Czech University of Life Sciences Prague

Faculty of Economics and Management

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Diploma Thesis

Mortgage Markets in Czech Republic and Russia

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DIPLOMA THESIS ASSIGNMENT

Bc. Alexandra Nikitenok

Economics and Management
Economics and Management

Thesis title

Mortgage Markets in Czech Republic and Russia

Objectives of thesis

The aim of this Diploma Thesis is to evaluate, analyse and compare mortgage markets in two chosen states – Czech Republic and Russia.

Methodology

- document study: professional literature, internet recources, specialized portals, laws
- description and comparison of given materials
- basic statistical methods

The proposed extent of the thesis

60 – 80 pages

Keywords

Mortgage, Lending System, Bank, Russia, Czechia

Recommended information sources

DUŠEK, Petr a Bohumil KOS. Právo hypotečního úvěrování. Praha: C.H. Beck, 2001. ISBN 80-7179-384-1

DVOŘÁK, P. – RADOVÁ, J. – MÁLEK, J. *Finanční matematika pro každého.* Praha: Grada, 2005. ISBN 80-247-1230-.

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Declaration

I declare that I have worked on my diploma thesis „Mortgage Markets in Czech Republic and Russia“ by myself under the supervision of my supervisor and I have used only sources that are mentioned at the end of the thesis.

In Prague

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Alexandra Nikitenok

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Abstrakt

Diplomová práce „Hypoteční trhy v České republice a v Rusku“ se zabývá analýzou a porovnáním hypotečních trhů ve vybraných státech – Česká republika a Ruská federace. Cílem této diplomové práce je zhodnotit a porovnat hypoteční trh ve vybraných státech, porovnat podmínky pro získáni hypoték, legislativní úpravu v této oblasti, porovnat soudobé trendy v této oblasti ve dvou státech. Dalším cílem je proanalyzovat faktory, které mají vliv na hypoteční trh a pomocí ekonometrické analýzy porovnat vliv těchto faktoru ve vybraných státech. Práce je rozdělená do 3 kapitol. První kapitola obsahuje vymezení cílů a metodologii této diplomové práce. Druhá kapitola se věnuje historickému a současnému vývoji hypotečních úvěru v Rusku a ČR, popisuje specifika tohoto typu úvěru ve vybraných zemích, a také popisuje a porovnává podmínky získáni hypotečních úvěrů pro žadatele, zabývá se legislativní úpravou této oblasti a statní podporou. Třetí kapitola poskytuje přehled některých makroekonomických a socioekonomických faktorů, které mají vliv na hypoteční trhy ve vybraných zemích, a dále poskytuje regresní analýzu těchto faktorů, prognózu budoucího vývoje a také obsahuje výsledky komparace českého a ruského hypotečního trhu.

Klíčová slova: hypotéka, hypoteční úvěr, hypoteční banka, Česká republika, Rusko, regresní analýza, prognóza, úroková sazba

Abstract

Diploma thesis „Mortgage Markets in Czech Republic and Russia“ deals with analysis and comparison of mortgage markets in selected countries - Czech Republic and Russia. The aim of my diploma thesis is to analyze and compare the mortgage market in selected states, compare conditions for obtaining mortgages, legislation in this area, compare current trends in this area in two states, further analyze the factors affecting the mortgage market, and, by using econometric analysis, compare the influence of these factors in selected countries. The thesis is divided into 4 chapters. The first chapter contains definition of goals and methodology of this thesis. The second chapter deals with the historical and current development of mortgage loans in Russia and the Czech Republic, describes the specifics of this type of loan in selected countries, and also describes and compares the conditions for obtaining mortgage loans for applicants, legislation in this area and state support. The third chapter provides an overview of some macroeconomic and socioeconomic factors affecting the mortgage markets in selected countries and provides a regression analysis of these factors, forecast of future development and contains the results of the comparison of the Czech and Russian mortgage markets.

Key words: Mortgage, Mortgage loan, Mortgage bank, Czech Republic, Russia, Regression analysis, Forecast, Interest rate

Content

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APR – Annual percentage rate of charge

CNB – Czech Central Bank

DSTI – Debt Service To Income ratio

DTI – Debt To Income ratio

GDP – Gross Domestic Product

LTV – Loan To Value ratio

Introduction

Present time is characterized by a constantly changing economic environment, the emergence of new products, the new forms of providing these products and the emergence of new institutions. Such constantly changing environment also requires changes in products offered by financial institutions. One of the fastest growing segments of the banking business in recent years has been mortgage lending. Market development has led to the emergence of different types of mortgage programs. Actuality of chosen topic is proved by the fact that mortgage is the most common way to finance the purchase of real estate property nowadays.

Currently, the Czech National Bank considers the current situation on the mortgage market in relation to the real estate market to be the greatest threat to the stability of the entire domestic financial sector. In addition, many significant changes, not only over the past few years, demonstrate the considerable dynamics of the Czech mortgage market.

In Russia, at the present stage of development of the Russian economy, the banking sector is no longer experiencing a period of rapid growth, as it was a year and a half earlier. However, credit organizations continue to slowly increase the volume of loan operations, thereby moving to the gradual saturation of the Russian banking market. Lending to the economy and the population has firmly taken the place of the main type of banking activity. In my diploma thesis I will use publicly available sources and information. The thesis will focus on the characteristics of mortgage loans, their specifics in selected states and comparison of loan conditions for applicants. In second part of this thesis will be provided regression analysis of factor, affecting mortgage market. The thesis is divided into three chapters. The first chapter describes objectives and methodology. Second chapter contains literature review and is focused on defining the terms of a mortgage loan in the Czech Republic and Russia, introduces the reader to the historical and current development of mortgage products in both countries and their specifics, regarding the situations on the real estate markets. Third chapter contains description of most important factors, which affect situation in mortgage markets in both states, compares these factors and provides regression analysis of these factors, such as GDP, inflation rate, interest rate, property price, unemployment rate, average wage and state support of mortgage lending, and also providing prognosis of the development of mortgage markets in both countries for the year 2020. Last part contains the results of the comparison of the Czech and Russian mortgage markets and conclusion.

1. Objectives and methodology

1.1. Objectives

The main aim of this diploma thesis is to compare mortgage markets in the Czech Republic and Russia.

The basic objectives of this diploma thesis are following:

- Introduce products of mortgage market in chosen countries to the reader
- Compare conditions of real estate markets in the Czech Republic and Russia and their influence on the mortgage loans development
- Evaluate and compare historical and current development of mortgage markets
- Compare legislation on mortgage loans in chosen states
- Compare conditions of mortgage loans and evaluate in which country the conditions are better.
- Describe and evaluate factors affecting mortgage loans market
- Provide econometric analysis of factors, affecting mortgage markets in chosen states, and evaluate, which factors have the biggest influence
- Provide prognosis of development of mortgage markets for the next year

1.2. Methodology

The collection of data for the thesis will be based mainly on the study of various documents and internet resources from the Czech Republic and Russia. These are mainly statistical sources, such as the Czech Statistical Office and its analogue in Russia, as well as other sources. After obtaining and comparing the data, a regression analysis will be performed using single equation econometric models. Chosen time period are years 2004-2018.

Regression analysis is one of the most widely used statistical methods. Its value lies in its ability to detect and quantify functional relationships between variables. It also allows to test various hypotheses about these relationships. It is widely used in many areas of everyday life. It can help us to clarify whether and how, for example, alcohol consumption is related to some negative phenomena in society; it can also help traders estimate the demand for their goods next year. It can be used in many other areas, even in sociolinguistics. The relationship between the variables is expressed by a model in which two types of variables appear.

Types of regression:

- Simple regression - studies the causal dependence between two variables
- Multiple regression - studies the causal dependence of one variable on at least two other variables

The independent regressors are denoted X_1, X_2,…, X_n[1]. The dependent variables (regressants) are denoted Y_1, Y_2, ..., Y_n. In this work the case of simple regression is considered, where there is only one dependent variable in the model and six independent variables. Dependence can be expressed in the form:

$$Y = f(X1, X2, \dots, Xn) + u \qquad (1.1.)$$

The member u in this model randomizes the error representing the deviation from the approximation. The function f can take many forms, but most often the relation between variables is linear and the model takes shape:

$$Y = ß0 + ß1X1 + ß2X2 + \cdots + ßnXn + u \qquad (1.2)$$

Parameters ß1, ß2, ..., ßn are called regression parameters or regression coefficients.

For a classical or standard linear regression model, the following requirements should be met:

1. $E(u) = 0$
2. $Var(u_t) = \sigma^2 < \infty$
3. $Cov(u_i,u_j) = 0$ for $i \neq j$
4. $Cov(x_it,u_t) = 0$
5. $h(X) = k$, i.e. nonrandom matrix X has linearly independent columns
6. Normal distribution of u_t

Method description:

1. Specifying the task

First, we need to carefully determine what task has to be solved. Further steps, such as selecting variables or specifying the model, then depend on this consideration. The next step is to specify the economic model, or basic hypothesis. Depending on the different assumptions of individual economic theories, more than one basic hypothesis can be reached, and it is not possible to determine in advance which one is correct[2].

2. Selection of potentially relevant variables

[1] Hušek, R. (2007). *Econometric analysis*. Prague: Oeconomica, pp.27-44, [Accessed 21 Feb. 2020], ISBN 978-80-245-1300-3.
[2] Hušek, R. (2007). *Econometric analysis*. Prague: Oeconomica, pp.9-23, [Accessed 21 Feb. 2020], ISBN 978-80-245-1300-3.

At this stage, it is necessary to select variables that could affect the dependent variable, i.e. select independent variables. It is better to include also variables that we are not sure about in the selection. Regression analysis allows us to test their relevance, and, upon the analysis results, they can then be excluded from the model.

3. Data collection

The data used to quantify the model usually have the character of quantitative statistical observations of a non-experimental nature. Therefore, they are not specifically generated to estimate the specific econometric model. Statistical data can be of various kinds:

a) Time series data – provide information on numerical values of variables in different consecutive periods of various lengths, such as years, quarters or months.

b) Cross-sectional data – represent observations of variables related to individual subjects in the same period.

c) Panel data – are generated by repeating a sample survey using a given program for the same sample of respondents in different periods.

4. Specifying the model

This part is very difficult and often decisive, as an improperly chosen model can lead to misleading results. Models can be backvalidated and two different models can be compared. This allows us to select a model that best describes the situation. The specification of the econometric model consists of the following steps:

a) Determination and classification of all variables included in the model in accordance with a priori and selective information obtained from economic theory and data

b) Determination of expected negative or positive influence (and thus, plus or minus sign should be used with the estimated parameter) and expected values of estimated model parameters

c) Selection of mathematical and analytical shape of the model, resp. of its individual equations

5. Estimation of regression parameters

Mathematically formulated dependencies of economic, but not only economic variables, allow us to quantify the intensity and direction of interaction between the model variables, as measured by estimated parameters of the econometric model.

Following is the calculation of the coefficients $ß_1$, $ß_2$, ..., $ß_n$. Most commonly, the so-called least squares method is used, which minimizes the sum of squares by distances of n points in k 1 dimensional space (which represent n observations) from a line or curve that we interleave

through space and which represents the resulting regression equation. Under certain assumptions that need to be known and verified, this method gives reliable estimates of the regression coefficients.

6. Evaluation of model quality and verification

If we are going to estimate the econometric model using adequate econometric methods and techniques, it should be followed by verification ensuring that the estimated parameters are consistent with the underlying theoretical assumptions. This is mainly done by selecting the suitable test criteria.

a) The economic verification of the estimated model is based on a priori economic criteria. It basically consists in verifying the correctness of the arithmetical signs (plus or minus) and the magnitude of the numerical values of the estimated parameters.

b) Statistical verification serves to assess the statistical feasibility of individual estimated parameters and the whole econometric model. It is based on statistical criteria or statistical tests to verify the accuracy or significance of the quantification results. The most commonly used criteria for statistical verification are standard errors of estimated parameters, multiple determination coefficients and t and F tests of statistical significance of estimates.

c) Econometric verification of the model consists in verifying the conditions necessary for the successful application of specific econometric methods, tests, and techniques. Econometric criteria can include heteroskedasticity tests, autocorrelation of random components, and criteria of multicolinearity of explanatory variables.

For statistical verification within this scope of this work, one of the most basic tests, namely the Student's t-test, will be used, which is a test of the mean value of one selection of one homogeneous group. This test compares the sample mean with a reference constant that represents the mean of the population. In this thesis, all statistical and econometric tests are provided by software *gretl*. I will use this test to estimate the significance of parameters in the model. Statistical significance is the criteria for the analyst that the ontained results cannot be explained by an accident. The result is expressed by a p-value between 0 and 1, showing the level of statistical significance. A p-value of 5% (0.05) or lower is often considered to be statistically significant.

The method of least squares allows us to determine the selective regression function by showing the maximum possible match with the observed data. The smaller is the regression variance, the more complete is the explanation of the changes in the dependent

variable due to the changes in the explanatory independent variables. Most often, the coefficient of multiple determination, which is a ratio explaining the variance of the endogenous variable Y by the estimated linear regression model, i.e. by all independent model variables, is used as the measure of conformity of the estimated linear model with empirical data. This is a random variable which value varies across different selections. We can simply say that the total sum of squares of the dependent variable Y can be broken down into the sum of squares explained by all independent variables (i.e. estimated regression model) and into the unexplained (residual) sum of squares. The coefficient of multiple determination R^2 can then be expressed as the ratio of the sum of explained squares and the total sum of the squares, or:

$$R^2 = \frac{SS_{reg}}{SS_{tot}} = 1 - \frac{SS_{res}}{SS_{tot}} \qquad (1.3.)$$

Where SS_{reg} is the sum of squares explained, SS_{res} is the sum of residuals unexplained, SS_{tot} is sum of squares total.

The value of R^2 ranges from zero to one. In the extreme case where all residues are zero, SS_{res} is zero, so the total sum of squares is completely explained by the regression model and R^2 = 1. For the opposite extremity where all estimated regression coefficients are zero, $SS_{res} = SS_{tot}$, it means that nothing from the total sum of squares is explained, and R^2 = 0. Therefore, R^2 is suitable for testing the statistical significance of the model as a whole.

For econometric tests to be used in this thesis, autocorrelation and heteroscedasticity tests have been chosen. For normally distributed random components, they are required to be independent in pairs. If a random component is correlated with the random component(s) in the previous period(s), it is considered to be an autocorrelation. In this work, autocorrelation will be tested using the Durbin-Watson test.

Heteroscedasticity means failure to meet the requirement of finite and constant variance of residuals. If the requirement of finite and constant dispersion of residuals is met, it is called homoscedasticity[3]. To test the presence of heteroscedasticity in the model, we will use the White's test, employing Gretl software application.

7. Practical use of the model

The final implementation phase of econometric analysis is the practical use of the estimated model for the purpose of analyzing the problem or system under investigation in the

[3] Hušek, R. (2007). Econometric analysis. Prague: Oeconomica, pp.74-83, [Accessed 21 Feb. 2020], ISBN 978-80-245-1300-3.

period for which statistical data is available (ex post analysis), as well as for the forecasting period (ex ante analysis).

The next part of the diploma thesis includes linear regression analysis of factors, described in the previous part: GDP, inflation rate, interest rate, unemployment rate and average wage. For each country, one-equation model is built, and based on it, the analysis conducted on how the chosen factors affect the number of granted mortgage loans. After that, economic verification is provided, describing whether these factors are consistent with the economic theory. Next step is providing statistical verification, by testing implication of variables and implication of the model as a whole. Next step is econometric verification, based on the Durbin-Watson test and White's test for heteroscedsticity. As a last step, elasticity of factors is calculated, as a parameter affecting the number of granted mortgage loans, and comparison of their influence strength in both countries is conducted.

2. Mortgage Markets

2.1. General characteristics of a mortgage loan as a bank product

Loan products in banks generally represent a substantial part of the assets. Banks provide a range of different loans.

Basic criteria for credit products systematization are the following[4]:

- **Loan beneficiary**
  - Government, municipalities, public entities
  - Business entities
  - Individuals
- **Form of granting the loan**
  - Cash loans (are known as the actual provision of money to a beneficiary in cash or cashless form. The client must repay the loan including the interest within the agreed time)
  - Commitment loans and guarantees (means that the bank only guarantees its client to fulfill the client‘s obligations, if the client fails to fulfill them by the agreed deadline)
- **Loan maturity**
  - Short-term – maturity up to one year
  - Medium-term – maturity up to five years
  - Long-term – maturity more than five years
- **Purpose of use**
  - Non-purpose loans – the purpose of use is not defined in the contract, the borrowers may use the money at their discretion
  - Special-purpose loans – the contract specifies the purpose for which the borrowers can use the loan, otherwise they would breach the contract

[4] Půlpánová, S. (2007). *Commercial banking in the Czech Republic*. Praha: Oeconomica, pp.293-296, [Accessed 21 Feb. 2020], ISBN 978-80-245-1180-1.

- **The currency** in which loan is provided may be domestic or foreign. If the loan is provided in foreign currency, from the bank‘s point of view, it is a foreign currency loan
- **Security method**
  - Unsecured, which are provided by banks without any collateral
  - Secured, where the form of collateral is agreed.

Mortgage loans belong to classic and popular bank loan products.

General definition of mortgage loans is the following: mortgage is an long-term agreement between applicant and banking or non-banking organization signed in order to purchase a real estate property. Its a debt instrument, which is secured by the real estate property, and the borrower must pay a defined set of payments. The nature of collateral has impact on the relatively low risk of mortgage loans and their possible long-term nature.

2.2. History of the mortgage loan concept

Mortgage as an element of economic life is rooted deep in history. It first appeared yet before our era, as a way of ensuring the obligation of a debtor person, who, in case of the fault of paying off the loan, would be enslaved. In the latest economic formations the mortgage has turned into a powerful investment and financial instrument. The concept of mortgage came into the world’s financial and economic system from the ancient Greece[5]. It was introduced by the Athenian ruler Solon in the 6th century before our era. In 594 BC Solon introduced reforms, declaring the freedom of will to transfer the property ownership rights. As a result of those changes, the land property could be passed to other people, not necessarily to the heirs of the clan. In order to replace personal liability with property liability, the following order was organized: the lender placed a stone pillar on the debtor’s land, where the following was written: the name of debtor-landowner who pledged it, the name of the lender, the amount of debt, and when this debt was to be repaid. Such a pillar was called “hypothec” (from the Greek. hypotheka – pillar, stand). In a figurative sense, this word began to be used to mean a pledge of real estate. The owner of the mortgaged land did not have the right to move it away from the property and re-mortgage, as then everyone saw that his land was already mortgaged. That innovation was caused by the fact that some unscrupulous debtors repeatedly

[5] S.U., N. (2020). *A brief history of the development of mortgages: foreign experience.* [online] Ciberleninka. Available at: https://cyberleninka.ru/article/v/kratkaya-istoriya-razvitiya-ipoteki-zarubezhnyy-opyt [Accessed 29 Jan. 2020].

pledged their land for many times, thereby deceiving creditors. A little later, the pillars were replaced by mortgage books.

Centuries afterwards, the institute of mortgages migrated to the Roman Empire, and then to the medieval Europe. In ancient Rome, in connection with its agrarian specialization (unlike Greece, where shipping and manufacturing were more developed), the land was a great value, and private property acquired legislative registration. Initially, the oldest form of real estate collateral was common, in which the property was transferred into the ownership of the lender until the debt was paid off. The debtor, having repaid the debt, received the right to demand the property back. Later, another type of mortgage became widespread, in which the property remained in the ownership and usage of the debtor.

The evolution of mortgage loans over the centuries has led to the formation of a two-tier lending system. For the first time such a system was implemented and gained distribution in the United States. In the United States of America, during the F. Roosevelt's presidency, an extensive system of lending for housing construction and house purchasing began to develop. Today the housing mortgage system in the United States is a complex market of enormous scale, in which a large number of institutions participate, including mortgage and commercial banks, savings and credit associations, insurance companies, pension funds, etc.

Also, the United States spent tens of millions of dollars in the countries of Eastern Europe, directly or through the World Bank, as part of assistance programs for creating American-style mortgage lending and financing systems. But instead of accepting the American mortgage system, these countries passed laws based on German (European continental) law, which was more in line with the traditions and the economic realities of these countries.

2.2.1. History of mortgage loan – in the Czech Republic

Mortgage banking has a relatively long history in the Czech region. The first mortgage loans and related mortgage bonds appeared as a specific type of financial operations for the first time in the 18th century in Silesia, from where they later spread to other countries.

The first mortgage bank in the Czech lands was the Mortgage Bank of the Kingdom of Bohemia, founded in 1865[6]. With the advent of the Protectorate of Nazi Germany in 1939, the mortgage banking sector was almost liquidated. Also later in the 20th century, for more than fifty years after World War II, the development of this area of banking has been forcibly interrupted. The ordinary citizens were much less familiar with this method than, for example,

[6] www.newlogic.cz, N. (2020). *Products*. [online] Partners. Available at: http://www.partners.cz/cs/produkty/hypoteky/historie-hypotecnich-uveru/ [Accessed 29 Jan. 2020].

with the method of conventional savings books. Mortgage lending was re-introduced in our country not so far ago. Mortgage banking was formally restored in 1990, but due to the malfunctioning of the capital market and insufficient legal background, the first mortgage loans were granted only in 1995. Since that time, the popularity of mortgage loans as a source of long-term financing of mainly residential property has been constantly increasing. Approximately since 2000, there has been a huge increase in the volume of mortgage loans and the emergence of new mortgage products answering the customer needs.

As mentioned above, mortgage loans have been provided in the Czech Republic since 1995. The initial period was characterized by a very small volume of provided mortgage loans, mainly due to the relatively high interest burden on mortgage loans, with minimum mortgage rates ranging between 11 and 12% per year, at different banks. The lack of experience with this form of housing financing, ignorance of conditions, distrust towards a new "untested" product and high real estate prices were probably the most significant reasons for the rather small interest in mortgages.

Only starting from the year 2000, the public interest to the mortgage loans began to show a constant growth, as the interest rate reduction trend continued. While in 1999 the rates fluctuated at an average of 10.3%, by the end of year 2000 they fell to 8.4%. Significant increase in competition in this area also had a significant impact on the development of the Czech mortgage market; with three other mortgage banks entering the market. At the same time, the demand in the mortgage credit market was strongly stimulated by the State aid system. The State aid covered 4 percentage points of the mortgage loans, which meant a reduction in the interest burden on many mortgage loans below 5%.

Mortgage loans were gradually becoming a standard tool for housing acquisition. In 2002, new products were introduced to the mortgage market, the most important of which was a mortgage loan granted up to the full amount of the pledge (100% loan-to-value, LTV). The average mortgage loan sum in 2003 for individuals increased by 7%, to CZK 1.15 million. The main reasons for the mortgage loans popularity were a decline in interest rates, expected changes in VAT, and concerns about the rise in property prices after the Czech Republic joined the European Union. Important factors were also the increase in real wages, and unresolved rent deregulation issue. Due to increased demand, housing development projects have developed rapidly, especially in large cities.

The growth in the mortgage market continued, along with the housing construction volumes. The number of newly started dwelling constructions increased by 4.2% (41,628) at the end of 2005, the highest indicator since 1993. In 2005, mortgage loans showed an increase

of 25% in number and 44% in volume compared to 2004. The average mortgage interest rate fell below 4,5%.

Years 2006 and 2007 marked a major boom in the mortgage lending. Interest rates are still very low. Development projects are doing well and the volume of provided mortgage loans is at its maximum. At the beginning of 2008, the number and volume of mortgage loans is increasing, but over the course of the year the Czech mortgage market has been hit by the American mortgage crisis. The end of the year has shown the weaker numbers.

At that period, due to the financial crisis, most banks suspended financing of 100% LTV mortgages and mortgages without documenting income. Development projects and new construction in general were also almost suspended. However, high demand for mortgage remained. After two years of great dampening, the boom was coming again. Interest rates fell to a historical low well below 4%. Most of those who postponed housing finance in the uncertain years of 2008-2010 saw 2011 as a good time for a mortgage loan. Due to the increase in VAT since 2012, many bank clients tried to finance their housing in 2011. The year 2011 was above all expectations marked by an enormous increase in the volume of mortgage loans.

The current stage of the mortgage market in the Czech Republic will be described in the following chapters.

2.2.2. History of mortgage loan - in Russian Federation

Mortgage lending in Russia was born together with the emergence of the right of private ownership on land. Already in the XIII century there existed a pledge, and in XV century there appeared a possibility of a secondary pledge on the land.[7]

State owned credit banks

The starting point of the official Russian mortgage can be considered as year 1754 – that's when the first state owned credit institutions – The Dvoriansky bank and the Commercial Merchants Bank appeared. All the banks were public (state owned) in form of ownership, and by the nature of their activities they were mainly mortgage lending institutions.

The main clients of the banks at that time were representatives of the St. Petersburg court nobility and large provincial landowners. Not seldom the loans were granted to them

[7] Rusipoteka.ru. (2020). *Mortgage History | Mortgage Development in Russia*. [online] Available at: http://rusipoteka.ru/istoria_ipoteki/ipoteka_istoriya/ [Accessed 18 Feb. 2020].

without any collateral, "by the pledge of His Imperial Majesty". Hence was the unwillingness to pay the bills, that's why the bank has accumulated huge debts.

Naturally, such "charity" from the government had a negative impact on the state treasury. By 1859, more than 7 million of peasants had been mortgaged in the State Bank and Preservation Treasuries, and the total debt of landowners reached 425 million rubles.

Ban on mortgages from the state banks

The Emperor Alexander II managed to protect the Treasury from the ruin: by his order of 16 April 1859, the issuance of loans from the state credit institutions against the pledge of real estate was stopped. Thus, the mortgage loans have temporary ceased to exist in Russia.

However, no one could cancel the need for them. New types of enterprises (partnerships, joint-stock companies), residents of fast-growing cities, representatives of the nobility class, deprived of free labor after the abolition of serfdom in 1861 needed "long" money. And here private initiative came to resque, which was in line with the government's policy of developing various forms of ownership in the banking sector.

Zemstvo banks

In 1859, Alexander II ordered to establish a new type of credit institutions – so-called "Zemstvo" (regional) banks. They were to replace the public credit institutions that were in the process of liquidation. As distinct from the State bank, which were public, that is, state-owned, Zemstvo banks were created as mutually responsible partnerships (limited liability companies). So, the mortgage banks were resurrected in Russia – but now in the form of joint stock companies.

Credit societies

To serve Russia's huge mortgage market, there were also established credit societies, creating a new system of mortgage lending in Russia. The largest was the St. Petersburg Credit Society. The scope of work of the St. Petersburg Credit Society was enormous. From the moment of opening till March, 1st, 1911 the company had accepted 9462 objects of property as a pledge, and the volume of credits had reached 332 million rubles.

Following the St. Petersburg Credit Society, a similar one was opened in Moscow, and its activity was no less large-scale than in the northern capital. The amount of loans issued reached three quarters of the estimated amount of mortgaged city property and up to 50% of the entire country property.

Following the example of Saint-Petersburg and Moscow, credit companies began to appear in other cities of the Russian Empire. By the beginning of the XX century there were already 32 of them, in different parts of the country.

Land banks

However, credit societies were not the monopolists in the area of urban real estate loans. Some time after their appearance, they faced strong competitors – the land banks. The first joint-stock land banks appeared in 1872.

By the beginning of the 20th century, land banks had achieved a leading position in the Russian land lending system. They accounted for one third of total mortgage loans and one third of all pledged land. By 1915, their mortgage loans totaled Rub. 5.5 billion. By 1917, there were already 21 land banks in Russia.

Golden age of mortgages and revolution

The end of the 19th century was a truly golden age for mortgages. By this time, Russia has formed a strong system of mortgage loans. At the turn of the century, mortgage operations continued to grow, and mortgage as a type of loan became a mass phenomenon: two thirds of private landowners became the clients of the land banks. The number of small credit associations was increasing significantly: in 1905 there were more than 500 of them, and by 1915 their number has already reached 15450.

The history of the mortgage in Russia was interrupted by the October Revolution – after the revolution private property was banned. In the course of nationalization, the banks were closed and credit societies were centralized. By the end of 1918, mortgage lending no longer existed. As a result, the concept of "mortgage" was forgotten for more than 70 years.

Reappearance of mortgages in new Russia

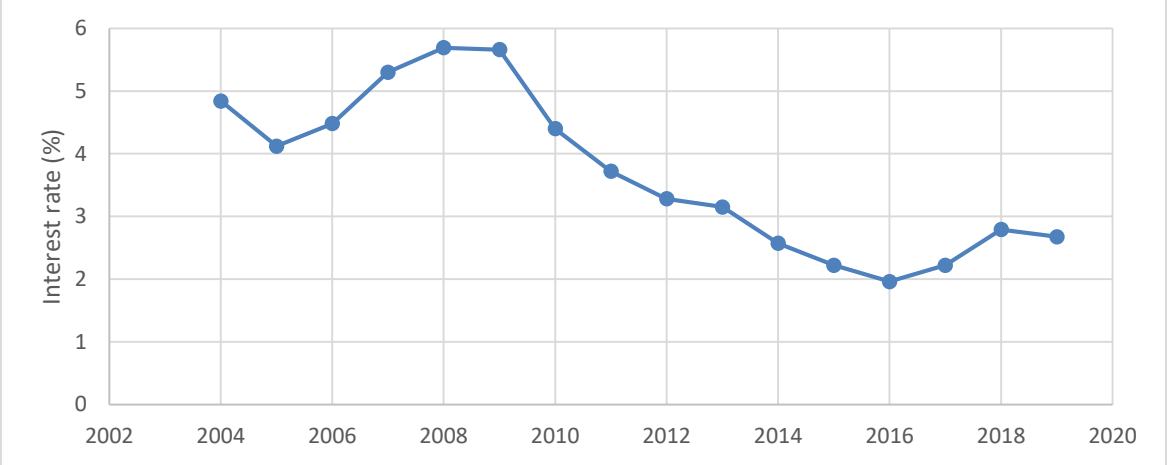
Mortgages were revived only in the early 1990s, and legislative support for them was provided in 1998, when Federal Law No. 102-FZ "On Mortgages (Pledges of Real Estate)" was issued. Since 2005, the mortgage market in Russia has entered the stage of active growth: over the year, loans worth 30 billion rubles were granted. As everywhere, the mortgage market in Russia was hit by the economic crisis of 2008-2010, but the wave of the economic crisis, having frightened the market, subsided, and by the beginning of 2011 the mortgage market had reached the next stage of its development. Current state of the mortgage market in Russia will be described below.

2.3. Current mortgage market in Czechia

The Czech mortgage market is constantly evolving. The importance of mortgages is constantly growing. Not only young people are interested in mortgages and interest rates have been falling sharply over the last decade. If we look back 10 years back, we can see that the

interest rate was around 6%, which is roughly twice as much as it is currently. Average interest rate in year 2018 was 2.79%, in year 2019 declining trend continued and in the end of the year the average rate on mortgage loans was 2.34%[8].

Graph 1: Average interest rate on mortgage loans 2004-2019 in Czech Republic



Source: www.cnb.cz, statistical series ARAD, self creation

After the world mortgage crisis, which hit the world in 2007, the number and volume of mortgage loans decreased, but since 2009 these figures have been growing continuously.

While in 2004, the mortgage loan contracts totaling CZK 68 billion (USD 3 bln.) were concluded, in 2018, the total volume of mortgage loans exceeded a record CZK 267 billion (USD 11 bln.)

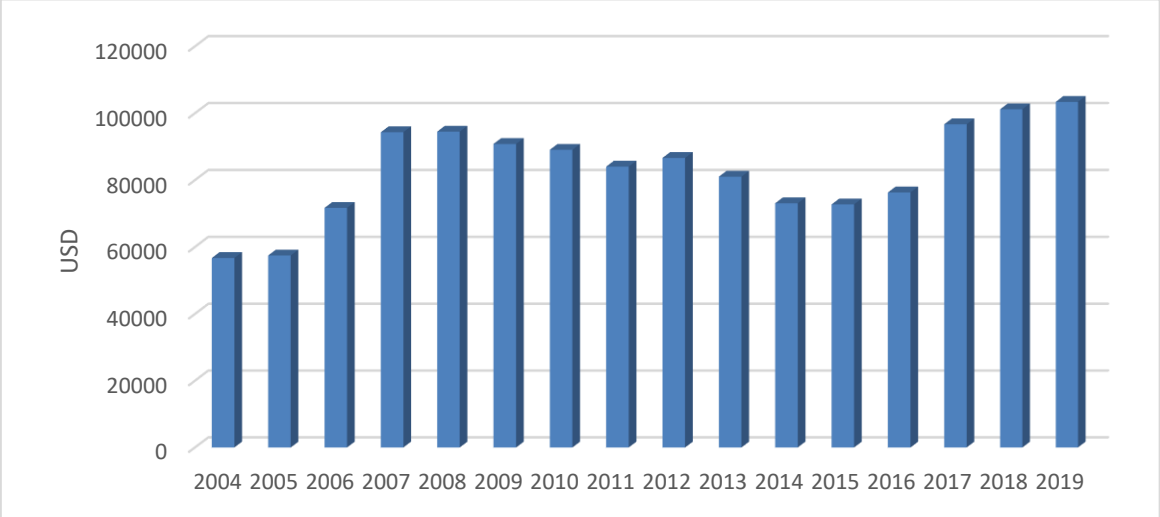
With the growing number of signed mortgage agreements and the total volume of borrowed money, the average amount of a mortgage loan also increased. While in 2004 the average mortgage loan amounted to approximately CZK 1.27 million (USD 56 ths.), in 2008 it was already CZK 1.77 million (USD 94 ths.) and in 2018 already CZK 2.2 million[9] (USD 101 ths.). In December 2019, the average mortgage loan amounted to CZK 2.54 million (USD 112.4 ths.), The average mortgage loan in 2019 was CZK 2.338 million (USD 103.3 ths.)[10]. The average mortgage loan amount in Czech Republic in years 2004-2019 is shown on Graph 2.

[8] Eremin, E. (2020). *Fincentrum Hypoindex - development - Hypoindex.cz*. [online] Hypoindex.cz. Available at: https://www.hypoindex.cz/hypoindex-vyvoj/ [Accessed 19 Feb. 2020].

[9] Novinky.cz. (2020). *Mortgage rates are falling sharply, but the market is stagnating - Novinky.cz*. [online] Available at: https://www.novinky.cz/finance/clanek/sazby-hypotek-prudce-klesaji-trh-vsak-stagnuje-40300015 [Accessed 23 Jan. 2020].

[10] Sovov, E., 2020. *Interest Rates On Mortgages Are Stabilizing, Interest In Mortgage Loans Is Declining*. [online] iDNES.cz. Available at: <https://www.idnes.cz/finance/hypoteky-a-pujcky/hypoteky-a-urokove-sazby-hypoindex-prosinec-2019-ceny-nemovitosti-investice.A200121_101519_pujcky_sov> [Accessed 24 March 2020].

Graph 2: Average mortgage loan volume 2004-2019 in Czech Republic



Source 1: https://www.peak.cz/hypoteky-uz-levne-nebudou-zmapovali-jsme-posledni-vyvoj-na-hypotecnim-trhu/13144/

Source 2: https://www.finance.cz/485001-uvery-na-bydleni-2016/, self creation

By combining Graph 1 and Graph 2 we can easily see that the most favorable year for the customers to take a mortgage loan was year 2016 – the interest rate was the smallest, and the borrowed sum was also among the lowest ones. And indeed, the year 2016 became a record year in terms of the number of concluded contracts for mortgage loans. There were concluded 114,044 loans in total value CZK 292,993 mln. (USD 13,761 mln.)

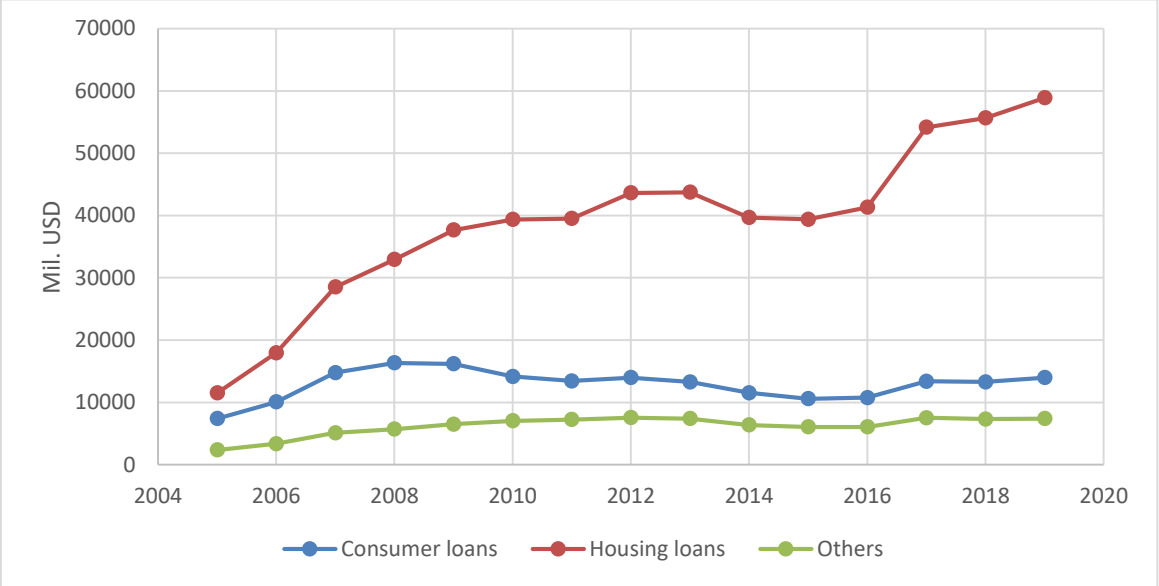
The relatively benevolent lending conditions, together with falling interest rates, contributed to the fact that almost every mortgage loan applicant got the loan.

This is one of the reasons why the indebtedness of Czech households continued to grow.

On the graph below a reader can see the structure of total debt of Czech households. Total debt consists of mortgage loans, consumer loans and other types of loans.

While in 2005 Czech households owed to the banks about CZK 522 billion (USD 21.2 bln), of which about 55% (USD 11.66 bln) were loans for housing, in year 2018 the total household debt exceeded CZK 1.71 trillion (USD 76.1 bln). Of this, Czech households owed to the banks more than CZK 1.2 trillion (USD 53.4 bln) in housing loans, which is more than 70%. So, currently, by the end of 2018 the role of mortgage loans in the total portfolio of banking products was continuing to grow.

Graph 3: Total indebtedness of Czech households 2005-2019



Source: https://www.cnb.cz/cnb/STAT.ARADY_PKG.VYSTUP?p_sestuid=1538&p_uka=1,2,3&p_strid=AAD&p_sort=2&p_od=200512&p_do=201911&p_period=12&p_des=50&p_format=4&p_decsep=,&p_lang=CS, self creation

That was one of the reasons why the CNB pushed for a tightening of mortgage lending conditions – for the fear of excessive debt of Czech households.

The increase in the overall indebtedness of Czech households can be explained mainly by the growing confidence in their ability to repay the debt, together with the current low unemployment rate and, on the other hand, by the low interest rates, which attract people to apply either for a consumer loan or a mortgage.

Easy availability of mortgages can be a reason of the market overheating, which could become a complication for the whole economy. In order to prevent this, the CNB terminated the "one hundred percent mortgage regime" in 2016.

The banks were forced to assess the ability of applicants to repay mortgage loans more strictly. The new limits considered the total indebtedness of the mortgage loan applicants in relation to their income or the size of their monthly income payments. In April 2017, CNB imposed a recommendation to the banks not to provide mortgages above 90 percent LTV, and also to limit mortgages above 80 percent LTV. Such mortgage contracts should not exceed 15 percent of the total volume of granted mortgages.

In addition, as of October 2018, a mortgage applicant must meet other conditions. The total indebtedness of applicants may not exceed nine times their annual net income and at the same time their expenditure on the repayment of all their loans may not exceed 45 per cent of their monthly income. Banks are allowed to exceed these values only exceptionally, and only up to five percent of all provided mortgages.

Household indebtedness by consumer loans is also assessed, in order to prevent the usage of credit money by the loan applicants for their first installment for the mortgage.

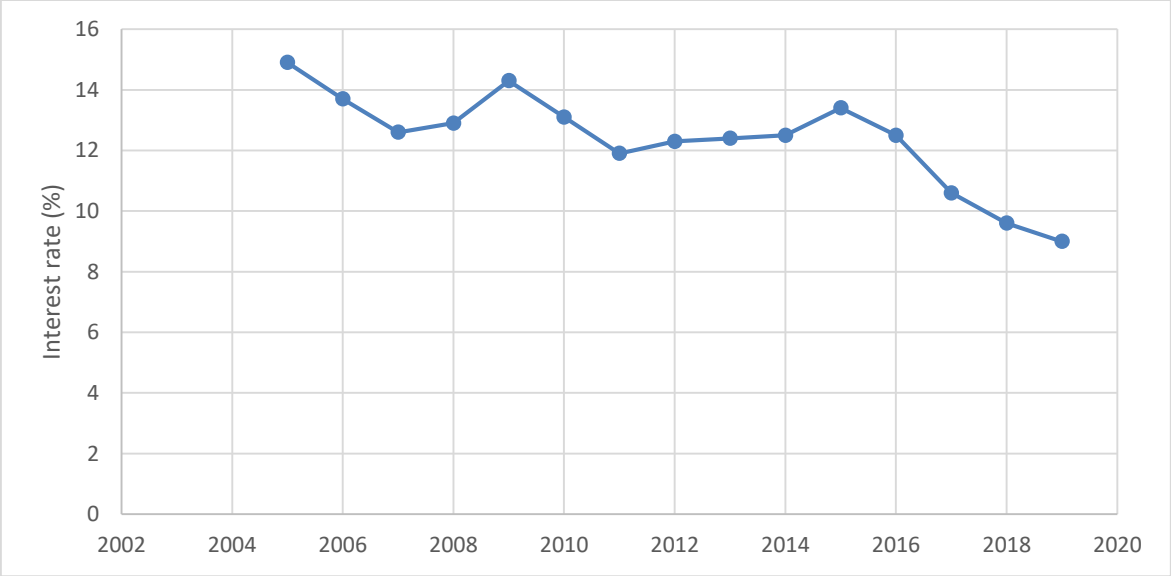
Top largest banks, which provide mortgage loans, are: Česká spořitelna**,** Hypoteční banka**,** Komerční banka**,** Raiffeisenbank**,** UniCredit Bank**,** Moneta Money Bank**.**

2.4. Current mortgage market in Russia

According to the RAEX rating agency, in 2018, the volume of mortgage lending in Russia increased to 3 trillion. rubles (about USD 50 bln)[11].

Year 2018 was a record year for the mortgage market. The growth of housing lending reached its peak since 2011. The banks issued mortgages for almost 3 trillion rubles, which is 49% higher than in 2017 (in 2011, the growth was 89%). For 12 months of 2018, banks issued 1,471.8 thousand mortgage loans totaling 3,013 billion rubles. The volume of lending increased by 49% against 37.2% a year earlier. The growth in mortgage lending in 2018 was ensured by gradually lowing lending rates and stable housing prices. A record increase in mortgage lending in 2018 was facilitated by lower lending rates. Compared to 2017, the average mortgage rate decreased by 11.3% - from 10.6% to 9.6% - this is the minimum level since the inception of the mortgage market in Russia in 1998. In 2019 interest rates continued in decreasing and the average rate was 9%.

Graph 4: Average interest rate on mortgage loans 2004-2019 in Russia



Source: https://raex-a.ru/media/uploads/bulletins/pdf/2019_ipoteka_bul.pdf, self creation

[11] Raex-a.ru. (2020). [online] Available at: https://raex-a.ru/media/uploads/bulletins/pdf/2019_ipoteka_bul.pdf [Accessed 26 Jan. 2020].

Housing prices rose in the primary real estate market by 4%, in the secondary market – by 2%. A significant contribution to the growth of the mortgage market was made by the launch in 2018 of the federal program to support young families with two or more children. For such families, mortgage loans, starting from January 1, 2018, were issued at a rate of 6%, provided that the loan is used to purchase housing in a new building or to refinance a previously taken mortgage. The development of the mortgage market in Russia may be hindered by the situation in the construction market. The volume of housing construction in the country is falling for the fourth consecutive year. In 2018, the volume of housing construction in Russia decreased by 3%, in 2019 the decline continued. Reducing volumes of development provoked a rise in the housing prices, which in turn negatively affected the mortgage market. According to the RAEX rating of 2018, the leaders of the mortgage market in Russia in terms of service volumes are Sberbank, Delta Credit (now merged with Rosbank) and VTB. These are the results of a RAEX survey of mortgage brokers at major real estate agencies.

Real estate prices and low lending rates have contributed to an increase in the average size of a mortgage loan and average loan term in 2018. The average term of mortgage loans added 5% and amounted to 196 months (16.3 years). The average loan amount increased by 10% to RUB 2 million (USD 29,850). Also, a mortgage loan in Russia in year 2018 was on average issued for the term of 16 years. The average loan amount comprised from 2 to 2.3 million rubles (USD 29-34 ths.).

2.5. Mortgage legislation in Czech Republic

The Debt Act defines a mortgage loan as a loan which is secured at least in part by a lien on a real property from the date of the legal effects of the lien. The mortgage loan receivable can only be entered in the register of cover assets on the day when the covered bond issuer becomes aware of the legal effects of the mortgage[12].

In addition to the Bond Act No. 190/2004 Coll., mortgage loans are regulated by the general legal regulation of the loan agreement in Act No. 89/2012 Coll., the Civil Code. Loans that are provided in connection with building savings are subject to a special regulation of Act No. 96/1993 Coll., On Building Savings. In general terms, mortgage loans are also regulated in Act No. 21/1992 Coll., On Banks, which regulates the management of banks in

[12] info@aion.cz, A. (2020). *190/2004 Coll. Bonds Act*. [online] Zákony pro lidi. Available at: https://www.zakonyprolidi.cz/cs/2004-190?text=hypote [Accessed 26 Jan. 2020]

terms of to whom, to what extent and under what conditions the bank can lend money. Since 1 December 2016, Act No. 257/2016 Coll., On Consumer Credit, has been in force. It is a comprehensive regulation of consumer loans, which regulates distribution for the whole segment of retail loans by abolishing the previously set value limits (CZK 5,000-1,880,000) and introducing regulation of mortgage loans.

Consumer credit legislation regulates both consumer loans (described in terms of a "consumer loan other than for housing") and housing loans (including mortgage loans, described in terms of a "consumer loan for housing").

Since 2014, housing loans have been regulated by Directive 2014/17/EU of the European Parliament and of the European Council of 4 February 2014 „On credit agreements for consumers for residential immovable property" and amending Directives 2008/48/EC and 2013/36/EU.

The Directive is based on the principle of so-called targeted harmonization, where some of the explicit provisions in the harmonization regime approach its maximum (APR calculation, content and form of the European Standardized fact sheet), while most parameters in the harmonization regime should satisfy some minimal threshold values. The Directive contains many discretions and, in many cases, allows states to maintain or introduce a stricter consumer protection regime in a given market segment.

Its aim is to unify and support the internal market of mortgage loans and to protect the consumer in the mortgage market, which monitors to the maximum extent possible the legislation on consumer credits[13].

The Directive in many cases refers directly to the definitions contained in Directive 2008/48/EC of the European Parliament and of the European Council on consumer credit agreements and repealing the European Council Directive 87/102/EEC, as amended by Directive 2011/90/EU (Consumer Credit Directive) "CCD") and takes into account the latest legal developments in the field of consumer credit contained in the Guidance on the interpretation of Directive 2008/48/EC (Consumer Credit Directive) in relation to costs and the annual percentage rate of charge[14].

[13] European Commission - European Commission. (2020). *Mortgage credit*. [online] Available at: https://ec.europa.eu/info/business-economy-euro/banking-and-finance/consumer-finance-and-payments/retail-financial-services/credit/mortgage-credit_en [Accessed 26 Jan. 2020].

[14] Ministry of Finance of the Czech Republic. (2020). *Legal frameworks*. [online] Available at: https://www.mfcr.cz/cs/soukromy-sektor/spotrebitelske-uvery/pravni-ramce [Accessed 26 Jan. 2020].

The cornerstones of this Directive, which contains regulations in many respects parallel to the regulation of consumer credit under Directive 2008/48/EC, are primarily the following[15]:

- Duty of information (the Directive contains a detailed regulation of the informational obligations of all interested parties. These also include the regulation of marketing materials and advertising, a list of pre-contractual information and standard information that must be communicated when granting credit);
- Annual percentage rate of charge (APR);
- Assessing the creditworthiness of the consumer and the suitability of the credit for the consumer, including access to the debtors' databases;
- The consumer's right to early repayment (the right to early repayment is one of the main points of the Mortgage Directive. However, its amendment recognizes that national legislation may, on the one hand, restrict that right under certain conditions and, on the other hand, grant creditors fair and objective compensation for the consumer's exercise of that right);
- Regulatory requirements for credit intermediaries, including a EU passport (banking license) for these entities;
- Requirements for adequate regulation and supervision of non-bank mortgage lenders, including the requirements for the expertise of those dealing with consumers.

One of the main points of the Directive is the regulation of the possibility of early repayment of the loan[16]. This point, however, takes into account the effect of national legislation, which may limit the possibility of early repayment of the loan by some conditions or grant compensation to creditors using the possibility of early repayment by the client. The Directive also requires Member States to set a time period within which the consumer could change his mind and withdraw from the contract.

This Mortgage Directive also lays down the rules for mortgage loans granted in a foreign currency.

[15] Ministry of Finance of the Czech Republic. (2020). *Basic information*. [online] Available at: https://www.mfcr.cz/cs/soukromy-sektor/uvery-pro-spotrebitele/hypotecni-uver/zakladni-informace [Accessed 26 Jan. 2020].

[16] EPRAVO.CZ. (2020). *Legal regulation of mortgage loans and its changes | epravo.cz*. [online] Available at: https://www.epravo.cz/top/clanky/pravni-uprava-hypotecnich-uveru-a-jeji-zmeny-v-souvislosti-s-novou-smernici-96102.html [Accessed 26 Jan. 2020].

The Directive also regulates the limitation of exchange rate risk for consumers on foreign currency loans, the requirements for setting a ceiling for penalties resulting from the debtor's default and other requirements to ensure the lender's leniency towards the defaulted debtor.

The Mortgage Directive also regulates the way property is valued. The main change is the adjustment of property valuation portability, which means both the lender's obligation to provide the client with an expert opinion and the obligation to accept the third-party expert's report, which was drafted by the client with another expert, who doesn‘t belong to the credit institution issuing the loan.

In addition to the above mentioned amendments, the Mortgage Directive defines the advisory activities of financial advisors providing individual services to clients as part of assistance in obtaining a mortgage loan. The implementing national laws could impose further restrictions and rules on financial advice.

2.5.1. General requirements for the mortgage submitter in the Czech Republic

The Czech National Bank (CNB) determines the basic conditions for obtaining a mortgage[17]. First, general conditions are described, which were actual until March 2020, then the changes are described, which have become actual from April 2020:

LTV (Loan To Value) – the ratio of the loan amount to the value of the property. The CNB determines that the maximum amount of the mortgage is 90% of the value of the property. At the same time, however, it reduced the allowed number of such loans. According to its instructions, mortgage loans with LTV over 80% may account for maximum 15% of all mortgage loans provided by the banks. Mortgages with LTV up to 80% are therefore more common (from April 1, 2020, the recommended limit of LTV is 90%, while 5% of new mortgages may show LTVs above 90%). This is the CNB's reaction to the current situation in the Czech Republic's mortgage market and should contribute to the faster recovery in the mortgage market, which shrinked due to the world’s coronavirus pandemia.

DTI (Debt To Income) – ratio of total debt to net annual income of the applicant. According to CNB guidelines, the total amount of the applicant‘s loans may not exceed 9 times of their net annual income. The recommended limit of the DTI now is completely abolished.

[17] Banky.cz. (2020). *Conditions for obtaining a mortgage 2020 :: Banky.cz*. [online] Available at: https://www.banky.cz/podminky-hypoteky/ [Accessed 26 Jan. 2020].

DSTI (Debt Service To Income) – ratio of installments to the applicant's net monthly income. Again, not only mortgage payments, but also all other loans are counted. They may not exceed 45% of the applicant‘s net monthly income. From April 1, 2020, DSTI has been raised to 50%.

These requirements can be exceeded in some cases, but not by more than 5% of total amount of loans given by the bank[18].

If the applicants want to get more favorable conditions from the bank, they should pledge more real estate to guarantee the loan or apply for a mortgage together with other members of their family (such as a husband or wife).

In addition to the requirements set by the Central Bank, the loan providers can add additional requirements to make sure that the applicant is able to repay and that the borrowed money actually returns. In particular, they are the following:

- Age. The minimum age for obtaining a mortgage is 18 years. It is more complicated with the upper limit, it always depends on the bank's methodology. Generally, people of working age have a chance to get a mortgage. So if the applicant is already retired, the chances are not very big. It is also possible to estimate your chances according to the time by which the mortgage must be repaid. Usually it is up to 67 years of age. Exceptionally up to 70 years or more.
- Income. In short, the income must be such that the applicant can manage the mortgage. However, there is no specific number. It depends on the amount of the mortgage, maturity and interest rate offered by the bank. The last instructions of the Czech National Bank may serve as a guide. According to them, the mortgage may not be more than nine times higher than net annual income of applicant. And the amount of the monthly repayment must not exceed 45% of the net monthly income. For example, the income recognized by the banks is usually calculated based on the following:
    - salary from employment,
    - income from business,
    - various types of pension (eg. retirement, disability, widow or orphan),
    - income from current and future leases,

[18] Cnb.cz. (2020). *CNB introduces new mortgage limits – Czech National Bank*. [online] Available at: https://www.cnb.cz/en/cnb-news/press-releases/CNB-introduces-new-mortgage-limits [Accessed 27 Jan. 2020].

- parental allowance,
- child maintenance,
- retirement allowance,
- foster parent reward,
- rent,
- other income.

The income must be established. Employees usually only need to confirm the amount of income, while the individual entrepreneurs must provide their tax payments, usually during the last two years.

- Creditworthiness. Creditworthiness is also important for obtaining a mortgage. This means the bank‘s evaluation of whether the client can repay the mortgage (or another loan) without any problems. The only way to verify it is to ask a bank or mortgage adviser. To estimate the creditworthiness, not only the client’s income or records in the debtors' registers are important, but also other loans that the client have to repay. Banks usually assume that sooner or later, if clients have other obligations, they may have difficulty repaying their mortgages. An unused overdraft or a credit card may also mean for mortgage lenders that these loans will start drawing on the client’s money.
- Records in the debtor's registers. If the applicant wishes to obtain a mortgage, he or she may not have any large records in the debtor registers, such as: BRKI (Bank Register of Client Information), NRKI (Non-Bank Register of Client Information), SOLUS (interest association of legal entities, contributes to preventing over-indebtedness of clients). This information is looked for the term of the last 3-5 years. Banks always check it themselves.
- Flag value. To obtain a mortgage, the applicant must always guarantee it by the property. Usually, it is the same property that they are buying using a mortgage loan. But it can be any other property that meets the conditions of the provider. The applicant may also to offer several properties as a guarantee at the same time. It will help to get a higher loan (but it also depends on the client’s creditworthiness). The maximum amount of the mortgage is limited by the value of the pledge. According to the instructions of the Czech National Bank, providers can lend a maximum of 90% of the guaranteed property price. And that is only in exceptional cases. Much more common is a loan up to 80% of the collateral value. So the client should pay out of their own means at least 10-

20% of the property value (unless they guarantee more real estate as a pledge). Along with the acquisition of real estate there are other costs. For example:

- property tax (4% of property price). It is not paid only for development projects (new buildings) and for the purchase of a cooperative apartment,
- real estate agency commission (usually at least 2 - 5% of the property price),
- fees for notaries or lawyers.

2.6. Mortgage legislation in Russia

The main law in the Russian Federation governing mortgage lending is Federal Law No. 102-FZ of July 16, 1998 “On Mortgage (Pledge of Real Estate)”. This legal act consolidated the rights and obligations of entities involved in relation to mortgage lending.

The Federal Law on Mortgages consists of 14 chapters and 79 articles[19]. The text takes into account all the nuances that arise when concluding a mortgage loan agreement.

The first chapter gives the main provisions of the contract, and also reveals all the concepts, which are important for understanding the mechanisms of the law.

The second chapter governs the conclusion of a mortgage loan agreement. It clearly describes all the points that must be included in the model contract, outlines the range of rights and obligations of the parties, lists the conditions that cannot be included in the contract. The procedure for the state registration of such agreements is also established and the principles for the inclusion of third parties into the contract, which can also be parties to the mortgage agreement, are defined.

The third chapter reveals the principles of mortgage contract compilation and functioning. It also lists all the points that must necessarily be included in this document, and which cannot be included in it under any circumstances.

The fourth chapter is fully devoted to the state registration of mortgages. In the fourth chapter, all the main nuances are already described in detail, including the procedure for paying the state fee, the package of documents that are required when registering the contract, and the factors that may cause the refusal of state registration.

The fifth chapter regulates the important points that are associated with the preservation of mortgage property.

The sixth chapter of the Federal Law On Mortgages regulates the procedure for transferring rights to mortgaged property. It clearly indicates the reasons why the collateral can be seized and transferred into the ownership of the lender, as well as moments on the voluntary and forced transfer of real estate.

The seventh chapter reveals the essence, concept and main points of registration of the subsequent mortgage. The eighth chapter is devoted to the procedure of transferring assignment of rights under a mortgage agreement.

[19] Consultant.ru. (2020). Federal Law "On Mortgage (Real Estate Mortgage)" of July 16, 1998 N 102-FL (latest revision). [online] Available at: http://www.consultant.ru/document/cons_doc_LAW_19396/ [Accessed 27 Jan. 2020].

The ninth chapter talks about how to apply to the judicial authorities for the recovery of collateral in case of refusal of the borrower to transfer it voluntarily. The tenth chapter indicates the procedure for the sale of collateral to reimburse the lender. The eleventh chapter is devoted to the peculiarities of mortgage lending, when a land plot acts as a pledge.

The twelfth chapter reveals the principles of functioning of the mortgage of enterprises, industrial buildings and structures.

The thirteenth chapter regulates the relations of mortgage lending when an apartment or a residential building is put up as a security.

Other legal acts and regulations governing mortgage legislation:

- Federal Law № 188-FZ of 29 December 2004 "Housing Code of the Russian Federation"
- Federal Law № 122-FZ of 21 July 1997 № 122-FZ "On State Registration of Real Estate Rights and Transactions in them"
- Federal Law № 218-FZ of December 30, 2004, “On Credit History”
- Government Resolution № 285 of 13 May 2006 “On the approval of the rules for providing subsidies to young families for the acquisition of housing under the “Provision of Housing for Young Families” plan of the Federal Housing Target Program

2.6.1. General requirements for the mortgage submitter in Russia

Each bank forms its own set of requirements for borrowers. But all of them are quite standardized[20]:

- Russian citizenship. In most financial institutions, this condition is mandatory for obtaining a mortgage. Very few banks offer mortgages to foreigners.
- Age restrictions. The minimum age for obtaining a mortgage is 18 years. But it will be very difficult to get a loan for anyone under the age of 21. In addition, the loan agreement is drawn up so that the full repayment of the debt occurs before the 60th birthday of the borrower.
- Income. If the monthly cost of covering a mortgage loan exceeds 40% of the borrower's income, then the chance that they will refused the loan is extremely high. In this case, it is necessary to find co-borrowers, which will take into

[20] Ipoteka-expert.com. (2020). *Requirements for the borrower for a mortgage in 2020 and methods for assessing creditworthiness*. [online] Available at: http://ipoteka-expert.com/trebovaniya-k-zaemshhiku-po-ipoteke/ [Accessed 28 Jan. 2020].

account the total income of all those who are responsible for paying the debt to the bank. Types of income that the banks usually recognize[21]:

- salary from employment,
- income from business
- income from leases
- income on liabilities (e.g. dividends)
- retirement allowance

- Place of residence and registration of the borrower. It is advisable when the acquired property is in the same region in which the borrower is registered.
- Work biography. In some banks, such as Bank of Moscow, VTB 24, OTP Bank, Alfa Bank, you need to work at your current place for at least six months from the end of the trial period to obtain a mortgage.
- Credit rating of the borrower. This complex aggregate indicator is one of the main ones when deciding on a loan. The credit rating indicator serves as the basis when analyzing the financial condition of the borrower. It is calculated on the basis of official documents. The following criteria are used: The number of delays. The higher was the payment discipline in the past, the better. Existing debt burden. The lower it is, the more solvent is the client. Types of loans. Banks have confidence in those who already have repaid mortgages or car loans in their biography. The number of consumer loans. Too frequent use of consumer loans is a bad sign. This indicates a low financial culture.
- Type of borrower. When estimating the clients applying for a mortgage, the banks need to understand what types of borrowers they are and whether they can be referred to some special social categories, such as military, young families, families with 2 or more children. There exist special state-funded mortgage programs for these categories.
- LTV (Loan To Value). In general, LTV is maximum of 80% of sale price of the property. In any case, it must not exceed 85% of sale price[22].

[21] Bn.ru. (2020). *What are the borrower's income accounted by the bank* [online] Available at: https://www.bn.ru/wiki/kakie-dohody-zaemshchika-uchityvayutsya-bankom [Accessed 28 Jan. 2020].

[22] Expat Guide to Russia | Expatica. (2020). *A buyer's guide to Russian mortgages - Expat Guide to Russia | Expatica*. [online] Available at: https://www.expatica.com/ru/housing/buying/a-buyers-guide-to-russian-mortgages-758273/ [Accessed 28 Jan. 2020].

3. Analysis of factors affecting the mortgage market

3.1. Factors affecting the mortgage market

This chapter will focus on identifying the macroeconomic factors that have impact on the mortgage market. In this part, the following basic factors are considered: gross domestic product, inflation, interest rate, price of property, unemployment rate, average wage and state support.

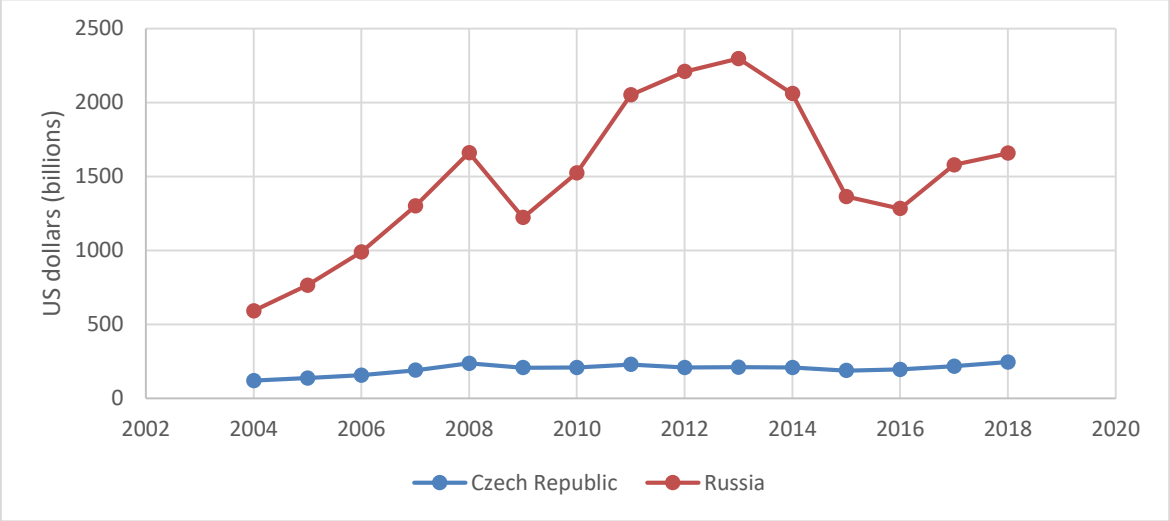
3.1.1. Gross Domestic Product

As the first factor affecting the mortgage market, it is necessary to mention GDP. Gross domestic product is by definition "*a measure of the economic activity, defined as the value of all goods and services produced less the value of any goods or services used in their creation for a certain period of time*[23]" and is used to determine the performance of the economy.

In general, if the growth rate of GDP is rising, it can be judged that the economy in the given state thrive, investments of enterprises grow, incomes of population increase, as well as the standard of living and willingness of people to borrow. Usually, demand for real estate and mortgage loans is growing during such periods. On the other hand, when the growth rate of GDP falls, the public interest in mortgage loans declines. The offering side is represented by the banks. While the economy conditions are good, the banks are willing to "soften" credit conditions. And on the contrary, during the economic downturn periods, the banks tend to tighten up the lending conditions.

[23] Data.europa.eu. (2020). *Real GDP growth rate - volume - ecodp.common.ckan.site_title*. [online] Available at: https://data.europa.eu/euodp/cs/data/dataset/1pdEHxMf8Q9YeXGyF1PYHQ [Accessed 1 Feb. 2020].

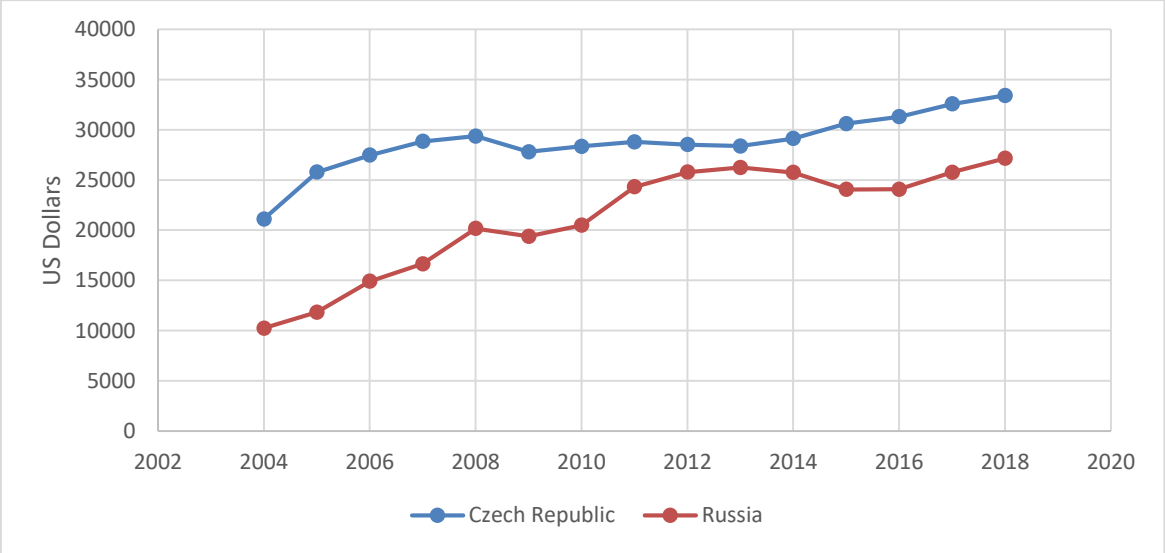
Graph 5: Nominal GDP (in billions USD) in Czech Republic and Russia 2004-2018



Source 1: https://tradingeconomics.com/russia/gdp, self creation
Source 2: https://tradingeconomics.com/czech-republic/gdp, self creation

As can be seen on the previous graph, nominal GDP of Czech Republic is constantly growing during chosen period, without big fluctuations. On the other hand, Russian GDP is very fluctuating, especially after the financial crises in 2008 and in 2014 it shows significant decrease. Such a large fluctuation in Russian GDP, showed on the graph, is conditioned by the fluctuations of the national currency, ruble, which exchange rate to USD fell considerably in those years. This influenced the number of mortgage loans granted, and especially in years 2008-2009 they showed significant decrease.

Graph 6: GDP (PPP) per capita in Czech Republic and Russia 2004-2018



Source 1: https://tradingeconomics.com/russia/gdp-per-capita-ppp, self creation
Source2: https://tradingeconomics.com/czech-republic/gdp-per-capita-ppp, self creation

The Gross Domestic Product per capita (in purchasing power parity (PPP)) in Czech Republic was last recorded at USD 33,414.46 in 2018[24]. The Gross Domestic Product (PPP) per capita in Russia was last recorded at USD 27,147.30 in 2018[25]. Development of Russian GDP and lower GDP per capita suggests that households would have lower demand for mortgage loans, borrow smaller amounts for housing, or possibly longer repay mortgage loans compared to the Czech Republic. As it was mentioned in previous chapter, average mortgage loan in 2018 in Czech Republic was CZK 2.2 millions (approximately USD 101 ths), in comparison with Russia RUB 2 - 2.3 millions[26] (approximately USD 29 - 34 ths). The most common repayment period in Czech Republic is 20 years, while in Russia average repayment period is around 16 years.

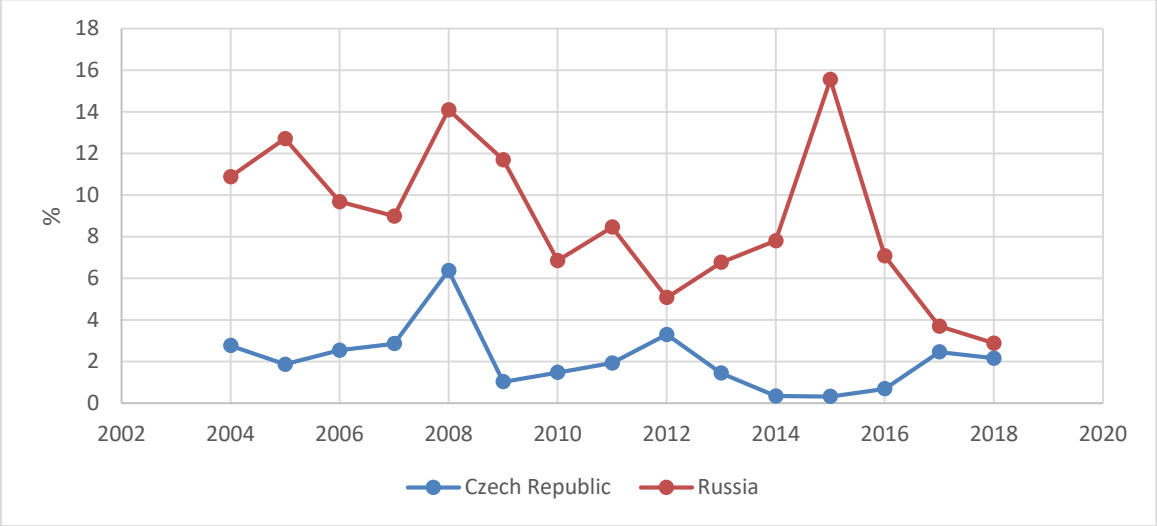
3.1.2. Inflation

By definition, inflation means "a general, continuous increase of price level over time[27]", its growth means rising prices of all goods and services. The inflation rate can be understood as a percentage change of price levels for some time period. Thus, inflation depreciates money, respectively reduces the purchasing power of the currency and therefore the consumer for the same nominal amount of money may acquire fewer goods and services. The inflation target of the Czech National Bank has been 2% since 2010, while the inflation target of the Russian Central Bank is 4%[28].

When we look at the inflation rate in terms of the mortgage market, it cannot be said that an increase in inflation rates by itself has a negative impact on the mortgage market, as it is sometimes mistakenly claimed. Usually, it is always a combination of several factors.

[24] Tradingeconomics.com. (2020). *Czech Republic GDP per capita PPP | 1990-2018 Data | 2019-2020 Forecast | Chart*. [online] Available at: https://tradingeconomics.com/czech-republic/gdp-per-capita-ppp [Accessed 5 Feb. 2020].
[25] Tradingeconomics.com. (2020). *Russia GDP per capita PPP | 1990-2018 Data | 2019-2020 Forecast | Chart | Calendar*. [online] Available at: https://tradingeconomics.com/russia/gdp-per-capita-ppp [Accessed 5 Feb. 2020].
[26] Real Estate RIA News. (2020). *The average size of a mortgage loan in the Russian Federation remains at a record level*. [online] Available at: https://realty.ria.ru/20190123/1549760605.html [Accessed 5 Feb. 2020].
[27] Dictionary.cambridge.org. (2020). *INFLATION | meaning in the Cambridge English Dictionary*. [online] Available at: https://dictionary.cambridge.org/dictionary/english/inflation [Accessed 5 Feb. 2020].
[28] Cbr.ru. (2020). *Main Objective and Principles | Bank of Russia*. [online] Available at: https://www.cbr.ru/eng/DKP/about_monetary_policy/main-objective-and-principles/ [Accessed 5 Feb. 2020].

Graph 7: Average inflation rate (CPI) in Czech Republic and Russia 2004-2018

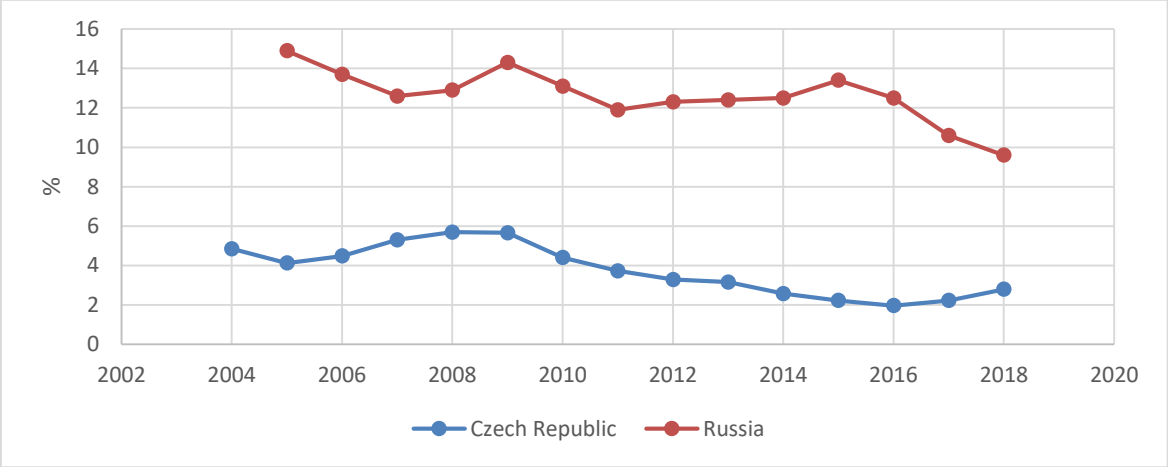


Source 1: https://www.inflation.eu/inflation-rates/russia/historic-inflation/cpi-inflation-russia.aspx, self creation
Source 2: https://www.inflation.eu/inflation-rates/czech-republic/historic-inflation/cpi-inflation-czech-republic.aspx, self creation

3.1.3. Interest rate

The interest rate can be considered as one the most important factors affecting the mortgage market. The amount of the interest rate affects both the amount of the monthly installment and the total "price" of the funds provided. As with other goods, price plays an important role. Therefore, if there is a decrease in the interest rate, or a decrease in the amount of the monthly payment, the client who had not been considered as creditworthy before, will also be able to get mortgage.

Graph 8: Average interest rate on mortgage loans 2004-2018 in Czech Republic and Russia



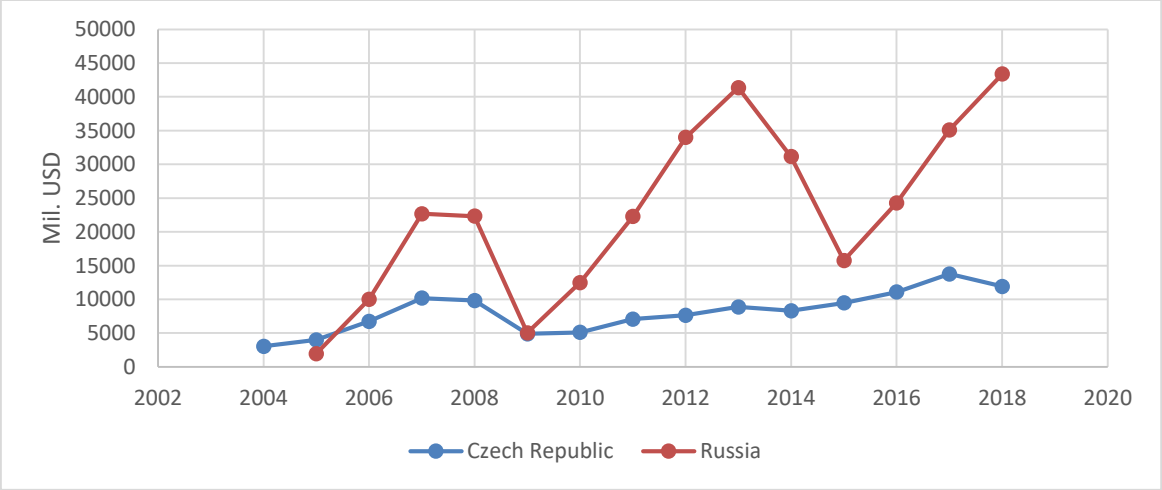
Source 1: https://www.factograph.info/a/29083212.html, self creation
Source 2: www.cnb.cz, statistical series ARAD, self creation

The relationship between the interest rate to the volume and number of mortgage loans is obvious. As interest rates fall, both demand for mortgage loans and their number and

volume are rising. As the interest rate decreases, the number of clients to whom the banks can provide credit increases. But it is also necessary to take into account other parameters than just the interest rate. There are other fees that some banks have not yet included in the interest rate, for example credit management fee, or account maintenance, or insurance that the bank gives as a lower rate condition. If the client then counted all those additional charges, it could happen that the "real" interest rate will be much higher. Therefore, the indicator of "profitability" of the loan, the so-called APR (annual percentage rate), has much better informative ability and takes into account all client's costs.

In graph, showing situation in Russia, this relationship can be seen very clear. During financial crises in years 2008 and 2014 GDP decreased, inflation rate increased and interest rate increased (in difference with Czech Republic, where it showed decreasing trend in years 2009-2016). Volume of granted mortgages decreased strongly in Russia, but slightly increased in Czech Republic.

Graph 9: Total volume of granted mortgage loans 2004-2018 in Czech Republic and Russia

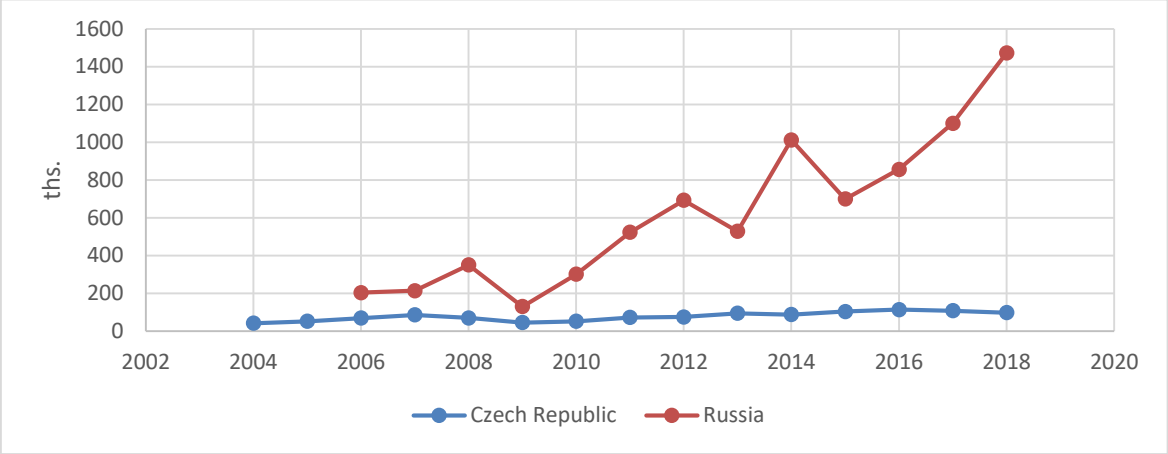


Source 1: http://rusipoteka.ru/ipoteka_v_rossii/ipoteka_statitiska/, self creation
Source 2: https://www.mmr.cz/cs/ministerstvo/bytova-politika/hypotecni-uvery/hypotecni-uvery-(2002-2008), self creation

The same is the situation with the number of granted loans. In Czech Republic the trend is more or less stable, there was small decrease in number of loans after the crisis in 2008. In Russia, strong dependency between the number of loans and volatility of interest rate can be seen. In year 2004 the average interest rate in Czech Republic was 4.84% p.a. After financial crisis in 2007 the interest rate grew up to the level 5.69% p.a. in 2008. During next years the interest rate was decreasing and in 2018 it was 2.79% p.a.. The total volume of mortgage loans also significantly decreased after the crisis. The increasing trend started in

year 2010 and by the end of 2018, the volume of new loans was USD 11,903.32 mln, with total number of granted loans being 98,096.

Graph 10: Number of granted mortgage loans 2004-2018 in Czech Republic and Russia



Source 1: https://www.factograph.info/a/29083212.html, self creation
Source 2: https://www.mmr.cz/getmedia/b7c1c2ab-a066-460b-b453-7e46e2ba2453/Hypotecni-uvery-za-roky-2002-az-4Q-2019,-k-31-12-19-s-logem.pdf.aspx?ext=.pdf, self creation

Slightly similar trend in mortgage markets occurred in Russian Federation. General trend of interest rates in mortgages is decreasing. During the given period, it was also affected by world financial crisis in 2008, after which the average interest rate grew up to 14.3% p.a. in year 2009, and also was affected by Russian financial crisis started in 2014, so the average interest rate grew up from 12.5% p.a. in 2014 to 13.4% in 2015. After this, the decreasing trend continued. The aim of government is to reduce the average interest rate on mortgages to 8% p.a. in year 2024[29]. The total number of mortgage loans granted in 2018 was 1,472,000, with the total volume of 43,372.67 millions USD.

3.1.4. Property – price, volume, indexes

A very important role in the mortgage market plays the price of real estate, both in terms of demand, but also the number and volume of mortgage loans. With the decline in interest rates demand for own housing is increasing, which affects property prices. Developers are also responding to the real estate demand, starting more real estate projects. Generally, if the demand for some product exceeds its supply the price is rising. If the average price of real estate increases, so does the average amount of mortgage loans. An important factor is the motive for buying real estate. It is necessary to distinguish the purchase for your own housing and purchase as an investment, not only for speculation but also purchasing real estate for future lease.

[29] RBC. (2020). [online] Available at: https://www.rbc.ru/rbcfreenews/5e3d6b0e9a794757d6a69069 [Accessed 8 Feb. 2020].

The average offer price of apartments in 2008 was CZK 2,259,370 (USD 101 ths.). Subsequently, the economic recession came down, bringing the average price down to CZK 1.68 million (USD 75 ths.) in June 2010. Since then, apartment prices have been rising and by the end of November 2019 the average price has risen to CZK 3.35 million (USD 150 ths.). Over the past 11 years, housing prices in the Czech Republic have increased by 48.3%[30]. In Prague the average price of an apartment in a brick house stopped at a new historical maximum of 85,200 CZK per m2 (around 3800 USD), in regions the price is around 17,500 CZK to 56,000 CZK (780 USD to 2500 USD).

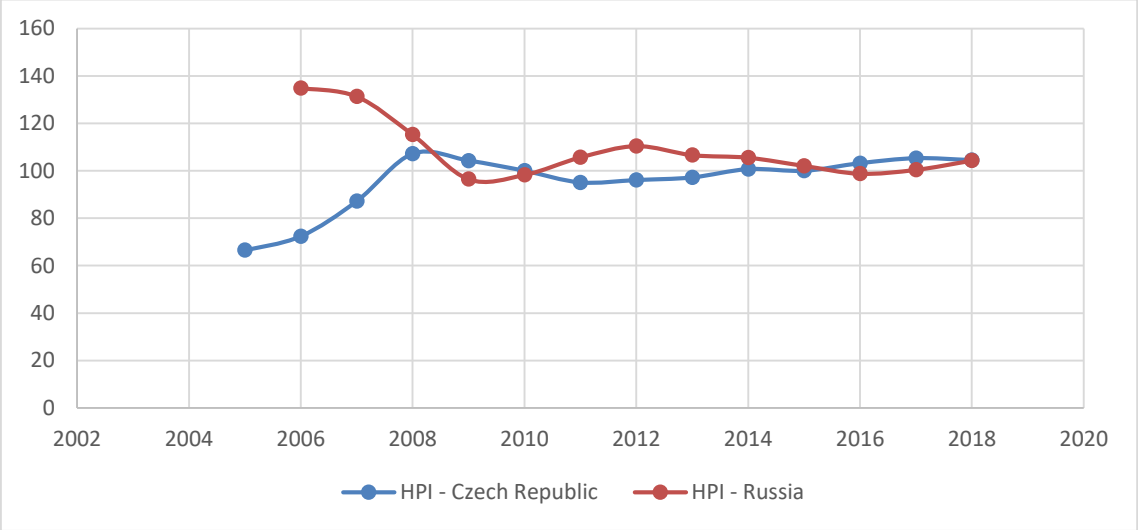
The Czech Statistical Office reports a price increase of 10% in 2018 and 2.4% in Q4. The volume of mortgage loans fell by almost a third in the fourth quarter of 2018.

If in the capital of Russia the average price is 10.8 million rubles (USD 155 ths.) then in other cities of the Russian Federation an average apartment costs 3 million rubles (USD 43 ths.)[31].

An index which measures the price changes of residential housing as a percentage change from some specific start date (which HPI is considered as 100) is the housing price index (HPI). For example, for Czech Republic, HPI was 100 in year 2015. This is a synthetic price index that measures the price levels dynamics of residential real estate in the Czech Republic, according to a uniform harmonized EU standard. Therefore, international comparability is an advantage. It measures the price dynamics for apartments and family houses, together with related land plots, and includes both new and older (previously inhabited) residential property. Below is a graph showing the dynamics of changes in the price index in the housing market in Czech Republic and Russia in recent years.

[30] Finance.cz. (2020). *Prices of flats are already half higher than in 2008*. [online] Available at: https://www.finance.cz/530184-vyvoj-cen-bytu/ [Accessed 9 Feb. 2020].
[31] RBC Real Estate. (2020). [online] Available at: https://realty.rbc.ru/news/57b5683d9a79473811067659 [Accessed 9 Feb. 2020].

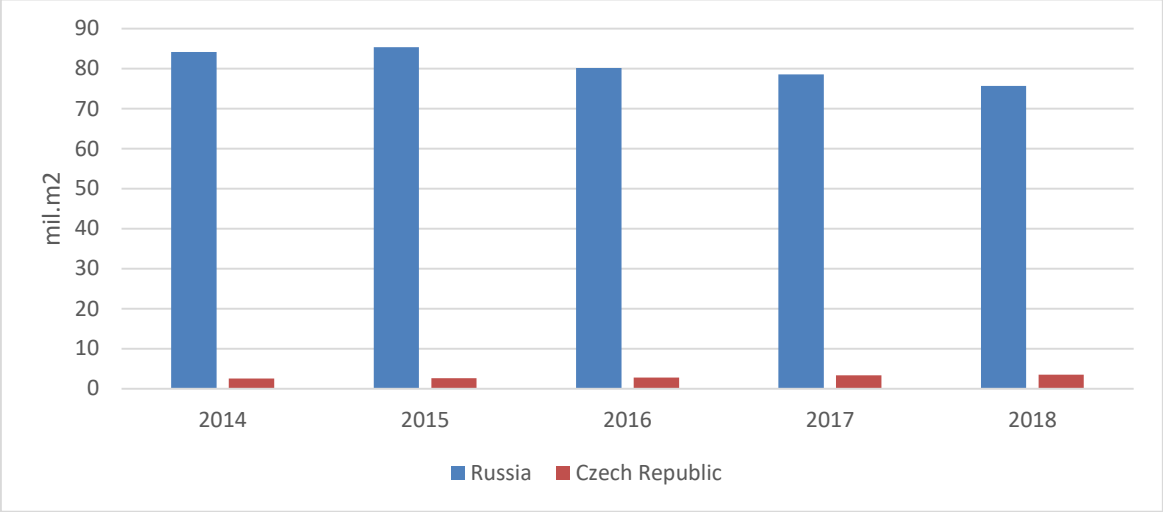
Graph 11: Housing Price Index (HPI) in Czech Republic and Russia



Source 1: https://www.czso.cz/csu/czso/ceny_bytu, self creation
Source 2: https://www.gks.ru/, self creation

According to the available data for years 2014-2018, Czech Republic and Russia have opposite trends in housing construction volume in the area of residential property. While in Czech Republic a slightly increasing trend can be seen, in Russia the housing volume of new residential properties is decreasing during the chosen years. The data before 2014 are not available for the Russian Federation. The reason of declining trend is that in recent years the number of new buildings sold before their actual commissioning has been growing, and the pace of such construction is seriously declining. In general, last years have not been the best in terms of the commissioning of new apartment buildings. On the contrary, in the Czech Republic, construction industry continues to grow moderately, but housing construction is mainly driven by regions. This is largely due to the outdated land-use plan, which almost ran out of land suitable for new construction.

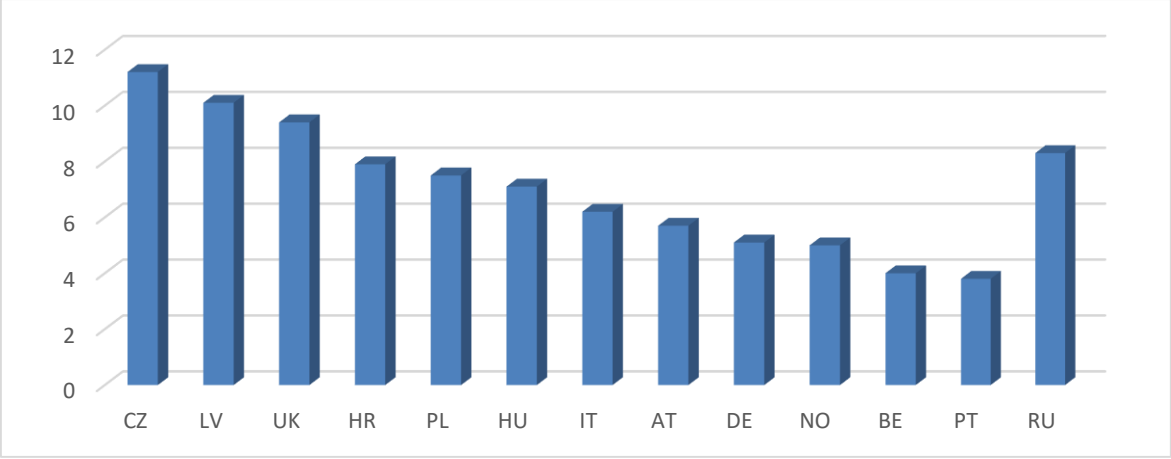
Graph 12: New housing volume 2014-2018 in Czech Republic and Russia



Source 1: https://www.czso.cz/csu/czso/ceny_bytu, self creation
Source 2: https://www.minstroyrf.ru/trades/zhilishnaya-politika/8/, self creation

Next graph shows the affordability of one's own housing, which is measured by property index. It measures how many average gross annual salaries it takes to buy a standardized new dwelling (70 m^2 in Europe and 90 m^2 in Russia – recalculated to 70 m^2). Due to better comparison property index in Russia, it was recalculated on base of 70 m^2. Original index for 90 m^2 is 10.67. Recalculated value 8.3 for Russia, the value for Czech Republic is 11.2.

Graph 13: Property index 2018 – chosen countries of EU + Russia



Source 1: https://www.numbeo.com/property-investment/country_result.jsp?country=Russia
Source2: deloitte.com, Property index. Overview of European residential markets 2019, p.12, self creation

In order to assess the affordability of own housing, it is necessary to compare how many gross annual wages will be needed to purchase a standardized new apartment of 70 m^2 (in Russia, the index is calculated taking into account the average apartment area of 90 m^2). According to a Deloitte study, the most affordable housing is in Portugal (3,8 years), then

goes Belgium, but the gross wage gap between Portugal and Belgium is very large. Relatively available apartments are also in Norway, Germany and Austria, where the property index is between 5 and 6.

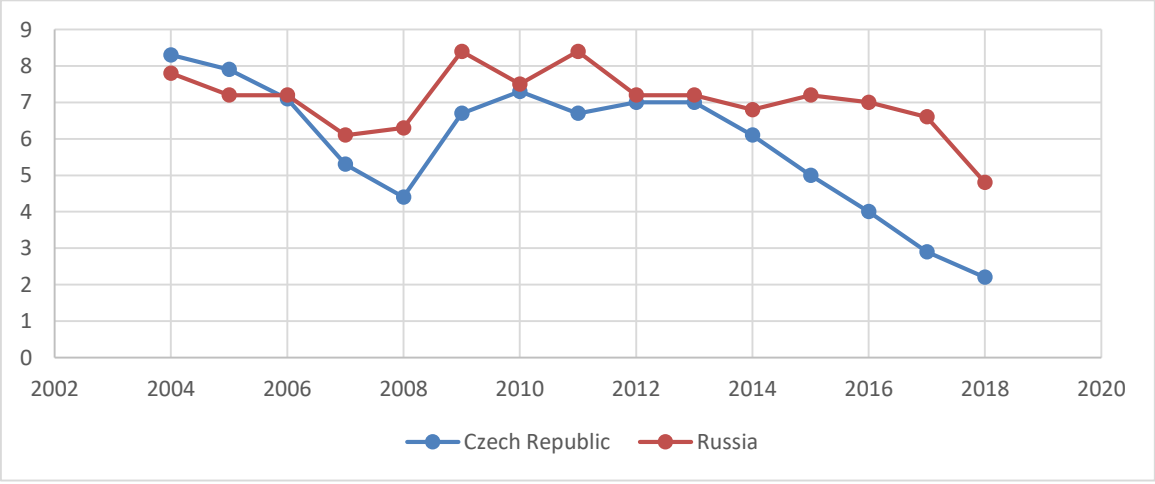
The least affordable housing in 2018 was observed in the Czech Republic, where citizens needed to save more than 11 years to buy a new apartment. In the following year, prices continued to rise, especially in the capital of Czech Republic. In 2019, the Prague citizens would have to save on average their gross income for 14,6 years, compared to 13,8 years in 2018.

Russia, like the Czech Republic and the United Kingdom, is one of the countries with the least available housing. There, residents should have been spared on average for 8,3 years to be able to afford the same big housing. In general, the higher is GDP per capita, the more affordable housing is in a particular country.

3.1.5. Unemployment rate

Unemployment is a key parameter in the market economy. In order to create a new product, production factors are needed. Labor force can be considered as one of the factors and it can be further divided into employed and unemployed. The unemployment rate can be understood as the share of the unemployed people in the total workforce. If the unemployment rate is rising, the disposable income of the population is decreasing, together with the willingness to borrow money. People are concerned about their future income, and the demand for mortgage loans therefore tends to decline. From the supply side, the banks have to be more cautious and tighter in lending money to a client. The rising unemployment rate thus has a negative impact on the mortgage market.

Graph 14: Unemployment rate in 2004-2018 in Czech Republic and Russia

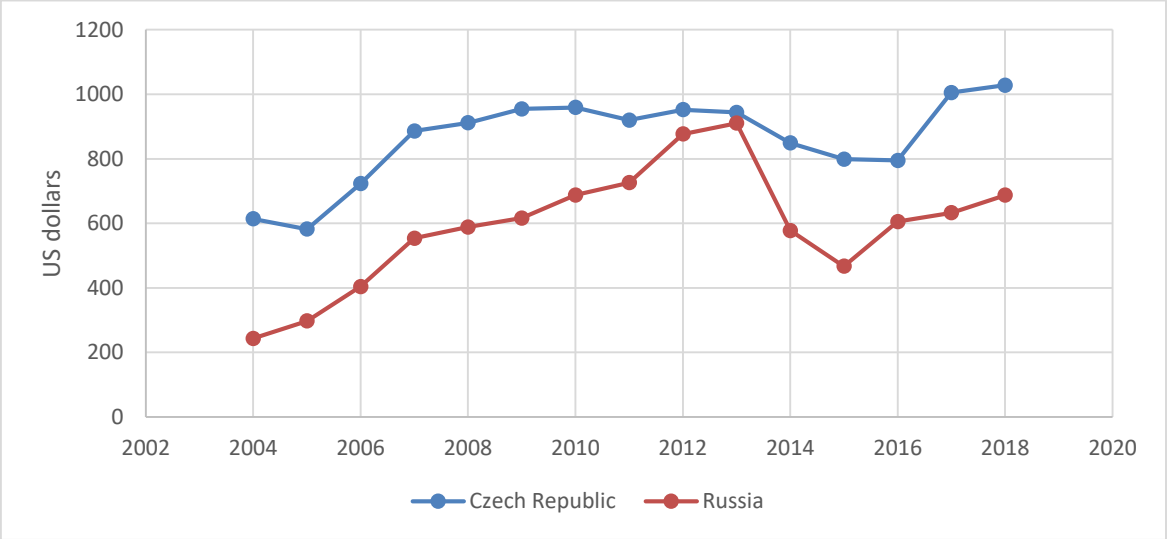


Source 1: www.gks.ru, self creation
Source 2: www.czso.cz, self creation

3.1.6. Average wage

The CZSO (Czech Statistical Office) defines the average wage as: "the share of wages, excluding other personnel costs, per employee of the registered number per month[32]". There are two kinds of average monthly wages: nominal and real. The difference is that the real wage represents the nominal wage adjusted for inflation, thus showing the real wage value and what we can buy for it. In fact, it can happen that even if nominal wages increase, real wages may fall as prices rise faster than wages. The relationship between this factor and the mortgage market is such that that the growth in real wages will increase the demand for mortgage loans. Another relationship can be defined as follows: the higher is the client's disposable income, the higher mortgage loan can be reached.

Graph 15: Average nominal wage in years 2004-2018 in Czech Republic and Russia



Source 1: http://fincan.ru/articles/49_srednyaja-zarplata-v-rossii-po-godam/, self creation
Source 2: https://www.czso.cz/, self creation

3.1.7. State support of mortgage lending

The last factor is the state support of mortgage loans, when people repaying the mortgage can apply for tax deductions. In Czech Republic,, tax deductions are based on the Income Tax Act No. 586/1992 Coll.. It is possible to deduct up to 300 thousand CZK from your tax base, due to the paid interest on a mortgage loan or building savings loan[33]. The condition for deduction of taxes is that the loan must be intended for housing needs and the

[32] Czso.cz. (2020). *Average wages and registered number of employees - Methodology | CZSO*. [online] Available at: https://www.czso.cz/csu/czso/2-pmz_m [Accessed 4 Feb. 2020].
[33] Laws for people. (2020). *586/1992 Coll. Income Tax Act*. [online] Available at: https://www.zakonyprolidi.cz/cs/1992-586 [Accessed 4 Feb. 2020].

property must serve the purpose of permanent housing. The second condition is that interest can only be deducted for the person participating in the loan agreement.

In Russia, there also exists a state support program for mortgage loans, for certain groups of population. The program acts in the following way – when the borrower receives a loan to purchase real estate, he or she pays the debt at a rate of 6%, regardless of the interest specified in the contract. All overpayments in excess of these 6% for the borrower are paid by the state. According to Decree No. 1711[34], families with children who have a second or third child can take advantage of the state support program. Also, in accordance with Federal Law N 76-FL[35], if the financial situation of the borrower worsens significantly, the borrower has the right to receive mortgage vacations for up to 6 months.

[34] Garant.ru. (2020). *Decree of the Government of the Russian Federation of December 30, 2017 No. 1711*. [online] Available at: https://www.garant.ru/products/ipo/prime/doc/71750282/ [Accessed 4 Feb. 2020].

[35] Consultant.ru. (2020). *Federal Law dated 01.05.2019 N 76-FL* [online] Available at: http://www.consultant.ru/document/cons_doc_LAW_323793/ [Accessed 4 Feb. 2020].

3.2. Linear regression analysis – one equation model

Theoretical basis

For the one-equation model, I have chosen the number of granted mortgage loans as a dependent variable, which depends on different factors, such as GDP, inflation rate, interest rate, property index, unemployment rate and average wage. Thus, endogenous variable in this model is the number of granted loans, exogenous variables of model are GDP, inflation rate, interest rate, property index, unemployment rate and average wage. These models are created on basis of data available for Czech Republic and Russia.

Due to the unavailable property index data for Russia, this part of diploma thesis will use our own calculation. Therefore, the index values obtained as a result of our own calculations may differ significantly from statistical data, which are nevertheless not available.

In this model we assume the following relations to be tested: number of granted loans is increasing, when GDP is increasing, inflation rate is decreasing, interest rate is decreasing, property index is rising, unemployment rate is decreasing and average wage is increasing, and the other way around.

Assumed economic model is:

$$y_{1t} = f\,(x_{1t}, x_{2t}, x_{3t}, x_{4t}, x_{5t}, x_{6t}, x_{7t}) \qquad (3.1.)$$

Formulation of econometric model

$$y_{1t} = \gamma_1 x_{1t} + \gamma_2 x_{2t} + \gamma_3 x_{3t} + \gamma_4 x_{4t} + \gamma_5 x_{5t} + \gamma_6 x_{6t} + \gamma_7 x_{7t} + u_{1t} \qquad (3.2)$$

Variables in model

y_{1t} number of granted mortgage loans

x_{1t} unit vector

x_{2t} GDP

x_{3t} inflation rate

x_{4t} interest rate

x_{5t} property index

x_{6t} unemployment rate

x_{7t} average wage

u_{1t} error term

3.2.1. Czech Republic

First of all, I used correlation matrix to eliminate multicollinearity.

Table 1: Estimation of multicollinearity - Czech Republic

	y_1	x_2	x_3	x_4	x_5	x_6	x_7
y_1	1	0.44327351	-0.2395339	-0.787235619	-0.6827581	-0.75174229	0.358328
x_2	0.443273515	1	0.13233722	-0.209097449	-0.0835975	-0.620628691	0.913278
x_3	-0.23953393	0.13233722	1	0.54284603	0.67124588	-0.09964967	0.086335
x_4	-0.78723562	-0.2090974	0.54284603	1	0.77819586	0.438591002	-0.14128
x_5	-0.6827581	-0.0835975	0.67124588	0.77819586	1	0.402057537	-0.02677
x_6	-0.75174229	-0.6206287	-0.0996497	0.438591002	0.40205754	1	-0.53002
x_7	0.358328373	0.91327796	0.08633461	-0.141276462	-0.0267702	-0.530021859	1

Source: self-creation

I applied correlation matrix to estimate multicollinearity occurance in the model, which means the values higher than 0,8. The table above shows multicollinearity occurance between variables x_2 and x_7 (GDP and average wage). High multicollinearity doesn't allow to do exact estimate of parameters, so I eliminated it by the method of gradual differences of variable x_7 (average wage). From the next table it is obvious that high multicolliniarity is eliminated and now I can estimate parameters.

Table 2: Eliminated multicollinearity - Czech Reapublic

	y_1	x_2	x_3	x_4	x_5	x_6	x_7
y_1	1	0.254155372	-0.20851904	-0.78222	-0.68276	-0.70662	0.098118
x_2	0.254155372	1	0.26250134	-0.0868	-0.0836	-0.53643	-0.06673
x_3	-0.20851904	0.262501339	1	0.532861	0.671246	-0.15727	0.381922
x_4	-0.78222072	-0.08679647	0.53286115	1	0.778196	0.389804	0.241134
x_5	-0.6827581	-0.08359755	0.67124588	0.778196	1	0.402058	0.329299
x_6	-0.70661577	-0.53643328	-0.15726855	0.389804	0.402058	1	-0.29785
x_7	0.09811819	-0.0667325	0.38192207	0.241134	0.329299	-0.29785	1

Source: self-creation

Using Ordinary Least Squares method I get the following estimated parameters:

Table 3: Ordinary Least Squares – Czech Republic

γ_1	γ_2	γ_3	γ_4	γ_5	γ_6	γ_7
181.572	-0.227	1.399	-11.699	3.797	-6.497	-0.0098

Source: self-creation

Econometric model including estimated parameters is the following:

$$y_{1t} = 181.572 - 0.227x_{2t} + 1.399x_{3t} – 11,699x_{4t} + 3,797x_{5t} - 6,497x_{6t} – 0,0098x_{7t} + u_{1t} \quad (3.3)$$

By conducting statistical verification, I tested significance of estimated parameters. Basic hypothesis is, that all the parameters are not significant for the model. Using P-value I will test, if for every parameter accept basic hypothesis or reject it. If some parameter will be proven as statistically non-significant, its factor should be excluded from the model. According to the theory, the less is P-value (probability value), the more significant is the parameter for remaining in the model.

The significance level of estimated parameters was calculated in Gretl software. According to the results, calculated in Gretl software, it can be seen that parameters $\gamma_1, \gamma_4, \gamma_6$ are statistically significant, with significance level less than 0.05; while parameters $\gamma_2, \gamma_3, \gamma_5, \gamma_7$ are not statistically significant at the chosen level of significance of 0.05.

Table 4: Statistical significance of estimated parameters – Czech Republic

Parameter	**p-value from SW Gretl**	**Statistical significance**
γ_1	0.0032	Is statistically significant at α=0.05
γ_2	0.2902	Is not statistically significant at α=0.05
γ_3	0.6341	Is not statistically significant at α=0.05
γ_4	0.0139	Is statistically significant at α=0.05
γ_5	0.1911	Is not statistically significant at α=0.05
γ_6	0.0626	Is statistically significant at α=0.05
γ_7	0.8567	Is not statistically significant at α=0.05

Source: self creation

Based on the results shown above, I will gradually eliminate non-significant variables and leave only significant variables in the model. First, I will eliminate γ_7 with the lowest significance. The model is modified to:

$$y_{1t} = 177.256 - 0.204x_{2t} + 1.264x_{3t} – 11,845x_{4t} + 3,547x_{5t} - 6,189x_{6t} + u_{1t} \quad (3.4)$$

where:

- y_{1t} number of granted mortgage loans
- x_{1t} unit vector
- x_{2t} GDP
- x_{3t} inflation rate
- x_{4t} interest rate
- x_{5t} property index

x_{6t} unemployment rate

Table 5: Statistical significance of estimated parameters after 1st elimination– Czech Republic

Parameter	p-value from SW Gretl	Statistical significance
γ_1	0.0006	Is statistically significant at α=0.05
γ_2	0.2042	Is not statistically significant at α=0.05
γ_3	0.6333	Is not statistically significant at α=0.05
γ_4	0.0069	Is statistically significant at α=0.05
γ_5	0.1328	Is not statistically significant at α=0.05
γ_6	0.0266	Is statistically significant at α=0.05

Source: self creation

Next step is the elimination of γ_3. The modified model is:

$$y_{1t} = 176.328 - 0.193x_{2t} - 10.805x_{4t} + 3.506x_{5t} - 6.577x_{6t} + u_{1t} \quad (3.5)$$

where:

y_{1t} number of granted mortgage loans

x_{1t} unit vector

x_{2t} GDP

x_{4t} interest rate

x_{5t} property index

x_{6t} unemployment rate

Table 6: Statistical significance of estimated parameters after 2nd elimination– Czech Republic

Parameter	p-value from SW Gretl	Statistical significance
γ_1	0.0003	Is statistically significant at α=0.05
γ_2	0.1997	Is not statistically significant at α=0.05
γ_4	0.0016	Is statistically significant at α=0.05
γ_5	0.1179	Is not statistically significant at α=0.05
γ_6	0.0108	Is statistically significant at α=0.05

Source: self creation

Next step is elimination of γ_2. The modified model is:

$$y_{1t} = 139.029 - 10.839x_{4t} + 1.913x_{5t} - 5.232x_{6t} + u_{1t} \quad (3.6)$$

where:

y_{1t} number of granted mortgage loans

x_{1t} unit vector

x_{4t} interest rate

x_{5t} property index

x_{6t} unemployment rate

Table 7: Statistical significance of estimated parameters after 3d elimination– Czech Republic

Parameter	p-value from SW Gretl	Statistical significance
γ_1	4.90e-06	Is statistically significant at α=0.05
γ_4	0.0016	Is statistically significant at α=0.05
γ_5	0.2984	Is not statistically significant at α=0.05
γ_6	0.0198	Is statistically significant at α=0.05

Source: self creation

The next step is elimination of γ_5. Modified model is:

$$y_{1t} = 151.361 - 10.1269x_{4t} - 5.886x_{6t} + u_{1t} \quad (3.7)$$

where:

y_{1t} number of granted mortgage loans

x_{1t} unit vector

x_{4t} interest rate

x_{6t} unemployment rate

Table 8: Statistical significance of estimated parameters after 4th elimination– Czech Republic

Parameter	p-value from SW Gretl	Statistical significance
γ_1	3.14e-08	Is statistically significant at α=0.05
γ_4	0.0017	Is statistically significant at α=0.05
γ_6	0.0077	Is statistically significant at α=0.05

Source: self creation

The next steps include estimation of the parameters in GRETL software, interpretation and economic, statistical and econometric verification of the results.

Table 9: GRETL estimation – Czech Republic

Model: OLS, using observations 2005-2018 (T = 14)
Dependent variable: Numberofgrantedmortgageloa

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	151.361	11.1157	13.62	<0.0001	***
Interestrate	−10.1269	2.46800	−4.103	0.0017	***
Unemploymentrate	−5.88623	1.80975	−3.253	0.0077	***

Mean dependent var	80.59757	S.D. dependent var	21.85693
Sum squared resid	1228.754	S.E. of regression	10.56905
R-squared	0.802147	Adjusted R-squared	0.766173
F(2, 11)	22.29839	P-value(F)	0.000135
Log-likelihood	−51.18803	Akaike criterion	108.3761
Schwarz criterion	110.2932	Hannan-Quinn	108.1986
rho	0.162181	Durbin-Watson	1.501621

Source: self creation

Economic verification:

If other variables are equal to zero, the number of granted mortgage loans will be 151,361, ceteris paribus. So, we have two significant variables – interest rate and unemployment rate.

If interest rate increases by 1%, the number of loans decreases by 10 thousands, ceteris paribus. The interest rate is one the most important factors affecting the mortgage market. The relationship of the interest rate to the volume and number of mortgage loans is obvious. As interest rates falls, the demand for mortgage loans rises and the number of loans and volume are rising too.

If unemployment rate increases by 1%, the number of loans decreases by 5.886 thousands, ceteris paribus. When the unemployment rate is rising, the disposable income of the population is decreasing, as well as willingness to borrow, therefore there is inverse relationship between the number of granted loans and unemployment rate.

Statistical verification:

From the estimation, contained in Gretl software, it is obvious, that both parameters are statistically significant at chosen significance level 0.05.

R^2 = 0.802 (Table 9), which means that 80.2% of variation of the dependent variable (number of granted mortgage loans) is explained by the variation of two independent variables (interest rate and unemployment rate).

P-value calculated during F-test is 0.000135 (Table 9), it is less than 0.05 => model is statistically significant as a whole.

Econometric verification:

Durbin-Watson test in GRETL

The value of Durbin-Watson test is 1.5, therefore I can not interpret it.

Test of normality in GRETL

Hypotheses:

H0: random variable has a normal distribution (normality presence)

H1: random variable doesn't have a normal distribution (normality absence)

p-value = 0.56557 > the residuals have normal distribution with probability 56.557% =>

therefore I accept H0 hypothesis.

Test of heteroscedasticity – White's test in GRETL

H0: homoscedasticity (the error level is the same across all values of the independent variable)

H1: heteroscedasticity (the values of the independent variable can have different error levels)

p-value = 0.833 – probably there is no heterocsedasticity presence in the model => therefore I accept H0 hypothesis.

Model application: coefficients of elasticity

The elasticity coefficient is a number, which shows the percentage change that will occur in dependent variable when independent variable changes for 1%.

Interest rate elasticity from the last period:

E=-10.1269*(2.79/80.59)= -0.35%

If interest rate increases by 1%, the number of granted loans decreases by 0.35%, ceteris paribus. This follows from the relationship between the number of mortgage loans and interest rate. As interest rates rise, the demand for mortgage loans falls and the number of loans and volume are also falling.

Unemployment rate elasticity from the last period:

E=-5.886*(2.2/80.59)= -0.16%

If unemployment rate increases by 1%, the number of granted loans decreases by 0.16%, ceteris paribus. This follows from the inverse relationship between number of mortgage loans and unemployment rate. When the unemployment rate is rising, the disposable income of the population is decreasing and also decreasing is the willingness to borrow money.

3.2.2. Russia

First of all, I used the correlation matrix to eliminate multicollinearity.

Table 10: Estimation of multicollinearity - Russia

	y_1	x_2	x_3	x_4	x_5	x_6	x_7
y_1	1	0.31590421	-0.5801040	-0.8314193	-0.8304918	-0.57988905	0.17150
x_2	0.315904213	1	-0.4636934	-0.5206358	-0.6023056	-0.1140682	0.8975
x_3	-0.58010404	-0.4636934	1	0.76468989	0.53380761	0.36275835	-0.5821
x_4	-0.831419319	-0.5206358	0.76468989	1	0.61937080	0.59889402	-0.5207
x_5	-0.830491867	-0.6023056	0.53380761	0.61937080	1	0.19260267	-0.5494
x_6	-0.57988905	-0.1140682	0.36275835	0.59889402	0.19260267	1	-0.0842
x_7	0.171507787	0.8975	-0.5821638	-0.5207944	-0.5494199	-0.0842932	1

Source: self-creation

I applied correlation matrix to estimate multicollinearity occurance in model, which means values higher than 0.8. The table above shows multicollinearity occurance between variables x_2 and x_7 (GDP and average wage). High multicollinearity is eliminated by the method of gradual differences of variable x_7 (average wage). From the next table is obvious, that high multicolliniarity is eliminated and now we can estimate the parameters. Also there is high dependency between variables y_1 and x_4 and x_5, but there is no multicollinearity.

Table 11: Eliminated multicollinearity - Russia

	y_1	x_2	x_3	x_4	x_5	x_6	x_7
y_1	1	0.315904213	-0.580104	-0.8314193	-0.8304919	-0.57988906	-0.31108102
x_2	0.315904213	1	-0.3591767	-0.3662558	-0.4749057	0.039791908	-0.26797936
x_3	-0.58010404	-0.359176714	1	0.73913482	0.47063347	0.33687954 6	-0.23146973
x_4	-0.831419319	-0.366255772	0.73913482	1	0.57332164	0.64901124 2	-0.05010413
x_5	-0.830491867	-0.474905688	0.47063347	0.57332164	1	0.11379322 4	0.33622780 9
x_6	-0.579889059	0.039791908	0.33687955	0.64901124	0.11379322	1	-0.03455189
x_7	-0.311081019	-0.267979364	-0.2314697	-0.0501041	0.33622781	-0.03455189	1

Source: self-creation

Using the method of Ordinary Least Squares, we get the following parameters to be estimated:

Table 12: Ordinary Least Squares – Russia

γ_1,	γ_2	γ_3	γ_4	γ_5	γ_6	γ_7
3831.57	-0.144	-6.883	-110.24	-59.33	-116.85	-0.61

Source: self-creation

Econometric model including estimated parameters is the following:

$$y_{1t} = 3831.57 – 0.144x_{2t} - 6.883x_{3t} – 110.24x_{4t} – 59.33x_{5t} - 116,85x_{6t} – 0,61x_{7t} + u_{1t} \quad (3.8)$$

By conducting statistical verification, I tested the significance of estimated parameters. The significance level of estimated parameters was calculated in Gretl software, using *t-test*. From the estimation conducted in Gretl, it is obvious, that parameters γ_1, γ_5, γ_6 (unit vector, property index, and unemployment rate) are statistically significant at the given significance level of 0.05; while parameters γ_2, γ_3, γ_4, γ_7 (GDP, inflation rate, interest rate, average rate) are not statistically significant at the given significance level of 0.05.

Table 13: Statistical significance of estimated parameters – Russia

Parameter	**p-value from SW Gretl**	**statistical significance**
γ_1	9.42e-05	Is statistically significant at α=0.05
γ_2	0.1299	Is not statistically significant at α=0.05
γ_3	0.5870	Is not statistically significant at α=0.05
γ_4	0.0757	Is not statistically significant at α=0.05
γ_5	0.0015	Is statistically significant at α=0.05
γ_6	0.0437	Is statistically significant at α=0.05
γ_7	0.0605	Is not statistically significant at α=0.05

Source: self creation

Based on the results shown above, I will gradually eliminate non-significant variables until all variables in model are statistically significant. As first, I will eliminate γ_3 with lowest significance. The model is modified to:

$$y_{1t} = 3926.88 – 0.138x_{2t} – 124.974x_{4t} – 60.1067x_{5t} – 112.978x_{6t} – 0.561x_{7t} + u_{1t} \quad (3.9)$$

where:

- y_{1t} number of granted mortgage loans
- x_{1t} unit vector
- x_{2t} GDP
- x_{4t} interest rate
- x_{5t} property index
- x_{6t} unemployment rate
- x_{7t} average wage

Table 14: Statistical significance of estimated parameters after 1st elimination– Russia

Parameter	p-value from SW Gretl	statistical significance
γ_1	1.30e-05	Is statistically significant at α=0.05
γ_2	0.1189	Is not statistically significant at α=0.05
γ_4	0.0214	Is not statistically significant at α=0.05
γ_5	0.0006	Is statistically significant at α=0.05
γ_6	0.0345	Is statistically significant at α=0.05
γ_7	0.0500	Is statistically significant at α=0.05

Source: self creation

Next step is the elimination of γ_2. Modified model is:

$$y_{1t} = 3517.37 - 96.776x_{4t} - 58.844x_{5t} - 139.495x_{6t} - 0.449x_{7t} + u_{1t} \quad (3.10)$$

where:

y_{1t} number of granted mortgage loans

x_{1t} unit vector

x_{4t} interest rate

x_{5t} property index

x_{6t} unemployment rate

x_{7t} average wage

Table 15: Statistical significance of estimated parameters after 2nd elimination– Russia

Parameter	p-value from SW Gretl	statistical significance
γ_1	3.94e-06	Is statistically significant at α=0.05
γ_4	0.0601	Is not statistically significant at α=0.05
γ_5	0.0008	Is statistically significant at α=0.05
γ_6	0.0157	Is statistically significant at α=0.05
γ_7	0.1195	Is not statistically significant at α=0.05

Source: self creation

Next step is elimination of γ_7. Modified model is:

$$y_{1t} = 3386.14 - 68.04x_{4t} - 68.517x_{5t} - 157.283x_{6t} + u_{1t} \quad (3.11)$$

where:

y_{1t} number of granted mortgage loans

x_{1t} unit vector

x_{4t} interest rate

x_{5t} property index

x_{6t} unemployment rate

Table 16: Statistical significance of estimated parameters after 3d elimination– Russia

Parameter	**p-value from SW Gretl**	**statistical significance**
γ_1	3.86e-06	Is statistically significant at α=0.05
γ_4	0.1687	Is not statistically significant at α=0.05
γ_5	0.0002	Is statistically significant at α=0.05
γ_6	0.0110	Is statistically significant at α=0.05

Source: self creation

Next step is elimination of γ_4. Modified model is:

$$y_{1t} = 3038.10 - 79.3644x_{5t} - 210.161x_{6t} + u_{1t} \quad (3.12)$$

where:

y_{1t} number of granted mortgage loans

x_{1t} unit vector

x_{5t} property index

x_{6t} unemployment rate

Table 17: Statistical significance of estimated parameters after 4th elimination– Russia

Parameter	**p-value from SW Gretl**	**statistical significance**
γ_1	4.55e-07	Is statistically significant at α=0.05
γ_2	3.77e-06	Is statistically significant at α=0.05
γ_3	0.0002	Is statistically significant at α=0.05

Source: self creation

The next step is the estimation of parameters in GRETL software, interpretation and economic, statistical and econometric verification of the results.

Table 18: Estimation of parameters in GRETL - Russia

Model: OLS, using observations 2006-2018 (T = 13)
Dependent variable: Numberofgrantedmortgageloa

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	3038.10	265.403	11.45	<0.0001	***
Propertyindex	−79.3644	8.72679	−9.094	<0.0001	***
Unemploymentrate	−210.161	36.3978	−5.774	0.0002	***

Mean dependent var	621.6154	S.D. dependent var	402.8628
Sum squared resid	139435.5	S.E. of regression	118.0828
R-squared	0.928406	Adjusted R-squared	0.914087
F(2, 10)	64.83808	P-value(F)	1.88e-06
Log-likelihood	−78.76885	Akaike criterion	163.5377
Schwarz criterion	165.2326	Hannan-Quinn	163.1893
rho	−0.408133	Durbin-Watson	2.789208

Source: self creation

Economic verification:

If other variables are equal to zero, the number of granted mortgage loans will be 3,038,100, ceteris paribus.

If property index increases by 1, the number of loans decreases by 79 thousands. Raising property index means, that housing is becoming less affordable. On the one hand, it should boost mortgage market, on the other hand it can mean the decrease of real wages, which negatively affect willingness of people to borrow.

If unemployment rate increases by 1%, the number of loans decreases by 210 thousands, ceteris paribus. If the unemployment rate is rising, the disposable income of the population is decreasing, together with the willingness to borrow, therefore there is inverse relationship between the number of granted loans and unemployment.

Statistical verification:

From Gretl estimation it is obvious that both parameters are statistically significant at the chosen significance level of 0.05.

R^2 = 0.928, which means that 92.8% of variation of dependent variable (number of granted mortgage loans) is explained by the variation of independent variables (property index and unemployment rate).

P-value for F-test is 1.88e-06, it is less then 0.05 => model is statistically significant as a whole.

Econometric verification:

Durbin-Watson test in GRETL

Value of Durbin-Watson test is 2.78, therefore we cannot interpret it.

Test of normality in GRETL

Hypotheses:

H0: random variable has a normal distribution (normality presence)

H1: random variable doesn't have a normal distribution (normality absence)

p-value = 0.611 > the residuals have normal distribution with probability 61.1%. => therefore we accept H0 hypothesis.

Test of heteroscedasticity – White's test in GRETL

H0: homoscedasticity

H1: heteroscedasticity

p-value = 0.61 – probably there is no heterocsedasticity presence in the model, therefore I accept H0 hypothesis.

Model application: coefficients of elasticity

Property index elasticity from the last period:

E=-79.36*(7.37/621.61)= -0.94%

If property index increases by 1%, the number of granted loans decreases by 0.94%, ceteris paribus. Increasing of property index can also mean the decrease in real wages, which negatively affect willingness of people to borrow.

Unemployment rate elasticity from the last period:

E= -210.161*(4.8/621.61) = -1.622%

If unemployment rate increases by 1%, the number of granted loans decreases by 1.622%, ceteris paribus. Rising unemployment rate means that disposable income of the population is decreasing and willingness to borrow is also decreasing.

In comparison with Czech mortgage market, fluctuation of the same factors in Russia affects the market much more. Also, the largest influence on the market is produced by different factors in the two countries: in Czech Republic such factors are the interest rate and the unemployment rate, while in Russia they are the property index and the unemployment rate, due to econometric analysis. For example, while in Czech Republic, 1% change in

unemployment rate involves 0.16% change in the number of granted loans, in Russia the same change will involve 1.622% change in the number of granted loans. This difference can be explained because of general instability of Russian mortgage market, lower income and life level and changing conditions.

3.3. Future prognosis

This part focuses on future forecasts for both macroeconomic factors and mortgage lending development. Due to the current rapid change in financial markets it is very hard to predict development of mortgage markets. The following prognosis is based on available data and publications, which were mostly published before the markets started to rapidly change.

3.3.1. Czech Republic

Forecasts for the future are such that the growth of the Czech economy will continue in the coming years at roughly the same level as in 2019, with the overall performance of the economy in 2019 compared to 2018 increased by 1.06%. The Ministry of Finance expects the economy to grow by 2.4% a year for next year[36]. By contrast, the Ministry of Industry and Trade expects a slight slowdown in the rate of economic growth[37]. In terms of internal conditions, higher performance continues to be hampered by tensions in labor capacities, while the external environment is marked by increasing uncertainties, notably by an increase in protectionism accompanied by a slowdown in export markets. So, household consumption should therefore remain the main growth factor, supported by fast wage growth, extremely low unemployment and a record rate of economic activity.

As already mentioned, inflation is another important factor. Looking at current developments, the average inflation rate in 2018 was 2.15%, then in 2019 it became 2.8%, which is 0.65 percentage points more than in the previous year. According to the Ministry of Finance of the Czech Republic, the expected inflation rate in 2020 is 2.4%.

Concerning interest rates, they bounced back in 2016 and grew slowly until January 2019. Then they started to decline slowly and by December 2019 the average mortgage rate was on the level of 2.34% p.a. In 2020, mortgages could be expected to rise and interest rates rise to as much as three percent, as evidenced by the fact that some banks are already attacking this threshold. In February 2020, the Czech National Bank raised its basic interest

[36] Lundegaard - e-business solutions provider, i. (2020). *MF zhoršilo odhad růstu tuzemské ekonomiky v příštím roce na dvě procenta | Investičníweb.cz*. [online] Investicniweb.cz. Available at: https://www.investicniweb.cz/news-cesko-ekonomika-prognoza-mf-2020/ [Accessed 8 Mar. 2020].

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rate (repo) from 2% to 2.25%[38]. The rates of domestic banks depend on it. Due to the actual situation the CNB Bank Board lowered its two-week repo rate (2W repo rate) by 75 basis points to 1.00%. It also decided to lower the Lombard rate to 2.00% and the discount rate to 0.05%. The new interest rates are effective from 27 March 2020[39].

In almost all regions of the Czech Republic, apartment prices reach historical highs in 2019. The most significant increase in recent years has been in those cities where young families are settling. They increase the mortgage demand in areas with low unemployment, a pleasant and safe environment and enough opportunities for study or leisure activities. In the third quarter of 2019, the average selling price of apartments in Prague and regional capitals remained at CZK 60,700 (approximately USD 2,650) per square meter. Housing prices are expected to stagnate for 2020. The reason is simple – for such expensive apartments there are no longer buyers. A further slight increase can be expected in the capital, where housing demand is the highest.

Since the second quarter of 2019, employment, according to the sample survey, has been more or less stagnating. The still strong labor shortage is the primary barrier to further large-scale growth in production, but in the context of slower economic growth, labor demand should weaken. The unemployment rate in 2019 is estimated by the Ministry of Finance to reach 2.0%. With the gradual closing of the output gap, it is expected to increase slightly to 2.2% in 2020 and further to 2.4% in 2021[40].

The results of average and median wages in 3d quarter 2019 confirmed the expectation that the pressure on wage growth will continue to ease. Although it was not as strong as in 2018, it nevertheless led to a year-on-year increase in the average wage by 7.2% in the first three quarters.[41] In 2020, the labor market situation will start to change. Slower economic growth, increased uncertainty in foreign countries and a decline in profit margins limit the scope for further rapid wage growth. In 2020, according to a Deloitte analysis, the average wage is expected to increase by 5.7%, which is less than in the previous few years.

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[38] Cnb.cz. 2020. *CNB Raises Interest Rates - Czech National Bank*. [online] Available at: <https://www.cnb.cz/cs/cnb-news/tiskove-zpravy/CNB-zvysuje-urokove-sazby-00011/> [Accessed 9 March 2020].

[39] Cnb.cz. 2020. *The CNB Cuts Interest Rates And Takes Other Measures - The Czech National Bank*. [online] Available at: <https://www.cnb.cz/cs/cnb-news/tiskove-zpravy/CNB-snizuje-urokove-sazby-a-prijima-dalsi-opatreni/> [Accessed 3 April 2020].

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[41] Www2.deloitte.com. 2020. [online] Available at: <https://www2.deloitte.com/content/dam/Deloitte/cz/Documents/about-deloitte/vyhled_ceske_ekonomiky_2020.pdf> [Accessed 9 March 2020].

Ex post forecast

In order to make a forecast of the mortgage market dynamics in the future, it is necessary to determine the quality of the forecast. For this purpose, the ex post method is used, in which I compare the actual measured values with the predicted ones. The calculation was made using the GRETL program, the output of which is the following table, which gives 95% interval estimate of the number of mortgage loans provided in 2005-2018. The numbers are in thousands.

Table 19: Ex post forecast – Czech Republic

Observation	Real	Prediction	Lower int.	Upper int.	Stand. error
2005	52.388	63.137	37.703	88.571	11.5558
2006	69.189	64.200	37.477	88.924	11.2330
2007	85.757	66.491	40.610	92.372	11.7589
2008	69.670	67.839	40.119	95.560	12.5945
2009	45.229	54.605	28.574	80.636	11.8271
2010	52.048	63.833	38.998	88.668	11.2836
2011	72.721	74.251	49.848	98.654	11.0874
2012	74.745	76.941	52.023	101.859	11.3214
2013	94.396	78.258	53.210	103.305	11.3802
2014	87.917	89.429	64.392	114.465	11.3752
2015	104.044	99.448	74.279	124.617	11.4353
2016	114.044	107.967	82.209	133.725	11.7029
2017	108.122	111.809	85.402	138.216	11.9977
2018	98.096	110.157	82.888	137.426	12.3894

Source: self-creation

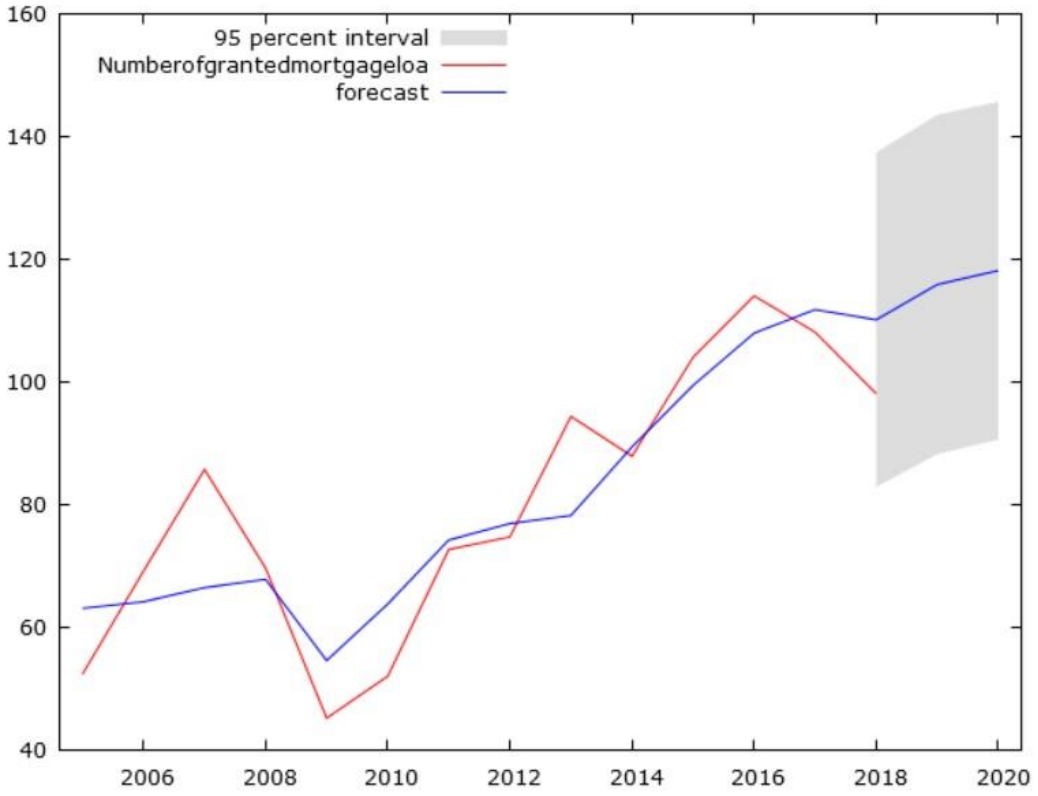
The ex post forecast for 2005 is 63,137 loans. Compared to the actual value, the forecast is 10,749 higher. The value falls within the 95% interval estimate. I can therefore conclude that the forecast for the first year is acceptable. Similarly, acceptability in the following years can be confirmed.

Ex ante forecast

For the ex ante forecast, all explanatory variables need to be estimated first. This can be achieved if the model contains time-delayed variables, or using predicted future values of the explanatory variables. As a basic data, I will take the predicted values announced by the CNB and the Ministry of Finance. For 2019 the current number have not yet been published,

so it was also included in the forecast. The forecast was calculated in the GRETL program, the output is as follows:

Picture 1: Ex ante forecast 2019-2020 – Czech Republic (in thousands)



Source: self creation

Specific values are shown in Table 20. The table also shows a 95% interval estimate of the number of mortgage loans provided and a standard error.

Table 20: Ex ante forecast – Czech Republic

Observation	Real	Prediction	Lower int.	Upper int.	Stand. error
2019		115.892	76.861	154.922	12.5668
2020		118.157	79.328	156.987	12.5021

Source: self creation

According to the predicted values, I can say that the growth trend in the number of provided mortgage loans continues. However, it depends on the development of the overall economy, especially in the current unstable situation.

3.3.2. Russia

The official forecast for Russia's economic growth rate in 2020 is 1.7%. However, the head of the Accounts Chamber believes that GDP growth will be lower than the official forecast of the government – about 1.5%. Among the problems that hinder the growth of the

Russian economy are named the demographic problem and low labor productivity. The growth forecast for 2021-2024 is 3.1% in 2021, 3.2% in 2022, 3.3% in 2023-2024[42].

In 2019, inflation in the Russian Federation amounted to 3%. This is the second record low result in the history of post-Soviet Russia. The forecast of the Ministry of Economic Development for 2020 is 3%, for 2021-2024 - 4%, which corresponds to the target of the Central Bank. The Central Bank itself currently adheres to a much more conservative forecast for inflation for the current year - 3.5-4%.

The presidential decrees in May set a goal: the mortgage interest should be 8% by the end of 2024. In 2019, there were more than once declines in interest on housing loans after a decision by the Central Bank Board of Directors to reduce the key refinancing rate. On average, the interest on the mortgage will be 8.4% in 2020, in accordance with the forecast[43]. However, in March 2020, large banks began to raise interest rates on loans. Based on the current critical situation in the financial markets and in the world as a whole, it is difficult to predict how the situation will develop in the future.

Decreasing mortgage rates will support the demand for residential real estate in 2020, but developers will have to take into account the changes in consumer preferences and demands. Market participants do not expect a significant increase in apartment prices in Russian cities, however, in some regions the price can grow up to 25 percent.

Many new projects in regional centers cannot receive bank financing due to low rates of return. This can lead to supply shortages in some cities. In such circumstances, prices can rise by 20-25% despite the modest rate of economic growth and stagnation of real incomes of the population[44].

Official expectations of the Ministry of Labor suggest that the number of unemployed in 2020 will remain close to 3.4 million, while the unemployment rate will remain at a historic low. According to the results of the past 2019, the level is expected in the range of 4.6-4.7 percent of the economically active population of Russia[45].

The average wage growth rate will be 2.3% at the end of 2020, according to the Minister of Labor and Social Protection. However, the growth in real disposable income of

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[42] Finmarket.ru. 2020. [online] Available at: <http://www.finmarket.ru/main/news/5163333> [Accessed 18 March 2020]

[43] News. 2020. *With a New Rate: What will be interest on deposits and loans in 2020*. [online] Available at: <https://iz.ru/957757/vadim-arapov/s-novoi-stavkoi-kakimi-budut-protcenty-po-vkladam-i-kreditam-v-2020-m> [Accessed 18 March 2020].

[44] Russian newspaper. 2020. *What will be with apartment prices in 2020*. [online] Available at: <https://rg.ru/2020/01/05/chto-budet-s-cenami-na-kvartiry-v-2020-godu.html> [Accessed 18 March 2020].

[45] RIA news. 2020. *Unemployment In Russia In December Preserved At 4.6 Percent*. [online] Available at: <https://ria.ru/20200127/1563930457.html> [Accessed 18 March 2020].

Russians (income minus obligatory tax and social payments adjusted for inflation) following the results of 2020 will be less impressive. They will increase by only 1.5%[46].

Ex post forecast

The ex post forecast procedure is exactly the same as in the previous section. The observation period is 2006-2018, due to missing data in 2005. The calculation was made using the GRETL program, the output of which is the following table, which gives 95% interval estimate of the number of mortgage loans provided in 2005-2018. The numbers are in thousands.

Table 21: Ex post forecast – Russia

Observation	Real	Prediction	Lower int.	Upper int.	Stand. error
2006	204.000	155.110	-136.48	446.70	130.866
2007	214.000	261.680	-53.82	577.19	141.600
2008	350.000	340.290	40.90	639.67	134.365
2009	130.000	59.260	-241.29	359.82	134.892
2010	301.000	399.200	122.00	676.41	124.411
2011	523.000	429.900	131.15	728.64	134.080
2012	692.000	713.040	437.06	989.02	123.861
2013	528.000	751.930	474.55	1029.31	124.490
2014	1012.000	883.610	605.03	1162.20	125.030
2015	699.000	817.800	537.32	1098.28	125.880
2016	856.000	892.370	611.05	1173.69	126.258
2017	1100.000	932.390	652.56	1212.23	125.591
2018	1472.000	1444.410	1112.55	1776.27	148.941

Source: self creation

The forecast for 2006 is 155,110 loans granted. Compared to the actual value, the forecast is lower by 48.890. The value falls within the 95% interval estimate. I can therefore conclude that the forecast for the first year is acceptable. Similarly, acceptability in the following years can be confirmed.

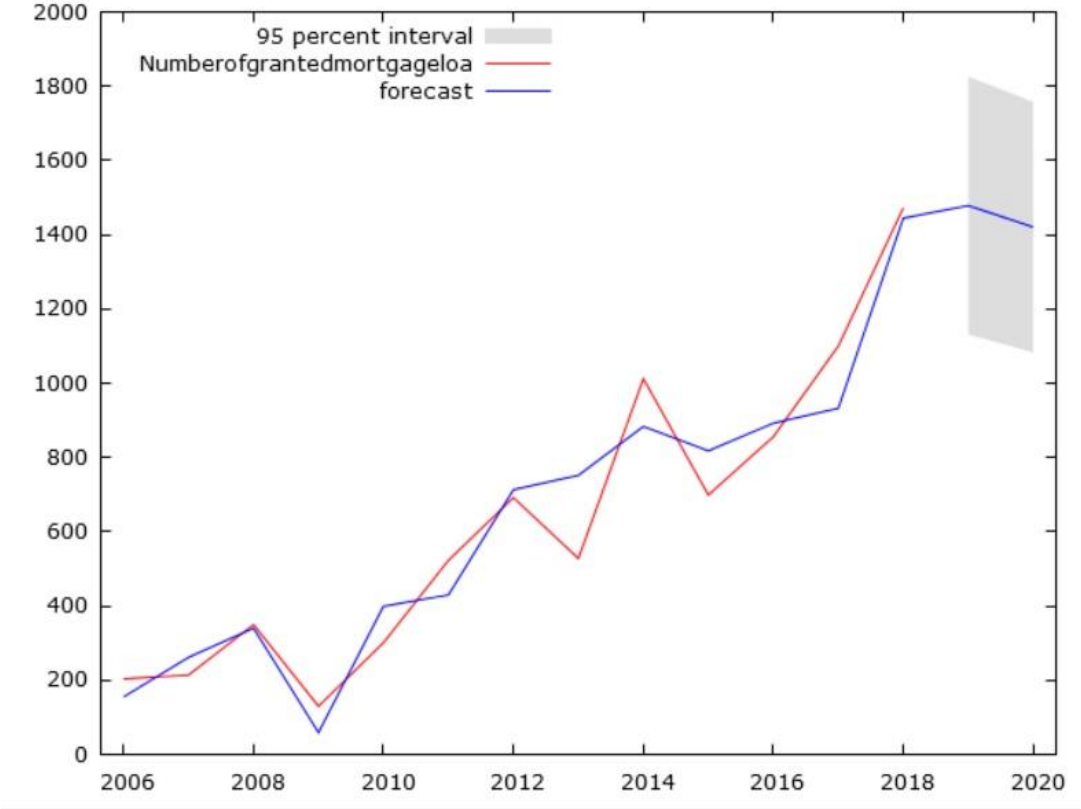
Ex ante forecast

For the ex ante forecast I will work with the predicted values announced by the Russian Central Bank and other institutions. The current numbers for 2019 have not yet been

[46] Gazeta.ru. 2020. [online] Available at: <https://www.gazeta.ru/business/2020/01/14/12909650.shtml> [Accessed 18 March 2020].

published at the moment of providing calculations, so it was also included in the forecast. The forecast was calculated in the GRETL program, the output is as follows:

Picture 2: Ex ante forecast 2019-2020 – Russia (in thousands)



Source: self creation

Specific values are shown in Table 21. The table also shows a 95% interval estimate of the number of mortgage loans provided and a standard error.

Table 21: Ex ante forecast – Russia

Observation	Real	Prediction	Lower int.	Upper int.	Stand. error
2019		1478.480	1131.32	1825.63	155.806
2020		1420.570	1083.12	1758.02	151.449

Source: self creation

According to the predicted values, I can say that the rising trend after the end of 2019 will be changed to slightly declining one. However, it depends on the dynamics of the overall economy, especially in the current fragile situation. This forecast is also supported by the depreciation of the ruble and the increase in mortgage rates in March 2020.

3.4. Results of comparison of Czech and Russian mortgage markets

The aim of this work was to compare two mortgage markets: Czech and Russian, which was carried out based on a number of factors. Specifically, the analysis focused mainly on socio-economic, macroeconomic indicators and institutional factors, as well as the characteristics of the financing of the housing market.

The main relatively fundamental difference between Russia and the Czech Republic is the percentage of mortgage loans burden on the population. There is a significant difference, as the mortgage lending system in Russia is not as developed as in other European countries. On the one hand, people often cannot afford a mortgage, also Russia has been experiencing an unstable economic situation in recent years. It should also be noted that the population has experienced economic shocks over the past few years, linked to the depreciation of the currency. There is a degree of uncertainty and mistrust on the part of citizens. However, despite this, the mortgage market in Russia is still growing rapidly. From 2015 to 2018, Russia experienced rapid growth in the mortgage market, which stopped in 2019.

Another reason, which leads to a low level of mortgage loan burden on the population, is a high interest rate, which in Russia is a very important factor. Compared to other European countries, this is a really high interest rate and thus a high amount that the candidates will pay extra. This is also one of the key issues in the development of the mortgage market.

Another cause of the underdeveloped mortgage market in Russia is slower GDP growth per capita, which means that households in Russia would have to borrow more money if they wanted to buy their own housing.

Over the past few years, a downward inflation trend has been observed in Russia, which has had a positive impact on the development of the mortgage market. In the Czech Republic, by contrast, the trend is slightly increasing, but the situation is broadly stable.

In terms of institutional factors, both countries seek to reduce waiting times and speed up the process of registering property rights as much as possible. Both governments are involved in creating benefits in an effort to support the development of mortgage lending. In the Czech Republic, legislation allows households to deduct interest on mortgage loans of up to CZK 300,000 per year from their tax base. In Russia, in addition to tax relief and subsidies for young families in the form of lower interest rates, there acts a program of the „parent capital“ that a family acquires after the birth of a second child, which can be used, inter alia, to pay part of its own resources when drawing up a mortgage.

Cultural factors also have an impact on the level of mortgage lending to the population. In Russia, the habit and social expectations are still valid, where adult children often expect assistance from their parents, which is rare or not so large in other European countries, especially in the Czech Republic.

In addition to the overall analysis of the two mortgage markets, their econometric analysis was also performed.

As an analysis of the markets showed, in Russia and in the Czech Republic, slightly different factors have the greatest impact on mortgage markets. In the Czech Republic, these are the interest rate and unemployment rate, while in Russia – the property index and unemployment rate. The property index depends on average house prices and average wages. Russia is one of the countries where housing is difficult to access, which results in a high property index. These countries also include the Czech Republic, but due to more favorable other factors in the Czech Republic, the situation is different.

Based on the provided prognosis, I can expect a continued growth in the Czech mortgage market, and the change of trend in Russian mortgage market. Due to current economic situation these prognosis might not be actual, because of fast changings in the world economy.

Conclusion

The purpose os this work was to provide comparison of mortgage markets and mortgage products in the Czech Republic and Russia. First, a global view of the two mortgage markets was created, showing the differences. Furthermore, factors influencing mortgage markets were demonstrated and econometric analysis of the influence of these factors on mortgage markets in the Czech Republic and Russia was performed, and prognosis of future development is provided.

Even from the first look at the mortgage market in Russia it is clear that it is very different from the mortgage markets of other European countries, especially the Czech Republic. Comparison of the two markets on the basis of a number of factors has allowed us to confirm and characterize the existing differences.

In Russia, despite the efforts of the banks to tailor the product to the population (the offer is indeed very extensive), there are a number of significant global problems that limit people's interest in mortgage lending. For people to become more interested in mortgage loans, the economic situation in the country must be stabilized, and lending must be more affordable. In my opinion, there must also be a fundamental change in the ways the banks are using to attract the mortgage loan clients. Despite the fact that the banks in Russia are trying to create a range of products for different social groups, it is necessary to focus on lowering the interest rate. However, the banks are currently rising interest rate taking into account the current economic situation. In Czech Republic the trend is the opposite one – due to the situation, the banks are lowering interest rates to stimulate demand for mortgages.

The unavailability of mortgage loans for the wide population is also controlled by the ratio of income levels and property prices. The low solvency of the population and the high prices of real estate hamper the development of the mortgage market in Russia. In addition, the high cost of long-term financial resources (high key refinancing rate) forces the banks to lend at existing interest rates, which are too expensive for most people. In general, however, the mortgage market in Russia has been rapidly growing during the latest years and has even more significant potential for growth, as it has a large amount of withholding demand for mortgages.

In my opinion, it is necessary to stabilize the economic situation in Russia and to reduce the interest rate so that the mortgage loan could be available to the wider segments of the population in Russia. Also it is important to monitor the unemployment rate, because due to the analysis, this is one of the most important factors which affect the mortgage market. As

soon as interest rates on mortgage loans are reduced, Russia will undoubtedly encounter a huge wave of public interest in mortgages. In the Czech Republic, the mortgage market is highly developed in comparison with Russia. The product offer is not so extensive, and due to the very low interest rate, it is fully sufficient in terms of the potential needs of the clients. In the Czech Republic, the public interest in mortgages was so great in recent years that the Czech central Bank was trying to slow it down by introducing new and new restrictions. Now, however, that restrictions are becoming softer, due to the wordwide economic recession because of the pandemia.

As for the development of the mortgage market in Russia, there is a need for major changes, which, in my opinion, will not arrive in the near future.

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