buying urban apartments, such as those in Prague. They stress that potential buyers should consider ongoing operating costs beyond the purchase price in order to make informed decisions. Their approach promotes transparency and efficiency in property transactions to avoid market distortions and support economic sustainability in property investment.

Pojar et al. (2022) highlight the importance of life cycle cost analysis for immovable cultural heritage, emphasising its impact on long-term economic outcomes and the valuation of works. This methodology helps to preserve the historical and cultural value of structures while maintaining their market viability. As the demand for residential and commercial space in historic buildings increases in the Czech Republic, these findings will be crucial in influencing housing prices and availability.

Macek (2023) explores how Building Information Modelling (BIM) is improving the facilities management tendering process, particularly for projects requiring detailed management and long-term maintenance strategies. Effective integration of BIM improves transparency and efficiency, leading to accurate cost estimates and optimised project lifecycles. These advances are significant for the Czech property market, as they affect the cost and quality of residential construction, which in turn affects the affordability and availability of housing.

In their insightful research, Kato and Takizawa delve into the influence of walkability on real estate prices and its subsequent effect on population trends in the Osaka metropolitan area, particularly underlining its significance in business centre and sprawl clusters. Their study utilizes structural equation modelling to connect the dots between the walkability index, real estate prices, and the future population change ratio. This approach offers a nuanced understanding of how urban planning focused on walkability could sustain or even enhance population levels in specific residential clusters amidst Japan's broader demographic challenges of population decline and aging (Kato, H. & Takizawa, A., 2021).

In the study conducted by Ozhegov and Ozhegova, a novel approach is introduced to real estate pricing that extends beyond traditional geographic space considerations and delves into the 'characteristic space' of properties. This dual-space methodology enriches the hedonic price model by incorporating both the physical closeness and attribute similarities of properties, which significantly improves the accuracy of real estate appraisal. Their research, focused on the market in Perm, Russia, demonstrates that both geographic proximity and similarity in property characteristics are crucial in influencing real estate prices, providing substantial implications for the construction of automated valuation models and deepening understanding of price competition dynamics (Ozhegov, E.M. & Ozhegova, A., 2022).

In their study, Nguyen and Do delve into understanding the factors that influence the perception of selling prices for luxury apartments in Hanoi. Utilizing robust statistical methods, including Cronbach's Alpha for reliability testing and multiple regression analysis, the research identifies critical determinants such as the physical characteristics of apartments, their location and surrounding areas, the quality of services provided by management, and demographic factors.

This comprehensive analysis helps in forming strategies that could enhance customer satisfaction regarding the pricing of luxury apartments, ultimately aiding in the market development of high-end residential properties in Hanoi (Nguyen, H.C. & Do, D.T., 2020).

A 2017 study by Heralova highlights the role of life cycle costing (LCC) in improving the effectiveness of feasibility studies for construction projects, particularly in the public sector. By incorporating LCC, the aim is to optimise costs and ensure the economic viability of projects over their lifetime. This approach is becoming increasingly important in the Czech Republic for public tender decisions and has a profound impact on the real estate market by influencing the cost, sustainability and long-term affordability of housing projects.

Ondrej Venhoda (2022) investigates the impact of macroprudential policy instruments, in particular the debt service to income (DSTI) and debt to income (DTI) ratios, on the Czech mortgage market landscape in the context of rising interest rates. His research assesses how these financial measures affect mortgage affordability and accessibility for potential buyers, highlighting their influence in moderating individual borrowing capacity, property demand and price dynamics in the housing sector during the economic uncertainty of 2022.

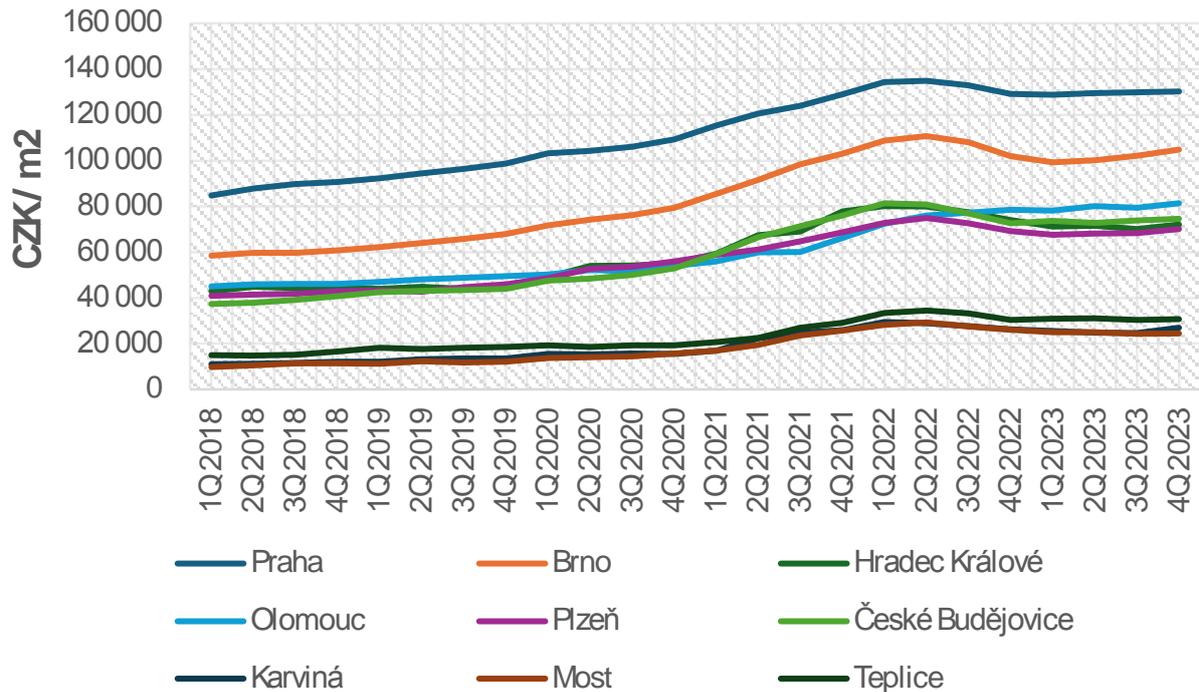
Jiri Rotschedl (2022) examines the impact of intertemporal discounting on real estate investment decisions across different income, savings and debt groups in the Czech Republic. Using a survey of 599 participants, the study explores preferences for immediate versus delayed financial rewards. The results indicate a significant relationship between financial patience and economic conditions - such as income level, savings presence and debt burden - that are crucial for making sound real estate investments. The results show that higher income individuals with savings are more likely to delay gratification and are better positioned in the property market. This suggests that property investors should consider the socio-economic profile of regions to gauge market potential. Rotschedl's research also points to the need for targeted financial education programmes to improve understanding of the benefits and risks of property investment in economically diverse environments.

Srivastava and Řežábek (2022) analyse the evolving dynamics of payment systems and their long-term impact on economic growth in the Czech Republic, focusing on the adoption of digital payments from 2015 to 2020. Using econometric models, including linear and multiple regression analyses, their research examines the relationship between cashless payment systems and economic indicators. The results indicate a moderate but tangible impact of digital payments on the economy, limited by current data limitations. The study suggests that overcoming these limitations could reveal more significant economic impacts. The adoption of digital payment platforms could streamline economic transactions and potentially improve property transactions by simplifying processes, reducing costs and increasing volumes. This shift towards robust digital payment systems could significantly boost activity in the Czech real estate market, suggesting an important area for future research at the intersection of technological innovation and real estate economics.

### 3 Results and Discussion

#### 3.1 Pricing Trends for Apartments for Sale

Figure 1 illustrates the evolution of supply-side pricing trends for apartments for sale in various cities in the Czech Republic from 2018 to 2023, segmented by quarterly intervals. A comprehensive analysis shows that Czech cities can be broadly categorised into three distinct pricing tiers, based on residential property values.



**Figure 1 Quarterly Trends in Apartment Prices Across Czech Cities: 2018-2023**

Source: Software EVAL, 2024.

At the top of the price spectrum is the capital city of Prague, which consistently has the highest property prices. Brno follows closely behind Prague with similarly high price levels, placing both cities in a price tier clearly distinct from the rest of the country.

A second tier includes cities in the middle price range. These cities include most of the major cities in the Czech Republic. Despite their significant urban status, these cities have more affordable property prices than Prague and Brno, making them attractive to a wider range of buyers.

Finally, the third category includes cities located in regions besieged by socio-economic challenges. In these areas, property prices are significantly lower than the national average. Such discrepancies can be attributed to a variety of factors, including lower local employment rates, economic stagnation and limited access to services, all of which contribute to reduced property desirability and value.

Taken together, these categories not only reflect the diverse economic landscapes of these cities, but also help to identify trends that potential investors and homebuyers may find critical to making informed decisions in a dynamic property market. This segmentation also provides a clearer understanding of regional disparities in property prices within the Czech Republic, highlighting the influence of both economic health and infrastructure development on property values.

The data show that housing affordability is lowest in Prague, Brno and their surrounding municipalities. While these regions offer lucrative employment opportunities with high salaries, exorbitant house prices put home ownership out of reach for much of the middle class, including those in managerial positions. This discrepancy highlights a pervasive problem where high-income levels are offset by relatively high living costs, effectively excluding a significant proportion of the workforce from investing in property in these areas.

Paradoxically, regions of the Czech Republic plagued by fewer and lower quality job opportunities have greater access to owner-occupied housing. This is largely due to the significantly lower property prices in these areas, which make it possible for individuals and families to purchase homes despite the economic disadvantages. This stark contrast highlights the delicate balance between job quality and housing affordability, presenting a peculiar scenario in which less economically prosperous regions may offer better conditions for home ownership, albeit at the potential cost of career progression and income stability.

This dichotomy raises critical concerns about regional economic policies and their impact on property markets, suggesting the need for targeted policies that could bridge the gap between high-income areas with low affordability and lower-income areas with high housing accessibility.

The analysis of trends in cities in the Czech Republic from 2018 to 2023 shows a generally upward trend in house prices. However, a notable exception occurs in 2023, when a slight decline is observed. This decline is mainly due to the significant increase in mortgage interest rates triggered by the Czech National Bank's anti-inflation strategy. The central bank raised the discount rate significantly in response to escalating inflation rates in order to stabilise the economy and achieve its core inflation target of 2%.

This inflation target was successfully achieved by March 2024, leading to expectations that the Czech National Bank would begin a period of interest rate cuts. As a result, mortgage rates are expected to fall. As a result, the real estate market is likely to revive, leading to an expected increase in house prices. This shift offers potential opportunities for investors and homeowners alike, suggesting a period of growth and recovery in the real estate sector across the Czech Republic.

### **3.2 Analysis of Apartment for Sale by Size and Layout**

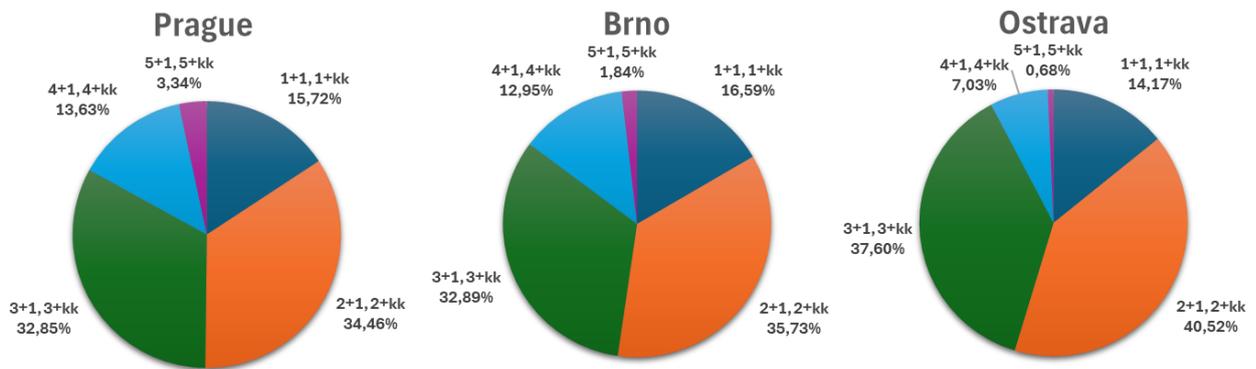
The structure of offers of flats for sale in different cities in the Czech Republic was examined. The analysis focused on apartment sizes ranging from one-room to five-room (1+kk to 5+1). The abbreviation 'kk' refers to a kitchenette within a room, while '+1' indicates a kitchen as a separate room within the apartment. Larger apartments were excluded from this particular study.

It was found that there are only minimal differences in the layout of apartments between cities in the Czech Republic. Similarly, apartment layouts were found to be comparable in both small and large cities. It is important to note that this study did not include detached houses, where significant differences between urban and rural areas would probably have been observed.

This observed structure of apartment supply is strongly influenced by the building practices of the socialist era, when there was a preference for building larger dwellings to support family living.

This approach was in line with the family policy promoted at the time. At present, this trend has shifted, as developers now focus mainly on building smaller dwellings to cater for the increasing number of single-person households due to changing living preferences. This situation is not favourable for young people wishing to start a family, as smaller dwellings may not meet their space requirements.

This research provides insights into the uniformity of housing supply in different urban contexts across the country, which could have implications for property marketing strategies and urban planning.

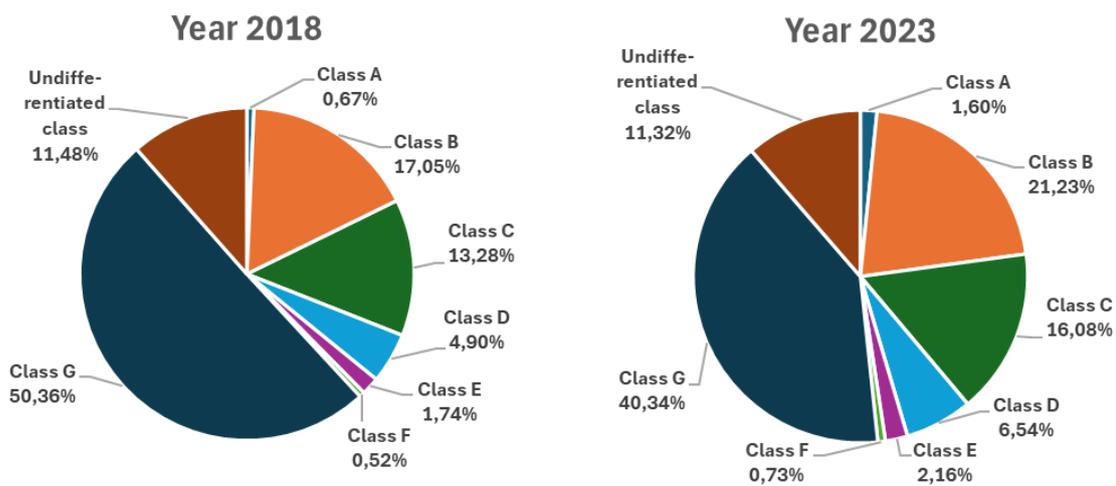


**Figure 2 Analysis of Apartments for Sale by Size and Layout Across Czech Cities: 2018-2023**

Source: Software EVAL, 2024.

### 3.3 Evolution of Energy Efficiency Ratings in Residential Buildings Marketed for Sale

Figure 3 examines the assessment of the energy efficiency structures of residential buildings offered for sale, looking at the changes that occurred between 2018 and 2023. The energy efficiency of a building, especially for existing structures, is characterised by the amount of energy actually consumed. This consumption mainly includes heating, hot water, cooling, air conditioning or ventilation and lighting. The energy efficiency rating of a building is determined by the calculated specific energy consumption, measured in kWh/(m<sup>2</sup>.year).



### Figure 3 Evolution of Energy Efficiency Ratings in Residential Buildings Marketed for Sale (2018-2023)

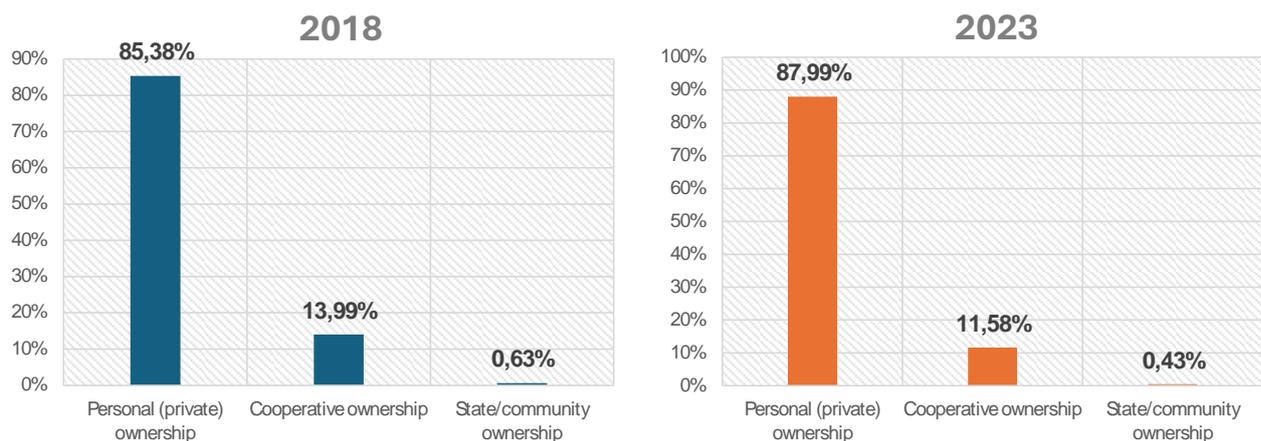
Source: Software EVAL, 2024.

A positive finding of the study is the gradual improvement in the energy efficiency of buildings. The pie charts clearly show a slight increase in the percentage of dwellings offered for sale in the higher energy classes A and B. However, this national increase remains modest. This is mainly due to the fact that the construction of new residential buildings in the Czech Republic is not fast enough to meet the needs of society. A significant decrease (-10%) was observed in the availability of dwellings in the worst energy efficiency category, class G.

In addition, the pie chart includes a category labelled 'Undifferentiated class'. This category includes dwellings for which the energy efficiency class has not been specified, despite legislation requiring the disclosure of energy classes for all listed dwellings. It can be assumed that the majority of these are likely to fall into the worst energy class, G.

#### 3.4 Ownership Distribution of Apartments Marketed for Sale

Figure 4 shows the distribution of dwellings offered for sale by type of ownership in the Czech Republic. The country mainly recognises two basic forms of ownership: Personal (private) ownership and cooperative ownership. In addition, there is a subset of personal ownership, namely state/community ownership.



### Figure 4 Ownership Distribution of Apartments in the Czech Republic Marketed for Sale (2018-2023)

Source: Software EVAL, 2024.

**Personal (private) ownership** of an apartment in the Czech Republic means that an individual or legal entity owns a specific apartment in a building, which is legally separate from ownership of other parts of the building, such as common areas (e.g. stairwells, corridors, and facades). Ownership of a flat is included in the land register and is defined by an entry in the title deed.

The owner of the apartment has the right to use the apartment, to use the common parts of the building, to rent the apartment, to sell it or otherwise legally dispose of it, provided that he or she complies with the laws and the statutes of the unit owners' association (HOA), if any. The HOA manages the common areas of the building, such as roofs, elevators, and garden areas, and

each unit owner is required to pay fees for the management and maintenance of these common areas.

In addition, there are certain legal and financial obligations associated with personal ownership of an apartment, including payment of property taxes, utility bills, and contributions to building repairs and maintenance. Thus, personal ownership provides a large degree of autonomy, but also requires responsibility for interaction and compliance within the apartment building.

**Cooperative ownership** of a flat in the Czech Republic means that an individual becomes a member of a housing cooperative that owns the building or buildings. A member of a cooperative acquires the right to use a particular apartment by purchasing a cooperative share but does not directly own the unit. This right is enshrined in the contract for the use of the apartment and the member is responsible for paying monthly fees that cover the costs of management, maintenance and any loans from the cooperative. The management of the entire property is in the hands of the co-op, which looks after the common areas and decides on major changes, with each member having the right to vote.

Advantages of this type of ownership include lower initial costs compared to personal ownership and the possibility of participation in the management of the house. Conversely, disadvantages may include more limited control over the property and the complexity of transferring the right to use the apartment. Co-operative ownership may be suitable for people who prefer a community approach to housing and for those who want to maintain a lower initial investment in their home.

**State/community ownership** in the Czech Republic is owned by the state or municipalities, not by private individuals. This form of ownership allows the state or municipality to provide housing at reasonable rents, thereby promoting housing affordability for a broader segment of the population. Apartments are usually rented out to citizens under conditions set by the public administration, which also maintains and manages the properties. State or municipal ownership means that profit is not the main objective, but rather the provision of stable and affordable housing.

Figure 4 illustrates the evolving landscape of property ownership in the Czech Republic. Over the years, there has been an increase in personal (private) ownership, accompanied by a decline in the other two categories: cooperative ownership and state/community ownership. This shift can be attributed to the gradual dissolution of building co-operatives, whose properties are transferred into private hands. Cooperative ownership, once very popular in the socialist era, has become less attractive in today's individualistic society, although it continues to exist, mainly because these properties are occupied by older and more conservative people. These residents are often resistant to change, even though a move to private ownership could lead to more efficient management and operation of their properties. In addition, the market value of privately owned housing is generally higher than that of co-owned housing, but the older generation is often reluctant to accept this perspective.

At the same time, there has been a decline in state/municipal ownership, as governments and municipalities dispose of their property assets for a number of reasons. First and foremost, they need capital for other investments and are increasingly unwilling to manage the substantial housing stock entrusted to them. In addition, they often lack the expertise to manage such

properties efficiently. Together, these factors are driving the trend towards privatisation, suggesting a broader shift away from traditional forms of property ownership towards more dynamic and economically viable models. This change in ownership structure is not only redefining property management in the Czech Republic, but also reflecting wider socio-economic changes in the country.

#### **4 Conclusion**

This study has provided a comprehensive analysis of the property market in the Czech Republic, outlining trends in apartment pricing, layout preferences, energy efficiency improvements and ownership distribution from 2018 to 2023. The findings reveal a distinctly tiered pricing structure across the region, with high-end markets such as Prague and Brno contrasting sharply with economically challenged areas offering more accessible housing. A nuanced understanding of these pricing tiers is crucial for potential investors and policymakers seeking to navigate the complex landscape of the Czech property market.

In addition, the analysis highlights a relatively uniform distribution of dwelling sizes and layouts across different urban areas, reflecting historical construction practices and recent shifts towards housing suitable for smaller households. This trend has significant implications for demographic targeting in property marketing and urban development strategies.

In addition, the study highlights a gradual but positive shift towards higher energy efficiency in residential property marketed in the Czech Republic. Although the increase in the proportion of dwellings in the highest energy classes (A and B) is modest, it signals a progressive compliance with sustainability standards, driven by both regulatory frameworks and consumer demand.

Ownership patterns indicate a significant move towards privatisation, with a notable decline in co-operative and state/community ownership. This transition reflects wider socio-economic shifts towards individual ownership, underpinned by the dissolution of co-operatives and the divestment of state-owned property.

Taken together, these trends point to a dynamic property sector poised to adapt and grow, particularly through the implementation of targeted policies to address regional disparities and promote housing affordability. With mortgage rates expected to decline following the Czech National Bank's economic interventions, the market may experience a revival, offering opportunities for investment and home ownership amid evolving economic conditions.

Overall, the findings of this study provide a valuable basis for informed decision-making in the Czech property market, offering a deep insight into the factors shaping its current state and future potential. This work not only contributes to the academic debate, but also serves as an important tool for stakeholders ranging from policy makers to private investors.

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