Czech University of Life Sciences Prague

Faculty of Economics and Management

Department of Economics

Bachelor Thesis

Real estate market

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Economics Policy and Administration
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Thesis title

Real estate market

Objectives of thesis

The goal of the bachelor thesis “The development of the real estate market in the Czech Republic” is to evaluate the development of the real estate market from the long-term perspective. The work will be concentrated on the evolution of market prices and their influence over the last 20 years. Furthermore the thesis aims to analyze and evaluate the evaluation of a private investment in real estate in a given period. The real estate market will also be taken into account in relation to the acquisition of the real estate and development of the mortgage market.

Methodology

The theoretical part will be dedicated to the overall description and development of the real estate market (apartments, land, houses) in the Czech Republic.

The practical part will focus on a selected locality namely, the Pilsen region where will be an analysis of the development of the prices for specific properties and there will be also a comparison of the rent prices of these properties and their development over a given period. The description will be made on specific examples of private investments and their subsequent evaluation together with the calculation of return. In this context, the sub-theme will be the development of the mortgage market concerning the acquisition of investments.

The proposed extent of the thesis

30 – 50 pages

Keywords

Real estate market, mortgage market, rent development, real estate analysis, calculation of return, investments, real estate development in the Pilsen region, market prices.

Recommended information sources

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Declaration

I declare that I have worked on my bachelor thesis titled "Real estate market" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the bachelor thesis, I declare that the thesis does not break any copyrights.

In Prague on 15.3.2021 _____

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Real estate market

Abstract

The bachelor's thesis Real Estate market in the theoretical part defines the basic concepts in the real estate market sector. The author tries to explain to the reader all the differences between real estate subjects, real estate entities, and later on gets to the calculations, which are used in more detail in the practical part.

In the practical part, the bachelor's thesis basically deals with a comparison of very similar investments in the Pilsen region. The investor acquired these properties in two different cities. The year of acquisition, purchase price, mortgage loan, payback period, and others were therefore different. The main goal is to find out which investment was the most advantageous for the investor on the basis of several calculations. Key calculations used by the author are, for example, payback period, net present value, the interest rate of a mortgage loan, etc.

Thanks to all the calculations, it turned out that the first investment that was made in 2000 for CZK 250,000 was definitely the most advantageous for the investor. The investor did not take out any mortgage loans for this investment and paid the entire amount in cash. As a result, the investor did not pay any interest or bank fees. It turned out that this investment had the shortest payback period of 8 years and 1 month. The investment that pays off at least is apartment number two which was purchased for CZK 660,000. The total purchase price with all the interest rates, bank charges, etc was CZK 763,509. The investor had to draw on a mortgage loan of CZK 490,000.

After all the calculations, the author found out that this investment has the lowest net present value, assuming a project life of 20 and 30 years. It also has the lowest internal rate of return. The payback period is also relatively long, less than 16 years.

Keywords: Real estate market, mortgage market, rent development, real estate analysis, payback period, investments, real estate development in the Pilsen region, market prices.

Realitní trh

Abstrakt

Bakalářská práce „Realitní trh“ v teoretické části definuje základní pojmy v sektoru realitního trhu. Autor se snaží čtenáři vysvětlit všechny rozdíly mezi realitními subjekty, realitními entitami a později se dostane k výpočtům, které jsou podrobněji použity v praktické části.

V praktické části se bakalářská práce v zásadě zabývá porovnáním velmi podobných investic v Plzeňském kraji. Investor pořídil tyto nemovitosti ve dvou různých městech. Rok pořízení, kupní cena, hypoteční úvěr, doba návratnosti a jiné se tedy lišily. Hlavním cílem je na základě několika výpočtů zjistit, která investice byla pro investora nejvýhodnější. Klíčové výpočty použité autorem jsou například doba návratnosti, čistá současná hodnota, úroková sazba hypotečního úvěru atd.

Díky všem výpočtům se ukázalo, že první investice, která byla provedena v roce 2000, která byla pořízena za 250 000 Kč, byla pro investora rozhodně nejvýhodnější. Investor si na tuto investici nevzal žádný hypoteční úvěr, a celou částku vyplatil v hotovosti. Výsledkem bylo, že investor neplatil žádné úroky ani bankovní poplatky. Ukázalo se, že tato investice měla nejkratší dobu návratnosti 8 let a 1 měsíc. Investicí, která se vyplatí nejméně, je byt číslo dva, který byl zakoupen za 660 000 Kč. Celková kupní cena se všemi úrokovými sazbami, bankovními poplatky atd. činila 763 509 Kč. Investor musel čerpat hypoteční úvěr ve výši 490 000 Kč.

Po všech výpočtech autor zjistil, že tato investice má nejnižší čistou současnou hodnotu za předpokladu životnosti projektu 20 a 30 let. Má také nejnižší vnitřní výnosové procento. Doba návratnosti je také relativně dlouhá, méně než 16 let. I přesto se tato investice pro investora vyhodnocuje jako výhodná, protože čistá současná hodnota se pohybuje v kladných číslech.

Klíčová slova: Realitní trh, hypoteční trh, vývoj nájemného, analýza realitního trhu, doba návratnosti, investice, vývoj realitního trhu v Plzeňském kraji, tržní ceny

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1. Goal of the bachelor thesis and methodology

1.1 Goal of the bachelor thesis

The goal of the bachelor thesis “The development of the real estate market in the Czech Republic” is to find out what the payback period on individual investments was and evaluate the development of the real estate market from the long-term perspective. The work will be concentrated on the evolution of market prices and their influence over the last 20 years. Furthermore the thesis aims to analyze and evaluate the evaluation of a private investment in real estate in a given period. The real estate market will also be taken into account in relation to the acquisition of the real estate and development of the mortgage market.

1.2 Methodology

In the theoretical part of the bachelor thesis, the author defined primary and secondary sources. The primary sources were mainly drawn from expertise books, which deal with the topic of investing in real estate. The author drew secondary sources mainly from registers and laws.

This part of the bachelor thesis explains all the important concepts in the field of real estate. Immediately after the introduction, the difference between movable and immovable property is explained, followed by the characteristics of construction, building, apartment, etc and the whole part is terminated by ownership. After explaining these concepts, the characteristics of all real estate entities and their purpose follow. After studying this section, the reader should understand terms such as seller, buyer, real estate agent, investor, and others. The definition of a central bank is also an important area. In addition to the definition, the purpose of the central bank is explained. This chapter deals with the difference between special-purpose and non-purpose mortgages, what affects mortgage loan rates, and the development of interest rates.

After the characteristics of the central bank, mortgage loan and an explanation of all the above-mentioned concepts, the bachelor's thesis deals with the payback period. The payback period is a key concept for all types of investments that the investor makes with the expectation of investment appreciation and future regular income and profit. The payback period indicates the period (number of years) for which the investor will be returned the invested investment in the form of profit after deducting costs. The chapter also contains a formula according to which the payback period is calculated, and which is crucial, especially in the practical part of the bachelor's thesis. The payback period formula, that tells the investor how long it will take for his directly invested funds to return to him at a certain profit is: purchase price / net annual

income. The purchase price is the total price of investment with all the interests, bank fees, and other charges (in case of drawing a mortgage). Net annual income is for example rental price per year.

After explaining this important chapter, the theoretical part of the bachelor's thesis further deals with the topic of apartments and their types in terms of ownership. There are explained differences between terms such as directly owned flats, cooperative flats, rental flats, etc. The theoretical part of the bachelor thesis ends with this chapter, which clarified the types in terms of ownership.

In the practical part of the bachelor's thesis, the author deals with three specific properties, which are compared within each other. Thanks to the calculations that are made, it is possible to find out which property was the most and least advantageous. In the practical part, there are formulas for calculating, for example, payback time, net present value, internal rate of return, and much more.

The practical part begins with an introduction to towns that the investments were bought in. The introduction first deals with the town of Janovice nad Úhlavou and then the town of Pilsen. The mentioned basic information about cities is important because they give us an idea and clarify the amount of the purchase price and the subsequent rent. In the practical part, a table is created that summarizes all the most basic information about the investment. The sample of resource table:

Table 1: Rental development in the first investment in selected years

Selected years	Rental price / month	Rental price / year	Profit per selected yeard

After basic information about each town, the calculation of individual investments takes its place. The first table shows the rent per month, per year, and the total profit per selected 20 years that the investment is owned. Table number two consists of the purchase price, own resources, mortgage, mortgage interest, and bank charges. In the first investment which was an apartment in the town of Janovice nad Úhlavou, there was no need for applying for a mortgage. The investor bought this property in cash. This property was bought in 2000. This table appears for each property. Resource table pattern looks like this:

Table 2: Used resources for purchasing the investment

Town	Purchase price	Purchase price (with all the interests and taxes	Own resources	Mortgage	Mortgage interest	Bank charges

Table number three is more complex. It contains a rental period, the rental price per month, the rental price per one year, tax from income, flat-rate maintenance costs per one year, net income after tax per 1 year, annual net income, net income per 5 years, and payback period. The net income table pattern looks like this:

Table 3: Calculation of the net income value for the investment

Rental period	Rental price / month	Rental price / year	Tax from income (flat-rate expenses * tax)	Flat-rate maintenance costs per one year	Net income after tax per 1 year (flat-rate expenses*tax)	Annual net income in %	Net income per 5 years

In addition to this table, it is necessary to mention the fact that between 2000-2008 there were several changes in tax rates. In 2000-2004, the deductible flat-rate expenses were 20% and the tax base was taxed by 15%. In 2005, flat-rate expenses were deductible and 30% and the tax base was taxed 15%. In 2006, another change took place. The deductible flat-rate expenses were 30% and the tax base was taxed by 12%. The same rate was in 2007. The last change took place in 2008. The deductible flat-rate expenses are 30% and the tax base is taxed by rate of 15%. This rate is still valid. These changes in the years 2000 - 2008 of course had an effect on the calculations and are included in the tables.

All of the mentioned data are calculated in the table. A summary of the information that the table contains is listed below the table.

After these calculations, the practical part also deals with the development of price per m^2. Again, there is a table that compares the price per m^2 at the time of investment and the price per m^2 at present. The development price per m^2 table looks like this.

Table 4: Development of prices per m^2 of compared investments

Apartment	Purchase price	Apartment area	Price per m^2 in CZK in the time of purchasing the property	Price of the exact same property in 2021 per m^2

This table is followed by a graph showing the movement of prices per m2 for all three properties being compared.

The development of price per m2 is followed by calculations of NPV, IRR, and DR. All these concepts are explained in the theoretical part as well.

Another significant chapter in the practical part of the bachelor thesis is the calculation of NPV, IRR, and DR.

Net Present Value (NPV)

The net present value is a method that is used to evaluate the return on investment. It can be also understood as a transfer of incomes to the present. For investment to be convenient the net present value has to be greater than capital expenditure. For net present value calculation is required to know a CF (cash flow), n – intended lifetime of the investment, and r – interest rate. The net present value is used for displaying a financial expression of the value of a cash flow.

NPV formula:

$$NPV = CFn / (1 + r)n$$

CF – cash flow (the difference between income and expenditure of funds per given period of time)

n – intended lifetime of the investment (example 20 years)

r – interest rate

Internal Rate of Return (IRR)

The internal rate of return (IRR) is the relative percentage return on which an investment reaches. IRR is calculated using the same concept as NPV, except it sets the NPV equal to zero. The higher the IRR, the more the project can be recommended for implementation.

IRR formula:

$$\mathbf{IRR = (Ct / (1 + IRR)t) – C0}$$

Ct - Net cash inflow during the period t

C0 – Total initial investment costs

IRR – The internal rate of return

t – The number of time periods

Discounted Payback Period (DPP)

The shorter the discounted payback period, the more the project can be recommended for implementation. This is a similar criterion as the simple payback period, but with the difference that it is not based on a simple cash flow, but on a discounted cash flow.

DPP formula:

$$\mathbf{(i / (1+ i * n))}$$

i – Interest rate

n – Time period

All these concepts are explained in the theoretical part as well. For each property, these terms are summarized and calculated in one table. Sample table:

Table 5: Calculation of NVP, IRR, and DPP

Intended Lifetime Period (years)	Net Present Value (CZK)	Internal Rate of Return (%)	Discounted payback period (years)

Next subject that the author of this work deals with is the risk calculation. This risk calculation is made in case that the investor would not be able to repay the property for some reason (eg illness, loss of work, etc.) and the loan repayment period would be extended. In this case, the table is calculated with an investment risk rate of 1%. This 1% risk is added to the mortgage interest rate for which the property was purchased. The table shows the change in the payback

period as the mortgage loan repayment period increases. Its pattern is the same as the previous table, only the values in the table will change. Table sample:

Table 6: Calculation of NVP, IRR, and DPP by 1% risk increase

Rental period	Rental price / month	Rental income per 1 year	Income tax (flat expenses * tax)	Flat-rate maintenance costs per one year	Net income after tax per one year	Annual net income in %

The last table, which is in the practical part, is the table of sensitivity analysis. Sensitivity analysis is a method that examines how the result will change if we change the criteria. The purpose of sensitivity analysis is to find out how individual changes affect the result. In this case, it will be tested how the increase in rent will affect the return on investment.
In the long run, real estate investments may have various effects, which may result in a decline in market rents or even their shortfall. Table sample:

Table 7: Calculation of rent reduction by 5% and 10%

Rental period	Rental price / month	Rental income per 1 year	Income tax (flat expenses * tax)	Flat-rate maintenance costs per one year	Net income after tax per one year	Annual net income in %

This table shows how the reduction of 5% and 10% would affect the net annual income.

2. Introduction

Owning property has become a kind of social norm in the Czech Republic. We want a roof over our head and we want the roof to be ours. In comparison with other European countries, it can be stated that about 80% of Czech citizens own a house or a flat, which is more than in neighboring Germany, Switzerland, the Netherlands, or Britain, where the people live most commonly in rent. *Germany has one of the lowest shares of owner-occupied housing in Europe (53.3%, according to Eurostat). Switzerland has an even lower share of owner-occupied housing (43.8%).*
In contrast, the country with the highest share of households living "in their own" (96.6%) is Romania.
- Koupě bytu pod lupou, Evžen Korec, Lukáš Kovanda, year 2014, page 11

Why does ownership predominate over rental housing in the Czech Republic? This is partly due to the possibilities that opened up after the Velvet revolution in 1989. It was about the possibility of buying apartments from state or municipal ownership and the possibility of financing the purchase of real estate with a mortgage.

The basic and main question is „why to own your own property?“. The answer will be different for each individual. Some people see the acquisition of real estate as an investment, for some, it is a feeling of security, some may calculate that it is more advantageous for them to acquire real estate than paying a lifetime of rent and some are afraid of an inability to pay rent, for example in retirement when the income is lower.
However, some may believe that owning a property does not guarantee financial security. *The collapse of the real estate market in 2008 was a clear signal that your residential property is not your asset. Not only is it not able to "put money in your pocket", but it cannot be relied upon that its value will increase. Even in 2017, many houses were still of lower value than in 2007.*
- Rich dad, poor dad, Robert T. Kiyosaki, year 2017, page 23

In this bachelor‘s thesis, real estate acquisition will be primarily seen as an investment. The owner of the real estate, which will be compared in the practical part in none of these real estates, does not live permanently, but it is a secondary rental income for her, which the investor collects monthly for each property.

Real estate is real value. Unlike movables, which, with a few exceptions, lose value, a good property increases its price and represents a real value for us and our children. Real estate is a real asset that is protected from inflation.

- Realitní kuchařka, Pavla Temrová, year 2015, page 29

2.1 Movable and immovable property

Pursuant to Act 89/2012, the Czech Civil Code distinguishes property between movable and immovable property.

According to §498, as immovable things is considered: flats, land and rights in rem to them, underground structures with a separate purpose (eg. metro, wine cellar under foreign land and material rights to them), a thing which the law provides about that is not part of the land, and if such a thing cannot be moved from place to place without disturbing its essence and any building that is connected to the ground by a solid foundation.

Unlike immovable property, "movables" can be moved without violating their essence. Basically, it is all property that is not connected to the land by a solid foundation. That is for example, about the furnishing of an apartment, means of transport, sculptures, works of art, securities, money… Exceptions are parts of the human body that are not things in this sense unless, according to §112 of the Civil Code, they are hair or other parts that can be painlessly removed and which are naturally renewed.

- Czech Act No. 89/2012, Civil Code

2.2 Land and parcel

There is also a difference between land and parcel. The definition of land has its roots in the oldest legal provisions, and even historical legal norms regulated the protection of land ownership.

The land is a non-reproducible natural resource unique in its location and compared to other types of real estate has exceptional qualities. The basis of the value of the land is its uniqueness and unrepeatable location, where the land is:

- *is technically non – transferable*
- *the life of the land is economically infinite*
- *the land is generally not subject to technical wear and tear (except for undermining, waterlogging or contamination of land)*
- *the supply of land is limited*

-Analýza realitního trhu, Petr Ort, year 2019, page 10

2.2.1 Land

Between the land, and the parcel are some differences. According to the provisions of Act No. 256/2013, Coll., On the Real Estate Cadastre, "*the land is defined as "part of the land separated from neighboring parts by the boundary of a territorial unit or cadastral area, ownership boundary, boundary set by the regulatory plan, zoning decision, joint permit the construction places and permits, by a public contract replacing the zoning decision, territorial consent or the limit given by the approval of the proposed project by the building authority, the limit of another right under § 19, the limit of the lien, the limit of the building right, the boundaries of land types, eventually possibly by the interface of the land use method."*

- Act No. 256/2013, Coll., On the Real Estate Cadastre

From the rate of appreciation and the rate of profitability, it can be stated that building land reaches the highest values.

2.2.2 Parcel

The parcel is only such a parcel of land, which is delimited by some of the ways of delimiting the parcel of land, and in addition, has an exact geometric and positional determination, is shown in the cadastral map and is marked with a cadastral number. In the real estate cadastre is land registered in the form of parcel.

The parcel is *"land which is geometrically and positionally determined, displayed in a cadastral map and marked with a parcel number."*

According to the Real Estate Cadastre Act, the land is divided by type into arable land, vineyards, hop gardens, gardens, orchards, permanent grassland, forest land, water areas, built-up areas, and courtyards and other areas.

- Act No. 256/2013 Coll., On the Real Estate Cadastre

2.3 Construction

Another immovable property is construction. According to Act No. 183/2006 Coll., On Spatial Planning and Building Regulations, construction means "*all construction works that arise from construction or assembly technology, regardless of their construction and technical design, used construction products, materials, and structures for the purpose of use and duration. A product fulfilling the function of a building is also considered to be a construction. A building that serves advertising purposes is a building for advertising. If the term construction is used*

in this Act, it means, depending on the circumstances, its part or change of the completed construction."

In comparison with land, the offer of construction is not limited. Constructions can be newly created and it is also possible to change their qualitative and quantitative parameters.

- *Act No. 183/2006 Coll., On Spatial Planning and Building Regulations (Building Act)*

2.4 Bulding

A building is a structure that is spatially concentrated and largely enclosed on the outside by perimeter walls and roof structures, with one or more delimited utility spaces. Buildings are registered in the real estate cadastre, with possible exceptions for some eg small constructions (nocstructions that fulfill an additional function to the main construction - greenhouses, sheds, etc.)

- *Analýza realitního trhu, Petr Ort, 2019, page 10*

2.5 Apartment

There is also a difference between an apartment and a non-residental space. The apartment is either one room or a set of rooms connected in a suitable way, which are separated from the rest of the house, where the entire space can be secured by locking. At the same time, according to the decision of the building authority, they must be intended for housing.

2.6 Non-residental space

A non-residential space is a room or a set of rooms that are determined by a decision of the building authority for purposes other than housing. These spaces are not accessories of the apartment or the common part of the house. Examples are mainly spaces for business - workshops, offices, shops.

2.7 Family house

There is also a specific definition for a family house. A family house is a building that is used mainly, ie more than 50% for housing. A family house can have a maximum of three approved apartments, a maximum of one underground floor, two above-ground floors, and an attic. It follows from this definition that a building that will have three 20 + 1 flats, thirty office rooms,

and at the same time only one underground and two above-ground floors and a residential attic will be considered a family house according to the valid legislation.

The market for family houses is very similar to the market for apartments. The buyer buys this property for the same purpose as an apartment due to the need for housing. In the Czech Republic, family houses are seldom bought due to a subsequent lease.

The advantages of a family house are, for example, greater privacy, usually greater comfort compared to living in an apartment, free land around the house, the possibility of extending the house (extension, attic ..), space for a garage, terrace, greenhouse, etc.

The disadvantages are in particular: higher price, location (usually outside the center), higher operating costs, usually poorer transport accessibility, necessary finances, and time to maintain the house and garden.

2.8 Apartment building

There is also a type of property called an apartment building. An apartment building is a building intended for a long-term living of people. These are houses with more independently used apartments. For an apartment building, more than half of the floor area must meet the requirements for permanent housing. In the apartment building, there are more apartments and at the same time, other spaces referred to as common areas. These are entrance halls, staircases, corridors, cellars, attics, laundries, boiler rooms. The apartment building can have a garden, parking, or yard.

2.9 Real estate components

Properties may have real estate components and real estate accessories. According to §505 of the Civil Code defines *the components of real estate, everything that belongs to the real estate according to its nature and cannot be separated without devaluing the real estate.* In the case of land, above-ground and underground surfaces, such as buildings and vegetation, ie everything that is above and below the surface, can be a part of it, unless this is affected by another legal regime. The land does not include deposits of so-called reserved raw materials, ie those raw materials that are the property of the state, as well as archaeological and paleontological finds.

- *Civil law, § 505*

2.10 Real estate accessories

An accessory to a thing is an ancillary thing of the owner of the main thing if the purpose of the secondary thing is to be used permanently together with the main thing within the framework of their economic purpose. If the secondary case has been temporarily separated from the main case, it does not cease to be an accessory.

- Civil law § 510

2.11 Ownership

Movable and immovable properties has to belong to someone. The owner of an apartment building can be a natural or legal person, or individual apartments can be in the personal ownership of the owners, which is established by the community of unit owners. Furthermore, apartment buildings can be owned by a housing cooperative, where the inhabitants of individual apartments are members of a housing cooperative with the right to use the apartment that is based on a lease agreement with this cooperative.

3. Real estate market entities

In the real estate market, there is a clash between entities selling real estate (sellers) and entities that demand real estate (buyers). It follows from this definition that real estate that is offered on the real estate market creates supply and those interested in real estate create demand.

3.1 Seller

The main subjects in real estate market is seller and buyer. The seller is the owner of the property he offers for sale.

It is a person who sells real estate and thus transfers ownership of the property to the buyer (new owner) at a pre-agreed price in the purchase contract.

The seller can act in person and offer his property privately, for example by publishing an advertisement on the relevant website. Or the seller may be represented by a real estate broker, with a real estate broker acting on his behalf. The task of a real estate broker is to sell the property to his client as optimally as possible. For this service, for example, he requires a several percent margin on the price of the property or a pre-agreed amount agreed and approved by the contract.

To a limited extent, the offer is also made up of other entities - for example, individual municipalities and city districts, which privatize their housing stock. However, these entities offer real estate under specific conditions - a limited circle of buyers (persons with a lease agreement who already live in the property) and at prices that are usually lower than market prices. The buyer must apply for such flats, after being allocated one of them he lives as a tenant for some time, and subsequently, he may have the opportunity to buy the flat at a more affordable price. This way of living and buying is most common in young families and seniors when the municipality or city tries to help them in this way.

3.2 Buyer

A buyer is a person who demands real estate.

It is a person who buys a property at a pre-agreed price agreed in the purchase contract. The buyer transfers ownership of the property to himself. This makes him the new owner of the property, which he can dispose of at his discretion.

When choosing a real estate, the price, location (most often in the vicinity of the current residence or studies), neighborhood, traffic availability, size, and dimensions of the real estate

are decisive for the buyer. The most common reasons for buying a property are, for example, acquisition for own use, for the expected rental income, and for increasing the value of the property over time.

Often these are buyers who buy real estate for investment. The ratio of profit and risk is decisive for him. In these cases, how many times the investor does not care so much about the location, as he will not be staying in the property himself. The investor only buys the property, or reconstructs it and then leases the property and receives income from it.

3.3 Foreign buyers

The share of foreign investors is also significant. *The share of foreign investors in the segment of new flats is currently estimated by Mgr. Peter Višňovský from RK LEXXUS around 20-30%, for some projects even up to 50%*. This is said to be due to *"rather a decrease in local buyers, whose ability to buy real estate has deteriorated sharply over the past year with rising prices, interest rates, and CNB restrictions."* Before the crisis in 2008, the most significant part of foreign investors were mainly investors from Ireland and the United Kingdom, who earned on rising residential property prices in the Czech Republic. After the crisis in 2008, foreign investors are mostly investors from Russia. Currently, important groups of foreign buyers (especially in Prague) include Israeli investors, Russian investors and many investors from Asian countries such as Korea, Vietnam, and China have invested in real estate in the Czech Republic.

-Mgr. Peter Višňovský 2018. Ceny bytů a domů rostou pomaleji, pozemky přestaly růst, *HB index - Hypoteční banka* [online]. 17.2. [cit. 13.2.2018]. Available from: https://www.hypotecnibanka.cz/o-bance/pro-media/hb-index/ceny-bytu-a-domu-rostoupomaleji-pozemky-prestaly-/ Path: Homepage; article; 13.2.2018.

3.4 Airbnb

Another important chapter are foreign tourists. A tourist can either stay at a hotel or use Airbnb. A business called "Airbnb" is becoming more and more common. In this business, it is a short-term rental of entire apartments or separate rooms. These advertised offers are used mainly by tourists, due to the fact that this form of accommodation is usually more financially advantageous than hotels or guesthouses. However, the real estate market is quite negatively

affected. Often these properties for short-term lease belong to foreign investors. This means that it is becoming increasingly difficult for residents to buy real estate, as there are fewer and fewer of them on the market, and they are bought by foreign investors. At the same time, this situation can be unpleasant for other residents of the house in the case of several apartment complexes. As I mentioned, Airbnb is a short-term lease, so tenants change very often. For permanent residents of the house, this means a constant meeting of strangers, frequent blocking of the elevator due to moving suitcases to Airbnb, the impossibility of creating social and neighborhood ties, and possibly not respecting the rules of the house. These tenants often do not care about, for example, night rest, cleaning of common areas, etc.

3.5 Real estate agency

A key subject in real estate worl is real estate agency. Most likely everyone who wanted whether rent, buy or sell a real estate has met with a real estate agency. Today, most real estate agencies offer several other services in addition to arranging the purchase, sale or lease. This is professional and legal advice, which includes mediation of purchase transactions, drafting of purchase contracts, securing real estate transfers at the cadastral office, assistance and support in securing financing, mediation and securing mortgage loans with banking companies, professional advice and mediation of various types of insurance, securing real estate appraisal and other professional and administrative services. Many real estate agencies also prepare the property for sale or hand it over to a new owner or tenant. This involves the eviction of real estate, securing building modifications, etc.

Some real estate companies also offer their clients the purchase of real estate for "cash", when they buy a property from the original owner for a pre-agreed price for so-called cash, which is a quick transaction, which, however, usually involves a lower purchase or sale price. Today, real estate companies can help their clients even in such situations as foreclosures, bankruptcies or insolvency proceedings.

3.6 Real estate agent

The real estate agency employs a real estate agent. A real estate agent provides and mediates the rental, sale, and purchase of the real estate, as well as property management. Performs professional activities in the field of real estate management and provides related advice to the customer, assists in concluding contracts, and is responsible for solving individual steps

associated with the purchase, sale, or lease of real estate. It also focuses on finding real estate for business, conducts inspections of real estate with potential customers, manages databases of clients and real estate, etc. From the sale of real estate, the agent receives a few percent margin from the sale price of real estate or a pre-agreed price and approved by the contract.

The best brokers also know that when the market is on the rise, this is not the best time to buy, so they advise investors. They act as advisors as well as sellers who have been in the market for a long time and know that it pays not to close a deal at any cost, as a result of which they could lose many other trades in the future.

The role of a real estate broker is to bring together buyers and sellers who are interested in the trade, even if his client may not close the best possible deal. From start to finish, they work to ensure the best possible transaction from the client's point of view.

- *Velká kniha realitního byznysu, Robert T. Kiyosaki, year 2009, page 43-44*

3.7 Investor

Buyer may buy the property for his own purposes or he may invest in property while living somewhere else. The goal of every investor is the most efficient evaluation of the invested investment and the ratio of costs, profit, investment risk, and liquidity. The investor has to take into account that invest in real estates that are expected to be rented or to be sold is going to bring you a shorter payback period than to invest in land because the evaluation of land can take several years or even decades.

In these cases, the issue of liquidity is usually less important for the investor in his decision-making.

3.8 The Central Bank

The central bank is the primary bank of the state and at the same time the supreme institution of banking supervision, which determines the monetary policy in the country. In the Czech Republic, this role is played by the Czech National Bank, in short, the ČNB. The ČNB implements monetary policy, manages the state currency, supervises the activities of commercial banks, provides loans and licenses to banks, and sets conditions for the activities of commercial banks and other financial institutions in the state.

It is established by the Constitution of the Czech Republic and develops its activities in accordance with Act No. 6/1993 Coll. (pdf, 367 kB), on the Czech National Bank, as amended, and other legal regulations.

- cnb.cz

The ČNB also maintains a national budget account.

In the Eurozone countries, the body of the European Union and the central bank is the European Central Bank, in short, the ECB. Its task is to manage the European Union's monetary policy and maintain price stability in countries that use the euro. The ECB, together with the national central banks of all the Member States of the European Union, constitutes the European System of Central Banks, or the ESCB for short. The ČNB became part of the ESCB with the accession of the Czech Republic to the European Union in 2004.

Commercial banks are institutions that provide financial services and trade for the purpose of making a profit, which consists of:

- Interest margin - interest on the loan and interest on the deposit is given
- Fees for services, account management, transaction mediation
- Active lending operations, where the bank provides loans and acts as a creditor
- Passive credit operations, where the bank receives money and is in the position of a borrower

The functions of commercial banks are divided into:

- Deposit function
- Credit function
- The function of a payment intermediary
- Other banking services

Types of loans:

- Consumer loan
- Mortgage loan
- Overdraft account
- Investment loan
- Operating loan
- Discount loan

The interest rate determines how much of the principal the borrower must pay to the creditor for the loan or credit, for a predetermined period.

3.9 Mortgage loan

What is the mortgage loan and the legal definition of a mortgage.
In the Czech Republic, the definition of a mortgage loan is given in Section 28, Paragraph 3 of the Art on Bonds No. 190/2004 Coll. *„A mortgage loan is a loan whose repayment, including accessories, is secured by a lien on real estate, even under construction. The loan is considered a mortgage loan on the day the legal effects of the lien arise.“*
A mortgage loan/ a mortgage is a bank loan that is secured by a mortgage. Usually, the real estate for which the mortgage loan is provided is used for the purpose of collateral, but other real estates can also be used for collateral. It is possible to guarantee more properties, in which case you can get a loan for the entire property without an advance.“
- Section 28, Paragraph 3 of the Art on Bonds No. 190/2004 Coll.

Financing real estate is not easy. You will need the help of a mortgage adviser. When we buy a building, we always turn to our mortgage adviser. He will be able to get a few offers to look at and help you choose the best financing available for your business plan.
- Mistrovství v investování do realit, Ken McElroy, year 2011, page 152

A mortgage loan can be either special-purpose or non-purpose.

3.9.1 Special-purpose mortgage

- buying the house or apartment in which you want to live
- buying the house or apartment you want to rent (a mortgage for rent)
- construction of a house
- reconstruction of a house or flat
- repayment of a house you have invested in the purchase, contruction, or renovation of real estate
- mortgage refinancing
- property settlement

In addition, it differs from a regular mortgage, for example, in the following parameters:

- maximum loan amount: 90 % of the property value (exceptionally more)
- minimum loan amount: CZK 200 000
- maximum repayment period: 30 years (exeptionally more)

3.9.2 Non-purpose mortgage

A non-purpose mortgage loan is referred to as an American mortgage. Its advantage is that borrowed money can be used for practically anything. It has a slightly higher interest rate than a conventional mortgage, but at the same time, it is more advantagerous than ordinary consumer loans.

In addition, it differs from a regular mortgage, for example, in the following parameters:

- maximum loan amount: 70 % of the property value
- minimum loan amount: CZK 100 000
- maximum repayment period: 20 years

As part of the bank's approval of a mortgage loan, it is necessary to meet the conditions for obtaining a mortgage:

- proof of income
- sufficient value of the pledge
- sufficient creditworthiness (based on your income and expenses)
- good credit history
- and some more

However, the assessment of creditworthiness is approached by individual providers according to their own methodologies. Therefore, if a mortgage cannot be obtained from one bank, it is possible to obtain it from another, as different banks have different requirements and parameters.

A mortgage loan also has its own advantages and disadvantages. The advantage of a mortgage loan is the fact that it is often the only way to buy real estate and the disadvantage is the mortgage of real estate in favor of the lending bank, throughout the loan repayment period, when the availability of real estate by the owner is significantly limited.

3.9.3 What affects mortgage loan rate?

Type of loan:

Purposefulness has a great influence on the interest rate. A special-purpose loan is usually cheaper / more advantageous than a non-specific one.

The amount of money you borrow:

The higher the loan the bank provides, the more installments will need to be repaid and the bank will not need to generate a higher interest rate.

The amount of LTV (the ratio between the mortgage loan and the mortgage value of the property) for mortgages:

The amount of a mortgage loan depends, among other things, on LTV - how much money needs to be borrowed to buy a property in relation to its price. The more own resources the investor has, the lower the rate will be.

Client's bonita:

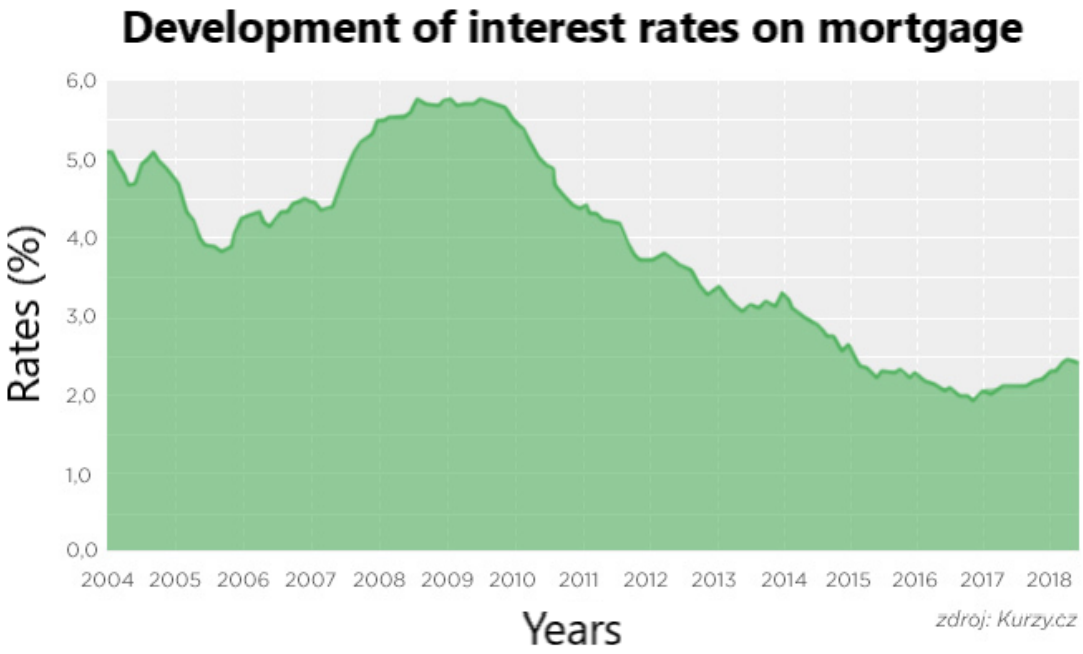
In this case, the task of the financial advisor is to check whether the client is able to repay his financial obligations (whether the client has a permanent job, whether the client is in debt, what is his monthly expenses, etc.)

- *https://www.finance.cz/509704-vyse-urokove-sazby/*

3.9.4 Development of interest rates

The development of interest rates varies depending on financial stability and central bank interventions.

Graph 1: Development of interest rates on mortgage



The most expensive mortgages have been offered by banks in the last 15 years during the financial crisis.

As the graph of mortgage interest rates shows above, the last low pre-crisis rates were given to applicants in September 2005. The same interest rate did not appear on the market until October 2011. The development of mortgage interest rates reached an absolute minimum in November and December 2016. The average rate was 1,77 %. *On the one hand, there was a record low price of money, on the other hand, banks could borrow cheaply and, due to fierce competition, subsequently lent cheaply to their clients.*

- *chytryhonza.cz*
- *kurzy.cz*

3.9.5 Interest

Interest rate is a certain percentage rate at which money is borrowed. It is a reward for the borrower. Loans are offered by banks and non-banking institutions, which have set interest rates for individual financial products. Banks have set interest rates for individual financial products (loans, mortgages).

Interest is not calculated as a mathematical percentage, the calculation of the interest percentage is more complicated. To calculate the interest, we must know the amount of the principal, ie the amount we borrow, the interest rate in percent per year time, ie the lenght of interest in time.
Formula for calculation of interest

interest = (principal * rate * time) / 100

Interest changes during repayment. Interest is calculated on the amount due, ie the pricipal, every day of the month, according to the rate. The difference between the amount of the installment and the amount of accrued interest for a given month is the amount by which the amount of the principal is reduced. Therefore, the share of interest in the monthly installment decreases during the repayment period, and which each subsequent installment, a slightly larger part of the principal is repaid.
The interest rate is affected by the type of loan, loan amount, maturity, interest rate fixation, fees, and other related contractual conditions.

3.10 Payback period

If investititon is made in some property, the one of the main things that ivestor is going to be interested in is payback period. The payback period indicates the period (number of years) for which the investor will be returned the invested investment in the form of profit after deducting costs.
The payback period is a key concept for all types of investments that the investor makes with the expectation of investment appreciation and future regular income and profit. The time it takes for a certain investment to return to the investor is, of course, information that interests every investor, regardless of the amount of money invested. In addition to other methods of investment analysis, payback time is also an important benchmark for investment projects. This applies to both investment companies and private investors. The payback period is used in several definitions. In the basic (simplified) definition, it is usually defined as the period (number of years) for which the investment income will be equal to the initial capital costs. With this definition, it is quite clear that it is an expression of the so-called simple payback period. This form of expressing and determining the payback period is the simplest form of calculating this parameter. It is a paradox that, on the other hand, it is a criterion very often used in practice. Its use can be imagined mainly for a quick indicative valuation of a certain investment opportunity, or for a quick check whether a certain investment opportunity is realistic at all in the conditions of a certain transaction.

Before making any investment in real estate, it is necessary to calculate a simple payback period and then take into account other investments, factors, and circumstances. These are factors of the type of time invested, whether in the search for a suitable type of real estate, or the solution of related administrative and organizational tasks, such as communication with authorities, banking institutions, real estate agencies, sellers, etc. It is also necessary to take into account real estate, building alterations, and financial investments related to furnishing interiors for use or rental.

No matter how much information and factors are included in the calculations, the calculation will always be only approximate. It is very difficult to count all the costs and that is why we are simplifying the calculations to help us choose the best investment, at least "roughly".

Better results can be achieved if there are the same investments in comparison. So, in this case, real estate investment. If the payback period investment for 5 apartments in different cities with different purchase price is calculated and, of course, the amount of rent, the calculations can show the most advantageous investment. It is not true that the best investment is the one where the highest rent is collected.

There are several ways to finance the purchase of the real estate. The property can be acquired for cash or through financing the purchase of the property on a mortgage loan or a combination of financing sources. Regarding the sources of financing, the return on funds also changes over time.

The payback period tells the investor how long it will take for his directly invested funds to return to him at a certain profit.

Which method of investment is more advantageous and what will be the return on investment can be calculated using the following formula:

$$\frac{\textbf{purchase price}}{\textbf{net annual income}} = \textbf{payback period (years)}$$

3.10.1 Gross and net income from real estate (rent)

Another significant calculation that interests every successful investor is how to calculate the return on investment. This calculation is split into gross and net income. The simplest and most well-known formula for calculating the return on investment is the so-called real estate yield (rent). Gross income and net income can be calculated. The only difference in the

calculation is that for the net income from the property, in the calculations all relevant costs of ownership and rental of the property are included.

$$\frac{\textbf{net monthly rent * 12}}{\textbf{purchase price}} \textbf{ * 100 = anual gross wages}$$

3.10.2 Potential gross income

It is the total return that can be expected from the assessed real estate for the selected time unit without being reduced by operating costs, but provided that the assessed real estate is fully (100%) used (occupied).
- Výnosová hodnota nemovitostí, Zbyněk Zazvonil, year 2004, page 40

3.11 Net Present Value (NPV)

The net present value is a method that is used to evaluate the return on investment. It can be also understood as a transfer of incomes to the present. For investment to be convenient the net present value has to be greater than capital expenditure. For net present value calculation is required to know a CF (cash flow), n – intended lifetime of the investment, and r – interest rate. The net present value is used for displaying a financial expression of the value of a cash flow.

NPV formula:

$$\textbf{NPV} = CF_n / (1 + r)^n$$

CF – cash flow
n – intended lifetime of the investment
r – interest rate

3.12 Internal Rate of Return (IRR)

The internal rate of return (IRR) is the relative percentage return on which an investment reaches. IRR is calculated using the same concept as NPV, except it sets the NPV equal to zero. The higher the IRR, the more the project can be recommended for implementation.

IRR formula:

$$IRR = (C_t / (1 + IRR)^t) – C_0$$

C_t - Net cash inflow during the period t

C_0 – Total initial investment costs

IRR – The internal rate of return

t – The number of time periods

3.13 Discounted Payback Period (DPP)

The shorter the discounted payback period, the more the project can be recommended for implementation. This is a similar criterion as the simple payback period, but with the difference that it is not based on a simple cash flow, but on a discounted cash flow.

DPP formula:

$$(i / (1+ i * n))$$

i – Interest rate

n – Time period

3.14 Net income

When the payback period is calculated, the costs of maintaining the investment, repairs, maintenance, reconstruction, and various fees, insurance, etc. are also deducted from the monthly profit.

$$\frac{\text{net monthly rent} * 12 – \text{total costs}}{\text{purchase price}} * 100 = \text{net annual income}$$

The amount of costs tends to be different for different types of real estate. Different types of costs can be expected in family houses, apartment units, or apartment buildings, where it is also necessary to take into account the costs in the common parts of the house. It is also necessary to take into account the fact that the leased property may not be fully occupied throughout the calendar year, that there may be some shortfalls in occupancy and thus loss of income when the

investor must continue to pay payments and fees related to real estate operation and advances on energy consumption.

3.14.1 Payback period

There are several ways to finance the purchase of the real estate. The property can be acquired for cash or through financing the purchase of the property on a mortgage loan or a combination of financing sources. Regarding the sources of financing, the return on funds also changes over time.

The payback period tells the investor how long it will take for his directly invested funds to return to him at a certain profit.

Which method of investment is more advantageous and what will be the return on investment can be calculated using the following formula:

$$\frac{\textbf{purchase price}}{\textbf{net annual income}} = \textbf{payback period (years)}$$

3.14.2 Return on equity

Return on equity does not tell how much can be gotten a percentage of the price of the property per year, but how much money can be made make in relation to the equity invested.

$$\frac{\textbf{annual rental profit * 100}}{\textbf{invested capital}} = \textbf{return on equity (in\%)}$$

3.14.3 Growth in property values over time

However, the above formulas for return calculations do not take into account the growth of real estate prices and rents over the years. Real estate prices are rising over time, and in different locations, they are growing at different rates and with different percentages.

If the price of rent increases, the time for which the invested funds will return will be significantly shortened. In the end, the property will also have a higher value.

What are the most common reasons for buying your own home?

- The house or apartment can be sold in the future and other plans can be implemented with cash
- Unlike living in a rent you can invest in your own property without any restrictions
- The property can be rented and used as a source of income
- Retirement insurance, when we expect lower housing costs

- Mortgage payments are usually lower than rents in the longer term
- Repayment of a mortgage loan is an investment in one's own interest and interest on the mortgage can be deducted from taxes

3.15 Apartments and their types in terms of ownership

In the Czech Republic, there are three basic categories of flats, which have a different legal régime in terms of use and disposal:

3.15.1 Directly owned flats

Flats directly owned are now the predominant form of direct housing ownership. These are flats that are owned by a specific natural or legal person. This legal nature is similar to the legal form of other real estates, land, or houses. Each housing unit is registered in the real estate cadastre and the ownership right to it can be transferred by its owner in the same way as for other real estate, hourses, or land. In connection with the ownership of flats, it is also necessary to mention the institute of a community of housing unit owners, which is established in each house with at least five housing units, of which at least three are owned by three different owners. The community of housing unit owners is set by law. It is a legal entity that has limited legal capacity and only acts related to the administration, operation, maintenance, and repair of shared parts of the house, or activities related to the operation of shared parts of the house. Directly owned flats unequivocally dominate the market.

3.15.2 Cooperative flats

Cooperative flats are flats whose owner, (ort he owner of the apartment building where the flats are located) is a housing cooperative, where members of such a cooperative have the right to rent one of the flats based on the cooperative's statutes. Individual members of the cooperative are not owners of flats but have a specific right to dispose of the respektive flat. In addition, these members of the cooperative have the opportunity, through their membership, to influence the functioning of the housing cooperative, which establishes a legal and factual influence on the management of such an apartment.

3.15.3 Rental flats

The occupant of the rental flat lives in such an apartment on the basis of the rental agreement which he has concluded with the owner of the flat ort he house in which the flat is located. A rental flat can be a state flat, where the state or municipality is the owner, or it can be owned by the private or legal person. The tenant't rental right is protected by the relevant provisions of the Civil Code, Act 82/2012.

3.15.4 Ownership of houses and land

The owner means a natural or legal person. Private natural person includes owners of family houses, apartment buildings, co-ownership of two or more natural persons.

3.15.5 Municipality, state flat

It is a real estate belonging to the state, a company, and also real estate owned by municipalities or cities. It also includes houses from former folk housing cooperatives, for which the flats were not transferred to ownership.

3.15.6 Housing cooperative

A cooperative is a legal entity engaged in business and providing for the housing needs of its members, as well as related services.

3.15.7 Foreign owner

These are properties where the owner is a foreign national, where the ownership was created by gift, inheritance, or purchase.

3.15.8 Legal entity

It is the ownership of real estate by joint-stock companies, agricultural cooperatives, social organizations, etc.

3.15.9 Combination of owners

These are houses where all or most of the flats are transferred to ownership. The transfer of flats into ownership creates co-ownership and the owners of individual flats, including ownership and co-ownership shares, are registered in the real estate cadastre.

4. Practical part

4.1 Introduction to town of Janovice nad Úhlavou

Acquisition of real estate as an investment in the locality of western Bohemia in the town of Janovice nad Úhlavou.

The town of Janovice nad Úhlavou is a town in the district of Klatovy in the Pilsen Region, 8 kilometers southwest from Klatovy. Approximately about 2 300 inhabitants live here. The town lies on the southern edge of the Švihov highlands at the estuary of the Jelenka stream into the Úhlava river.

The origin of the village dates back to around 1290 when the first written mention is made that the village was held by Jan, the first member of the Janovický family. It was founded near the ford on the river Úhlava and an important country path that connected Bavaria with the Czech midland. In the second half of the 13th century, an early Gothic church and castle were built, from which the Janovský family from Janovice came. During the 14th century, a city fortification with three gates was built and the village gained the status of a small town.

The Czechoslovak army took advantage of the important strategic location near the former western border with the Federal Republic of Germany in the 1950s and built a large complex of military garrisons with a capacity of 4 000 soldiers. In 1951, the construction of the Janovice barracks began, and in 1954 the first military garrison moved into the barracks. In 1955, in this context, the construction of a housing estate for soldiers and their families began on the outskirts of the city.

The Janovická barracks was one of the largest and most modern barracks in the country. In January 2004, the town was officially informed that the army would end its activities in Janovice nad Úhlavou, and at the end of the same year, the army completely left Janovice nad Úhlavou. A large monument to the operation of the army remained a large barracks with an area of 45 hectares on the outskirts of the city. The complex was taken over by the city and leased to the development company, which is implementing, in cooperation with the city, the transformation of the complex and its incorporation into the city. The area of the former barracks is now called the Janovice nad Úhlavou Development Zone and currently, there are

several large and small manufacturing companies, including large injection molding plants for the automotive and consumer industries, which have grown literally on a green field.
The former houses of the military garrison have found their use as a kangaroo for children, a specialized retirement home, a dining room, a dormitory, and storage facilities. From some of the former crew houses, the reconstruction resulted in apartments that are sold commercially into personal ownership.
It can be stated that the space of the former military garrison is significantly and efficiently used and the transformation into an industrial zone is very successful in this case. The development zone provides many job opportunities in this locality for production and administrative professions.

The case study will deal with the analysis of the investment and its return in former military flats in a housing estate built in the town of Janovice nad Úhlavou between 1955 and 1960.

The investor that gave us all the information invested in two apartments in this town. In the tables below we will calculate all the needed calculations, total profit, and return on investment, and finally we will compare all three properties.

4.2 Introduction to town of Pilsen

Pilsen is a statutory town and a metropolis of the Pilsen region that is located in the west. About 175 000 inhabitants live in Pilsen, which makes Pilsen the 4th biggest city in the Czech Republic. The town lies on the estutary of four rivers – Radbuza, Úhlava, Mže, Úslava. The establishment of the city of Pilsen dates back to 1295. The king Wenceslas II. decided about this establishment because of an important trade route that connected Prague with Nuremberg and Regensburg. Today is the city of Pilsen known as brewing and industry city. The significant importance is also linked to the interesting geographical location on the estutary of four rivers. The city of Pilsen is obviously at the first sight more interesting for investing in real estates because of higher work opportunities, better living conditions, better schools, transportation etc. A calculation will be made in the table below if this assumption is true or if it is better to invest in the real estate in a smaller town.

4.3 Calculation of individual investments

4.3.1 Apartment number 1 – Janovice nad Úhlavou

Apartment type: 2+1

Purchase year: 2000

Purchase price: CZK 250 000 (65m^2)

Table 8: Rental development in the first investment in selected years

Selected years	Rental price / month	Rental price / year	Profit per selected years
2000 – 2004	3 000	36 000	180 000
2005 – 2009	4 000	48 000	240 000
2010 – 2014	5 000	60 000	300 000
2015 – 2019	6 000	72 000	360 000
2020	6 000	72 000	72 000

Source: Own processing based on documents supplied by the investor

Table 9: Used resources for purchasing the investment

Janovice nad Úhlavou	Purchase price	Own resources	Mortgage	Mortgage interest	Bank charges
Apartment n. 1	250 000	250 000	0	0	0

Source: Own processing based on documents supplied by the investor

This first apartment was purchased in 2000 in town of Janovice nad Úhlavou for purchase price CZK 250 000. The investor bought this property in cash so there was no need for applying for a mortgage. As can be seen in the resources table, there was no mortgage, mortgage interest, or bank charges.

Table 10: Calculation of the net income value for the investment

Rental period	Rental price / month	Rental income per one year	Tax from income (flat-rate expenses * tax)	Flat-rate maintenance costs per one year	Net income after tax per 1 year (flat-rate expenses*tax)	Annual net income in %	Net income per 5 years
2000 - 2004	3 000	36 000	4 320	5 000	26 680	10,67	133 400
2005 -2009	4 000	48 000	4 637	5 000	38 363	15,35	191 815
2010 - 2014	5 000	60 000	6 300	6 000	47 700	19,08	238 500
2015 - 2019	6 000	72 000	7 560	6 000	58 440	23,38	292 200
2020	6 000	72 000	7 560	6 000	58 440	23,38	58 440

Source: Own processing based on documents supplied by the investor

Net income table analyzes and calculates the income from renting an apartment in the specified periods. The rental income of a given real estate takes into account the flat-rate cost of real estate maintenance and taxation according to Czech accounting standards valid in the monitored periods.

It was not necessary to apply for a mortgage loan for this investment, which the investor acquired in 2000 for CZK 250,000. Therefore, no interest on a mortgage loan or bank charges is reflected in the table.

During the years 2000 - 2008, there were several changes in tax rates according to Act No. 586/1992 Coll. Czech National Council on Income Taxes that affected the calculations in the table above. In 2000-2004, the deductible flat-rate expenses were 20% and the base tax was taxed by 15%. In 2005, there was a change and the deductible flat-rate expenses were 30% and the base tax was taxed by 15%. Another change took place a year later and the change took place in the tax base that was taxed by 12%. The deductible flat-rate expenses of 30% and the base tax of 12% were the same in 2007, but in 2008 there was another and last change. From 2008 onwards, deductable flat-rate expenses are 30%, and base tax is taxed by 15%.

4.3.2 Apartment number 2 – Janovice nad Úhlavou

Apartment type: 2+1

Purchase year: 2005

Purchase price: CZK 660 000 (65m^2)

Table 11: Rental development in the first investment in selected years

Selected years	Rental price / month	Rental price / year	Profit per selected years
2005 – 2009	4 000	48 000	240 000
2010 – 2014	5 000	60 000	300 000
2015 - 2019	6 000	72 000	360 000
2020	6 000	72 000	72 000

Source: Own processing based on documents supplied by the investor

Table 12: Used resources for purchasing the investment

Janovice nad Úhlavou	Purchase price	Purchase price (purchase price + interests + flat rate costs)	Own resources	Mortgage	Mortgage interest (duration of mortgage was 5 years)	Bank charges (150 + 20) monthly per 5 years
Apartmen n. 2	660 000	763 502	170 000	490 000	93 302	10 200

Source: Own processing based on documents supplied by the investor

As can be seen in this resources table, buying this property needed a mortgage in the height of CZK 490 000. Mortgage interest were CZK 93 302 and bank charges were CZK 10 200 (CZK 150 bank account management, CZK 20 account report). The total purchase price was CZK 763 502.

Table 13: Calculation of the net income value for the investment

Rental period	Rental price / month	Rental income per one year	Income tax (flat expenses * tax) per year	Flat-rate maintenance costs for one year	Net income after tax for given period (flat-rate) expenses * tax 15%)	Annual net income in %	Net income per given period
2005 – 2009	4 000	48 000	4 637	5 000	17 663	2,31	88 313
2010 – 2014	5 000	60 000	6 300	6 000	47 700	6,25	238 500
2015 – 2019	6 000	72 000	7 560	6 000	58 440	7,65	292 200
2020	6 000	72 000	7 560	6 000	58 440	7,65	58 440

Source: Own processing based on documents supplied by the investor

Net income table analyzes and calculates again the income from renting an apartment in the specified periods. The rental income of a given real estate takes into account the flat-rate cost of real estate maintenance and taxation according to Czech accounting standards valid in the monitored periods.

This example is affected by the change in tax rates, which changed several times during the years 2000-2008. In 2005, flat-rate expenses were deductible 30% and base tax was taxed by 15%. In 2006, this rate changed to deductible flat-rate expenses of 30% and base tax was taxed by 15%. This rate was the same in 2007 but has changed again and lastly in 2008. From 2008 to the present, we expect deductible flat-rate expenses of 30% and base tax is taxed by 15%.

In this case, unlike apartment number 1, this property was financed partly from investor‘s own resources and partly by a mortgage loan, where the acquisition price of the property also reflects the costs associated with interest and bank fees of the mortgage loan.

The purchase price of the property was CZK 660,000 in 2005, own resources, in this case, amounted to CZK 170,000, the mortgage loan amounted to CZK 490,000, interest on the mortgage loan for the period of the first fixation was CZK 93,302 and bank fees amounted to CZK 10,200 CZK. After five years of fixation, the mortgage loan was repaid.

Assuming the current lease, this property would be repaid in 15 years and 9 months if the investor did not repaid the property earlier.
The table also shows the net annual income.

4.3.3 Apartment number 3 – Pilsen

Apartment type: 3kk

Purchase year: 2010

Purchase price: CZK 1 060 000 (63m^2)

Table 14: Rental development in the first investment in selected years

Selected years	Rental / month	Rental price / year	Profit per selected years
2010 – 2014	7 000	84 000	420 000
2015 – 2017	9 000	108 000	324 000
2018 - 2019	10 000	120 000	240 000
2020	10 000	120 000	120 000

Source: Own processing based on documents supplied by the investor

Table 15: Used resources for purchasing the investment

Pilsen	Purchase price	Purchase price (purchace price+interests+flat-rate costs)	Own resources	Mortgage	Rental interests (duration of mortgage was 10 years)	Bank charges (150+20) monthly per 10 years
Apartment n. 3	1 060 000	1 360 889	260 000	800 000	280 489	20 400

Source: Own processing based on documents supplied by the investor

A mortgage of CZK 800 000 had to be applied for from the bank for purchasing this property. The calculation from the table above show that the amount of interest was CZK 280 489 and bank charges were CZK 20 400(CZK 150 bank account management, CZK 20 account report). The total purchase price was CZK 1 360 889.

Table 16: Calculation of the net income value for the investment

Rental period	Rental price / month	Rental income per 1 year	Income tax (flat expenses * tax)	Flat-rate maintenance costs for one year	Net income after tax for given period (flat-rate expenses * tax)	Annual net income in %	Net income per given period
2010 – 2014	7 000	84 000	8 820	6 000	35 704	4,47	178 519
2015 – 2017	9 000	108 000	11 340	6 000	62 444	6,13	187 332
2018 – 2019	10 000	120 000	12 600	6 000	76 970	6,97	153 940
2020	10 000	120 000	12 600	6 000	101 400	7,45	101 400

Source: Own processing based on documents supplied by the investor

Net income calculation table analyzes and calculates again the income from renting an apartment in the specified periods. In this case, it is already another locality, namely the regional city of Pilsen, where the price levels of apartment rents are otherwise developing, and therefore they are monitored after shorter periods. The rental income of a given real estate again takes into account the flat-rate cost of real estate maintenance and taxation according to Czech accounting standards valid in the monitored periods.

In this case, the property was financed partly from its own resources and partly by a mortgage loan, where the acquisition price of the property also reflects the costs associated with interest and bank fees of the mortgage loan.

The purchase price of the property was CZK 1,060,000 in 2005, own resources, in this case, amounted to CZK 260,000, the mortgage loan amounted to CZK 800,000, interest on the mortgage loan for the period of the fixation period amounted to CZK 280,489 and bank fees amounted to CZK 20 400 per 10 years (CZK 150 bank account management, CZK 20 account report). After a ten-year fixation, the mortgage loan was repaid. The table again shows the net annual income. Expenses for the acquisition of this property have not yet been amortized.

The following table shows the development of prices of the same real estate in the same locality over time.

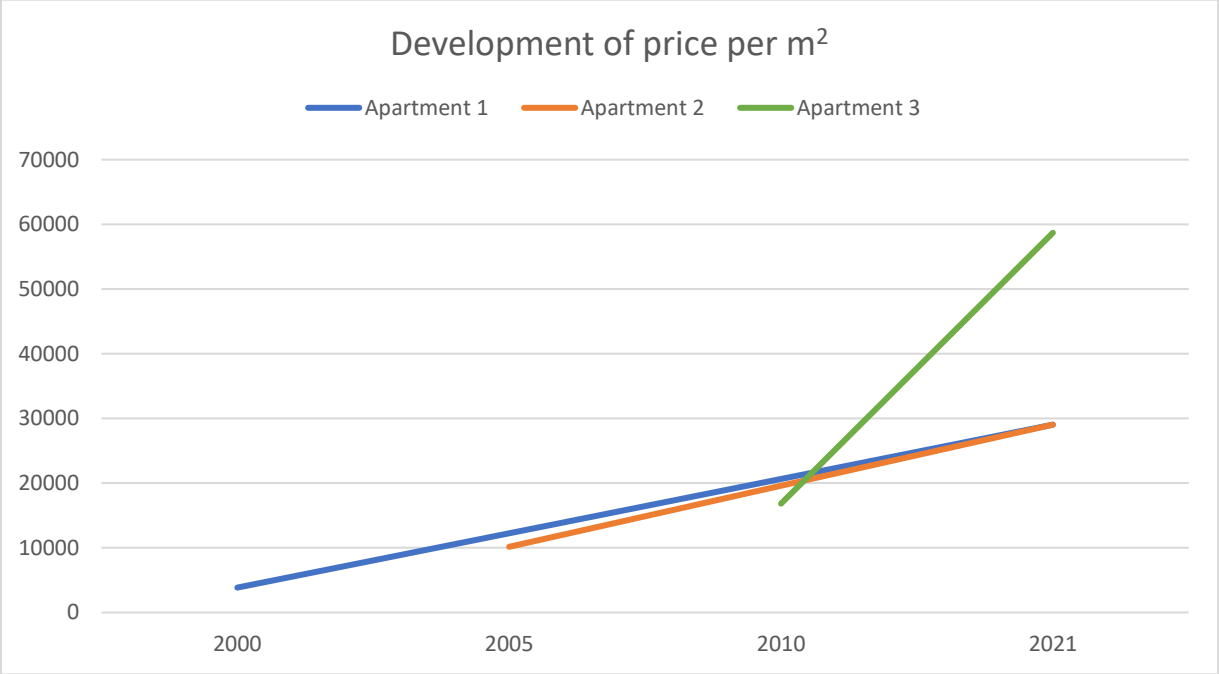
The analysis shows the development of the price, or its increase in comparison with the acquisition of the property and the current market price, ie the price in 2021.

Table 17: Development of prices per m2 of compared investments

Apartment	Purchase price	Apartment area	Price per m^2 in CZK in the time of purchasing the property	Price of the exact same property in 2021 per m^2
Apartment n. 1 purchased in 2000	250 000	65	3 846	29 032
Apartment n. 2 purchased in 2005	660 000	65	10 154	29 032
Apartment n. 3 purchased in 2010	1 060 000	63	16 825	58 695

Source: Own processing based on documents supplied by the investor

Graph 2: Development of prices per m2 of compared investments



Source: Own processing based on documents supplied by the investor

As can be seen in the graph, the price per m^2 has increased most in the third apartment – apartment in Pilsen. This property was bought in 2010 for CZK 16 825 / m^2 and its price has increased the most in short period of time, eventhough it is not fully paid yet.

4.4 Calculations of NVP, IRR, and DR

To calculate the following tables, it was necessary to use data of income and expenses from the time of acquisition of the property to the present. The broken-down income and expenses in individual years determined the cash flow, which the following calculations were subsequently calculated with. Intended lifetime periods were in most cases longer than data obtained to date. It was therefore necessary to generate estimated costs and revenues from the present to the end of the intended lifetime period, which determined the future cash flow. Therefore, a 3% increase in rent was used over a five-year period, which assumes a natural increase in rent. Higher costs are not expected in this case.

Table 18: Apartment n. 1 - Calculation of NVP, IRR, and DPP

Intended Lifetime Period (years)	Net Present Value (CZK)	Internal Rate of Return (%)	Discounted Payback Period
20	605 915	12,96	8 years, 1 month
30	1 199 080	14,23	8 years, 1 month

Source: Own processing based on documents supplied by the investor

Table 19: Apartment n. 2 - Calculation of NVP, IRR, and DPP

Intended Lifetime Period (years)	Net Present Value (CZK)	Internal Rate of Return (%)	Discounted Payback Period
20	251 215	2,73	15 years, 9 months
30	862 175	5,35	15 years, 9 months

Source: Own processing based on documents supplied by the investor

Table 20: Apartment n. 3 - Calculation of NVP, IRR, and DPP

Intended Lifetime Period (years)	Net Present Value (CZK)	Internal Rate of Return (%)	Discounted Payback Period
20	489 001	3,20	15 years, 4 months
30	1 580 890	5,83	15 years, 4 months

Source: Own processing based on documents supplied by the investor

The above tables show that the net present value is always in positive values which indicates that the investments are convenient.
In the short term, the most advantageous investment is apartment n.1. This investment has the highest internal rate of return in 20 and 30 years, the shortest discounted payback period and net present value are the highest in the intended lifetime period of 20 years.
In the long run, apartment number 3 is more advantageous because it has the highest net present value in the intended lifetime period of 30 years. The internal rate of return is above 5% in the intended lifetime period of 30 years and the discounted payback period is 15 years and 4 months.

The worst investment out of these three is apartment number 2 that has the lowest interest rate of return and the highest discount rate - 15 years, 9 months. This investment is also convenient as long as the net present value is in positive numbers and the internal rate of return is above 5% in the intended lifetime period of 30 years.

In the case that the investor would not be able to repay the mortgage loan due to environmental influences (illness, loss of work, etc.), the author of the work also included in the practical part a variant where the author adds 1% of the mentioned risks to the discount rate. This 1% risk was added to the mortgage interest rate.

Table 21: Apartment n. 1 - Calculation of NVP, IRR, and DPP by 1% risk increase

Intended Lifetime Period (years)	Net Present Value (CZK)	Internal Rate of Return (%)	Discounted Payback Period
20	510 535	12,96	8 years, 1 month
30	970 790	14,23	8 years, 1 month

Source: Own processing based on documents supplied by the investor

Table 22: Apartment n. 2 - Calculation of NVP, IRR, and DPP by 1% risk increase

Intended Lifetime Period (years)	Net Present Value (CZK)	Internal Rate of Return (%)	Discounted Payback Period
20	147 078	2,73	15 years, 9 months
30	621 140	5,35	15 years, 9 months

Source: Own processing based on documents supplied by the investor

Table 23: Apartment n. 3 - Calculation of NVP, IRR, and DPP by 1% risk increase

Intended Lifetime Period (years)	Net Present Value (CZK)	Internal Rate of Return (%)	Discounted Payback Period
20	310 222	3,20	15 years, 4 months
30	1 157 452	5,83	15 years, 4 months

Source: Own processing based on documents supplied by the investor

The outcome from the above tables, where the 1% risk was included in case of loss of income, shows that investments are still convenient because the net present value is still in positive numbers that have just decreased. The internal rate of return and discounted payback period is the same.

4.5 Sensitivity analysis

Sensitivity analysis is a method that examines how the result will change if we change the criteria. The purpose of sensitivity analysis is to find out how individual changes affect the result. In this case, it will be tested how the decrease in rent will affect the return on investment. In the long run, real estate investments may have various effects, which may result in a decline in market rents or even their shortfall.

The present is an example of this. At the events of the last year, we can see the effects on rents that can, and undoubtedly have, the current situation of the COVID-19 epidemic, which has affected virtually the whole world and has far-reaching economic consequences. The Covid-19 epidemic has significantly reduced and ceased operations in some sectors, which has a huge impact on the incomes of the population.

While in previous years landlords have been accustomed to the rising trend of rents, we are now witnessing that after a year of the COVID-19 epidemic, this trend has reversed and rents are declining due to the effects of economic restrictions on COVID-19 measures and overall declining incomes.

As a result, it can already be seen that rents are falling in many locations.

The following calculation will take into account the reduction in rent compared to the previous period at current costs. The effect of the reduction in rent on the net annual return on investment compared to the previous period will be monitored.

Table 24: Apartment n. 1 - Calculation of rent reduction by 5% and 10%

Rental period	Rental price / month	Rental income per 1 year	Income tax (flat expenses * tax)	Flat-rate maintenance costs for one year	Net income after tax for 1 year (flat-rate expenses * tax)	Annual net income in %
2015 – 2020	6 000	72 000	7 560	6 000	58 440	23,38
2021 (5% rental decrease)	5 700	68 400	6 804	6 000	55 596	22,24
2021 (10% rental decrease)	5 400	64 800	7 182	6 000	51 618	20,65

Source: Own processing based on documents supplied by the investor

If the rent reduction by 5% is made, the net annual income will decrease compared to the previous period, when the net annual income was 23.38% to 22.24%, with a reduction of 10% it will decrease to 20.65%.

Table 25: Apartment n. 2 - Calculation of rent reduction by 5% and 10%

Rental period	Rental price / month	Rental income per 1 year	Income tax (flat expenses * tax)	Flat-rate maintenance costs per one year	Net income after tax per 1 year (flat-rate expenses * tax)	Annual net income in %
2015 – 2020	6 000	72 000	7 560	6 000	58 440	7,65
2021 (5% rental decrease)	5 400	64 800	6 804	6 000	51 996	6,81
2021 (10% rental decrease)	5 700	68 400	7 182	6 000	55 218	7,23

Source: Own processing based on documents supplied by the investor

If we reduce the rent by 5%, the net annual income will decrease compared to the previous period, when the net annual income was 7.65% to 6,81%, with a reduction of 10% it will decrease to 7,23%.

Table 26: Apartment n. 3 - Calculation of rent reduction by 5% and 10%

Rental period	Rental price / month	Rental income per 1 year	Income tax (flat expenses * tax)	Flat-rate maintenance costs for one year	Net income after tax for 1 year (flat-rate expenses * tax)	Annual net income in %
2021 (5% rental decrease)	9 000	108 800	11 340	6 000	90 660	6,00
2021 (10% rental decrease)	9 500	114 000	11 970	6 000	96 030	6,36
2015 – 2020	10 000	120 000	12 600	6 000	101 400	6,71

Source: Own processing based on documents supplied by the investor

If we reduce the rent by 5%, the net annual income will decrease compared to the previous period, when the net annual income was 6.71% to 6.00%, with a reduction of 10% it will decrease to 6.36%.

5. Conclusion

The aim of this work was to show the return on investment on individual properties and the development of market prices for their acquisition, as well as the development of the price level of rents for the monitored properties. The analysis shows that the total costs reflect the partial costs associated with the combination of sources of financing, where in cases where it is financed at the same time as a mortgage loan, the total costs increase, and thus the payback period of the investment increases. In the case of the calculation of the lease of investment flats, it is necessary to take into account the overhead costs associated with operation and maintenance, as well as the taxes paid. These costs also affect the net annual income from the property.

From Table No. 17 it is possible to read how the market prices of the given real estate increased per m^2 in the monitored periods. In this table can be seen that the price per m^2 has increased at minimum 2,9% in every investment from purchasing date. The price increased the most in apartment number 1, where the price per m^2 increased 7,5 times. For both remaining properties apartment 2 and apartment 3, the price per m^2 increased about approximately 3 times. This fact is very interesting, because these two apartments, where the price per m^2 has increased similarly, are each in a different location and were purchased in different years. Apartment number 3 is located in Pilsen, which is a much larger and more lucrative city than Janovice nad Úhlavou, where apartment number 2 is located.

The attached graph shows the development or increase in market prices of monitored properties from the time of their acquisition to the present. Current market values were found on real estate portals according to the current prices of real estate offered in the same locations.

This bachelor thesis confirmed that investing in real estate is advantageous in most cases. The demand for real estate for sale and rent is still high. The work also proved that investing in a lucrative city (in this case Pilsen) can be similarly advantageous as investing in a less lucrative city (in this case the small town of Janovice nad Úhlavou, which is located near the German border. In the practical part, it turned out that the price per m^2 increased for apartment number 2, which is located in the town of Janovice nad Úhlavou 3 times as well as for apartment number 3, which is located in the regional city of Pilsen. The discounted payback period for these two

investments was also very similar, namely 15 years and 9 months for apartment number 2 and 15 years and 4 months for apartment number 3.

It is always necessary to think in advance about the amount of investment and its return. If it is to be a profitable investment, it is recommended to work with a return in the form of leases for a maximum of 15 years. The return covered by rents may not be as high in the first years. Other circumstances must also be taken into account, such as the future use of the property for the family's needs, where the rent helps to repay the acquisition costs, in which case a lower yield can be calculated. In general, an annual return of about 7 percent is a great investment, but even a yield of about 5 percent is very good. Investing in real estate is a stable and long-term affair, which usually requires further investment, especially in the first years. Return on investment is affected by the amount of rent, location, the technical condition of the property, civic amenities. It is also necessary to take into account various factors that affect rental income. There may be a loss of rental income due to a change of tenants or their solvency. Other economic fluctuations may also be reflected in rental income, which are observed at the present time when the COVID-19 epidemic and economic restrictions are reducing rents and the income and solvency of the population.

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7. Appendix