Determinants of House Prices and Housing Affordability Dynamics in the Czech Republic

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Abstract
The property market in Central European Region countries share a number of common features among which privatization, restitution of property, massive regulation or underdeveloped financial market all of which contributed on persisting property market imbalances and continuous dynamic changes. These changes have recently been significantly exacerbated by the presence of the Covid-19 pandemic, the war in Ukraine and a significant increase in energy prices (heating of apartments and houses, production of building materials, etc.). It is currently difficult for investors and people looking for their own housing to predict the future development of housing prices and housing affordability. This article analyses the housing market trends in this region taking the example of the Czech Republic using unique primary statistical data. It offers a deeper insight into the trends present on this market, identifies significant determinants of housing prices and evaluates changes in housing affordability. Our research reveals why the property market trends may contribute to opening inequality scissors and thus economic stability. This research is based on primary statistical data mined by EVAL software which allows to gather information about the development of the real estate market from real estate advertising.

Keywords: real estate; investing; availability of housing; inflation; mortgage loans; energy prices;

JEL Classification: E31; R21; R31;

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1. Introduction

2021 and 2022 brought an increase of property prices all over Europe. Many investors redirected their funds to what is considered safe heaven in turbulent times: commodities and, above all, properties. On the demand side, unprecedented pressures have been formed due to Covid-19 restrictions. New experience with distance teaching (Skornova and Safrankova, 2022), home office preference and new needs of out of office working (Jasova and Kaderabkova, 2022), lock downs creating new job opportunities on the one hand and sectors contraction on the other hand (Cerna and Hejdukova, 2022), sudden deficit of tourists (Cermakova *et al.*, 2022) as well as fiscal easing (Zubikova and Smolak, 2022) have all together created an unprecedented and regionally very diversified shifts in demand for properties for sale and for rent. Demand was pushed up and down at the same time, and

the real estate market was very volatile because of it. The Central and Eastern European countries have experienced this trend to a much larger extent due to long lasting property market imbalance in this region (Hromada and Cermakova, 2021). The property market in the CEE countries has long been influenced by intensive regulation and massive privatization which influenced substantially the original distribution of properties. The functioning of property market has also been limited by slowly developing financial market keeping households' financial limitations an obstacle for faster development of property market in CEE (Venhoda, 2022). On the other hand, owning housing is by generations considered life security to be aimed (Rotschedl, 2022). This target is being lost by a large share of young generation which is the group most hit by the current trend of housing unaffordability (Cermakova *et al.*, 2022; Hromada, 2021) combined with energy unaffordability (Stankuniene, 2021) and new forms of poverty (Łuczak and Kalinowski, 2022).

As effect of the same historical circumstances the property markets across all CEE economies follow similar trends and imbalances. This paper presents a key study using primary data mined from property selling server the Czech Republic. The study is aimed on identifying property prices trends and its determinants with implications on changes in housing affordability. After a brief description of the current state of the real estate market in the Czech Republic we evaluate changes in housing affordability and its consequences. This study uses data from the Czech property market; however, its conclusions reflect the trends prevailing on this market in the CEE region.

2. Literature Review

The real estate market in the Czech Republic has been in deep market imbalance for many years. There are many different pricing factors in the market that move real estate supply and demand up and down at the same time. In addition, the Covid-19 pandemic and the war in Ukraine came into play, making the situation even more confusing and difficult to predict in the future. The real estate market in the Czech Republic was fundamentally affected by the war, as it had to urgently provide accommodation for more than 400,000 refugees. Given that the Czech Republic has 10.7 million inhabitants, this is a major influence. The Czech Republic was one of the largest recipients of refugees in terms of its population.

In the last two years, there has been a significant increase in the prices of all types of real estate. In fact, the speed of increase in property prices during the last 2 years or so has surprised even the most optimistic analysts (Kaderabkova and Jasova, 2021). The peaking prices were driven by several factors among which concerns of savers about the rise in inflation, as real estate replaces standard financial and bank products. Property is understood best store of value in times of high inflation (Cecrdlova, 2021), volatile markets (Andelinović *et al.*, 2020) and insufficient pension system (Kliber and Rutkowska-Ziarko, 2021) as properties attract investors under uncertainty at stock markets (Altinbas, 2020) also for diversification purposes (Sliskovic and Sekur, 2020) and prudence (Sestanj-Perić and Keglević Kozjak, 2020). In this regard the decision to buy a property is made independently on potential profit from its rental. This is an important feature for understanding the property price formation as property price is less dependent on its yield than financial assets (Just *et al.*, 2019). Property prices will increase all time investors believe in their future continuous increase. Boosting demand for properties was driven also by concerns about rising interest rates on mortgage loans (Zubikova and Smolak, 2022),

lengthy building permits (Schneiderova Heralova, 2017), significant increases in construction work and materials prices (Vitasek *et al.*, 2021), and last, but not least, shortage of construction workers (Kaderabkova and Jasova, 2020). High property prices make housing unaffordable forcing people to move in cheaper regions and commute to work (Lukavec and Kaderabkova, 2017) affecting regional development and migration (Kurekova and Hejdukova, 2021) and burdening public budgets with need of providing social housing (Borgersen, 2019). Although people in the Czech Republic are not traditionally used to move for work, there is a significant population movement in certain districts. Specifically, over the last twenty years, there has been a significant increase in population in the immediate districts near Prague (Kurekova and Hejdukova, 2021). Specifically, the district of Prague-East has an increase in population of 95.2% and the district of Prague-West has an increase in population of 80.1% (Czech Statistical Office, 2022). This change places a heavy burden on public infrastructure and the environment and, also, affects the price level of real estate.

As the values of all variables mentioned have deviated substantially from the long run trend, it is interesting to see some numbers in more detail. The annual inflation rate as of March 2022 reached a very high value of 12.7% (Fincentrum Hypoindex, 2022a) and a further inflation growth is predicted mainly driven by the supply shock (Bednar *et al.*, 2022). The average mortgage rate was 4.62% as of March 2022 (Czech News Center, 2022), a significant increase over previous months. At the same time, however, it still means that it is possible to borrow at a negative real interest rate. This situation is therefore still very beneficial for borrowers. In terms of the volume of provided mortgage loans, the limit of CZK 400 billion was exceeded last year (Fincentrum Hypoindex, 2022b). In this context, it should be added that in 2016 the average mortgage amount was over CZK 2.1 million, in 2022 it is al-ready CZK 3.2 million (Cermakova *et al.*, 2022). For 2022 it is estimated, however, that 2021 new mortgage volume peak will not be outdone indicating a slight cooling down of the real estate market (Stavebni forum a.s., 2022).

The share of rental housing in the CEE economies is low compared to EU average. Also, in the Czech Republic (21.4%) this rate is significantly lower than is common in the developed countries of the European Union (Austria: 44.8%, Germany: 48.9%) (Stavebni forum a.s., 2022). Living in own apartment has become a strong social norm and criterion of success in the Czech Republic. However, as real estate becomes more expensive and the rules for providing mortgages become stricter, the Czech Republic will gradually approach Western Europe in this indicator as well. During 2021, approximately 7,500 new flats were sold in Prague (ZipRealty s.r.o., 2022). By the end of 2021, however, there was a gradual reduction in interest in acquiring an apartment. To meet the demand in Prague, it would be necessary to build between 10 and 15 thousand apartments a year. In reality, however, only between three and six thousand new flats a year have been completed in recent years.

3. Materials and methods

The presented data and graphs are based on our own statistical data obtained using EVAL software. The software is operated using the network of the Czech Technical University in Prague. The software was created in the Python programming language. EVAL software collects and evaluates real estate advertising from major real estate servers in the Czech Republic. Data collection has been carried out regularly over a period of one month since 2007. For the period 2007 to 2022, a continuous series of unique data was collected, which

has no parallel in the Czech Republic. These data make it possible to perform detailed analyses of the real estate market in the Czech Republic according to many different criteria. The software can process data analysis down to the details of a street anywhere in the Czech Republic, provided, of course, that there was a real advertisement on that street. This article deals with data for the period January 2017 to June 2022.

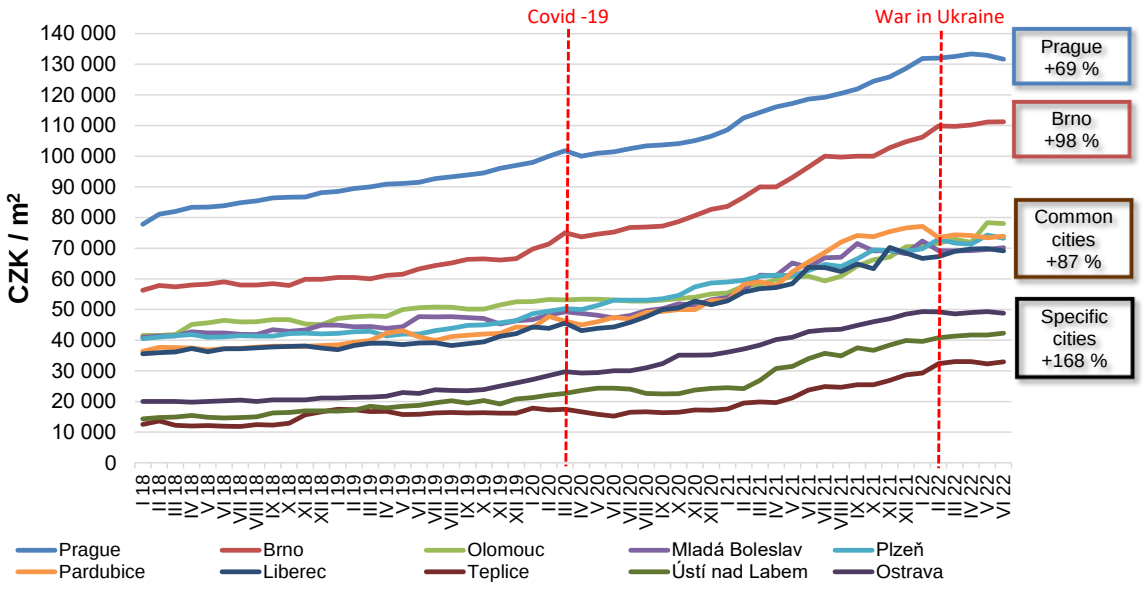
The software works in such a way that all advertisements published on real estate servers in the Czech Republic are collected within a period of one month. The obtained data are subsequently subjected to analysis for the reliability of the data. Duplicate ads are checked. The floor area, unit price, age and about 20 other parameters characterizing each property are verified. If any irregularities or errors are found in the ad, this ad is excluded from further statistical processing.

The primary data are the offer prices listed in the real estate advertisement. These are not actual realized prices. The actual realized prices are available in the real estate cadastre; however, these records cannot be used reliably. The real estate cadastre does not distinguish whether the entire property was sold or only part of it, and sales prices within the family, privatization, sale of state-owned real estate, auctions can also be listed here, which discredits the results. It is not possible to distinguish the degree of wear and tear of the property also. That is why we work with offer prices that represent real market prices, which do not take into account the distressed price, the effect of special popularity, incomplete real estate, and the like.

4. Results

Figure 1 presents the development of offer prices of flats intended for sale in selected big cities in the Czech Republic. The medians are shown in the graph as they give the most accurate results. This is the offer price for 1 m^2 of floor space of the apartment. Note on conversion rate: 1 EUR = approximately 25 CZK.

Figure 1. The development of offer prices of flats intended for sale in selected big cities in the Czech Republic.



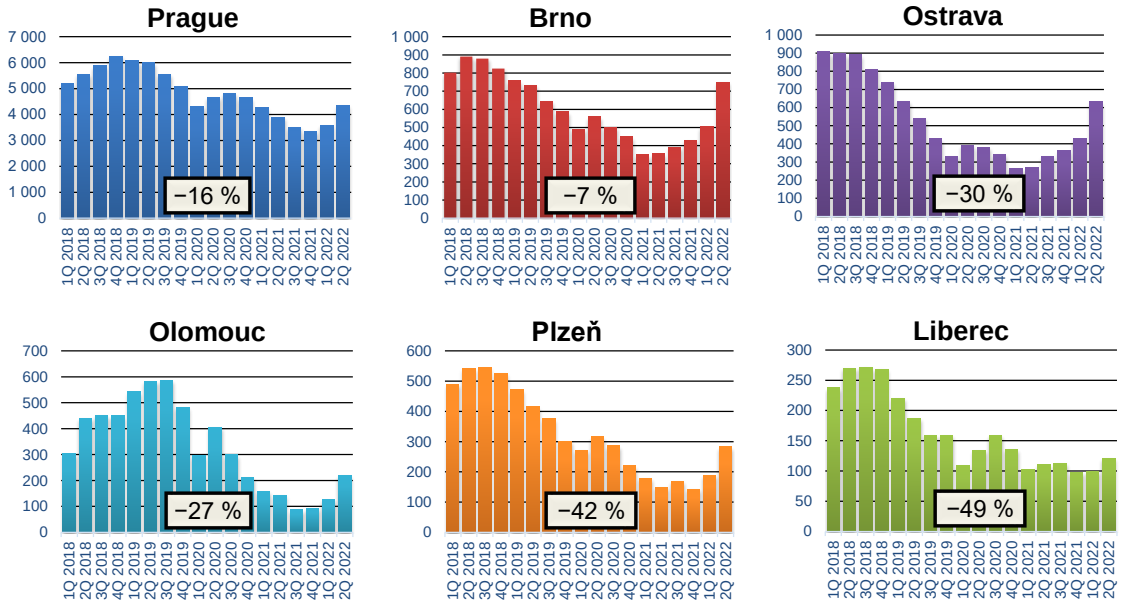
Source: own research. Data: January 2018 to June 2022, bid prices, medians

In general, it can be stated that the price level in all cities has been growing for a long time. In Prague, the price level increased by 69% between January 2018 and June 2022. This increase in the price level is the lowest compared to other cities. This is mainly due to the high comparative price base in 2018 and deteriorating mortgage lending opportunities due to the very high price level. In the last few months, the sharp price rise has stopped.

The largest increase in the price level is observed in the period from January 2018 to June 2022 in cities with structural and socio-economic problems (Ostrava, Ústí nad Labem, Teplice, Most, etc.). This is due to the very low comparative base in 2018, the transfer of part of investors from Prague to cheaper regions of the Czech Republic, speculative investments and, unfortunately, poverty trade, where investors buy apartments in problematic localities to collect housing benefits from the state budget. ***Figure 1*** shows that there are significant price differences between individual cities in the Czech Republic. These differences are significantly larger than the average wage in a given city. In other words, the availability of owner-occupied housing is significantly worse in Prague than in other regions of the Czech Republic, even though more money can be earned in Prague and there are more job opportunities. On the other hand, a significant increase in the prices of energy associated with heating apartments and houses will have the most significant effects precisely in locations where the average income is the lowest. Heating costs will make up a higher share of the household consumption basket in poor regions than, for example, in a rich region like Prague. It can be assumed that energy consumption will be very similar in all locations of the Czech Republic. The Czech Republic is a small country where there are only small temperature differences between regions. This fact will cause the demand for living in old family houses to decrease in the future because of the disproportionate costs associated with heating inefficient houses.

Figure 2 shows the change in the size of the offer of flats for sale in selected large cities in the Czech Republic. The small box in the middle of each graph shows the change in supply size for each city between the first quarter of 2018 and the second quarter of 2022.

Figure 2. The development of average number of recorded ads per month in selected big cities in the Czech Republic.



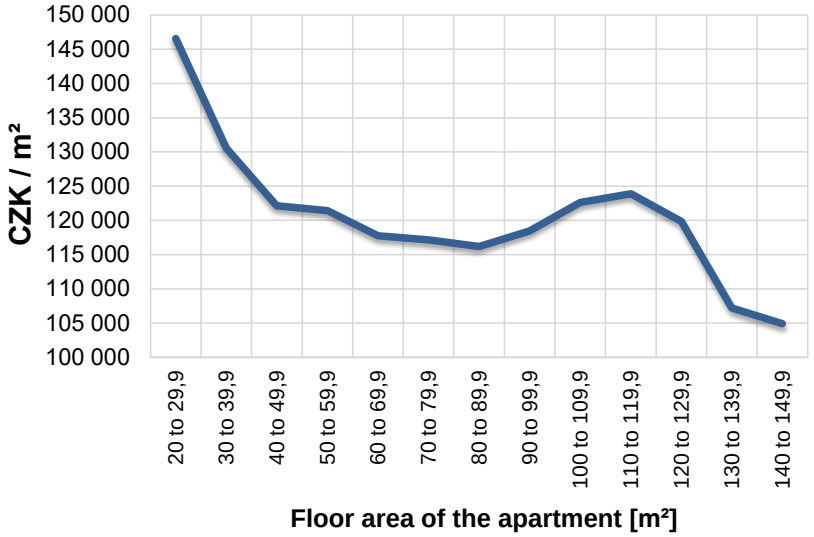
Source: own research. Data: January 2018 to June 2022

In all cities, we are seeing a significant drop in supply by the end of the third to fourth quarter of 2021. The market was bought, including badly sold real estate, and potential buyers had little choice. In the first half of 2022, however, we have seen an increase in the size of the supply of flats for sale, mainly due to poor availability of mortgage loans, a very high price level of flat sales prices, investors uncertainty about the war in Ukraine and a significant increase in energy prices. Due to cost savings associated with heating, people prefer to buy an apartment with a smaller floor area.

Figure 3 expresses the dependence of the offer prices of flats on the floor area of the flat. It was found that as the floor area of the apartment increases, the unit price decreases. This is because small flats are in greatest demand, as they are the most affordable and also best rented. Buying a small flat also has the advantage that, from an investment point of view, it is less risky than buying a large flat. Acquiring a smaller flat also requires lower initial costs. During its lifetime, a small flat needs lower operating costs.

However, from the size of the floor area of around 90 m^2, there is an increase in the unit price of the apartment. This is due to the fact that large apartments are usually located in the centres of large cities and are above standard equipped, which increases their price level. Furthermore, in the years 1950 to 1990, flats up to 75 m^2 were built on a large scale, which caused them to have the largest share in the housing stock of the Czech Republic and are therefore also the cheapest in terms of the unit price of the floor area. The drop in the price of very large apartments is caused, among other things, by the high costs of heating, which not every household can afford.

Figure 3. The dependence of the offer prices of flats on the floor area of the flat



Source: own research. Data: January 2021 to June 2022, bid prices, medians, the Czech Republic

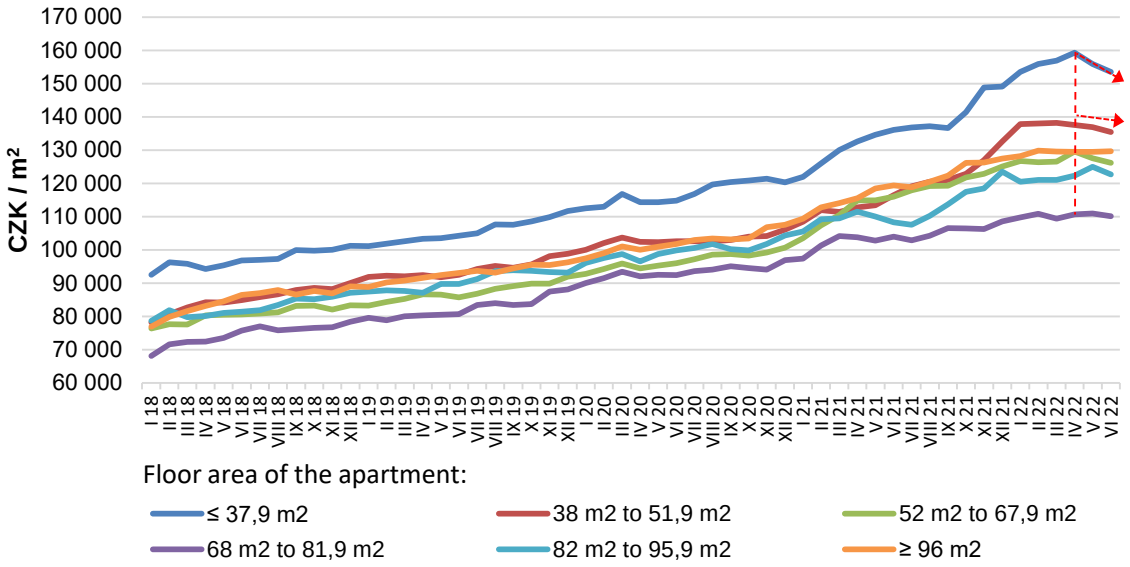
Figure 4 shows the development of offer sales prices of apartments in Prague depending on the size of the floor area of the apartment. Note in particular the category of the smallest flats, which have made a significant rise in price over the last two years. And they completely deviate in price per square meter compared to larger apartments. In the last months, however, there is a decline or stagnation in prices.

This is due to the fact that more people get a mortgage on a small apartment than on a mortgage on a large apartment. When acquiring more expensive and larger real estate, the number of people interested in the purchase will decrease, and at the same time potential

competition from buyers will be eliminated. Small apartments have the greatest demand and the greatest price competition among buyers.

In addition, due to high real estate prices, many people have already discounted their original requirements for the standard of living and are making various compromises. They decided to modify it by either acquiring a smaller property or leaving Prague altogether and acquiring a property within a driving distance of 30 minutes from Prague, for example. Due to the high costs of heating, households try to lower the average temperature of the apartment and thereby reduce the total operating costs. It can be assumed that the demand for new properties, which must meet high parameters in terms of thermal insulation properties, will increase.

Figure 4. The development of offer sales prices of apartments in Prague depending on the size of the floor area of the apartment



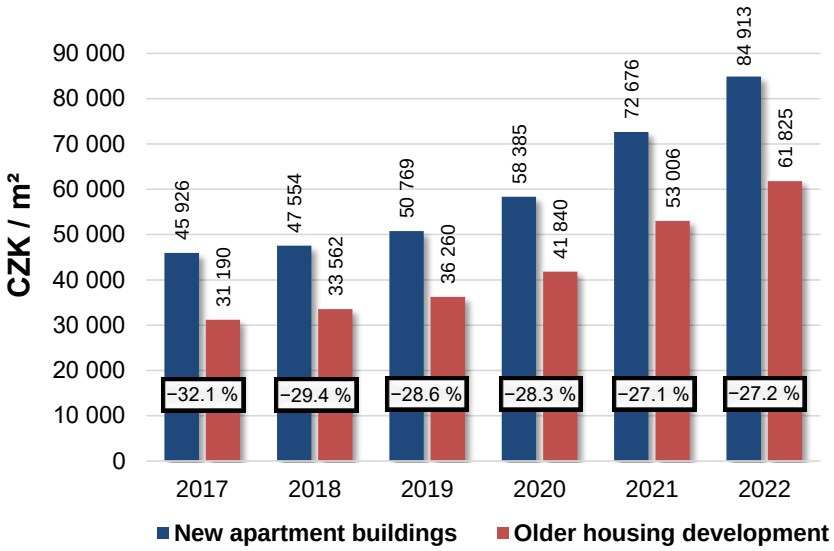
Source: own research. Data: January 2018 to June 2022, bid prices, medians, Prague

Figure 5 examines the differences in offer prices according to whether it is an apartment in a new building or in an older development. Older flats are approximately 27% cheaper than new buildings. At the same time, the differences in time gradually decrease. This dependence is due to the fact that investors try to invest their money at all costs to protect against high inflation. The weight of the criterion of the construction and technical condition of the apartment gradually decreases over time. The values given in small rectangles represent the difference between the unit price of new construction and older development.

In the future, when the rate of inflation drops to standard values, it can be expected that the construction-technical condition and thermal insulation properties of the purchased property will play a more significant role. From a property life cycle perspective, operating costs (which also include heating costs) will become increasingly important to investors over acquisition costs.

In the case of renting flats, the differences between new buildings and older flats are smaller. From the tenant's point of view, it plays an important role whether the apartment is after modernization or before modernization. The total life of the property is not a decisive criterion for the tenant, as he plans to use it only for a limited period of time.

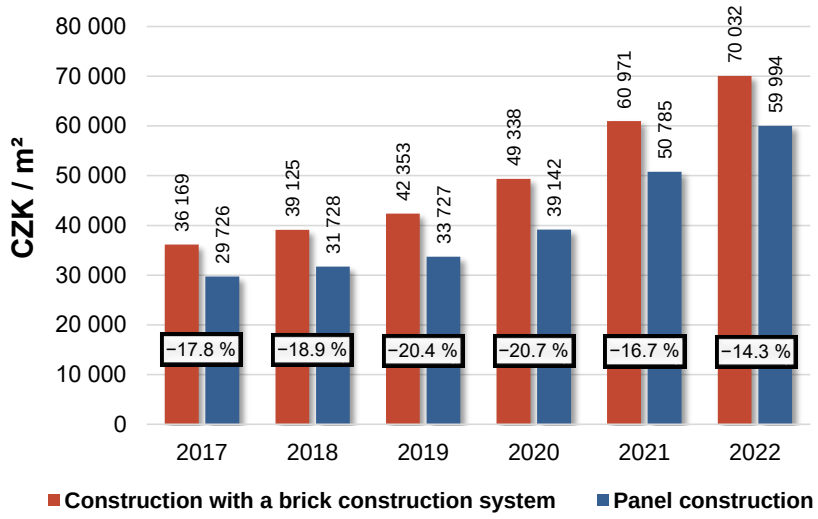
Figure 5. Comparison of offer prices of apartments in new buildings and older buildings



Source: own research. Data: January 2017 to June 2022, bid prices, medians

Figure 6 compares the differences in prices depending on the structural and material characteristics of the building. It was found that in the case of flat sales, prefabricated buildings are approximately 14% cheaper than buildings with a brick construction system. Price differences have been narrowing since 2021, due to efforts to protect financial savings from high inflation. Unfortunately, a quality pension reform has not been implemented in the Czech Republic, so citizens do not trust long-term financial savings products and real estate serves as a substitute for a dysfunctional pension system. The values given in small rectangles represent the difference between the unit price of apartment built using a brick construction system and panel technology.

Figure 6. Comparison of offer prices of apartments built using a brick construction system and panel technology



Source: own research. Data: January 2017 to June 2022, bid prices, medians

The ***Figure 6*** does not show wooden buildings, as the construction of flats in wooden technology in the Czech Republic is very limited. Only family houses are built in the Czech Republic using the technology of wooden construction, but only to a very limited extent.

In the case of apartment rentals, the differences between brick construction system and panel technology are very small. For tenants it is not important what construction technology was used. The tenant is interested in the achieved standard of living in the apartment, which is comparable for both construction technologies used.

In the future, it can be expected that the energy footprint in the production of building materials will be significantly reflected in prices. The production of building materials is very demanding in terms of energy consumption (cement, insulating materials, glass, steel, etc.). Since there is a significant increase in energy prices in industry, a significant increase in the price of a large number of building materials can be expected. This fact will lead to a decrease in the financial availability of housing.

At the same time, waste products from the operation of coal-fired power plants (e.g. plasterboard for wall cladding, slag into road embankments) are currently used as common building materials. In the event that coal-fired power plants cease operation, it will be necessary to replace these construction materials with other materials, and it can be expected that this replacement will make construction production more expensive.

Figure 7 shows a comparison of the average offer price per m^2 of floor area of an apartment for sale and the average mortgage interest rate. In the Czech Republic, the average mortgage rate was at a very low level for a long time. The lowest interest rates were reached at the end of 2020 and the beginning of 2021. Since then, interest rates have been rising. In the last six months, the Czech National Bank has been raising all key interest rates significantly. The reason for the increase in rates is the continuing rise in inflation exacerbated by the war in Ukraine and a sharp increase in energy prices and the central bank's efforts to dampen inflation expectations, meaning that inflation will continue to rise rapidly. The Czech National Bank is also trying to dampen public inflation expectations.

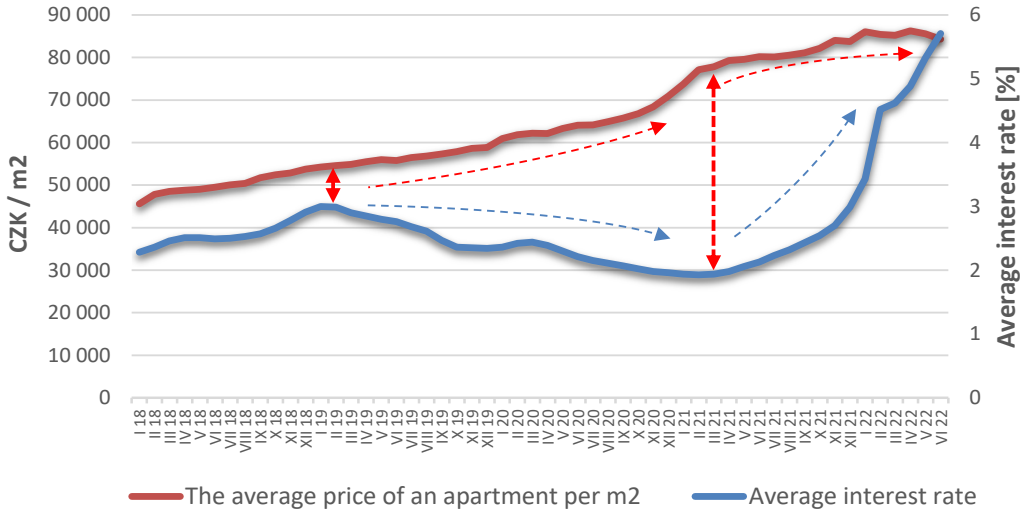
Figure 7 shows the basic economic relationship, which shows that as the interest rate on mortgage loans falls, the purchase price of apartments increases. However, this dependence also applies the other way around. In the next period, an increase in average interest rates on mortgage loans can be expected to cool the growth rate of house prices. However, real estate prices cannot be expected to fall in attractive locations in the Czech Republic.

At this point, it should be added that in 2020 and 2021 approximately 40% of apartments were bought using a mortgage loan and 60% of flats were bought for cash, without the need for credit financing. In 2022, however, there has been a significant change, it is assumed that only 10% of apartments are currently bought with the use of a mortgage loan, and 90% of apartments are bought with cash, mainly for investment reasons.

Currently, there is a sharp drop in demand from middle-income and low-income households, as these households are unable to meet the strict terms of a mortgage loan. As a result of the tightening of mortgage conditions, middle-income and low-income households will be forced to turn to the rental segment more often. At the same time, low-income and middle-income households will be most burdened by the sharp increase in energy prices, which will further worsen the financial availability of housing. As another associated problem, we can expect a subsequent increase in rent prices and the prices of services connected with the rental, since property owners are also strongly affected by the significant increase in mortgage interest rates, the increase in the cost of construction work and the increase in the cost of energy.

Methodological note: Average mortgage interest rates are based on data from Fincentrum Hypoindex. The Hypoindex represents the weighted average interest rate at which new mortgage loans for individuals are provided in a given calendar month. The volumes of loans provided serve as weights. The input data for the Hypoindex calculations are provided by the following banks: Air Bank, Česká spořitelna, ČSOB, Equa Bank, Moneta Money Bank, Hypoteční banka, Komerční banka, Raiffeisenbank, Sberbank CZ and UniCredit Bank. The average interest rate on mortgages in the Czech Republic is also calculated by GOLEM FINANCE s.r.o. (GOFI index).

Figure 7. Comparison of the average offer price per m^2 of floor space of an apartment and the average mortgage interest rate



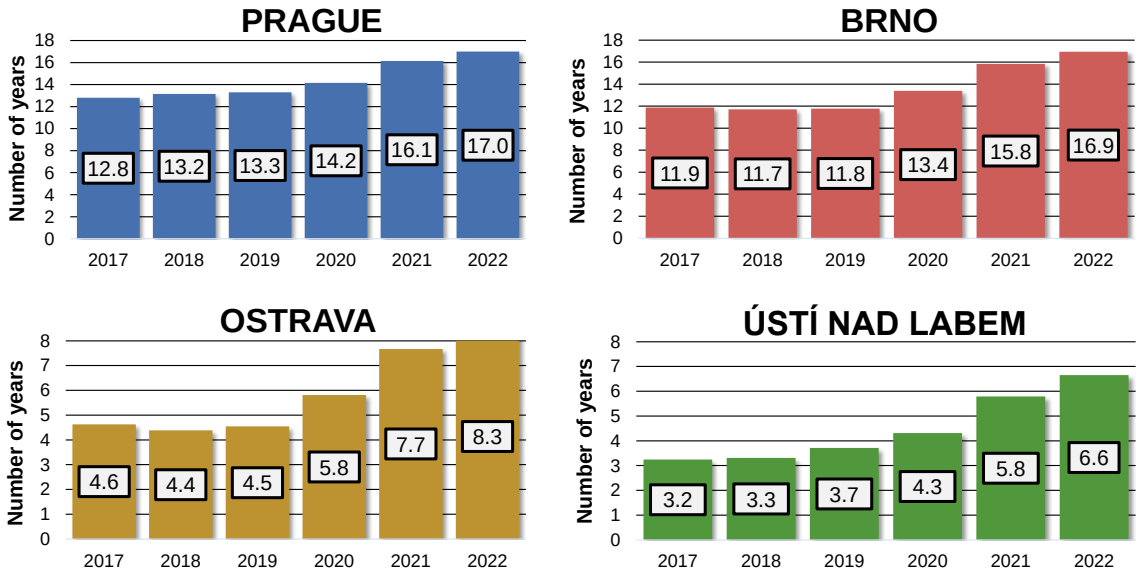
Source: own research. Data: Fincentrum Hypoindex, January 2018 to June 2022, bid prices, medians, older and new flats, the Czech Republic

Figure 8 documents the differences in the affordability of housing in selected large cities in the Czech Republic. It is stated how many years it is necessary to save for an apartment with a floor area of 70 m^2. The calculation does not take into account the fact that the purchase price of the apartment will change during the savings period.

The calculation assumes the acquisition of an average older apartment with a floor area of 70 m^2, which will require an additional initial investment of CZK 350,000. The average gross wage for a given region is included in the calculation, while it is assumed for simplicity that the individual average wage is the same in the individual districts of the given region. Wage data were taken from data from the Ministry of Labor and Social Affairs on wages and salaries by region. It is also assumed that the investor will defer from his salary the full amount of the payment for the acquisition of the apartment. This amount will be deposited in a non-interest-bearing account. It is based on the median offer prices of apartment sales for individual districts from the EVAL software for the period January 2017 to June 2022.

The cities of Prague and Brno perform very poorly in this calculation. It is clear from the graphs that the situation has been deteriorating, especially in the last two years. Housing affordability can be expected to deteriorate further over time due to continued high inflation, rising prices for construction materials and construction work and rising energy prices. However, the situation is significantly better in other cities in the Czech Republic. This is mainly due to the fact that investors focus mainly on attractive cities with a good offer of jobs and services. For comparison, in Vienna, for example, it only takes 8.7 years and in Berlin 8 years to save money on a comparable flat.

Figure 8. Financial affordability of housing in selected large cities - the number of years needed to save the amount for the acquisition of an average older apartment with a floor area of 70 m^2



Source: own research. Data: Ministry of Labor and Social Affairs, January 2017 to June 2022, bid prices - medians, average monthly wages

Our results indicate low and decreasing own housing affordability in the Czech Republic compared to other countries in the CEE and in the European Union. Presumably, budget constraints may limit the demand boost in property market even if other factors described above (high inflation, insufficient pension system, lack of other safe investments, demographic factors, energies, etc.) will persist.

5. Conclusion

Currently, there is a huge uncertainty in the construction and real estate market, which is due to many factors. Above all, it is about rising inflation, rising prices of building materials and construction works, and rising energy prices. Furthermore, there is uncertainty regarding the amendment of the Building Act, which would speed up the very lengthy permitting processes in the Czech Republic. According to the Czech Prosperity Index, it takes an average of 246 days to obtain a building permit in the Czech Republic. In Denmark and Finland, for example, it is just over two months.

The housing stock in the Czech Republic is often outdated and needs modifications in terms of construction and energy requirements. In recent years, the quality of thermal insulation of buildings and heating systems has im-proved, especially in panel houses with the use of state subsidies. Reducing the energy demand of residential buildings would both increase the quality of housing and at the same time, thanks to the reduction of energy costs (heating, lighting), it would have a significant effect on its overall availability. The installation of modern renewable energy sources appears to be very promising. The return on these investments is very good considering the very high energy prices.

Unfortunately, there is currently no detailed information available on the extent of the reconstruction of the housing stock in the Czech Republic in connection with the improvement of thermal insulation properties and the installation of renewable energy

sources. Collecting this data is very challenging. We hope that some data will be available in the future after the evaluation of data from the last census of houses and flats.

Recently real estate prices in the CEE region have risen faster than households' income. From the property market perspective, during the Covid-19 period scissors between rich and poor opened remarkably for two reasons: peaking property prices increased the wealth of property owners and decreasing the wealth of renters, and households whose professions have not been affected by the coronavirus took advantage of low interest rates on mortgages and secured their capital against inflation through the acquisition of next real estate. On the other hand, households with professions affected by the coronavirus see their aspiration to owned housing more complicated than ever.

The scissors are opening up among people who already have their own housing and people who do not yet have one and will have a huge problem reaching it in the future. Intergenerational property inequality is also deepening. Whoever inherits or his parents will help him with housing during his lifetime will have a great competitive advantage in life. If you do not have this option, you can get a sense of wrongdoing from it.

Not only intergenerational property inequality is deepening, but also interclass property inequality. Anyone who already owns a property has easier access to acquire another property than someone who does not yet own a property. Our research has confirmed the trend of society polarization and shrinking middle class, a trend discussed across the CEE region (Jasova and Kaderabkova, 2021; Łuczak and Kalinowski, 2020; Rakauskiene *et al.*, 2019; Kaderabkova and Jasova, 2019). In the future, these trends may induce significant social tensions in society.

References:

Altinbas, H. (2020). Examining Time-Varying Integrity and Interrelationships Among Global Stock Markets. *International Journal of Economic Sciences*, 9(1): 1-24.

Andelinović, M.; Pavković, A.; Valentić, L. (2020). Equity Fund Performance and Sector Diversification. *International Journal of Economic Sciences*, 9 (1), pp. 25-43, DOI: 10.52950/ES.2020.9.1.002

Bednar, O.; Cecrdlova, A.; Kaderabkova, B.; Rezabek, P. (2022). Energy Prices Impact on Inflationary Spiral. *Energies*, *15*, 3443. DOI: 10.3390/en15093443

Borgersen, T.A. (2019). Social Housing Policy in a Segmented Housing Market: Indirect Effects on Markets and on Individuals. *International Journal of Economic Sciences*, 8 (2), pp. 1-21., DOI: 10.52950/ES.2019.8.2.001

Cecrdlova, A. (2021). Comparison of the Approach of the Czech National Bank and the European Central Bank to the Effects of the Global Financial Crisis. *International Journal of Economic Sciences*, 10 (2), pp. 18-46., DOI: 10.52950/ES.2021.10.2.002

Cermakova, K.; Hromada, E.; Machova, V. (2022), Comparison of property price development in regions affected by mining with other regions of the CR, *Acta Montanistica Slovaca*, 27 (2), 491-504

Cermakova, K.; Hromada, E.; Filho, A.E.H.; Krulicky, T. (2022): The Effects of Homeownership on Wealth Distribution, *European Journal of Interdisciplinary Studies*, 14 (1), pp. 68-86, DOI: 10.24818/ejis.2022.05

Cermakova, K.; Hromada, E. (2022). Change in the Affordability of Owner-Occupied Housing in the Context of Rising Energy Prices. *Energies*, 15, 1281. DOI: 10.3390/en15041281.

Cerna, M.; Hejdukova, P. (2022). COVID-19 Pandemic: New Opportunities for Employment and Education? *European Journal of Interdisciplinary Studies*, 14 (1), pp. 252-264, DOI: 10.24818/ejis.2022.16

Czech Statistical Office [online]. Consumer price indices - inflation - March 2022, 2022. [cit. 2022-05-05]. Available from: https://www.czso.cz/csu/czso/ari/consumer-price-indices-inflation-march-2022

Fincentrum Hypoindex (2022a). Fincentrum Hypoindex- development [online]. Fincentrum Hypoindex [cit. 2022-07-05]. Available from: https://www.hypoindex.cz/hypoindex-vyvoj/

Fincentrum Hypoindex (2022b). Fincentrum Hypoindex- mortgages [online]. Fincentrum Hypoindex [cit. 2022-07-05]. Available from: https://www.hypoindex.cz/rubrika/hypoteky/

Hromada, E. (2021). Development of the real estate market in the Czech Republic in connection with the Covid-19 pandemic. *Proceedings of the 15th Economics and Finance Conference*, Prague, DOI: 10.20472/EFC.2021.015.014.

Hromada, E.; Cermakova, K. (2021). Financial unavailability of housing in the Czech Republic and recommendations for its solution. *International Journal of Economic Sciences*, 10 (2), pp. 47-58, DOI: 10.52950/ES.2021.10.2.003

Jasova, E.; Kaderabkova, B. (2022). The effectiveness of government measures in the first wave of Covid-19 pandemic. *International Journal of Economic Sciences*, 11(1), pp. 19-36, DOI: 10.52950/ES.2022.11.1.002

Jasova, E.; Kaderabkova, B. (2021), Ambiguous effects of minimum wage tool of labour markets regulation – key study of V4 countries, *International Journal of Economic Sciences*, 10 (2), pp. 58-85, DOI: 10.52950/ES.2021.10.2.004

Just, M.; Łuczak, A.; Kozera, A. (2019). Conditional Dependence Structure in the Precious Metals Futures Market. *International Journal of Economic Sciences*, 8 (1), pp. 81-93., DOI: 10.52950/ES.2019.8.1.006

Kaderabkova, B.; Jasova E. (2019), Development of real unit wage costs on the macro- and mezzo- level of the Czech Republic, *International Journal of Economic Sciences*, 8 (2), 45-59.

Kaderabkova, B.; Jasova, E. (2021): How the Czech government got the pandemic wrong. *Proceedings of the 15th Economics and Finance Conference*, pp. 42-52, DOI: 10.20472/EFC.2021.015.005

Kaderabkova, B.; Jasova, E. (2020): Comparation of the economic cycle on labour market in the construction industry and in the national economy of the Czechia. *Civil Engineering Journal Stavebni obzor*, 3/2020, DOI: 10.14311/CEJ.2020.03.0024

Kliber, P.; Rutkowska-Ziarko, A. (2021). Portfolio choice with a fundamental criterion – an algorithm and practical applicationon – a computation methods and empirical analysis. *International Journal of Economic Sciences*, 10 (1), pp. 39-52, DOI: 10.52950/ES.2021.10.1.003

Kurekova, L.; Hejdukova, P. (2021). Multilevel research of migration with a focus on internal migration. *International Journal of Economic Sciences*, 10 (2), pp. 87-103., DOI: 10.52950/ES.2021.10.2.005

Łuczak A.; Kalinowski S., (2020), Assessing the level of the material deprivation of European Union countries, *PLoS ONE* 15 (9), e0238376. DOI: 10.1371/journal.pone.0238376

Łuczak, A.; Kalinowski, S. (2022). A multidimensional comparative analysis of poverty statuses in European Union countries. *International Journal of Economic Sciences*, 11 (1), pp. 146-160., DOI: 10.52950/ES.2022.11.1.009

Lukavec, M.; Kaderabkova, B. (2017). How much does a minute of commuting time cost? An examination of property prices in relation to distance to the city center in Prague, Czech Republic, *Civil Engineering Journal – Stavebni obzor* 4/2017, DOI: 10.14311/CEJ.2017.04.0044

Rakauskiene, O.G.; Servetkiene, V.; Volodzkiene, L. (2019), Assessment of Wealth diversity, *International Journal of Economic Sciences*, 8 (1), pp. 106-130, DOI: 10.52950/ES.2019.8.1.008

Stavebni forum a.s. (2022). Rental housing in anticipation of change? [online]. Stavebni forum a.s. [cit. 2022-05-05]. Available from: https://www.stavebni-forum.cz/clanek/najemni-bydleni-v-ocekavani-zmen/

Rotschedl, J. (2022). Study of Intertemporal Discounting According to Income Group, Savings, and Loans. *International Journal of Economic Sciences,* 11 (1), pp. 68-84, DOI: 10.52950/ES.2022.11.1.005

Schneiderova Heralova, R. (2017). Life Cycle Costing as an Important Contribution to Feasibility Study in Construction Projects, *Procedia Engineering* 196, pp. 565-570, DOI: 10.1016/j.proeng.2017.08.031

Sestanj-Perić, T.; Keglević Kozjak, S. (2020). The Concept of Prudence in Theory and Practice. *International Journal of Economic Sciences*, 9(1): 156-178.

Skornova, E.; Safrankova, J.M. (2022). Teaching new trends in human resources management at university. *International Journal of Teaching and Education,* Vol. 10 (1), pp. 65-72, DOI: 10.52950/TE.2022.10.1.005

Sliskovic, T.; Sekur, T. (2020) The Calculation of Regional Index of Dwelling Prices In Croatia, *Proceedings of the 13th Economics and Finance Conference,* Lisbon. DOI**:** 10.20472/EFC.2020.014.013

Czech News Center (2022). Spectacular mortgage business. People got into a record debt last year, the interest rate jump did not matter, 2022. E15.CZ [online]. [cit. 2022-07-05]. Available from: https://www.e15.cz/byznys/finance-a-bankovnictvi/spektakularni-hypotecni-byznys-lide-se-loni-rekordne-zadluzili-urokovy-skok-nevadil-1387009

Stankuniene, G. (2021). Energy Saving in Households: A Systematic Literature Review, 13 (1) *European Journal of Interdisciplinary Studies,* DOI: 10.24818/ejis.2021.04

Venhoda, O. (2022). Application of DSTI and DTI macroprudential policy limits to the mortgage market in the Czech Republic for the year 2022. *International Journal of Economic Sciences*, 11(1), pp. 105-116, DOI: 10.52950/ES.2022.11.1.007

Vitasek, S.; Hromada, E.; Holcman, J.; Schneiderová Heralová, R.; Krulický, T. (2021). Residential Construction with a Focus on Evaluation of the Life Cycle of Buildings. *Buildings* 11, 524. DOI: 10.3390/buildings11110524

ZipRealty s.r.o. (2022) A record number of new flats were sold in Prague in 2021. ZipRealty s.r.o. [online]. ZipRealty s.r.o. [cit. 2022-05-05]. Available from: https://www.ziprealty.cz/v-praze-se-v-roce-2021-prodalo-rekordni-mnozstvi-novych-bytu/

Zubikova, A.; Smolak, P. (2022). Macroeconomic impacts of the COVID-19 pandemic in the Czech Republic in the period of 2020-2021. *International Journal of Economic Sciences*, 11(1), pp. 117-145, DOI: 10.52950/ES.2022.11.1.008