The Historical Comparison of Housing Affordability in Czech Republic

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Abstract: *The Czech Republic is a country with the highest growth of real estate's prices in Europe. The paper is focused on the analysis of this long-term growth of real estate's prices and its influences to the availability of housing. There will be presented Czech historical data describing housing affordability as well. The housing affordability in Czech Republic will be compared using the basic indicators of housing affordability such as P/I ratio and P/R ratio. The aim of the paper is to find out (with the help of mentioned ratios), if the present price level of the Czech real estate market is overvalued or undervalued. To evaluate the results the sum of P/I and P/R ratios will be used. For that purpose in the article there will be presented the results of my long term research which one of the outputs the average wages and average prices of one flat family houses are. There will be presented the collected data from the year 1861 to 1943. The data were from daily newspapers taken.*

Key words: Housing price · P/I ratio · Housing Affordability · Overvaluation

JEL Classification: R30 · P50

1 Introduction

The paper focuses on analyse of housing affordability in Czech Republic from historical point of view. Besides of this the present situation of housing affordability in selected European countries will be presented. Many countries in the world have been experiencing with boom in house prices for a couple of years. The European countries are not an exception. The house price is one of the highly monitored indicator. The house price analysis has become very common in connection with crisis in 2008. From the time up to now the economists make many of researches to explore potential risk of house price increase. Now in 2018 again many of papers are analysing the potential real estate bubble. Under condition of rising prices of homes and rising amount of mortgages there are some worries of Czech National Bank, that there can be some real estate bubble expected.

The aim of the paper is: 1.to analyze housin affordability in selected European countries,

2. to compare and analyze historical real estete market data comming from Czech region (Czech part of Czechoslovakia, Czech part of Habsburk Empire)

3. to indicate present overvaluation or undervaluation of flats due the price level of European countries and due the historical price level of Czech.

To identify the overvaluation or undervaluation of house prices is not so easy. There are many of different view and factors how to identify the housing affordability. Under the condition of Czech Republic there are several authors who analyse the situation of house prices in Czech Republic. J Cadil (2009) tries to analyse the real estate bubble in Czech Republic using the R/I ratio and regression analysis. He states the price bubble is the expectation of price acceleration of particular asset, which results in higher demand and such increase in demand is pushing prices up. The self – reinforcing mechanism is working until bubble bursts.

There are some other authors who try to analyse the Czech real estate market from the point of real estate bubble. Hlavacek, Komarek (2010) define real estate bubble as residual of housing price growth that cannot be explained by the aforementioned "standard" factors. The main factors for increase of real estate prices in national economy they define as:

1. a process of catching-up with the usual level in developed economies combined with macroeconomic convergence,

2. a correction in relative prices,

3. the development of the Czech housing market and

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4. the constantly expanding mortgage market in the Czech Republic.

They analyse the property prices using three alternative approaches – an approach based on simple indicators of housing price sustainability (price-to-income and rental returns) and two simple econometric models (a time series model and panel regression).

Zemcik and Mikhed (2009) in their paper investigate the situation of decreasing of U.S. real estate market after the beginning of the financial crisis. Thea use the regression analysis to explain the main fluctuations.

Many of sources use for identification of price real estate bubble the simple housing market indicators. There are mainly compared the historical levels of indicators with the current level of indicators. The most typical indicator using by accredited institutions (national and international financial institutions such as Goldman Sachs, Czech National Bank etc.) is P/I ratio. The comparison of P/I can indicate potential real estate bubble.

The main simple real estate indicators can be divided into the four separate groups:

1. housing affordability measures

2. housing debt measures

3. housing ownership and rent indicators

4. housing price indexes

The aim of the paper is to find out, if the prices are overvalued or undervalued using by selected simple real estate indicators.

2 Methods

The analysis of housing affordability will be made by using main real estate indicators, which is P/I ratio (average price of flat to year personal income ratio), P/R ratio (average price of flat to year rent ratio). As additional in some cases to get more precise results, the other indicators will be used. They are: P/GDP ratio (average price of flat to GDP per capita ratio), P/W ratio (average price of flat to average wage ratio) and M/I ratio (year mortgage payment to year personal income ratio).

To analyse the Czech real estate market with the price levels of other European countries the data from several sources was taken. It has been already found, that different data sources refer to different numbers for the same time. The reason consist in different methodology and likely in time delays as well. The annual net wages for the latest period 2018 were presented as different by the Eurostat and by www.numbeo.com for instance. Since the www.numbeo.cz determines the average monthly net salary after tax as an average of data contributed by the contributors, Eurostat presents the official data received from the national statistical agencies. To make it more objective, if necessary to count the comparative indicators there has been used the average of these numbers.

The GDP per capita was taken from the World Bank's statistical survey. Such variables were important to determine P/GDP ratio comparative indicator. In some cases it is more objective to use P/GDP ratio (even some sources presents only the P/GDP ratio in their housing statistics instead of maybe less informative P/I ratio) instead of P/I ratio. While net Income in P/I ratio indicator captures more of the employees' situation, the GDP per capita in P/GDP ratio may capture the economic situation of traders and other entities whose income does not depend on dependent activity (as in case of employee). To make it more objective, if necessary to count the comparative indicators there has been used the averages of P/GDP ratio and P/I ratio.

The levels of prices and rents were from www.numbeo.com taken. Other sources of prices were found but due to incompleteness or insufficient form (Eurostat presents only indexed prices) I decided for the www.numbeo.com source. The method used to determine housing prices and rents was derived from the average prices entered into the system by individual contributors.

To analyse the Czech real estate market in comparison with its historical level of basic indicatore values the data from historical peridical newspapers were taken. As the main source of information were Lidove Noviny and Narodni Listy used. There were picked up and recorded the prices presented in ads. The Lidove Noviny were published daily from year 1893 – 1945 and the ads information described mostly the situation in Moravian regions. The Narodni Listy newspapers were published during the years 1861 – 1941 and the ads information described mostly the situation in Bohemia regions. To get more homogenues output describing the situation in Czech regions as whole, from the recorded database, the average values were calculated.

There were especially inspected the bid wages to calculate averge level of emploee income in each year. As the second step tehre were analysed the ads describing the real estate market. Which is the bid price of family houses for sale and the bid price of rents. The rents were mostly in their month price presented, so it was necessary to calculate it on the year level.

To calculate undervaluation or overvation the next mathematical formula and steps will be use:

$$PI = \frac{P}{I}$$ (1)

where:

P……   average price of flat

I……..   average value of personal income

The price to income ratio (see the formula 1) represents the basic affordability measure of housing. It is generally the ratio of average house prices to average personal disposable income, expressed as a percentage or as years of income. This ratio, applied to individuals, is a basic component of mortgage lending decisions.

$$PR = \frac{P}{R}$$ (2)

where:

R………   average year rent

The price to rent ratio express the inverted value of capitalization. It says how many year rents will cover the current price of flat. As lower the P/R ratio is as more convenient to buy the flat. Trulia established the following thresholds for the P/R ratio: less than 15 indicates it is much better to buy than rent; from 15 to 20 indicates it is typically better to rent than buy; and 20 or more indicates it is much better to rent than buy.

The overvaluation or undervaluation will be calculated by the mathematical formula 3:

$$OUa = \frac{\frac{PIa+PRa}{1} - \frac{\sum(PIn+PRn)}{n}}{\frac{\sum(PIn+PRn)}{n}} \; x \; 100$$ (3)

where:

OU….   overvaluation or undervaluation

a…….   the given European country (given year in case of historical comparison)

n……..   number of selected countries (number of years in case of historical comparison)

The separate values of above ratios (described in formula (1) and (2) with their different information values will be added up and implemented into the global indicator OU (see formula (3)).

3 Research results

The results valid for the particular countries are in percentage shown and valid for centrum areas and outside of centrum areas as well as average value of values for centrum and outside of centrum areas. The rank is assigned to the countries according to their average value. The results are in next Table 1 shown.

Table 1 Overvaluation and undervaluation of flat prices in %, July 2018

Country	Overvaluation, undervaluation in % city center areas	Overvaluation, undervaluation in % outside of center	Average	
			value	rank
Albania	22,75	3,23	12,99	6,00
Austria	13,06	18,96	16,01	5,00
Belgium	-21,53	-10,03	-15,78	26,00
Bulgaria	-16,28	-12,59	-14,44	24,00
Croatia	18,32	25,42	21,87	4,00
Cyprus	-35,57	-30,30	-32,94	30,00
Czech Republic	**31,75**	**32,55**	**32,15**	**2,00**

Denmark	-12,89	-10,13	-11,51	21,00
Estonia	-2,60	0,84	-0,88	15,00
Finland	2,66	-5,18	-1,26	16,00
France	39,99	33,01	36,50	1,00
Germany	11,88	13,04	12,46	7,00
Greece	-6,24	6,72	0,24	14,00
Hungary	10,75	0,56	5,66	12,00
Ireland	-29,34	-31,82	-30,58	29,00
Italy	12,50	2,88	7,69	11,00
Latvia	-6,87	-10,44	-8,65	20,00
Lithuania	7,60	10,73	9,16	9,00
Luxembourg	7,69	15,13	11,41	8,00
Malta	-16,87	-18,91	-17,89	28,00
Netherlands	-16,77	-17,18	-16,97	27,00
Poland	-9,24	-6,68	-7,96	19,00
Portugal	-6,62	-16,87	-11,75	22,00
Romania	-6,70	0,87	-2,91	17,00
Slovakia	-16,22	-7,92	-12,07	23,00
Slovenia	3,38	13,22	8,30	10,00
Spain	-12,04	-17,54	-14,79	25,00
Sweden	29,71	24,37	27,04	3,00
Ukraine	0,09	-9,68	-4,79	18,00
United Kingdom	3,61	3,74	3,68	13,00

Source: Own calculations, www.numbeo.com, Eurostat 2018, World Bank 2018, www.trzniceny.cz

The overvaluation and undervaluation is calculated due to the deviation of average values counted from the given parameters. The methodology of calculations is presented in previous chapter.

The results from Table 1 show the overvaluation of flats in Czech Republic. The price overvaluation of flats is 32.15% above the average value for the file of presented countries. The rank assigned to the country is 2. The Czech Republic is the country with one of the most overvalued flats in Europe.

The most overvalued flats in Europe you can find in France with the rank 1, where the level of overvaluation exceeds 36%. The rank number 3 belongs to the Sweden with its overvaluation of 27.04%. The data show undervaluation of flats in Poland. The average undervaluation of flats is 7.96%, which is the 19th position from inspected countries.

On the other hand the most undervalued prices of flats are Cyprus (-32.94%, rank 30), Ireland (-30.58%, rank 29) and Malta (-17.89, rank 28). It is assumed the increase of price flats in the future in these countries.

From the Table 1 it is seen even the difference between overvaluation/undervaluation of flat prices in city centrum areas and overvaluation/undervaluation of flat prices in outside city areas. The difference between overvaluation of city centrum areas and outside of centrum areas is -0,80% in case of Czech Republic. It imply there is nearly no difference between cities and rural areas. The demand covers all the areas equally.

The highest difference is indicated for Albania (+19.52%). While the overvaluation in cities there is indicated at the level of 22.75%, the situation in outside of central areas indicates the overvaluation only +3.23%. The next country with the high difference is Belgium (-11.49%). Undervaluation of central city areas is equal to -21.53% which is more than in outside of city areas (-10.03%). The third position belongs to the Portugal (10.25%). Its city centrum areas are undervalued by -6.62% while the outside city centrum areas are undervalued by -16.87%.

3.1 Historical data comparison

The partial results of collecting data from Lidove noviny and Narodni listy are in next three figures (figure 1, figure 2, figure 3) shown. All the prices are in their average nominal values shown. Each figure presents the basic variables which are necessary to constract the housing affordability indicators (P/I ratio and P/R ratio).

The first figure 1 presents the average levels of wages in Bohemia and Moravia within the years 1861 – 1943. In the figure 1 separately the averages of specialized wages, the averages of labour wages and averages of both specialized and labour wages are shown. The data show the stable level of nominal values within the most of Habsburg empire period. The increase of nominal wages starts during the First World War with its peaks in pre crisis (great depression) period in 1928 and 1929.

Figure 1 Average level of wages in Czech countries within the years 1861 - 1943
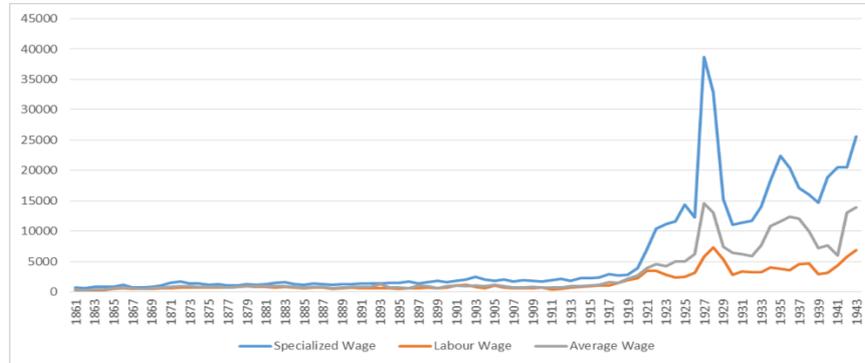
Source: Own processing, Lidove noviny, Narodni listy

The figure 2 presents the average asking price per one flat family house within the years 1861 – 1943. The data show the stable level of nominal values within the most of Habsburg empire period. The increase of average nominal values of houses starts during the First World War with its peak in pre crisis (great depression) period in 1929. The main reason of the drop of prices in the years 1924 and 1925 is likely the emigration wave of Czech population to the USA. From 1925 the strict immigration rules were implemented in USA. Because of the deadline for the liberal rules in 1925 ended, many of owners who decided to emmigrate tried to sell their houses as quicker as possible. It influenced the asking prices of course.

**Figure 2** Average asking price per one flat family house within the years 1861 - 1943
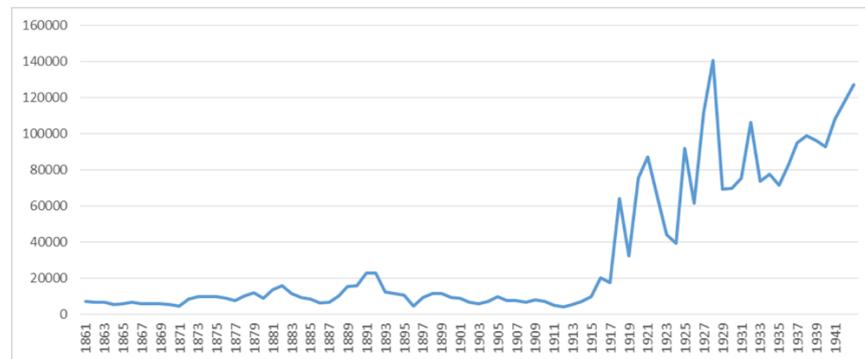
Source: Own processing, Lidove noviny, Narodni listy

The next figure 3 presents the average asking price per year rent for average flat. The data show the gradual increase of nominal values within the most of Habsburg empire period. The steep geometrical increase of average nominal values of rents starts during the First World War with its peak in pre crisis (great depression) period in 1929. The period of years 1914 – 1927 is well known as period with the most strict rent regulation rules implemented in Czechoslovak legal system. The strict rules were gradualy released untill the year 1938.

Figure 3 Average asking price per year rent for average flat within the years 1861 - 1943
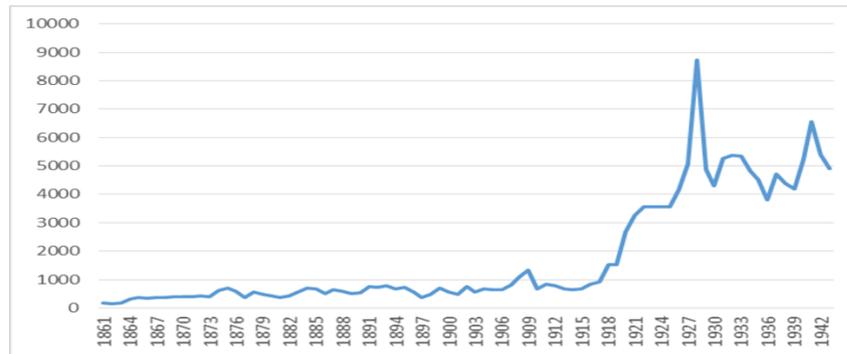
Source: Own processing, Lidove noviny, Narodni listy

The next figure 4 presents the comparison of housing affordability level in 2018 and within the period of 1861 – 1943. The data were calculated from previous values of wages, family houses and rents. The red line presents the current value of affordability indicator (P/I ratio + P/R ratio), while the blue line presents the value of housing affordability indicator in shown years.

Figure 4 Comparison of housing affordability level in 2018 and from 1861 – 1943 in Czech countries
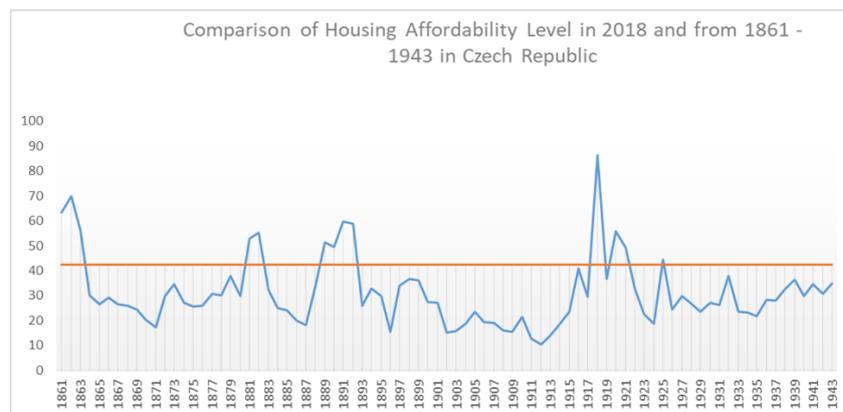
Source: Own processing, Lidove noviny, Narodni listy

The level of red line seems to be above the average value calculated from the values of the years 1861 – 1943. It is clear the calculations of housing affordability indicates worse acces in 2018 in comparison to the searched period. From the point of presented indicators (P/I ratio + P/R ratio) the housing affordability is comparable with First World War period (1914 – 1918). To calculate the overvaluation or undervaluation using the mathematical formulas 1, 2, 3 which are presented in chapter 2 the current price of flats indicates overvaluation +36,11%.

4 Conclusions

The analyzed data show very low level of housing affordability in Czech Republic. The prices of flats using the housing affordability indicators show overvaluation. The overvaluation is indicated by comparison with the average level of housing affordability indicators calculated from the values of indicators of 30 European countries. The level of overvaluation in Czech Republic is 32,15%.

The second - historical approach consist in comparison of historical levels of housing affordability indicators. Its average value is calculated from the values stated in daily press ads Lidove noviny and Narodni listy. Even by using this historical approach the overvaluation is indicated. The historical approach indicates overvaluation + 36,11%.

The main likely reasons of flat overvaluation are low mortgage interests in previous period. Due the actions of Czech central bank the interest rates have increased in recent months. The second likely reason seems to be increase of wages. The wages have increased since last year due the rapid increase of Czech GDP. High demand for labour increases the nominal wages and safty of those who are interested to buy a real estate. The third likely reason seems to be the impact of Czech central bank monetary policy. It held the advantageous exchange rate for foreign investors for a years. As the result of such step it probably influenced the increase of flat prices. The main effect of price rises was the massive use of shared housing. For incomming tourist that was the most convenient and economical way how to spend their money in Czech republic.

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