

**Czech University of Life Sciences Prague**

**Faculty of Economics and Management**

**Department of Economics**



**Diploma Thesis**

**Macroeconomic influences on housing prices in Prague,  
the Czech Republic**

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**Summary:**

This paper studies the determinants of housing prices in Prague, the Czech Republic. The main question addressed is, which of the supply and/or demand factors (housing prices, price of rents, supply of new housing stock, natural population growth, immigration, material input prices, building plot prices, inflow of foreign direct investment, GDP growth, interest rate on mortgages etc.) are the main determinants of prices of flats in Prague. The econometric model is estimated using the Ordinary Least Square method, where explained variable are indices of realized prices of flats in Prague and explanatory variables are above mentioned determinants of housing prices in Prague. The author concludes, that the macroeconomic determinants of residential property prices in Prague are changes in prices of building plots in Prague, economic activity rate in the Czech republic, average monthly gross wages in Prague, price to rent ratio in the CR, volume of long-term loans lent to households and interest rates of mortgages. Trend analysis shows, that further increase in indices of realized prices of flats in Prague is expected in next 2 quarters.

**Keywords:****Objectives and methodology:**

The objectives of this thesis are to find macroeconomic determinants of the residential real estate price in Prague and to forecast the development of housing prices for the next two quarters based on study of the trend function. The author also aims follow work of Hlavacek and Komarek, who first conducted a study of determinants of property prices in Prague and Czech regions using panel regression for period from 1998 to 2007 and compare the results. The determinants of residential property prices in the Czech republic are not object of many studies, even though the real estate sector is very important part of GDP and each year more than 1 billion of Czech crowns are lent to households for mortgages and other loans.

Methods of descriptive analysis, regression analysis and prognosis were used. Data collected were analysed in MS Excel and gretl statistical software. Data were analysed

using summary statistics, then correlation coefficients matrix was computed and data were adjusted accordingly to mitigate relationships with correlation coefficients equal and higher than 0.9. Following correlation matrix, OLS model was computed and the result was statistically tested (T-test, evaluation according to P-value, White's test for heteroscedasticity, LM test for autocorrelation, RESET test, test for normality of residual, Chow test for structural break at observation 2009:1) to decide which variables were statistically significant and accuracy of the model. In the end of the work, trend analysis which showed prognosis according to trend function for next 2 quarters was done.

### **Theoretical part:**

The first part of the theoretical part is dedicated to explanation of main terms in the real estate market and supply and demand. The second part describes the development of housing market in Prague, ownership structure, state regulation tools etc. Most important is the chapter Determinants of housing prices, in which supply and demand factors influencing housing prices are described. The outcomes of this chapter had key influence on selection of explanatory variables in the OLS model.

### **Practical part:**

In the third part, the author presents analysis of macroeconomic determinants of housing prices in Prague. The econometric model was estimated using the Ordinary Least Square method, where explained variable were indices of realized prices of flats in Prague and explanatory variables were determinants of housing prices in Prague. Data used are time series from period Q1 2008 – Q1 2016. The outcome of the model was, that the macroeconomic determinants of realized prices of flats in Prague for given period were changes in prices of building plots in Prague, economic activity rate in the Czech republic, average monthly gross wages in Prague, price to rent ratio in the CR, volume of long-term loans lent to households and interest rates of mortgages. Trend analysis shows, that further increase in indices of realized prices of flats in Prague is expected in next 2 quarters.

### **Conclusion:**

OLSM showed that the determinants of residential real estate prices in Prague are changes in prices of building plots in Prague, economic activity rate in the Czech republic, average monthly gross wages in Prague, price to rent ratio in the CR, volume of long-term loans lent to households and IR on flats. The analysed period (9 years quarterly observations) is still relatively short, so the results should be interpreted with caution. There is however conformity between results of Hlavacek and Komarek and results of this thesis. Both works came to conclusion that building plot prices and monthly rents are the determinants of property prices in Prague. The short-term prognosis for next 2 quarters (2Q and 3Q 2016) showed, that there might be a steep increase in the indices of realized prices of flats in Prague. The author however doesn't think that such a steep increase is possible. The price index in Q1 2016 was on level 103.6 (base is average of year 2010) and the proposed development should reach the level of 111 in the end of Q3 2016. Verification of the prognosis based on trend analysis is not possible at the time of finishing this thesis. However, there are some novelties, such as: (1) payer of tax on purchase of real estate (4% of invoice price) will be always the purchaser since 1<sup>st</sup> November 2016, (2) restriction on mortgages in value of 85% and more of the total invoice price. The restriction is prepared by the Czech National Bank and will apply since the 1st October 2016. These changes are expected to decrease accessibility of loan and reduce the market, which is now in boom thanks to record low interest rates.

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