The impact of population aging on the development of real estate prices in the Czech Republic

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Abstract

Rising housing prices and population ageing currently represent key factors influencing the development of real estate markets in many countries, including the Czech Republic. The aim of this thesis was to evaluate the development of housing prices in the Czech Republic between 2015 and 2024 and to determine whether population ageing influenced the rise in apartment and house prices. To achieve this goal, time series analysis, correlation analysis, a two-sample paired t-test, and regression analysis were used to quantify the development of both variables and their mutual relationship. The research showed a significant increase in housing prices during the examined period and confirmed a steady rise in the average age of the population. A strong and statistically significant relationship between the two variables was identified, and the regression models demonstrated that demographic ageing significantly contributed to predicting housing price trends. The thesis thus provides valuable insights into the dynamics of the Czech housing market and highlights the importance of demographic factors in assessing its long-term sustainability. The research is limited by its reliance on aggregated annual data and by the omission of additional variables that may affect housing prices. These limitations create opportunities for future studies focusing on regional analyses, data models, or an expanded set of predictors.

Keywords: Population ageing; Housing prices; Real estate market; Time series analysis; Correlation analysis; Regression analysis; Czech Republic

Introduction

There is an interconnection between population aging, housing prices, and household consumption behavior. Population aging may affect the level of consumption not only directly, but also indirectly through changes in the housing market, where rising real estate prices influence the structure of household expenditures (Wang & Suna, 2024). As noted by Chien et al. (2025), in many countries over recent decades, income and wealth inequality have increased alongside rising housing prices. Growing real estate prices lead to higher income from property ownership, which further deepens wealth disparities among different social groups. At the macroeconomic level, Cuestas et al. (2023) point out that price imbalances in the real estate market may amplify economic cycles in the short term, while long-term overvaluation of real estate prices slows economic growth. These conclusions confirm the need for stabilization measures to mitigate housing market fluctuations.

At the same time, increased housing costs represent a serious social problem that affects the very functioning of families. Marçal et al. (2025) found that the financial burden associated with housing costs is a stress factor for families, which may disrupt a healthy family environment and lead to tension or aggressive behavior of parents toward children. These findings indicate that high housing prices are not only an economic issue, but also a psychological and social one, highlighting the importance of monitoring housing market developments in connection with broader demographic changes.

Housing unaffordability represents a growing problem not only for young households but also for the aging population, especially in cities with a high level of urbanization. Alidoust (2024) points out that the lack of affordable housing increasingly affects older individuals, who often face financial insecurity and limited long-term housing options. The study shows that alternative forms of housing, such as house-sitting or home sharing, may represent a more affordable option for some seniors, increasing their financial stability and enabling them to better cover other life needs. At the same time, however, the uncertainty associated with the temporary nature of these housing forms may lead to feelings of vulnerability and negatively affect the psychological well-being of older persons.

Population aging also brings the need to adapt housing to the changing needs of older individuals. A recent analysis of data from the American Housing Survey showed that housing modifications in households with persons aged 65 and over are significantly influenced by demographic and housing factors, such as income, housing type, or household size. The study confirms that housing adequacy and affordability play a key role in the quality of life of seniors and may influence their decisions regarding relocation or housing adjustments. These findings emphasize the growing importance of housing issues in the context of an aging population, which is becoming a key socio-economic topic not only in the United States but also in Europe (Green et al., 2022).

The aim of this thesis is to evaluate the development of housing prices in the Czech Republic and to determine whether the process of population aging may influence the growth of apartment and family house prices. Based on the identified data, relationships between

demographic development (especially population aging) and real estate price development in the Czech Republic in the period 2015–2024 will be examined.

In relation to this objective, the following research questions are formulated:

RQ1: How did house and apartment prices develop between 2015 and 2024 in the Czech Republic?

The first research question examines time series of house and apartment prices in the Czech Republic. The results provide findings on how real estate prices increased (or decreased) and serve as a basis for the following research questions.

RQ2: How did the average age of the population in the Czech Republic develop?

The second research question illustrates the development of the average age of the population in the Czech Republic. The output consists of data presented graphically and in tables. These data form an important basis for the third research question.

RQ3: Is there a relationship between population aging and real estate price growth in the Czech Republic?

This research question is central to this thesis. It further examines whether there is a relationship between the variables: population aging and real estate price growth.

H0: Population aging influences real estate prices.

H1: Population aging has no effect on real estate prices.

Literary research

Wang & Suna (2024) used time series analysis for the period 2001–2018, where housing prices served as a mediating variable. The results showed that population aging directly increases the level of household consumption and indirectly increases it through housing prices. The study proposes solutions such as optimizing the population structure, improving the housing system, and advancing the development of industries focused on older adults. Sun et al. (2024) found that aging has differentiated effects on housing prices and that these differences stem from aspects of aging and housing. In terms of aging, a decline in birth rates and an increase in survival rates may have opposite effects on housing prices. In terms of housing, the prices of both components—land and structure—respond to declining birth rates and rising survival rates to different degrees. Therefore, the impact of population aging on housing prices does not have a clear long-term trajectory. In the short term, the results suggest that aging may cause a structural break in price dynamics. Heo (2022) uses correlation analysis to measure the old-age dependency rate, redefining it by incorporating the actual retirement age and the estimated remaining life expectancy. In this way, the study examines the differentiated impacts of population aging on the market value of real estate. The results of the correlation analysis

indicate that an increase in the dependency rate measured by remaining life expectancy is associated with a decline in real housing prices, while the traditionally defined old-age dependency rate does not explain this relationship. Furthermore, distinguishing between the groups of the "young-old" and the "old-old" reveals that the negative effect on housing prices is primarily associated with an increasing share of very old individuals. Overall, the conclusions suggest that demographic aging does not necessarily lead to a long-term decline in real estate prices, as the negative effect is particularly evident among the oldest segment of the population with limited life expectancy.

Cheung (2025) focuses on the relationship between population aging and real estate price development in rural areas and examines why prices there are rising faster than in cities despite population aging. Time series analysis within a cointegration framework was used to capture both long-term and short-term relationships between demographic factors and housing market dynamics. The results show that short-term deviations of rural real estate prices from cointegration relationships are a significant predictor of future price and migration developments over a one- to four-year horizon, whereas this relationship does not appear in urban areas. The findings suggest that the key to understanding housing market dynamics in an aging society lies in rural areas. The authors also emphasize that accounting for these long-term cointegration relationships may be important for supporting rural development. Wealth inequalities based on residential property ownership have long been more pronounced in the Czech Republic than income inequalities. Property values have increased significantly, and households with higher incomes and family ownership backgrounds have a greater advantage in acquiring housing and achieve higher unrealized gains from price growth. The findings highlight barriers to entry into homeownership and the role of real estate as a security instrument in old age (Sunega & Lux, 2018).

Cho & Lee (2024) point out that many older studies demonstrate that aging has a negative impact on real estate price growth, and in 2012 this claim was repeatedly confirmed. Motivated by this research, they examined the relationship between population aging and real estate prices with a focus on the effect of credit availability. The analysis uses unbalanced panel data from 1981–2020 for 59 countries. They find that the negative impact of aging on housing prices is not confirmed when credit availability is taken into account. However, this effect may be offset by greater access to financing. The results suggest that population aging may affect real estate prices differently depending on credit conditions in a given market and that the expected downward demographic pressure has not yet materialized. The study by Akgündüz et al. (2023) shows that a reduction in mortgage interest rates has a direct and measurable impact on mortgage demand and housing prices. Specifically, a one-percentage-point decrease in the mortgage rate led to an increase in mortgage volumes and simultaneously to higher house prices.

Lee et al. (2023) used hierarchical linear modeling of growth (HLM) to analyze the development of repeated house sale prices between 2012 and 2020. This approach allowed for simultaneous tracking of variable effects over time and across property groups. The results showed significant differences in average repeated sale prices (ICC = 91.65%), indicating high

variability among individual houses. It was further confirmed that time of sale and its quadratic term significantly influence price development, while the effect of house age is modified by floor area, type, and location. The study demonstrates that a combination of temporal and spatial factors can explain a large part of the variability in real estate market dynamics and that HLM represents an appropriate tool for analyzing repeated transactions over time. The study by Kalaviska & Hlavacek (2022) analyzes determinants of apartment prices in Czech regions between 2000 and 2019 and shows that their development is mainly influenced by wages, unemployment rates, and migration. The significance of these effects differs according to regional income levels, with land prices playing a greater role in wealthier regions, while labor market factors and population age structure are key in poorer regions. Disequilibrium price shocks are, according to the results, corrected within approximately two years.

Küçükyazici & Bregger (2024) examine the social aspects of housing and the development of Turkish residential architecture from the perspective of interaction between the individual, society, and space. The study uses content analysis of articles from the journal Arkitekt followed by spatial analysis of selected residential construction examples. The results show that shared spaces in residential areas play a key role in shaping relationships between private and public life and contribute to the development of socially sustainable housing forms. Green et al. (2024) address persistent housing discrimination in the state of Mississippi between 1998 and 2018. The study uses content analysis of newspaper reports on discrimination cases to identify sociodemographic characteristics of victims and sanctions imposed on perpetrators. The results show that racial housing discrimination persists decades after the adoption of the Fair Housing Act and significantly affects the lives of those impacted. Rysavy & Dobisova (2023) examine the communication of housing issues in municipal newspapers of three Czech cities with different shares of municipal housing. The study combines quantitative and qualitative content analysis of articles to assess how housing is politically framed in the period before municipal elections. Quantitative results did not confirm the expected favoritism toward the ruling coalition, while the qualitative part showed that communication about housing is strongly influenced by the editorial policy of municipal periodicals. New city administrations may thus expand space for presenting their own housing policy through changes in communication strategy or use selective coverage of non-conflict topics to improve their public image.

Promphakping et al. (2021) examined how the importance of life goals and subjective well-being of residents in northeastern Thailand changed over a ten-year period (2006–2016) and how these changes relate to housing and population age. Using paired t-tests, the authors compared respondents' attitudes in both periods and identified significant changes, particularly in external life goals, including owning a large house, being debt-free, and having a clean environment—values closely linked to housing and living standards. The results showed that older respondents placed greater emphasis on housing security and stability, while younger respondents focused more on economic self-sufficiency. Multiple linear regression further revealed that in 2006 the importance of life goals (including housing) significantly predicted subjective well-being, whereas in 2016 this relationship weakened and changed direction. The study suggests that population aging alters the perception of the role of housing and material

security in overall life satisfaction. The study by Melnychenko et al. (2022) analyzes the impact of inflation on the real estate market in Poland between 2009 and 2021 using panel data and time series models. The results show that housing prices are mainly influenced by inflation, interest rates, construction activity, and mortgage volumes, with forecasts achieving low error rates and identifying a structural break in the price trend around 2017. The findings provide practical insight for consumer decision-making and analysis of real estate market dynamics.

Andersson et al. (2021) identified changes in housing accessibility for people with Parkinson's disease over three years. Using a paired t-test and questionnaire survey, they compared the severity of environmental barriers identified by the Housing Enabler instrument. The results showed that although the main types of barriers did not change, their intensity evolved over time—some (e.g., absence of grab bars or access via stairs) decreased due to modifications, while others (e.g., difficult access to waste disposal areas) increased. The study emphasizes that age and health status significantly affect the need for housing adaptations and that continuous accessibility assessment is essential for sustainable and safe living of seniors. On the other hand, Douglas et al. (2022) evaluated the impact of relocating persons with disabilities and complex needs into newly built individual apartments in a community setting. Using a paired t-test and Wilcoxon test, they compared outcomes before and after relocation. In the paired test, the formula $t = \bar{d} / (sd / \sqrt{n})$ was used to determine statistical dependence. The study demonstrated significant improvement in well-being and community integration, a trend toward improved health, and reduced support needs. The authors conclude that well-designed, accessible, and technologically adapted housing can significantly improve quality of life and independence for people with disabilities, thereby confirming the importance of appropriate housing adaptations and environments for vulnerable population groups.

Data collection will be conducted using content analysis. The data will be processed using correlation analysis with a paired test and regression. Time series analysis will also be used and presented graphically.

Data and methods

This thesis works with secondary data collected through content analysis. The content analysis was carried out by reviewing publicly available sources, specifically kurzy.cz and the Czech Statistical Office (CZSO). First, data on real estate prices (specifically houses and apartments separately) were collected from the website kurzy.cz for the period from 31 December 2014 to 31 December 2024 in order to answer RQ1. The same procedure was used to obtain data for RQ2, with the only difference being the data source. Data for the subsequent research question were obtained from the CZSO. From the above-mentioned data, tables were created that clearly present the development of real estate prices and the average age of the population, and graphs were subsequently generated from these tables. Both tables and graphs were processed in Microsoft Excel and represent specific time series for the given period.

Subsequently, statistical analyses were conducted exclusively in Microsoft Excel to answer RQ3 and to evaluate whether H0 or H1 is valid. First, a correlation analysis was performed using Pearson's correlation coefficient, separately examining the relationship

between average age and apartment prices, and between average age and house prices. The following formula was used for the calculation (Hindls et al., 2016):

$$r = [\ \Sigma\ (xi - \bar{x})(yi - \bar{y})\ ] / \sqrt{[\ \Sigma\ (xi - \bar{x})^2\ ]} \cdot \sqrt{[\ \Sigma\ (yi - \bar{y})^2\ ]}$$

The numerator of the fraction represents the covariance, and the denominator represents the product of the standard deviations of both variables.

x_i= individual values of the first variable

y_i= individual values of the second variable

$\bar{x}$= arithmetic mean of X values

$\bar{y}$= arithmetic mean of Y values

n= number of observations

The resulting value of r ranges within the interval:

+1 = perfect positive correlation

0 = no linear correlation

−1 = perfect negative correlation

To verify whether the development of the average age and real estate prices over time systematically corresponds, a two-sample paired t-test for the mean was used. The test compared differences between paired values for individual years and determined whether these differences were statistically significant. The following formula was used for the paired two-sample t-test (Hindls et al., 2016):

$$t = \bar{d} / (sd / \sqrt{n})$$

kde:

$\bar{d} = (1/n) \cdot \Sigma(xi - yi)$

$sd = \sqrt{[\ \Sigma(di - \bar{d})^2 / (n - 1)\ ]}$

$di = xi - yi$

n = number of paired observations

The final step was a simple linear regression analysis, the purpose of which was to quantify the effect of the average age of the population on the development of real estate prices and to determine what proportion of price variability can be explained by demographic development. The regression was performed using the Regression tool and provided key indicators such as the regression coefficient, model constant, p-value, and coefficient of determination R^2. The combination of these methods made it possible to comprehensively

assess the development of both variables and evaluate their mutual relationship. This analysis uses the following three formulas (Hindls et al., 2016):

$$1. \quad Y = a + bX + \varepsilon$$

$$2. \quad b = Cov(X, Y) / Var(X)$$

$$3. \quad a = \bar{y} - b \cdot \bar{x}$$

Where:

Y = dependent variable (real estate price)

X = independent variable (average age of the population)

a = constant

b = regression coefficient (slope of the line)

ε = random error term of the model

All these analyses aim, among other things, to evaluate the following hypotheses:

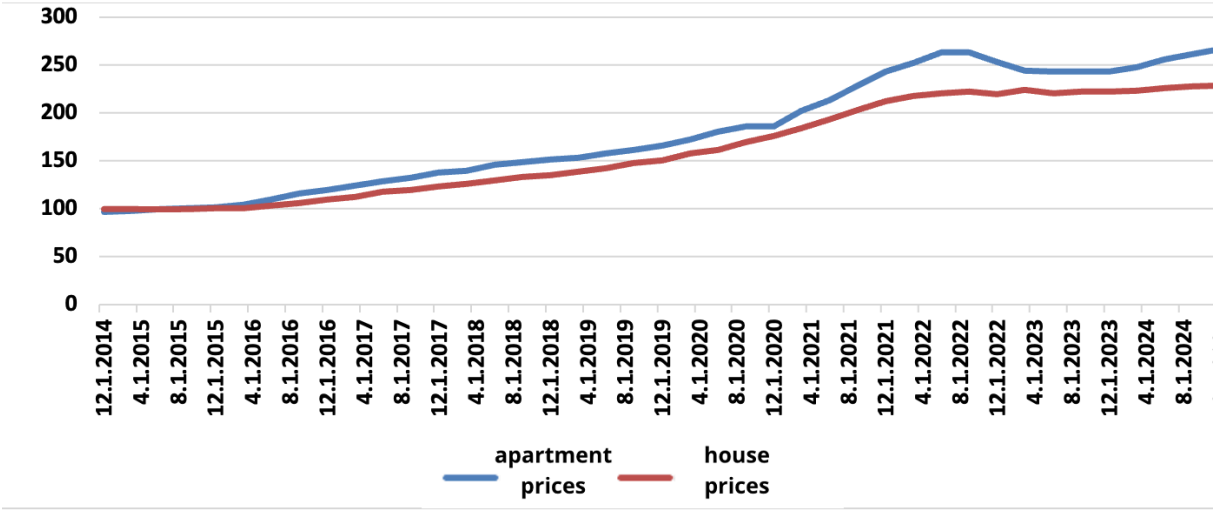
H_0: *Population aging has an effect on real estate prices.*

H_1: *Population aging has no effect on real estate prices.*

Results

Graph 1 illustrates the development of apartment and single-family house prices in the Czech Republic over the period 31 December 2014 – 31 December 2024. The data are based on the time series presented in Appendix 1 (Development of Real Estate Prices), compiled according to kurzy.cz.The values of the price indices for both apartments and houses show an upward trend over time, reaching their highest levels at the end of the observed period, indicating that real estate prices have been increasing. The graph enables a comparison of both property categories at individual points in time. At the beginning of the observed period, as of 31 December 2014, the apartment price index stood at 97.2, while the house price index was 99.7. In the following years, both series exhibit a predominantly upward trend. A more significant increase is observed particularly from 2019 onward. The highest values are recorded at the end of the period: as of 31 December 2024, the apartment price index reaches 266.5 and the house price index 228.6, representing nearly a 2.5-fold increase compared to the beginning of the observed period.

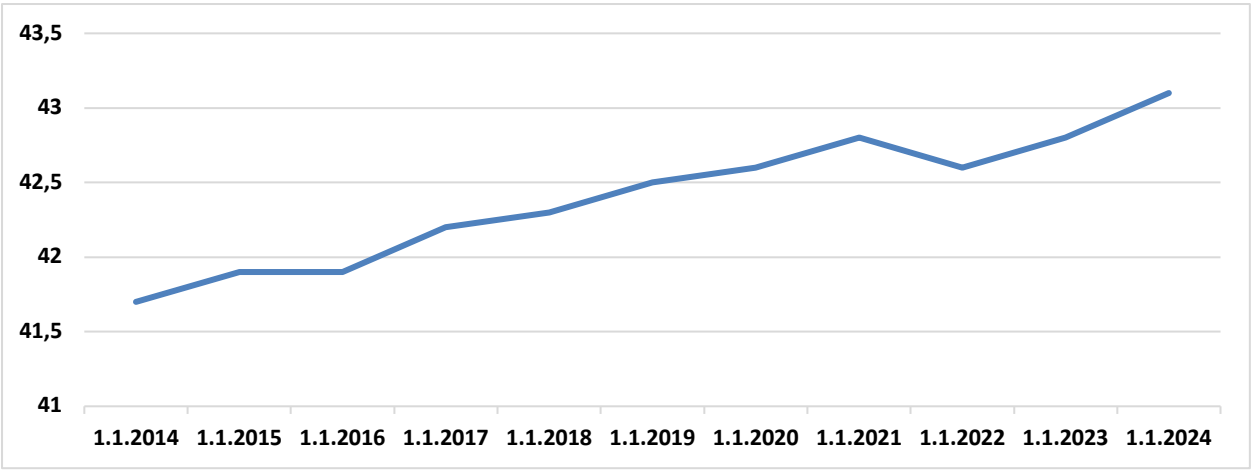
Figure 1 - Development of house and apartment prices over time.



Source: Own processing based on data from kurzy.cz (see Appendix 1).

V Grafu 2 je uveden vývoj průměrného věku obyvatel České republiky od 31.12.2014 do 31.12.2024. Data vycházejí z časové řady ČSÚ. Průměrný věk populace v průběhu sledovaného období roste, což odpovídá faktu, že na začátku sledovaného období činil průměrný věk obyvatel 41,7 roku a v dalších letech dochází k postupnému zvyšování tohoto ukazatele. Nejvyšší hodnota je zaznamenána na konci roku 2024, kdy průměrný věk dosahuje 43,1 roku. Průběh grafu zachycuje souvislý růst průměrného věku v jednotlivých letech sledovaného období.

Figure 2 - Average age of the population over time



Source: Own processing based on data from CZSO.cz.

Table 1 presents paired values of the average age of the population and apartment and house prices for individual years over the period 2014–2024. The table allows for a direct comparison of all three monitored indicators within a unified time framework.

At the beginning of the observed period, the average age of the population was 41.7 years, the apartment price index reached 97.2, and the house price index 99.7. At the end of the

observed period, as of 31 December 2024, the average age is 43.1 years, the apartment price index 266.5, and the house price index 228.6.

The table provides a summary overview of the input data used in subsequent calculations of correlation, paired t-tests, and regression models.

Table 1 - Comparison of real estate prices and age

period	average age	apartment prices	house prices
31.12.2014	41,7	**97,2**	**99,7**
31.12.2015	41,9	**101,70**	**100,60**
31.12.2016	41,9	**120,10**	**109,60**
31.12.2017	42,2	**137,40**	**123,00**
31.12.2018	42,3	**151,30**	**135,30**
31.12.2019	42,5	**166,40**	**150,80**
31.12.2020	42,6	**186,20**	**176,20**
31.12.2021	42,8	**243,10**	**212,30**
31.12.2022	42,6	**252,90**	**219,40**
31.12.2023	42,8	**243,40**	**222,50**
31.12.2024	43,1	**266,50**	**228,60**

Source: Own processing.

The results of the correlation analysis are presented in Table 2 and Table 3. Table 2 contains the correlation coefficient between the average age of the population and the prices of single-family houses. The value of Pearson's correlation coefficient is r = 0.942080534. The table also shows the correlations within the individual variables and represents a correlation matrix.

Table 3 presents the correlation between the average age and apartment prices. The identified value of Pearson's correlation coefficient is r = 0.94535808. In correlation analysis, if the value of r approaches 1, the correlation is considered very strong and statistical significance exists.

Tabulka 2 – Correlation of house prices

	House prices	***Average age***
House prices	1	
Average age	0,942080534	1

Source: Own processing.

Tabulka 3 – Correlation of apartment prices

	Apartment price	***Average age***
Apartment price	1	
Average age	0,945358077	1

Source: Own processing.

The results of the two-sample paired t-test for the pair average age of the population and apartment prices are presented in Table 4. The two-tailed p-value (P(T≤t) (2)) equals 3.00405 × 10^{-5}, which is significantly lower than the significance level of 0.05. The absolute value of the t-statistic (t Stat) is –7.177805, which exceeds the critical t-value of 2.228138852 (t crit (1)).These values confirm that the difference between the compared time series is not random and that the test result is statistically significant. The table also includes the means of both variables, variances, number of observations, and critical t-values, which are not essential for the research.

Table 4 – Paired t-test for apartment prices

	Average age of the population	***Apartment price***
Mean	42,4	178,7454545
Variance	0,194	4021,710727
Observations	11	11
Pearson correlation	0,945358077	
Hypothesized mean difference	0	
df	10	
t Stat	-7,177800512	
P(T<=t) (1)	1,50203E-05	
t critical (1)	1,812461123	
P(T<=t) (2)	3,00405E-05	
t critical (2)	2,228138852	

Source: Own processing.

The results of the paired t-test for the pair average age of the population and single-family house prices are presented in Table 5. The two-tailed p-value (P(T≤t) (2)) in this case is 8.31264 × 10^{-6}, which is again significantly lower than the significance level of 0.05. The absolute value of the t-statistic reaches –7.689558, exceeding the critical t-value (2.228138852). The result therefore confirms a statistically significant difference between the two compared time series.

The table also includes the means, variances, t-statistics, p-values, and critical t-values, which are not essential for this research.

Table 5 – Paired t-test for house prices.

	Average age of the population	***House prices***
Mean	42,4	161,6363636
Variance	0,194	2687,718545
Observations	11	11
Pearson correlation	0,942080534	
Hypothesized mean difference	0	
df	10	
t Stat	-7,689558009	
P(T<=t) (1)	8,31264E-06	
t critical (1)	1,812461123	
P(T<=t) (2)	1,66253E-05	
t critical (2)	2,228138852	

Source: Own processing.

The results of the regression analysis are presented in Table 6, which summarizes the key indicators for both pairs of variables – average age of the population and apartment prices, as well as average age of the population and single-family house prices. For the model working with apartment prices, the coefficient of determination reaches $R^2 = 0.893701894$, indicating a high degree of explanation of the variability of the dependent variable. The regression coefficient has a value of b = 0.006565863 and the model constant is 41.22638191. The two-tailed p-value of the regression coefficient (1.1271×10^{-5}) and the p-value of the F-statistic (1.12707×10^{-5}) are significantly lower than the chosen significance level of 0.05, confirming the statistical significance of both the model and the individual coefficient. The model also shows a high F-statistic value (75.66754823), demonstrating its overall robustness. The table also includes the number of observations and the standard error of the model.

For the model analyzing the relationship between the average age of the population and single-family house prices, the coefficient of determination reaches $R^2 = 0.887515733$, again indicating a strong ability of the model to explain the variability of the observed variable. The regression coefficient b equals 0.008003814 and the model constant is 41.10629257. The p-value of the coefficient (1.4579×10^{-5}) and the p-value of the F-statistic (1.45785×10^{-5}) are well below the 0.05 threshold, confirming the statistical significance of the model. The F-statistic reaches 71.01118944, corresponding to a high explanatory power of the model. The table further includes the number of observations and related regression indicators.

Table 6 – Regression analysis

	Regression of house prices and age	**Regression of apartment prices and age**
Multiple R	0,94535808	0,942080534

R^2	0,893701894	0,887515733
Regression coefficient b	0,006565863	0,008003814
Constant a	41,22638191	41,10629257
p-value of coefficient	$1{,}1271\times10^{-5}$	$1{,}4579\times10^{-5}$
F-statistic	75,66754823	71,01118944
p-value of F	$1{,}1271\times10^{-5}$	$1{,}4579\times10^{-5}$
Number of observations	11	11

Source: Own processing.

All these results clearly confirm the null hypothesis (H0), which states that population aging has an effect on real estate prices. Conversely, H1 is rejected.

Discussion of results

RQ1: How did house and apartment prices develop between 2015 and 2024 in the Czech Republic?

Based on the conducted analysis, it can be stated that both apartment and single-family house prices in the Czech Republic increased significantly over the period from 31 December 2014 to 31 December 2024. At the end of 2014, the average apartment price index was 97.2 and rose to 266.50 by 2024, representing an increase of approximately 171%. A similar development was recorded for single-family house prices, which increased from 99.7 in 2015 to 228.60 in 2024, i.e., by roughly 129%.

The time series thus shows long-term and stable growth, with the most pronounced acceleration occurring between 2020 and 2022, when prices increased most dynamically. The data do not indicate any period of sustained price decline, only a short-term slowdown in growth in 2023.

The results of the analysis are consistent with some international studies that also describe rising real estate prices in connection with demographic changes or other socioeconomic factors. Wang & Suna (2024) identify that population aging may contribute to price growth through increased consumption and housing demand. This conclusion is partially consistent with my findings, which show long-term price growth during a period of demographic aging. Cheung (2025) describes a significant increase in prices particularly in rural areas, where aging and migration of the younger population may act as short-term catalysts for price growth. This phenomenon is consistent with the upward trend observed in my data.

On the other hand, some authors point out that real estate prices do not always grow linearly or uniformly. Sun et al. (2024) state that aging may have different effects on housing prices in the short and long term and may even cause temporary reversals in price dynamics. In this respect, my results differ, as the Czech data do not show any short-term downward reversal. Similarly, Heo (2022) describes situations in which certain demographic changes may lead to

a slowdown in growth or even a decline in prices. However, such an effect was not observed in the analyzed period of the Czech market, which represents a limitation of this thesis. Another limitation is the focus solely on the Czech Republic and not on any other region.

RQ2: How did the average age of the population develop in the Czech Republic?

Based on the conducted analysis, it can be stated that the average age of the population in the Czech Republic gradually increased during the period 2015–2024. In 2015, the average age was 41.8 years and increased to 43.1 years by 2024. The total increase therefore amounts to approximately 1.3 years over the observed decade.

The time series shows stable and continuous growth without significant fluctuations or declines. The highest absolute increases are evident in the first part of the observed period, when the average age increased year-on-year by 0.2–0.3 years, while in the years 2022–2024 the growth rate slightly slowed. Overall, the results indicate that demographic aging in the Czech Republic is a long-term and stable process.

This development is fully consistent with the academic literature, which confirms a general trend of population aging across developed countries. Wang & Suna (2024) state that population aging is a persistent phenomenon that has a direct impact on household consumption behavior, including housing. Similarly, Sun et al. (2024) emphasize that aging is a continuous process whose long-term character may influence real estate market dynamics. These conclusions correspond to the results obtained for the Czech Republic, where a continuous increase in average age was also observed.

Some studies, however, emphasize that demographic aging may not proceed at a uniform pace or have a uniform impact across regions or population segments. Heo (2022), for example, distinguishes between the "young-old" and the "old-old," noting that the share of very old individuals grows faster and may have specific economic impacts. This conclusion cannot be directly confirmed or refuted based on the available aggregated data from the Czech Statistical Office, but it does not contradict the observed gradual aging trend in the Czech Republic.

RQ3: Is there a relationship between population aging and real estate price growth in the Czech Republic?

Based on the conducted correlation analysis, paired t-tests, and regression analysis, it can be concluded that there is a statistically significant relationship between the average age of the population and real estate prices in the Czech Republic.

The correlation between average age and apartment prices reached 0.945, indicating a very strong positive relationship. A similar result was found for single-family house prices, where the correlation coefficient was 0.942. The presence of a statistically significant relationship was also confirmed by the two-sample paired t-tests, whose p-values for both pairs of variables were significantly lower than the 0.05 significance level. Thus, hypothesis H1 was

rejected and hypothesis H0 was accepted, meaning that population aging has an effect on real estate prices.

The regression analysis further showed that the average age can significantly predict real estate price development — the model explained 89.37% of the variability in apartment prices ($R^2 = 0.8937$) and 88.75% of the variability in house prices ($R^2 = 0.8875$). The p-values of the regression coefficients and F-statistics were significantly lower than 0.05 in both models, confirming the statistical significance of the relationship. Overall, the results of the selected methods demonstrate a strong and statistically significant positive relationship between the two observed phenomena, confirming that growth in the average age of the population may be one of the factors contributing to rising real estate prices.

It can be concluded that the identified relationship is partially consistent with, but in some respects differs from, the conclusions of other authors. Wang & Suna (2024) state that population aging may directly and indirectly increase housing prices through household consumption behavior, which aligns with the findings of this study. Cheung (2025) also identifies mechanisms through which aging may contribute to price growth, particularly in regions with different migration dynamics. Thus, the results of this analysis correspond to those authors who confirm a positive relationship between population aging and rising real estate prices.

Conversely, some studies point to more complex or even opposite relationships. Sun et al. (2024) emphasize that aging may have different short-term and long-term effects, with the direction of impact differing depending on housing price components. Heo (2022) even suggests that an increase in the dependency rate measured by remaining life expectancy may be associated with a decline in real estate prices, which contrasts with the results obtained in this thesis. The difference may be explained by different definitions of aging, differing characteristics of foreign real estate markets, or differences in population structure. Cho & Lee (2024) emphasize the role of credit availability, which may weaken or even offset negative demographic pressures, and note that the effect of aging is not universal. These conclusions indicate that the results may vary across countries and periods, which naturally explains the differences between my analysis and some foreign studies.

Conclusion

The aim of this thesis was to evaluate the development of housing prices in the Czech Republic and to determine whether the process of population aging may influence the growth of apartment and single-family house prices. Based on the identified data, relationships between demographic development (especially population aging) and real estate price development in the Czech Republic over the period 2015–2024 were examined. This objective was achieved through time series analysis, correlation analysis, a two-sample paired t-test, and regression analysis.Using these methods, it was possible to precisely determine the development of both observed variables, quantify their mutual relationship, and assess its statistical significance. In doing so, the study also addressed the societal demand described in the introduction, which

stemmed from the growing importance of issues such as population aging, housing unaffordability, and real estate market dynamics. The results showed that both apartment and single-family house prices in the Czech Republic increased significantly over the observed decade.

The average apartment price rose from 97.2 in 2015 to 266.5 in 2024, representing an increase of approximately 174%, with the fastest growth recorded between 2020 and 2022. In the case of single-family houses, prices increased from 99.7 to 228.6, corresponding to a rise of 129%. This upward trend was evident throughout the entire period, with no phase of sustained decline, confirming long-term pressure on the Czech real estate market. At the same time, a stable increase in the average age of the population was confirmed, rising from 41.8 years in 2015 to 43.1 years in 2024. Although this represents an absolute change of only 1.3 years, the time series shows a consistent aging trend, with no decline or stagnation except for a slight slowdown in the final two years. This development confirms that demographic aging is a long-term structural phenomenon occurring in parallel with housing price growth.

The main outcome of the thesis was the evaluation of the relationship between these two phenomena. The correlation analysis revealed a very strong positive relationship between the average age of the population and real estate prices, with correlation coefficients exceeding 0.94 for both apartments and single-family houses. The paired t-tests subsequently confirmed the statistical significance of this relationship, as p-values in all cases were significantly lower than the 0.05 significance level, allowing the rejection of the hypothesis of no relationship between the variables.The regression analysis further demonstrated that the average age of the population significantly predicts the development of real estate prices, both for apartments and single-family houses. Coefficients of determination (R^2) exceeding 0.88 indicate that the vast majority of price variability was explainable by demographic development. These findings confirm that population aging was one of the factors associated with housing price growth in the Czech Republic during the analyzed period and that demographic indicators may represent a significant predictor of real estate market dynamics in the domestic context.

The research had several limitations. The analysis was based on aggregated annual data, which does not allow for capturing short-term fluctuations or regional differences, and only two variables were included in the model, although real estate prices are influenced by a broader range of factors such as interest rates, credit availability, and economic cycles. Moreover, available academic sources often did not contain quantitative data, which limited the possibility of direct comparison of results, and the thesis focused exclusively on the Czech Republic. Nevertheless, the contribution of the study lies in the quantitative evaluation of the relationship between population aging and real estate prices, which has so far been largely absent in domestic literature. The results may be useful for housing policy makers, the real estate sector, and the professional community, and they provide a foundation for further research incorporating more detailed data structures or a broader set of variables.

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Appendices

Appendix 1 – Development of Real Estate Prices from 31 December 2014 to 31 December 2024

Period	**Apartment Prices**	**House Prices**
31.12.2014	97,2	99,7
31.03.2015	98,00	99,80
30.06.2015	99,30	99,30
30.09.2015	101,00	99,90
31.12.2015	**101,70**	**100,60**
31.03.2016	104,30	100,30
30.06.2016	109,90	103,30
30.09.2016	115,60	105,70
31.12.2016	**120,10**	**109,60**
31.03.2017	124,10	112,80
30.06.2017	128,50	118,00
30.09.2017	132,40	120,10
31.12.2017	**137,40**	**123,00**
31.03.2018	139,30	126,30
30.06.2018	145,70	129,20
30.09.2018	148,90	133,00
31.12.2018	**151,30**	**135,30**
31.03.2019	153,40	139,00

30.06.2019	157,60	142,70
30.09.2019	161,70	148,20
31.12.2019	**166,40**	**150,80**
31.03.2020	172,60	157,70
30.06.2020	180,90	161,70
30.09.2020	185,70	169,40
31.12.2020	**186,20**	**176,20**
31.03.2021	201,80	184,00
30.06.2021	212,80	192,80
30.09.2021	228,70	203,40
31.12.2021	**243,10**	**212,30**
31.03.2022	252,20	218,00
30.06.2022	262,70	220,40
30.09.2022	263,00	222,20
31.12.2022	**252,90**	**219,40**
31.03.2023	243,60	223,70
30.06.2023	243,00	220,70
30.09.2023	242,70	222,30
31.12.2023	**243,40**	**222,50**
31.03.2024	247,30	222,90
30.06.2024	255,50	225,60
30.09.2024	261,30	227,20
31.12.2024	**266,50**	**228,60**

Source: Own processing based on data from kurzy.cz.

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