

SLOVAK AND CZECH HOUSING MARKET ANALYSIS

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Abstract:

Research background: In 2020 and 2021, there was a significant price development in the real estate market in the whole of Europe. Many investors moved their capital into what they thought was a safe investment. These are specific investments in commodities and, above all, real estate. In the last three years, the Czech and Slovak Republics, along with other countries, had to deal with several crisis effects that fundamentally affected the real estate market. These are the global pandemic of the disease COVID-19, the energy crisis, and the war in Ukraine.

Purpose of the article: In recent years, the housing market in the Czech Republic and Slovakia has been a hotly debated topic. The high demand for housing and at the same time the low supply of apartments and land cause a situation where real estate prices have a high tendency to rise. In this contribution, we will focus on the analysis of the development of the housing market in the Czech Republic and Slovakia, and we will try to evaluate the situation in both markets with subsequent comparisons of both markets.

Methods: We will be focused on the analysis of the situation in both markets for the years 2020, 2021, and 2022. For the evaluation, we will use many indicators for comparisons such as housing price indices, average wages, indebtedness, unemployment, and interest rates of the central banks of both countries and hypindex indicators DTI, DSTI, and LTV. Based on these factors, we will then compare the Czech Republic and Slovakia in 2023. Subsequently, we will focus on the availability of housing in these countries, we will also mention in which parts of individual countries housing is cheaper and, conversely, more expensive. In the last part, we will deal with the macroeconomic forecast of both countries. That is, how indicators such as GDP, unemployment, average wages, inflation, and others will develop. We will also give examples of investment in real estate with selected funds. Finally, we will compare interest rates for mortgage loans from Czech and Slovak banks.

Findings & Value added: In both countries, it is therefore assumed that real estate prices will stagnate in 2023, or possibly only grow more moderately.

Keywords: housing market; real estate prices; mortgage loans.

JEL Classification: R21; R31; R32.

1. Introduction

The banking sector has historically been one of the most regulated sectors in the economy. Traditionally, the main business of a commercial bank is to receive funds from individuals who have surplus resources and allocate those resources to productive activities.

The European banking environment has changed fundamentally since the beginning of the 21st century, thanks in part to the regulatory response to the global financial crisis of 2007-2008 and the subsequent sovereign debt crisis in the Eurozone. Even after major regulatory reforms, discussions continue about the next steps needed to strengthen the EU regulatory framework to limit future risks from the banking system. The European Commission has been developing several initiatives, including stricter prudential requirements for banks, better protection of depositors, and common rules for managing bank failures (Beck & Casu, 2016).

The reasons for the introduction of banking regulation and the related necessity of public interventions are traditionally based on the need to correct market deficiencies referred to as market failure. The field of banking regulation and supervision covers a wide range of issues. It is mainly about what and to what extent to regulate, how often, and with what tools and institutions should be entrusted with the performance of banking regulation and supervision.

For example, lax lending by banks contributed to the financial crisis of 2008. Obstacles to the necessary credit were often, for example, the initial deposit and the amount of monthly mortgage payments. The loosening of standards, however, brought about innovations that made it easier to overcome both obstacles. The use of so-called subprime mortgages began to develop greatly (Jurošková, 2012). The loan approval rate increases following the adoption of labor protection laws (Shang & Saffar, 2023).

Nunez-Torres (2022) claims, that tests indicate that banks with a high deposit concentration may service mortgages for longer periods of time.

According to Hodula et al. (2023) DSTI index serves as an indicator of the borrower's ability to repay his loan obligations from his net income – after deducting current expenses, how much of the borrower's income is left to cover the repayments (interest and principal) of his loan.

This is a percentage expression of the share of the loan applicant's annual average expenses resulting from his total indebtedness on his annual net income. Put simply, it is the percentage of the total amount of all monthly installments on the loan applicant's net monthly income. (Česká národní banka, 2023)

DTI index serves as an indicator of the borrower's ability to repay his debt, for example, how much (net) annual income will be needed to pay off his total debt. (Hodula, Melecký, Pfeifer, & Szabo, 2023) This is the ratio of the total indebtedness of the loan applicant and the amount of his net annual income. (Česká národní banka, 2023)

Limit LTV aims to reduce creditors' losses in the event of default and the simultaneous decline in real estate prices (Hodula et al, 2023). It represents the percentage ratio between the amount of the loan and the value of the mortgaged property.

Interest rates are among the most monitored variables in the economy. Their movements are reported almost daily by the news media because they have a direct impact on our daily lives and have important consequences for the state of the economy. They influence personal decisions, such as whether to consume or save, whether to buy a house, and whether to buy bonds or put funds in a savings account (Mishkin, 2019).

Banai et al. (2022) claim that the bank regulation is strikingly not neutral in this aspect, it explicitly favors short-duration adjustable-rate loans over long-duration fixed-rate loans in the framework of the gap management.

Discount loan, discount rate serves as an indicator of interest rates for commercial banks: with a restrictive monetary policy, the discount interest rate increases, with an expansionary

monetary policy, on the contrary, it decreases. The discount rate can determine the interest rates of a commercial bank toward clients if these rates are determined by a deviation from the discount rate (Belás, 2013).

The discount rate is defined as the rate at which banks deposit money with the Czech National Bank (next CNB) and is the lowest rate on the interbank market (Mejstřík et al., 2014). Regular discount loans are used to bridge short-term fluctuations in banks' liquidity. The maturity period usually does not exceed one month (Revenda, 2013).

Repo rate is defined as the limit rate at which the CNB carries out repo operations with commercial banks (Mejstřík et al., 2014). A decrease or increase in the repo rate directly affects the costs of banks in obtaining liquid resources from the central bank (Revenda, 2013).

Lombard Rate is defined as the rate at which the CNB lends to commercial banks against the pledge of securities (so-called Lombard loan), (Mejstřík et al., 2014). They differ from ordinary discount loans primarily in that they are requested by banks that have significant liquidity problems and no longer can obtain discount loans (Revenda, 2013).

Main refinancing operations

The ECB's most important operation is the main refinancing operation (MRO), also called the main tender. Commercial banks can obtain money from the ECB through an auction procedure for providing eligible collateral (securities). Central bank money is offered to the highest bidder. The minimum bid rate, or main refinancing rate, set by the ECB is often called the key interest rate because of its meaning. MROs are typically performed with a frequency and maturity of one week (Schmolke, 2017).

The marginal lending facility rate provides commercial banks with the opportunity to obtain liquidity by paying interest and providing collateral with the ECB until the next business day, while the corresponding interest rate usually sets a ceiling for the overnight market interest rate (Schmolke, 2017).

The interest rate of the deposit facility is used for commercial banks, which can save their excess liquidity as deposits on demand with the ECB, or of national central banks until the next working day for the interest rate of the deposit facility in the form of overnight money. This interest rate usually represents the floor for the overnight market interest rate (Schmolke, 2017). Central banks often use automatic facilities when conducting monetary policy directly aimed at regulating the short-term interest rate. It is a combination of bank deposits deposited overnight with the central bank and bank loans drawn overnight from the central bank (Revenda, 2013).

Factors affecting the client's credit

Brčák et al. (2014) define unemployment as a state where an individual who can work is actively looking for work but cannot find it. According to Eurostat, "an unemployed person is defined as older than 15 years, without work, actively looking for work and ready to start within 14 days".

Default is defined as the probability of the client's failure, where he will not be able to continue to repay his obligations partially or fully (Mejstřík et al., 2014).

In his study, Farias-Nazel (2020) claims that people with primary household income have better knowledge of the total cost of mortgage loans. The results also show that price-conscious people with primary household income and brand-distrustful people have more knowledge about the overall cost of mortgage loans.

Saengchote & Samphantharak (2022) claim that banks play an important role in consumer credit. In their study, they found that if a borrower has more loans at the same bank, they are

more likely to pay off their mortgage loan first, and borrowers with a longer bank relationship and lower switching costs are more likely to default on their mortgage loan first (which improves welfare).

Inflation is a macroeconomic imbalance that occurs in any country and is monetary in nature. Inflation is manifested by a reduction in purchasing power and a significant increase in prices and affects the entire economic system. It is one of the main tools for the functioning of market economies, which can be manifested in various forms and ways.

According to Keynesian theory, the cause of inflation is the demand for goods, or a demand pull that exceeds the level of full employment and thus causes an inflation gap. A central characteristic of this explanatory approach is the claim that an increase in the money supply does not necessarily lead to a proportional change in prices. (Schmolke, 2017)

Loans and Investments

Consumer loans are loans granted to natural persons – consumers for non-business purposes (Revenda, 2013). Consumer loans are provided by banks and non-bank institutions. Those are primarily used to purchase consumer goods (electronics, clothing, etc.) or to finance various services, such as vacations (Kantnerová, 2016).

The basic characteristic of a mortgage loan can be considered to be the method of securing it, which is a lien on real estate. The nature of the collateral results in a relatively low risk of mortgage loans. It follows from the definition of mortgage loans that it is not limited in terms of the purpose for which it is provided. However, in practice, mortgage loans provided to finance the acquisition of real estate and housing needs completely prevail (Revenda, 2013). It is considered long-term. This loan is usually distinguished from others by a longer repayment period, usually 20-30 years, while 20 years is recommended as the most favourable for the client. The most common type of pledge is real estate, which is acquired or reconstructed from a loan (Kantnerová, 2016).

Collateral is one of the most important topics in connection with the means that the bank uses to mitigate credit risk (Mejstřík et al., 2014).

Mishkin (2019) claims that collateral is property pledged to a lender as compensation in the event of a borrower's default. The main principle of this system is that the bank lends the borrower a sum of money and takes real estate as collateral (Ushakov et al., 2020). According to its nature, collateral can be divided into:

- Personal guarantee – the bank guarantees the repayment of the loan in addition to its beneficiary, a third person approved by the bank.
- Security in kind – gives the bank certain rights to the property values of the person who provides this security, whether it is the recipient of the loan or a third party (Kantnerová, 2016).

According to the context of the collateral with the credit claim for:

- Accessory collateral – closely linked to the object of the loan, while this object can itself be an object, it expires with the extinction of the claim.
- Abstract security – it is not related to the loaned claim and represents a stand-alone right that is independent of the loaned claim, the subject is entitled to return the pledge immediately after the loan is paid off (Kantnerová, 2016).

The fund's investment model is based on the same principles as a joint-stock company is organized. The investment fund obtains funds by issuing shares. The acquired capital is then invested in the financial market in various types of investment instruments. When using the investment model, investors become shareholders of the fund, while they can assert their rights at the general meeting (Revenda, 2013).

Collective investing is based on the interest of several investors to evaluate their free funds. This activity mainly concerns small investors. There are two models of such activity, namely mutual funds, and investment funds. In the case of an investment fund, clients become its shareholders with the right to vote at the fund's general meeting. The mutual fund does not have a legal personality, it is founded by an investment company that has a legal personality and a license for this business. By depositing funds, the client becomes a shareholder of the fund and receives a share certificate. (Kantnerová, 2016)

2. Methodology

In our research, we will focus on the analysis of the development of the housing market in the Czech Republic and Slovakia for the period 2020-2022 and try to provide an overview of the current situation. We will focus on the factors affecting this market, such as demand factors and supply factors, then these factors are compared between countries. Based on this analysis, a general overview of the current situation in the housing market in both countries is provided.

First, we examined the housing price indices in the Czech Republic and Slovakia. Apartment prices are influenced by many factors, which are discussed further. Subsequently, a mutual comparison of both countries is made.

Another factor that affects the price of real estate is interest rates. We analyzed the interest rates of the central banks of the Czech and Slovak Republics, while we also captured the development of mortgage loan interest rates in both countries.

The global increase in real estate prices increased after the outbreak of Covid-19 in 2020. This increase was caused by the synchronized reduction of interest rates and the more accommodative monetary policy of central banks. (Chung, 2023) According to author Lu Liu, interest rates and down payment ratio affect housing services consumed, while interest rates and mortgage length will affect rental housing rates. He also adds that the down payment or the interest rate does not affect on the housing acquisition period. (Liu, 2023)

Another factor that affects apartment prices is the creditworthiness of clients. We investigated the development of the average wage and unemployment of both countries because based on these data it is possible to estimate the purchasing power of the population of a given country.

In Western Europe, the great influence of the labor force is known. The greater the labor force and the more tolerant their approach to credit, the more banks are willing to lend, and the more debt households can accrue. At the same time, it is not enough to just accept that the demand for loans grows with income, it is also important to consider the security and the potential upward trajectory of this income. (Johnston, Fuller, & Regan, 2021)

An important factor affecting the demand for mortgages and, consequently, the individual price of apartments is the mortgage market regulation. We performed a comparative analysis of DTI and DSTI indicators in both countries. These indicators serve as instruments of financial stability used by central banks.

Another factor influencing the price of apartments is their construction. This factor is one of the supply factors. If the construction of apartments is lower than the demand, there is a shortage of apartments, which increases their price.

Based on the developed analyses, we made short predictions for the year 2023 for both countries.

3. Results

3.1 Price of Apartments

Czech Republic

Apartment price index: According to the Czech Statistical Office, there was a year-on-year increase in apartment prices. The average index in all monitored years was based on 2010. In 2020, there was an increase of 64.3%, the following year by 79.7%, and the year 2022 saw an increase of 116.8% (Table 1).

Table 1: Apartment price indices

2015 index = 100	2020	2021	2022
Housing price index	164.3	179.7	216.8

Source: Český statistický úřad, 2023

The prediction of the housing price index for the year 2023 was advanced using the development of consumer price inflation and its prediction for the year 2023. The calculation was carried out using regression analysis. Table 2 shows that the housing price index will fall by 8.2% in 2023 compared to the previous year. (Český statistický úřad, 2023)

Table 2: Predictions for the year 2023

Year	Index	Inflation
2020	164.3	3.2
2021	179.7	3.8
2022	216.8	15.1
2023	200.3	10.8

Source: own processing

Development of apartment prices in square meters (Table 3): Apartment prices in the Czech Republic averaged around CZK 69,125 per m² in 2020. In 2021, the amount increased to 82,475 CZK/m²; in 2022, the price increased to 93,025 (Deloitte Česká republika, 2023).

Table 3: Development of apartment prices

Prices in CZK per m ²	2020	2021	2022
	69,125	82,475	93,025

Source: Deloitte Česká republika, 2023

The year 2023 was advanced according to the development of consumer price inflation using regression analysis. The apartment price per m² is expected to decrease by 7.2% compared to 2022 (Table 4).

Table 4: Prediction of the apartment price for the year 2023

Year	Prices in CZK for m ²	Inflation in %
2020	69,125	3.2
2021	82,475	3.8
2022	93,025	15.1
2023	86,783	10.8

Source: own processing

Price indices of construction works according to CZ-CC classification: The price indices of construction work according to the CZ-CC classification (Table 5) had an increasing trend compared to 2015. In 2020, the value of residential buildings grew by 15.2% compared to 2015, the following year by almost 22%, and in 2022 by 37.6% (Český statistický úřad, 2023).

Table 5: Index of construction works

2015 = 100 %	2020	2021	2022
Apartment buildings	115.2	121.8	137.6
Single-family buildings	115.8	122.7	139.2
Two-and multi-apartment buildings	115.2	121.8	137.5
Other apartment buildings	114.5	120.7	136.2

Source: own processing based on Český statistický úřad (2023)

In the following Table 6, the residential building index in 2023 is advanced, which was calculated using regression analysis, depending on the development of inflation.

Table 6: Prediction of the index of residential buildings for the year 2023

Year	Residential buildings	Inflation
2020	115	3.2
2021	122	3.8
2022	138	15.1
2023	131	10.8

Source: own processing

Slovak Republic

Real estate price realization index: The price of apartments is influenced on the one hand by demand factors and on the other hand by supply factors. Apartment prices are expressed using various price indexes. The first index is the housing price growth index. This index measures the change in the price of apartments over time. In this case, the starting year is 2015. In 2015, the average price of an apartment was €1,351. From 2010 to 2022, it is possible to observe an increase in the price by more than double, i.e., by almost 119%. The highest year-on-year increase is recorded between 2021 and 2022 when the average price of apartments per m² increased by 22%. From this period until the middle of 2022, the Slovak mortgage market was in a good situation, and mortgage interest was around 1%, which was one of the factors in the growth of real estate prices (Table 7).

Table 7: Index of price growth in Slovakia

	2020	2021	2022	20/21	21/22
Housing price growth index (the year 2015 = 100)	151,9	175,4	214,6		
Housing price growth index (the year 2010 = 100)	154,6	178,5	218,5		
Average apartment prices (in EUR/m ²)	2 052	2 369	2 899	15%	22%

Source: own processing according to National Bank of Slovakia (next only NBS)

Prediction of apartment prices in Slovakia for the year 2023: The prediction is made based on regression analysis using MS Excel. As part of the regression analysis, the relationship between inflation and the price of apartments is used. Based on the NBS prediction, inflation will decrease by 2023. With the help of regression analysis, it follows that in 2023 there will be a slight decrease in apartment prices. The price per m² could be around 2,761 EUR. A cooling of the real estate market is very likely in 2023 (Table 8).

Table 8: Prediction of the apartment prices for the year 2023

Year	Prices in EUR for m ²	Inflation in %
2020	2,052	1.9
2021	2,369	3.2
2022	2,899	12.8
2023	2,761	10.6

Source: own processing

The price index of construction work: Another index that is used to record the development of apartment prices is the index of construction work prices according to the classification of

buildings. The price of construction work and materials in the construction industry is closely related to the development of apartment prices. The year 2015 is again used as the starting year. The prices of construction work in Slovakia have an increasing trend in all observed periods. However, this growth is not as fast as the growth of housing prices. The highest increase is recorded between the years 2021 and 2022 when there was a sharp increase in the prices of building materials, which also contributed to the already mentioned higher increase in the prices of apartments between these years (Table 9).

Table 9: Price index of construction works

2015 = 100 %	2020	2021	2022
Apartment buildings	116.1	122	148.5
Single-family buildings	114.9	118.3	143.7
Two-and multi-apartment buildings	116	122.1	148.6
Other apartment buildings	116.3	122.3	148.8

Source: custom processing according to Czech Republic House Price Index (2023)

The relationship between the housing price realization index and the construction work index is obvious. These indexes have a dependency and copy each other. This confirms the fact that apartment prices are also influenced by the factor of construction work prices.

3.2 Interest rates

Czech Republic

The following table 10 lists all interest rate changes in the Czech Republic from 2020. Currently (as of April 2023), the rates that changed on June 23, 2022, are still in place (Český statistický úřad, 2023).

Table 10: Changes in interest rates

2015 = 100 %	Lombard	2-weeks repo	Discount
07.02.2020	3.25	2.25	1.25
17.03.2020	2.75	1.75	0.75
27.03.2020	2	1	0.05
11.05.2020	1	0.25	-
24.06.2021	1.25	0.5	-
06.08.2021	1.75	0.75	-
01.10.2021	2.5	1.5	0.5
05.11.2021	3.75	2.75	1.75
23.12.2021	4.75	3.75	2.75
04.02.2022	5.5	4.5	3.5
01.04.2022	6	5	4
06.05.2022	6.75	5.75	4.75
03.06.2022	8	7	6

Source: own processing according to Český statistický úřad (2023)

Mortgage interest rates: Mortgage interest rates in 2020 are gradually falling after three years and even fall below 2 percent. Interest in mortgages is growing this year. In May 2021, the interest rate increased, and this trend continues for the following months, but the volume of mortgages provided did not decrease this year. In 2022, the interest is still increasing, but the interest in mortgages is decreasing (Table 11).

Table 11: Changes in mortgage interest

Mortgage interest	2020	2021	2022
January	2,36	1,94	4,14
February	2,42	1,93	4,52
March	2,44	1,94	4,62
April	2,39	1,98	4,88

May	2,3	2,4	5,33
June	2,21	2,51	5,71
July	2,15	2,61	6,24
August	2,11	2,67	6,28
September	2,07	2,84	6,23
October	2,02	3,14	6,2
November	1,98	3,39	6,31
December	1,96	3,81	6,34
Total	2,20	2,59	5,57

Source: own processing according to Fincentrum Hypoindex (2022)

Table 12 shows the volume of mortgages provided for the years 2020 – 2022 (Fincentrum Hypoindex, 2022).

Table 12: Volume of mortgages provided

Mortgages granted	2020	2021	2022
Volume (billion CZK)	16.88	24.94	22.89

Source: own processing according to Fincentrum Hypoindex (2022)

Slovak Republic

Another factor that affects the price of real estate is the interest rates of the central bank. This factor is one of the supply factors. The interest rate of the main refinancing operations is considered the basic interest rate. It is determined based on the ECB. Interest rates on loans provided by commercial banks are then developed based on this rate. With the base rate, the ECB kept the interest rate at 0.00% from 2016 until July 2022 (table 13). In 2022, because of rising inflation, the ECB decided to increase rates, and there were up to three increases during the year. Currently, the basic interest rate is already at the level of 3.50% and it is possible to assume its further increase.

Table 13: Interest rates of the central bank over time

Valid from	One-day refinancing operations	Main refinancing operations	One-day sterilization operations
21.12.2022	2.75 %	2.50 %	2.00 %
02.11.2022	2.25 %	2.00 %	1.50 %
14.09.2022	1.50 %	1.25 %	0.75 %
27.07.2022	0.75 %	0.50 %	0.00 %
18.09.2019	0.25%	0.00%	-0.50%

Source: own processing according to Národná banka Slovenska (2023)

Table 14 shows the interest rates of newly granted mortgage loans with a fixed term of 5 years or more. It can be seen from the table that in 2020 and 2021 interest rates were on average around 1.2%. Thanks to such low-interest rates, there was a great demand for loans, which resulted in supporting the growth of real estate prices. In 2022, due to rising inflation, the ECB decided to raise interest rates in July. This fact was immediately reflected in the growth of mortgage loan interest rates, and at the end of 2022, the average interest rate was already at the level of 2.82%. In 2023, growth in mortgage loan interest rates is also expected.

Table 14: Interest rates of mortgages with 5 or more-year fixation

Interest rates of newly granted mortgage loans	2020	2021	2022
January	1.253	1.22	1.04
February	1.25	1.12	1.07
March	1.202	1.14	1.18
April	1.18	1.1	1.39
May	1.25	1.13	1.74
June	1.26	1.1	2.07
July	1.197	1.08	2.52

August	1.206	1.06	2.86
September	1.133	1.06	2.82
October	1.209	1.06	3.07
November	1.13	1.06	3.19
December	1.18	1.09	3.32
Total	1.2	1.1	2.19

Source: own processing according to Národná banka Slovenska (2023)

Below in Table 15 is the volume of newly provided mortgages in pcs. Due to the increase in interest rates, there is a decrease in the volume of mortgages in 2022.

Table 15: Volume of provided mortgages

Mortgages granted	2020	2021	2022
Volume in units	8,396	11,042	9,484

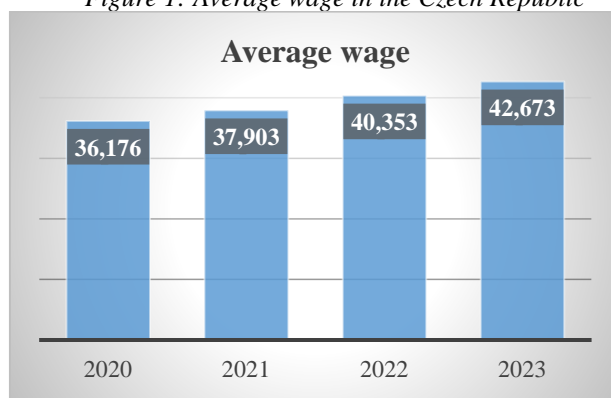
Source: own processing according to Národná banka Slovenska (2023)

3.3 Credit validity of clients

Czech Republic

Average wage: From the following graph (Figure 1), it can be observed that the average nominal wage in the Czech Republic is growing year-on-year. The year 2023 was advanced according to the average increase for the previous observed period, i.e., by almost 6%.

Figure 1: Average wage in the Czech Republic



Source: own processing

Indebtedness of Czech households: Household indebtedness for consumption, housing, and other loans has an increasing trend. Loans for household consumption increased by 1.2% from 2020/2021, in the next period the increase is larger, i.e., by 5.8%. Housing loans are similar in both periods and amount to an annual increase of around 8-9%. Loans included in the other section have the same trend, which increased by almost 5% year-on-year. The growing trend of loans is caused by the influence of rising inflation (Table 16), which causes the price of housing, food, energy, and even transport to rise (Český statistický úřad, 2023).

Table 16: Household indebtedness

In millions of CZK	For consumption	For housing	Others
2020	314,967	1,383,937	170,978
2021	319,045	1,517,101	179,261
2022	337,796	1,641,878	189,838

Source: custom processing according to (Český statistický úřad, 2023)

Default: The credit market is growing and borrowing money is fast and easy today thanks to the Internet. Unfortunately, with the growth of simplicity on the Internet, people often subscribe

to a non-bank institution that offers an easy loan at a disadvantageous interest rate, and thus households often find themselves unable to make proper repayments.

An example can be that the net annual income of one household reaches CZK 200,000. Unpaid loans amount to 90 thousand crowns. The maturity of such a loan is 3 years, i.e., every year the household must pay 30 thousand crowns. Loans make up exactly 15% of annual net income. Financial health equals $\text{debt} = 0$. The higher the debt-to-annual net income ratio, the more likely the household will be in financial trouble.

Higher mortgage debt has a clear negative effect on consumption. A high level of household indebtedness concerning income can weaken the entire household sector, if there is a decrease in income or an increase in interest rates, there may be problems with debt repayment. To determine the marginal forces of mortgage debt, it is important to consider monetary policy and macroeconomic indicators.

Unemployment: The unemployment rate in the Czech Republic is lower compared to the rest of Europe, reaching similar values as of the twelfth month of 2020-2022, i.e., around 3.5-4%. The beginning of 2023 shows a slight increase in unemployment (Table 17), which, however, still reaches similar values (Cost of living, 2023).

Table 17: The unemployment rate in the Czech Republic

Year	The unemployment rate in percent
2020	4.0
2021	3.5
2022	3.7
2023	3.9

Source: own processing according to (Český statistický úřad, 2023)

Slovak Republic

Average wage: Another factor affecting the growth of real estate prices is the development of the average nominal wage. Because the growth of the nominal wage results in greater purchasing power of the population. As a result, most of the demand for mortgages can occur. In Slovakia, it is possible to see an annual increase in the nominal wage every year. Between 2020 and 2021 there was a growth of 6.9% and between 2021 and 2022 a growth of 7.7% (Figure 2).

Figure 2: Development of the average nominal wage



Source: own processing according to (Štatistický úrad Slovenskej republiky, 2023)

Unemployment rate: Another factor that affects the price of real estate is the unemployment rate. If there is an increase in employment in the country, the potential number of real estate buyers also increases, which can increase real estate prices. In Slovakia, it is possible to see an annual decrease in unemployment (Table 18).

Table 18: Development of an unemployment rate

Year	The unemployment rate in percent
2020	7.57
2021	6.76
2022	5.9

Source: own processing according to (Štatistický úrad Slovenskej republiky, 2023)

3.4 Regulation of the mortgage market

The regulation of the mortgage market is an important factor that affects the demand for mortgages and, consequently, the individual price of apartments. Within this chapter, DTI, and DSTI indicators in individual countries are compared. These indicators serve as instruments of financial stability used by central banks.

Czech Republic

In 2020, the CNB set the LTV indicator at 90% and canceled the DSTI indicator limit due to the COVID-19 pandemic. It also reduced the countercyclical capital reserve rate of banks from 1% to 0.5%. The LTV indicator has not changed compared to the previous year and remains at 90%. In April of the same year, it abolished the limit for DTI indicators.

In 2021, with effect from April 2022, the upper limits of credit indicators were set. The maximum amount of LTV is 80%, and therefore 90% for applicants under the age of 36 who are purchasing the property for their housing. Furthermore, the maximum amount of DSTI was set – at 45%, for applicants under the age of 36 who purchase real estate for their housing, the indicator is set at 50%. The DTI indicator was set at 8.5%, for applicants younger than 36 who comply with the conditions, 9.5% applies. The counter-cyclical capital reserve was increased twice by 0.5% in 2021, at the end of the year it was 1.5%. The current countercyclical capital buffer rate is 2.5%. (Česká národní banka, 2023)

In the current situation, fixing the interest rate for a longer period is not worth it. The option is to fix the interest rate for a period of one year, up to three years, or choose a variable interest rate. In a year, the economic situation may be better, and the interest rate may be much more favorable (Česká národní banka, 2023).

Slovak Republic

The total indebtedness indicator serves to mitigate the risk of rapid growth in household indebtedness. The NBS uses this indicator as a financial stability tool. Currently, the total debt-to-income limit is set according to the borrower's age and the loan maturity period. The limits are shown in Table 20. If the client is under 40 years old, it is possible to grant him a loan in the amount of 8 times the annual household income. With increasing age, this limit decreases (Národná banka Slovenska, 2023).

Table 20: DTI depending on the age of the applicant

Age (in years)	Up to 40	41	42	43	44	56	57	58	59	From 60
Limit (DTI)	8	7.75	7.5	7.25	7	4	3.75	3.5	3.25	3

Source: own processing according to (Národná banka Slovenska, 2023)

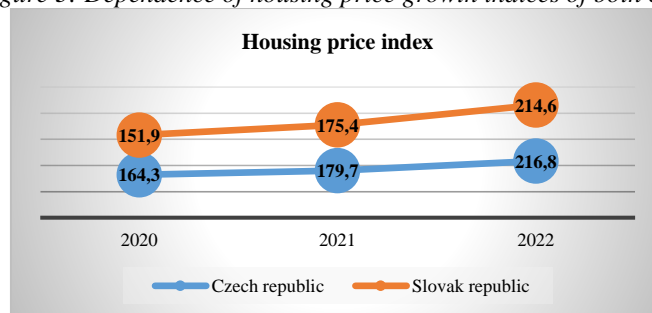
The ability to repay indicator serves to create a reserve in income. The NBS also uses this indicator as a financial stability tool. Currently, this limit is set by the NBS so that repayments can make up no more than 60% of household income. This means that at least 40% of income must be left for current expenses. In this case, the household income is further reduced by the

living wage. As for this limit until 2020, the amount of the limit was up to 80%. From 1.1. 2020 NBS proceeded to tighten this limit to 60% (Národná banka Slovenska, 2023).

4. Discussion

Regarding the comparison of apartment prices, it can be seen from the graph below (Figure 3) that the price growth index, which is based on 2010, is almost identical in both countries. The increase in apartment prices is very similar in both countries. The only year that deviated slightly was 2020, when there was a sharper increase in prices in the Czech Republic than in Slovakia. The difference in both countries is noted mainly in the price per square meter.

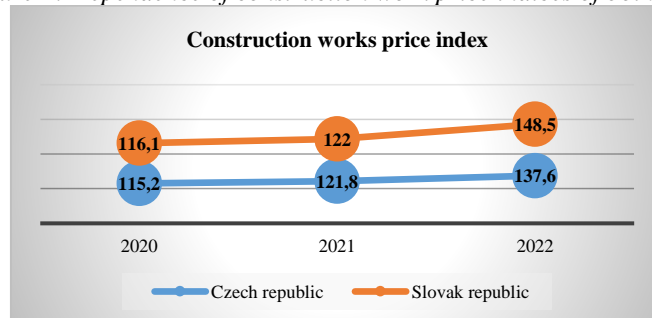
Figure 3: Dependence of housing price growth indices of both countries



Source: own processing

As with the price growth index, the same development can be followed with the construction work price index (Figure 4). The index in both countries is again almost identical. The difference only occurs in 2022, when there was a more significant increase in the prices of construction work in the Slovak Republic than in the Czech Republic.

Figure 4: Dependence of construction work price indices of both countries



Source: own processing

When looking at the interest rates of mortgage loans in both countries, it is possible to observe significant differences. These differences are caused by the politicians of individual central banks. Since Slovakia is based on the base interest rate of the European Central Bank (ECB), which does not have such a strong policy as the Czech National Bank, it is possible to see subsequent significant differences between the interest rates of mortgage loans. The biggest difference can be seen in 2022 when the 2t-repo rate was set at 7% in the Czech Republic in June. On the contrary, the ECB raised this rate to 2.5% at the end of 2022. This significantly affected the interest rates of mortgage loans, where in Slovakia the average mortgage rate with a fixation of 5 years or more was at the level of 2.19%. On the contrary, in the Czech Republic, the average mortgage rate with the same fixation climbed up to 5.57%. This makes mortgages in the Czech Republic significantly more financially demanding than in the Slovak Republic (Table 19).

Table 19: Comparison of interest rates in Slovakia and the Czech Republic

Interest rates of newly granted mortgage loans	2020	2021	2022
interest rates the Czech Republic	2.2	2.59	5.57
interest rates the Slovak Republic	1.2	1.1	2.19
2-week repo Czech Republic	0.25	3.75	7
2-week repo Slovak Republic	0	0	2.5

Source: own processing

Regarding the average nominal wage, it is possible to observe a year-on-year increase in the analyzed years in both countries. As for the average nominal wage, the Czech Republic achieves higher values than Slovakia. Likewise, unemployment in both countries has a downward trend. Higher values of the unemployment rate were achieved in Slovakia during the observed periods. In both countries, the average nominal wage is growing, and unemployment is falling. A higher average nominal wage increases the purchasing power of the population, which can lead to a greater demand for mortgages, which again supports the growth of apartment prices. Also, reducing unemployment increases the number of potential people who will apply for a mortgage, which again supports the growth of real estate prices in both countries.

5. Conclusions

The increase in the price of apartments in the period 2020-2022 is very similar for the Czech and Slovak Republics. In the period 2020/2021, there was an increase in the price of apartments in the Czech Republic by 19%, and in SK by 15%, in the following period, it increased by 13% in the Czech Republic, by 22%. The only significant difference is the price per m², which is almost CZK 20,000 higher in the Czech Republic. The price index of construction works again has a similar growth, except the last year, when the price of construction works increased significantly in Slovakia. Thanks to the different policies of the central banks, the interest rates of the two countries are quite different. The biggest difference is recorded again in 2022, when the 2t-repo rate in the Czech Republic reached 7%, while in SK it was only 2.5%. This fact affected the interest rate of mortgages, as the interest rate of a mortgage with a 5-year fixed rate was 3.28% higher in the Czech Republic, i.e., 5.57%.

The Czech Republic has one of the lowest unemployment rates in Europe, surpassing Slovakia by approximately 3% every year. The average nominal wage is also higher in the Czech Republic. However, the positive thing is that the unemployment trend is decreasing for both countries. In the years 2020/2021 there is an increase in exhibitions of new apartments for both states, while in the period 2021/2022, their decrease is recorded. This decrease is mainly caused by the increase in the price of materials and construction works. Completed buildings in the Czech Republic are increasing in both periods, while in Slovakia there is an annual decrease. Due to the high demand and the insufficient number of apartments, the price of apartments increases, which interrupts construction. The volume of new mortgages granted, and the development of GDP are similar in both countries. In the period 2020/2021, the economies did better, which was reflected in the increase in the volume of mortgages, the next period had the opposite trend for both states. When comparing inflation and mortgage interest, there is again a similar situation for both countries. There is a rise in inflation, which devalues money and central banks raise interest rates. In both countries, it is therefore assumed that real estate prices will stagnate in 2023, or possibly only grow more moderately.

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