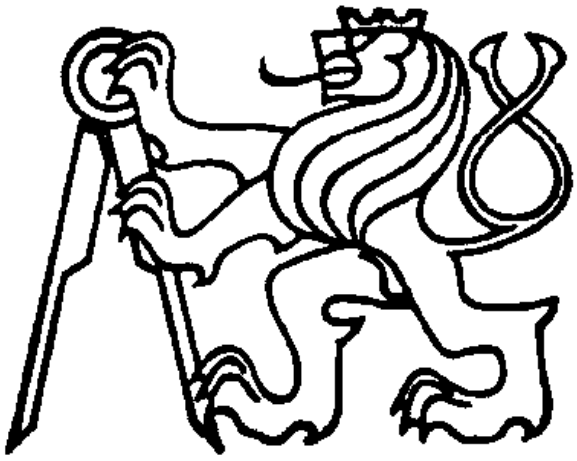
ČESKÉ VYSOKÉ UČENÍ TECHNICKÉ V PRAZE

FAKULTA STAVEBNÍ

Katedra ekonomiky a řízení ve stavebnictví



DIPLOMOVÁ PRÁCE

2022 Bc. Samuel Weidlich

ZADÁNÍ DIPLOMOVÉ PRÁCE

I. OSOBNÍ A STUDIJNÍ ÚDAJE

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Fakulta/ústav: **Fakulta stavební**

Zadávající katedra/ústav: **Katedra ekonomiky a řízení ve stavebnictví**

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Studijní obor: **Projektový management a inženýring**

II. ÚDAJE K DIPLOMOVÉ PRÁCI

Název diplomové práce:

Vyhodnocení efektivnosti pronájmu postaveného bytového domu

Název diplomové práce anglicky:

Evaluation of the efficiency of renting a built apartment building

Pokyny pro vypracování:

- Introduction
- Theoretical part - description of the current state of world, basic items economical and technical
- Practical part - specifiv decelpoment project, its description, data, calculation, evaluation
- Resume

Seznam doporučené literatury:

- FOTR, J. a SOUČEK, I. Investiční rozhodování a řízení projektů: jak připravovat, financovat a hodnotit projekty, řídit jejich riziko a vytvářet portfolio projektů. Praha: Grada, 2011. Expert (Grada). ISBN 978-80-247-3293-0
- VALACH, J. Investiční rozhodování a dlouhodobé financování. 2. vydání. Praha: Ekopress, 2006. ISBN 80-86929-01-9

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III. PŘEVZETÍ ZADÁNÍ

Diplomant bere na vědomí, že je povinen vypracovat diplomovou práci samostatně, bez cizí pomoci, s výjimkou poskytnutých konzultací. Seznam použité literatury, jiných pramenů a jmen konzultantů je třeba uvést v diplomové práci.

Datum převzetí zadání

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Podpis studenta

Statement:

I declare that I have created the diploma thesis independently and that I have listed all the information sources used.

In Prague on 2.1. 2022

Bc. Samuel Weidlich

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Evaluation of the efficiency of renting a built apartment building

Annotation:

The task of the work is to assess the efficiency of constructing an apartment building designed for rental housing. The reference apartment building used for the purposes of this work is a specific project, that is currently in the construction phase. Within the work, 3 scenarios will be processed and evaluated based on economic efficiency indicators. In the theoretical part the reader will have the opportunity to find information about market situation in Czech Republic, characteristics of BTR project, market situation in Taiwan and project effectivity evaluation methods. In the practical part the reference project will be introduced, and all required information will be summarized. 3 scenarios of constructing an apartment building built for the purpose of renting will be processed. Scenarios will be compared with each other and final evaluation of the BTR project from the developers perspective will be made.

Key words:

Net present value, real estate sale, payback period, investment, sublease, cash flow, internal rate of return, real estate market, real estate investment, build to rent, build to sale, private rent sector, institutional rent sector, developer, tenant

List of abbreviations

BTR - build to rent

BTS - build to sale

PRS - private rent sector

PP - payback period

DPP - discounted payback period

NPV - net present value

IRR - internal rate of return

CF - cash flow

CCF- cumulated cash-flow

DCF- discounted cash-flow

CDCF- cumulated discounted cash-flow

LTV - loan to value

NOI – net operating income

FPA – forward purchase agreement

PRIBOR – Prague inter-bank offered rate

Contents

1 Introduction

The main goal of the diploma thesis is to evaluate and compare the effectiveness of three scenarios of the investment plan. The first is the construction and sale of an apartment house after the using permit is issued, the second scenario is the construction and sale of an apartment house after 2 years of operational phase and after it is filled with tenants, and the third scenario is the sale of land and subsequent construction financing through forward funding. The solutions of all three scenarios are based on the same reference project.

2 Theoretical part

In the theoretical part the reader will have the opportunity to find information about market situation in the Czech Republic, characteristics of BTR project, market situation in Taiwan and project effectivity evaluation methods.

2.1 Market analysis

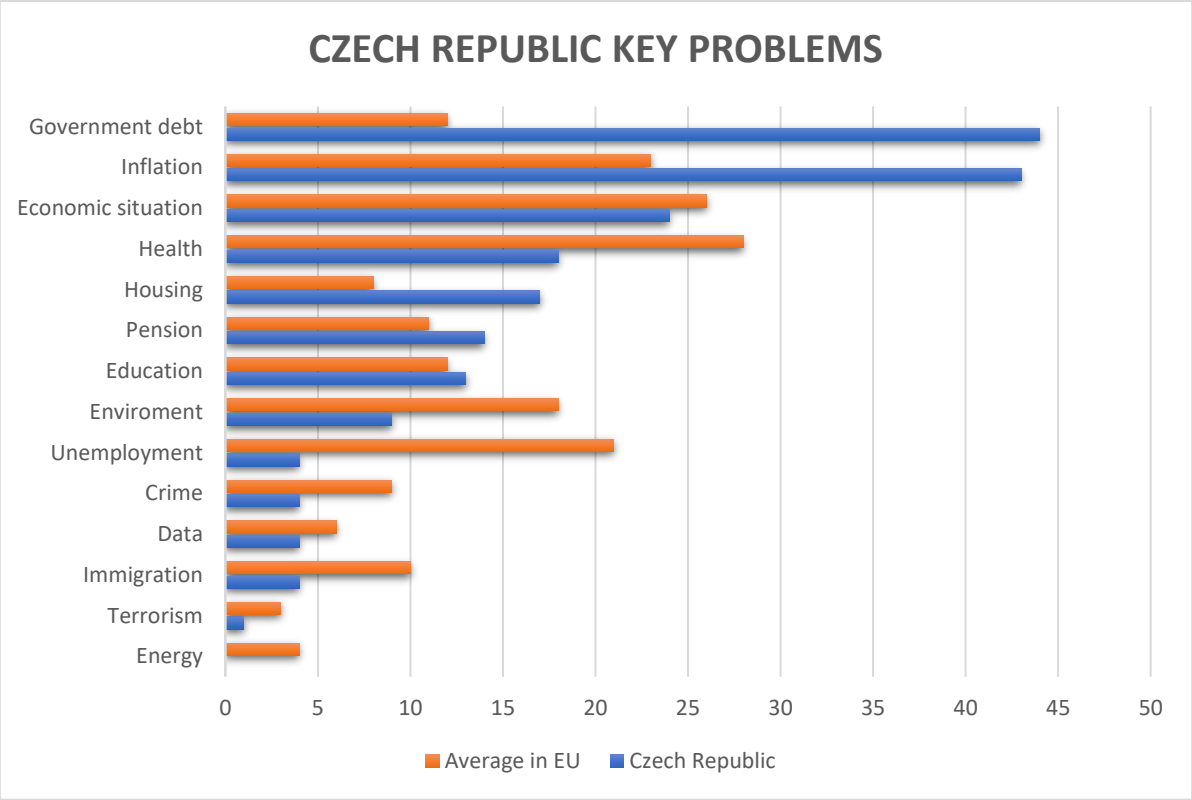
In this chapter there will be explained why it is time to start considering build to rent (BTR) as suitable development strategy. The following subchapters will discuss some of the inputs to the decision on whether it is appropriate to design new development projects as BTR or not.

The real estate market, the availability or the demand for the real estate, and the like, are influenced by several factors. In the following chapters some of them will be defined in more detail, and thus the reader will be brought closer to the current situation on the real estate market in the Czech Republic.

2.1.1 Present situation on the real estate market

There are many factors influencing the real estate market. In the next subchapter will be dealt with some of them in more detail.

The main ones, as can be seen from the following picture, include the level of government debt and inflation in the country.



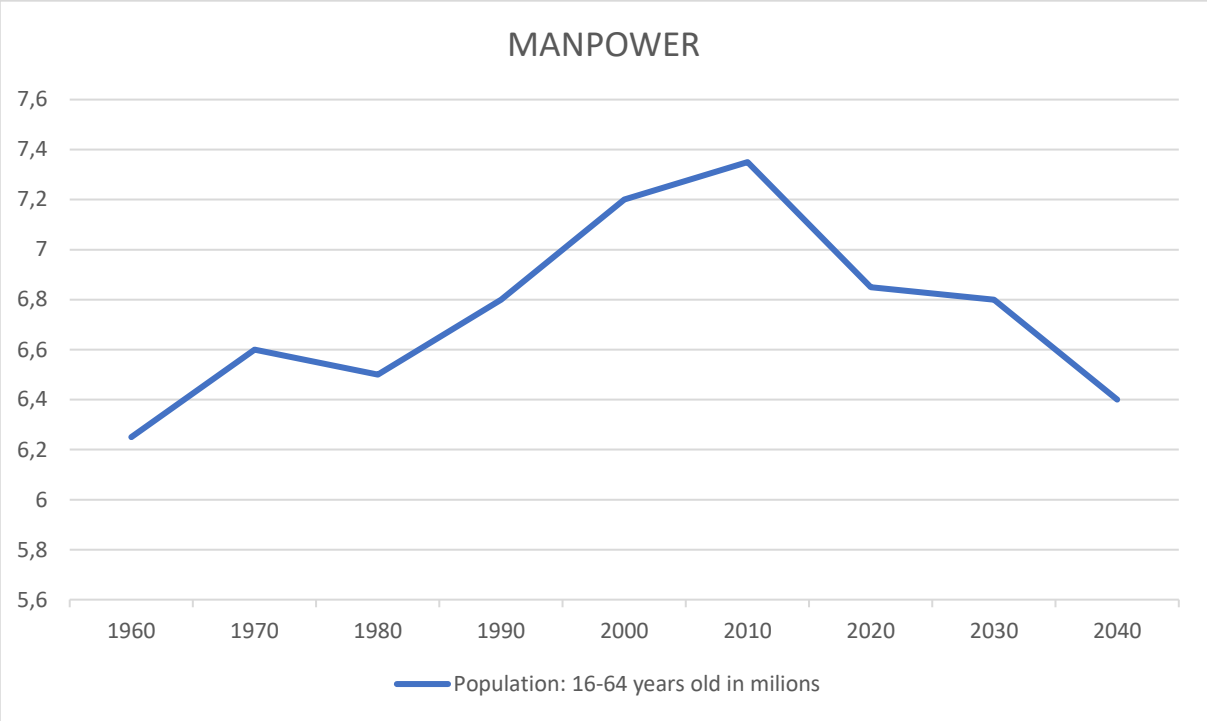
Picture 1, Czech Republic key problems [own processing by source 3]

When comparing the Czech Republic with the average in other EU countries, it can be seen, that among other things, government debt and inflation are much higher than the mentioned average. At the same time, the government debt created by the covid situation has raised inflation, which is expected to continue to rise. Currently, headline inflation is around 5%. This was stated by one of the experts during his presentation at a conference on rental housing. [3]

The fact that inflation reaches 5% and the assumption that it will rise furthermore affects the behavior of people. They are trying to protect their money from losing its value by investing in real estate. Many people find this type of investment to be more secure, than other investment possibilities. This trend has contributed to the recent dramatic increase in property prices. [3]

According to [3], it is possible to assume that if inflation rises, or if it will remain elevated for a longer period, the Czech National Bank will raise interest rates by 3-4%, which will affect the real estate market significantly. [3]

Another important factor affecting the real estate market is the declining manpower. In the following picture can be seen the development and its future assumption of manpower in Czech Republic.

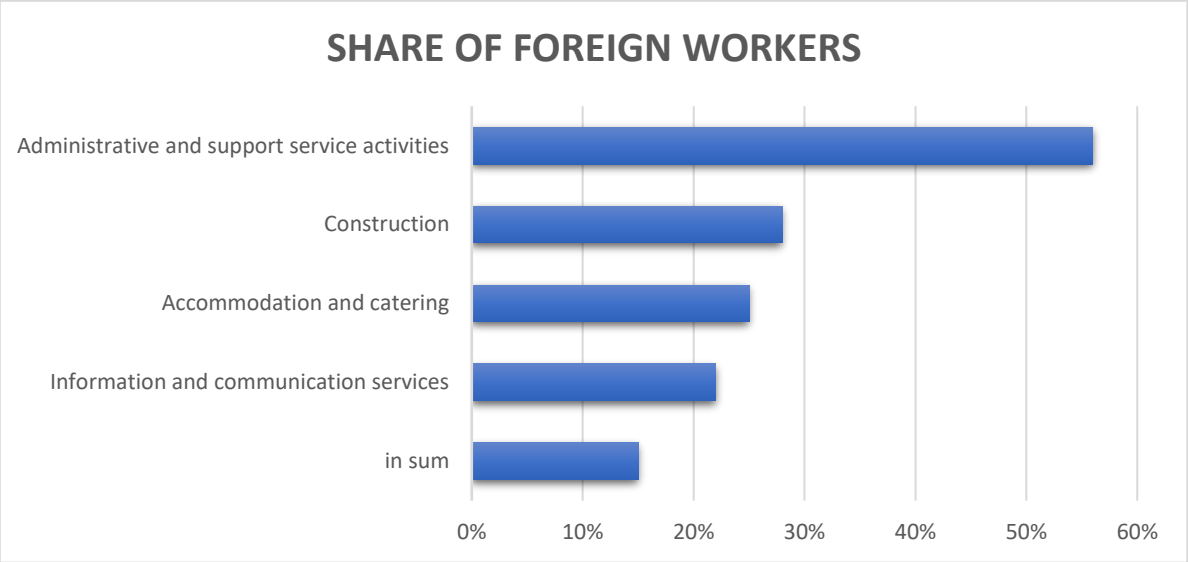


Picture 2, Manpower [own processing by source 3]

The picture shows that the manpower has been declining since about 2010 and is expected to continue in this descending trend. According to [3], this fact can, among other reasons, be explained by the low birth rate after 1991. It is possible to assume, that the low unemployment rate is one of the consequences of this fact. [3] also claims, that low unemployment rate leads to the assumption that the wages in the Czech Republic should grow by 6-8% in the long run.

The potential of the rental market is given by wage growth. The higher the wages, the higher the rents, because the inhabitants move primarily to higher-income areas. As a result, the demand for housing in these localities increases. Flats are not being built at the same pace as demand is rising, therefore rents will continue to rise in the near future (2-3 years) [4].

Wage growth in the Czech Republic could have a positive effect on attracting foreign workers. A fundamental factor influencing the construction industry in the Czech Republic is also the fact that there is a high dependence on foreign workers. More than 25% of people employed in construction are foreigners. During Covid has this caused complications, because due to the restrictions, some foreign workers left temporarily [5]. If the Czech Republic would not be able to attract foreign workers in the future, it could result in further real estate price increases. [3] The following picture shows the share of foreign workers in few sectors.



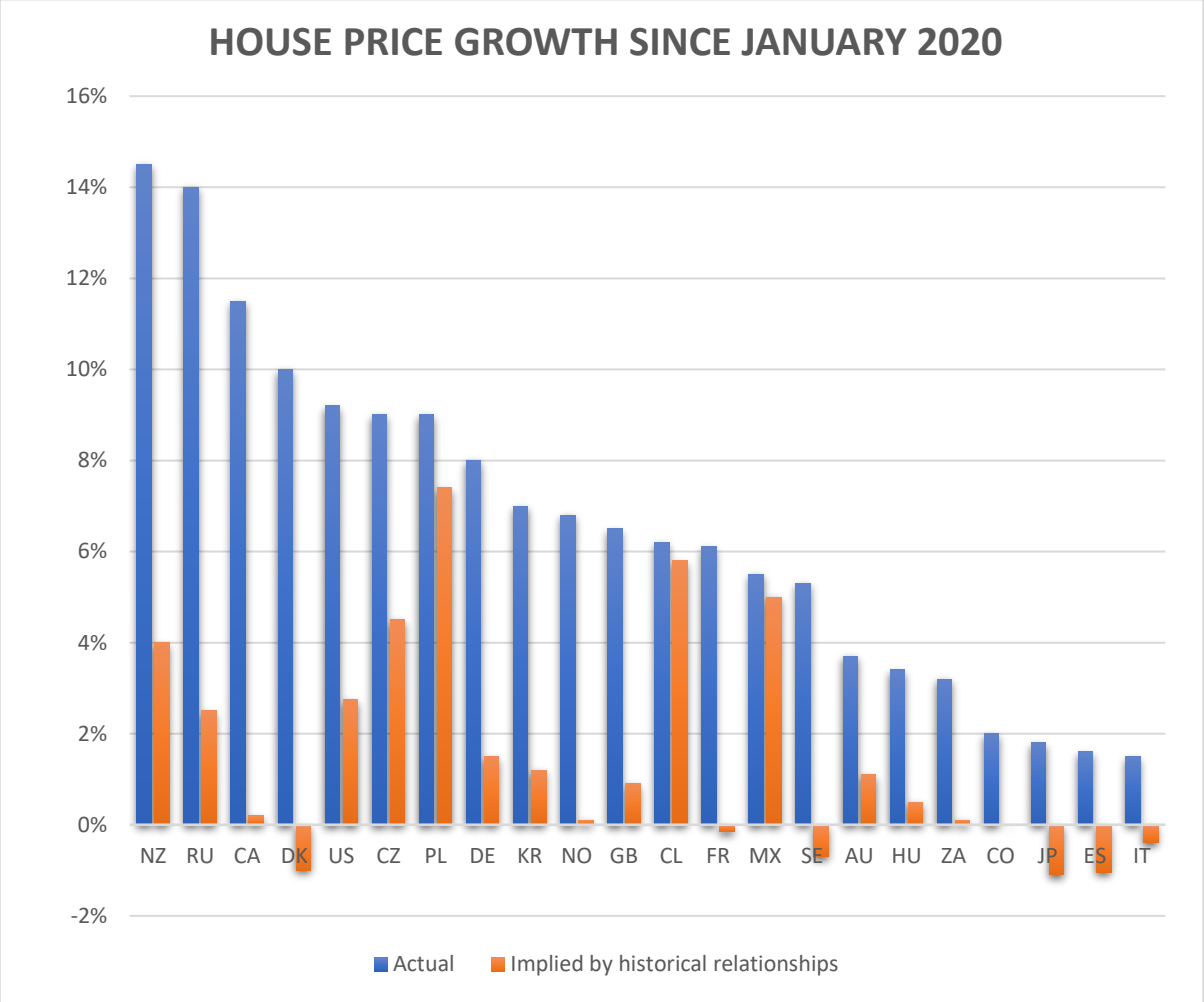
Picture 3, Share of foreign workers [own processing by source 3]

In construction is employed more than 25% of foreign workers, putting it on the second place after administrative and support activities, where more than 55% of foreign workers are employed.

Another factor is, for example, sudden change in material costs or the large disparity between strong demand and low housing supply. This is due, inter alia, to the lengthy authorization processes [21]

Of course, it would be possible to continue to list other factors affecting the price of real estates, their unavailability, scarcity, and the like. Ultimately, everything leads to the fact that real estate is very overvalued. This as well confirms the Czech National Bank, according to which they are overvalued by up to 25%. [25]

Prices of the real estate have been growing rapidly during Covid. In the following picture can be seen the house price growth since January 2020

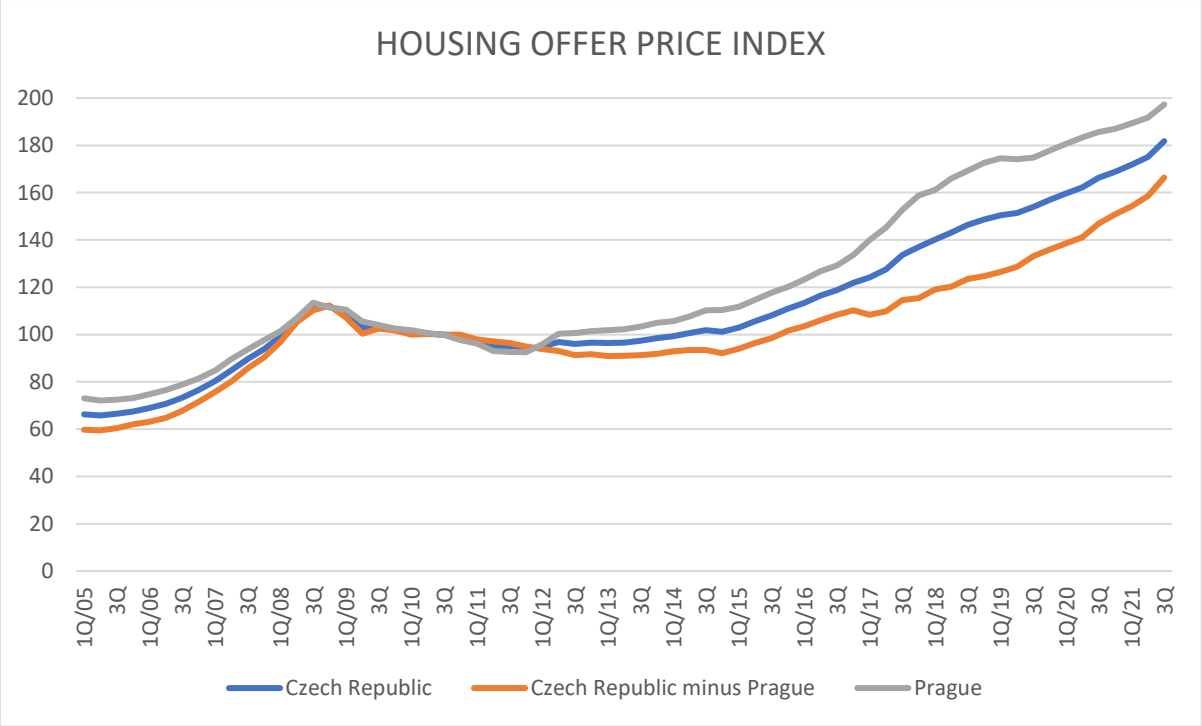


Picture 4, House price growth [own processing by source 3]

It is possible to observe the actual rise in property prices since January 2020 (blue bars). Orange bars are showing, how real estate prices should have had changed, based on historical relationships - this means that the dependent variable in the market defining equation was real estate prices and independent variables were all other impacts. [3] states, that the difference between blue bars and orange bars can be explained by the fact that property prices usually fall with the recession. This did not happen, because the recession was not caused by people not wanting or not being able to spend money, but by the fact that they simply could not. The economy has been forced shut down. Demand for mortgages grew and people wanted to invest their

free money in housing. As a result, property prices have risen more than could have been predicted from historical relationships.

However, the overvaluation of real estate did not only arise during the Covid. Following picture shows the development of the housing offer price index in the Czech Republic.

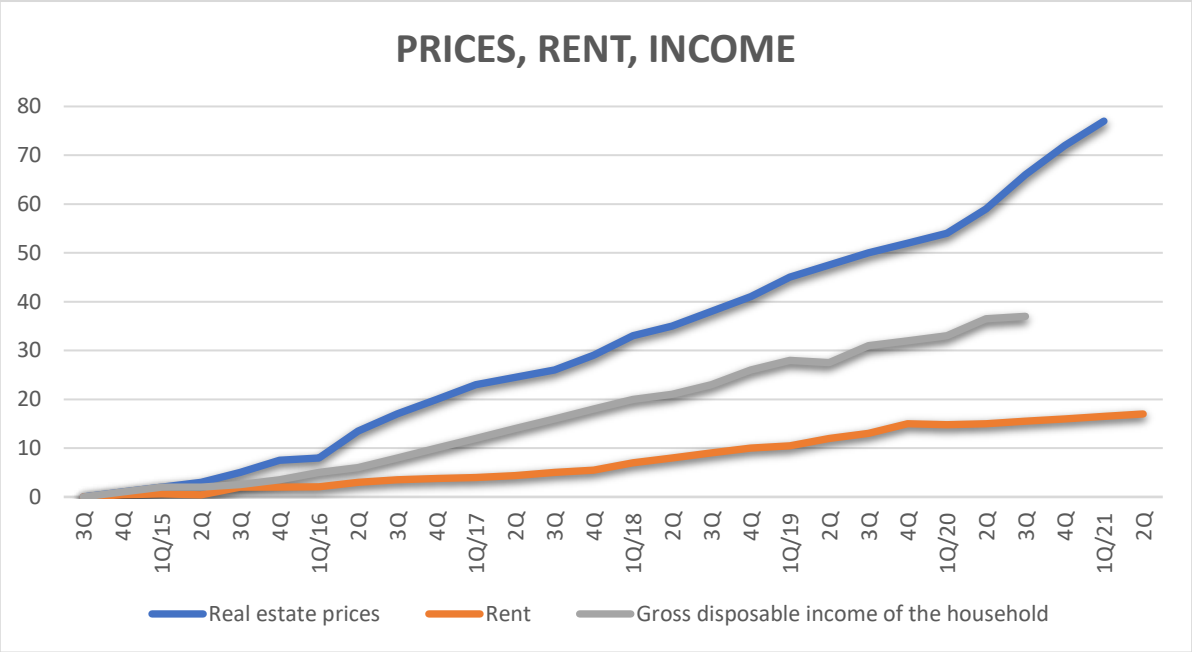


Picture 5, Housing offer price index [own processing by source 26]

The picture shows the rising trend of an apartment prices from 2012 to the present.

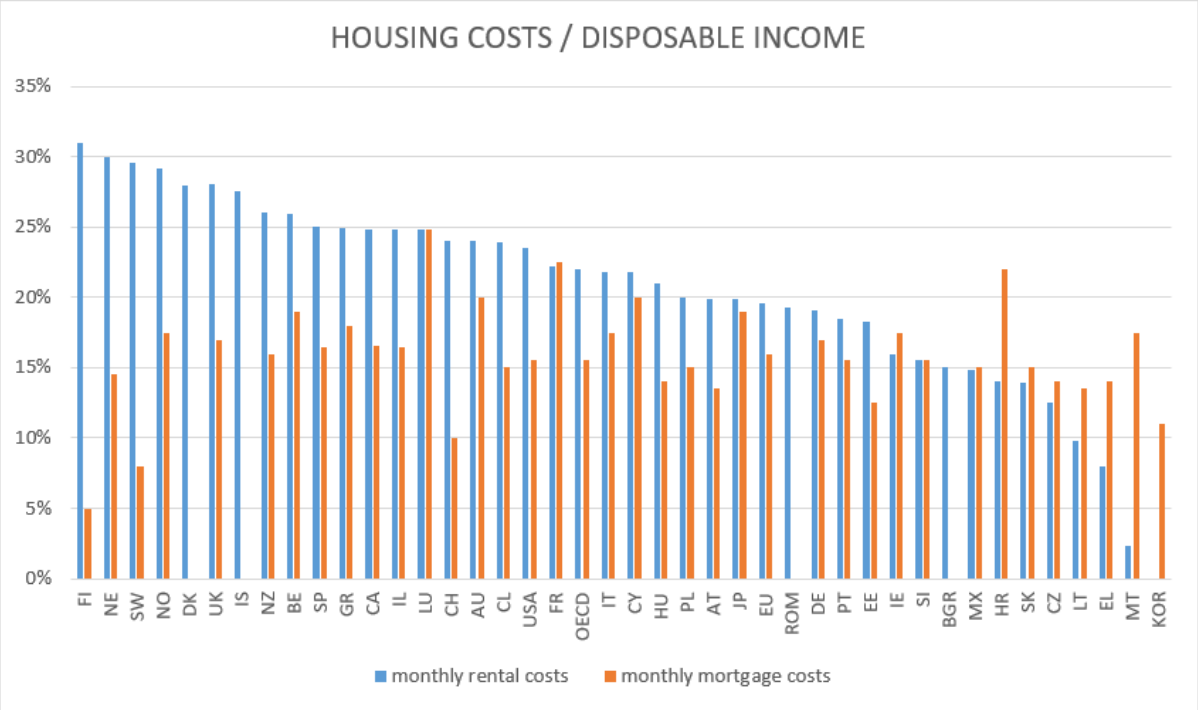
The consequence of the overvaluation of real estate in the Czech Republic is, among other things, a decrease in the availability of owner-occupied housing. However, this does not apply to rental housing. At present, the average rental prices per square meter according to [19] remain at CZK 333 in Prague. During the pandemic, a significant number of individually rented flats was added to the Prague market. This caused a 15% drop in rental prices. [42]

As mentioned earlier in this chapter, the change in the rental prices should be a function of change in the wage amount. In the following picture can be seen, that since 2015 has been the gross household income rising faster than the rental prices. [3]



Picture 6, Prices, rent, income [own processing by source 3]

The picture shows that rental housing has become more affordable in recent years. However, this cannot be said about owner-occupied housing, the graph clearly shows that real estate prices have been rising faster than wages. [3] This fact is reflected in the average monthly costs that need to be incurred for owner-occupied housing (annuity and interest payment) or rental housing (monthly rent) respectively in relation to the average disposable income of the household. Following picture shows this ratio in some countries around the world. Values are given as a percentage of average disposable income.



Picture 7, Hpisng cost / disposable income [own processing by source 3]

It can be seen that the monthly costs of owner-occupied housing are higher than those of rented housing - the availability of owner-occupied housing has decreased, but not the availability of rental housing. Interestingly, in most developed countries of the world, monthly rental expenses are higher. [3]

One way to reduce the price of real estate could be to reduce demand for them. As most Czechs buy real estate with a mortgage, drawing on the maximum possible LTV limit, this could be possible, for example, by raising interest rates. According to [3], a 1% increase in interest rates should reduce the price of real estate by 1% over a 2-year horizon. Another way, according to [8], could be to provide an alternative to owner-occupied housing - affordable rental housing. This could be ensured by institutional investors.

Finally, it can be argued, that overvaluation of real estate, resulting from rising inflation, demand for undersupplied real estate, lengthy permitting processes, Covid's situation, changes in building material prices and other factors, has an impact on the unavailability of owner-occupied housing. However, this does not apply to the availability of rental housing, which on the contrary, has increased in recent years. The average monthly cost of owner-occupied housing (annuity payment plus interest)

exceeded the average monthly cost of rented housing (monthly rent). There is an assumption that wages will grow in the long run and with them the average rental levels in the near future as well.

2.1.2 Trends

In accordance with previous chapter, it is possible to claim, that in the Czech Republic were created conditions suitable for the development of a new market segment - rental housing. This segment immediately began to emerge here. Several institutional landlords have entered the market. According to [4], the era of rental housing has begun, and rental housing should become the future of the residential market in the Czech Republic.

According to [4], the predominance of Czechs still prefers housing in their own real estate. At the same time, however, the willingness to pay rent instead of a mortgage is increasing, respectively, real estate ownership is becoming too unaffordable. In addition to the higher interest in rental apartments, this also has an impact on the tenant's higher demands on the quality of the rented apartments [10].

[10] stated, that according to their analysis, Czechs already predominate in the most expensive segment of rental housing. Before, it has always been the domain of foreigners, which confirms that Czechs really are willing to pay such high rents.

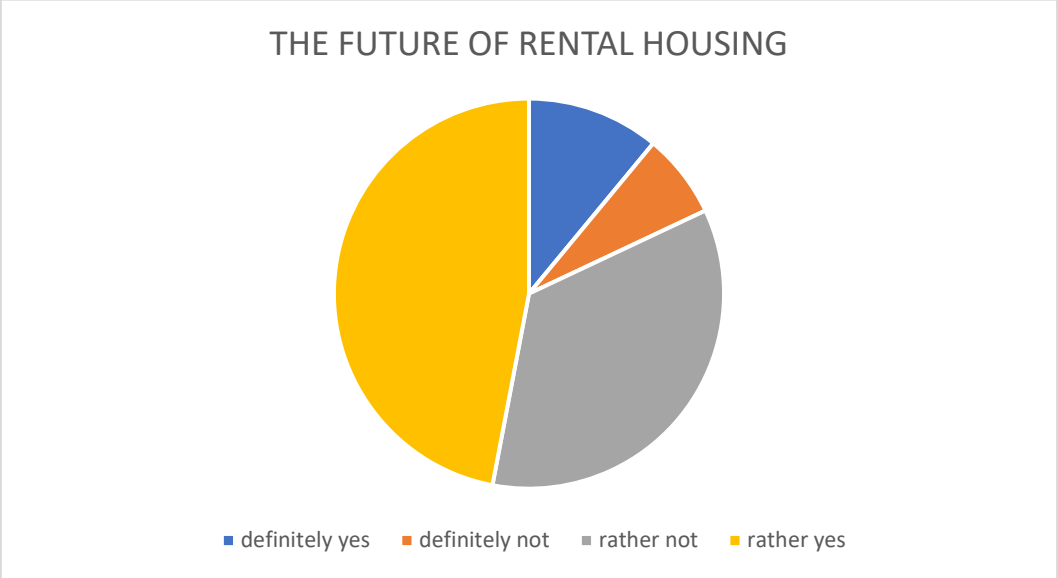
	DEMAND		REALIZED LEASE	
Price segments	**Czechs**	**Foreigners**	**Czechs**	**Foreigners**
<25 000 Kč	70%	30%	61%	39%
25 000- 55 000 Kč	70%	30%	48%	52%
>55 000 Kč	63%	37%	53%	47%
SUM	**63%**	**37%**	**55%**	**45%**

Picture 8, Overview of rental price segments [own processing by source 10]

The table shows the percentage distribution of rental demand and the distribution of leases in individual price segments. The Czechs really predominate in the most expensive segment.

COVID has made people more aware of the importance of the quality of their housing. It has become essential for them, that their housing meets requirements such as workspaces for home office or home schooling, areas for rest, leisure, or quarantine. [21] Of course, these increased demands affect the final price of housing and many families will be forced to rent, if they are unwilling to give up their demands. This fact is also confirmed by the increased willingness to pay higher rents, which was discussed in the previous paragraph.

The opinion that rental housing is the future of the residential market is also confirmed by the result of a questionnaire from May 2021 [56] in which more than 50% of respondents responded, that rental housing will expand in the Czech Republic as in other countries. This result could suggest that citizens of the Czech Republic are starting to take rental housing as a relevant long-term option.



Picture 9, The future of rental housing [own processing by source 56]

An interesting insight into the future of rental housing is also provided by the result of the research of the Institute of Sociology, which was mentioned in an interview on the topic of research on the housing of millennials. [41] This research showed that in the pre-covid period, the proportion of respondents living with their parents decreased. This was explained by stating that young people were starting to make more use of the rental housing sector for their independence. The goal of young people is still to buy their own housing. 90% of millennials living in rent do not consider this

type of housing to be permanent and they want to buy their own housing in the future. This is despite the fact, that approximately 2/3 of respondents are aware that the availability of owner-occupied housing has decreased. However, the reality is that they stay in the lease longer than they would like, out of necessity, because they cannot afford their own housing.

It is therefore possible to assume that rental housing will continue to develop in the coming years. If not because people would prefer it to ownership, then certainly because it will be more affordable.

2.1.3 Projects for rent in the Czech Republic

The rental housing segment is currently developing mainly in Prague, where there are currently approximately 160,000 rental flats, of which 3,000 (1.9%) are in institutional ownership. In the Czech Republic (except for Moravia where the Heimstaden fund bought 42,500 flats [28]), local individual owners predominate. [4]

According to [4], there was a great deal of interest in the purchase of flats by individual clients, but also in the purchase of entire projects by institutional investors. In 2021, 8 large rental projects were recorded in Prague with a total of 1,670 flats with a total investment of CZK 8 billion. These were sold or are being developed for rent. The following is a preview of some of them.

Trigema is currently implementing 3 rental housing projects. They are: Fragment (picture number 10) - designed for the premium market segment, Lihovar (picture number 11) - designed for the middle market segment and Toptower (picture number 12)- designed primarily for young people, which should also be the new tallest building in Prague.

Picture 10, Fragment [source 29]

Picture 11, Lihovar [source 24]

Picture 12, Toptower [source 24]

Skanska is currently implementing its first mixed use project in Prague. Towers B and C are intended for rental housing, Construction should start at the turn of 2022/2023

Picture 13, Port 7BC [source 30]

There are also older, already completed rental housing projects in Prague. An interesting representative is, for example, the Luka Living rental apartments project Which includes, among other things, a shopping centre. Residents can shop or go to the fitness centre directly in the building in which they are living. [44]

Picture 14, Luka Living [source 44]

2.1.4 Opinion of developers

In the Czech Republic, there is enough room for the growth of institutional rental housing [4]. It is also possible to expect an increased interest of foreign investors. According to [6], ideal legal and economic conditions have emerged that allow them to enter the market.

Of course, this issue is also being addressed by developers, who have been supplying the market with new flats for more than the last 30 years. Representatives of some of them shared their views on the issue of rental housing. This happened at the conference of renaissance of rental housing, which took place on 13.10.2021.

According to one of the experts [21], who represented company Skanska at the conference, the rental market is growing in importance. The main reason being high apartment prices, which have doubled since 2016. But the market still lacks professionally managed portfolios for rental housing.

Skanska has finished 20 rental housing projects in Scandinavia - investors are interested. Key clients are repeated when selling projects. Thanks to prefabrications

and unifications, the product is very well defined and the sale to the investor takes place before the start of construction - without leasing risk. [21]

In the Czech Republic, however, the BTS segment is still the main direction for Skanska, as sales to the end customer have a better return than sales to one issuer and BTR is so far only a supplementary segment. Expert representing Skanska is not of the opinion that the BTR segment would crowd out sales to end clients in the near future. Nevertheless, Skanska is preparing its first multifunctional project, which has been presented in the previous chapter. [21]

According to another expert [24] from company Trigema, the BTR business segment is in its infancy - there are already funds that invest in rental housing. Trigema is currently building 3 rental housing projects in Prague and other projects are in the phase of architectural studies.

Finep, which started renting housing as early as 2018, has the longest experience with the BTR segment. Expert representing this company is of the opinion that rented housing is only a detail of today's market. The bottom line is supposedly that little is being built. Finep embarked on rental housing because owner-occupied housing became unavailable, and this was the way to availability. He added that rental housing is a cultural issue and that the Czechs are built on different grounds than Western, more developed countries. In the Czech Republic, owning an apartment is preparing for retirement. Nevertheless, in the future, the funds should compete with individual landlords, so over time developers will be forced to sell to the fund to a significant extent. Thus, two main segments of rental housing should emerge on the market, which will differ mainly in the quality and scope of services offered. There will be unfurnished flats rented for a shorter period (1 year) by individual landlords and then equipped and professionally managed flats from institutional landlords, which will be rented for longer periods (3-5 years). [23]

Company Penta was also represented at the Renaissance of Rental Housing conference [22]. As a company focusing on the middle and upper housing segment, Penta is of the opinion that their product is not suitable for BTR and they do not succeed financially in this segment. According to one of its experts, the product they offer is too above standards in terms of the market. In the future, they would like to devote part of

their capacity to the BTR segment, but as long, as there is a housing deficit and there is interest in buying by end customers, it does not make sense to walk the “unbeaten path”. In the present, they see the BTR segment only as an opportunity to reduce risk by reducing the exit time from a large - scale project (part of the flats for the fund, part for sale, part as student housing, etc.)

Developers usually have a positive attitude and are inclined to believe that BTR certainly has a future in the Czech market and that it is an interesting segment. However, the BTR segment is not for everyone, so there are also developers who call for a more cautious approach and stick to the “beaten paths” for as long as possible. The interest in entire apartment building projects from the funds is great.

2.1.5 Opportunities and risks of BTR

With BTR projects, it is possible to see an opportunity especially in the market itself, which is not yet saturated with competition. Thus, entering the market may seem a little easier than it would be in a saturated market

The big advantage is a certain cash flow thanks to the, often used, forward funding. By BTR projects, the future owner is selected, and the project is usually sold before construction begins, thanks to which the developer has a certain cash flow and lower financing costs. This eliminates marketing costs and the whole sales process becomes much faster, simpler and, above all, cheaper. [22]

Another indisputable advantage is that the time needed to exit the project is very short and the risk associated with the sale of individual housing units to end users is eliminated. At a time when owner-occupied housing is becoming increasingly inaccessible, it is only a matter of time before it will be a problem to sell BTS apartments to end users.

BTR is characterized by its repeatability, unification, and prefabrication. These features make construction easier and faster, while reducing construction costs and future operating costs. [21]

The main risks include the unpreparedness of current legislation on institutional rental housing [6]. However, according to [9], both threat and opportunity can be seen in the legislation.

The Brussels regulations also carries certain risks. For example, a mandatory energy target and plan for every building in the EU [6]. State intervention or market regulation [9].

And, of course, slow permitting processes, which cause a big difference between supply and demand for apartments. Rising housing prices and rising prices of building materials are dramatically affecting the economy of the BTR segment.

Volatility of construction work and materials prices is especially dangerous for BTR projects. Since BTR projects are usually sold before the start of construction, they are sold at a price that is defined by expert estimates and calculations. However, they are not able to capture price changes in the future, so a project that is profitable today can become a loss-making project during its implementation, due to unpredictable increases in the prices of materials or construction work.

Another disadvantage may seem to be the need to invest in the equipment of the apartment. Apartments in the BTR segment are usually rented fully furnished.

2.1.6 Summary

In accordance with previous subchapters, it is possible to claim, that build to rent projects have and will have their place on the market. For developers it is still more lucrative to build project to sale to the end users. But the demand, for build to rent project from institutional landlords is present and is growing. Of course, there is a lot of influences, that may support or suppress further development of institutional rental housing.

2.2 Rental housing

The following chapter will explain what a build to rent project (BTR) is, and its basic characteristics or principles in its implementation. Differences between institutional and private rent sector (PRS).

2.2.1 Build to rent – BTR

The abbreviation BTR (build to rent) can be used to name a development project that is built with the intention of leasing it, during its operational phase.

Depending on the target group for which the project is intended, there are several types of BTR projects. According to [16] they are:

1. Co-living - unrelated people live in one house and share some common areas.
2. Retirement homes - rental housing for the elderly.
3. Student housing - substitution of dormitories, which may be inaccessible in larger cities.
4. Affordable / social housing - [16] assumes that in the future it will be implemented directly by municipalities using the services of developers.

BTR differs fundamentally from BTS (build to sale - the classic way of developing a project intended for housing and its subsequent sale to end customers) in many aspects, and in the end, it is a completely different product.

With BTR, it is necessary to determine at the outset that this is a rental housing project, for which market segment a particular project will be intended and what services will be provided within the project for future tenants. Based on these parameters, it is possible to create a study and continue the preparation. [24]

According to [23], it is important for the developer to work closely with the selected investor from the outset. It is advantageous for the future owner to be able to define the basic parameters of the project himself. The requirements of the investor, in most cases it is the fund, will vary depending on the location in which the project will be built, the selected segment for which the project is being prepared, etc. Apart of that, each owner is unique and has its own requirements for how he wants to manage the project in the future. In addition, according to [14], it is important that an apartment building has ideally only one caretaker during its entire lifetime. This should ensure that the quality of the project as well as the quantity and quality of the offered services remain at a high level.

The BTR project is not only about flats and living spaces, but also about the offered services and the overall property management. [13] Static residential real estate thus becomes a dynamic service. [12]

For these reasons, rental housing is much more demanding in the pre-investment phase and in communication between the investor, architect, future landlord, etc. [14]

Within the BTR project, individual flats should be as unified as possible. For the future manager, there is a big difference if he manages 100 bathrooms while each is different or if they are all the same [21]. Unification is important to reduce building, repair, and management costs during the operational phase.

To save construction costs and time required for construction, it is appropriate to design prefabricated and modulated properties in some segments of rental housing. [24] The use of prefabricated bathrooms or the design of standardized flats and the like can also contribute to the definition of the final project, which in the future will make it easier for potential exporters to decide whether they are interested in the project. [21]

In terms of revenue maximization, it is appropriate to minimize the area and maximize the use of space. As it is known, the smallest apartments are rented at the highest prices per square meter. [42]

2.2.1 Difference between institutional and private rental sector

As mentioned before (subchapter 2.1.3), most real estate rentals are held by individual investors. However, unlike professional institutional landlords, they do not have such a background [7].

A professional landlord offers his tenants, compared to a regular landlord, above all a greater guarantee of security, but also a greater number of services or simplification of processes [7]. It is a comprehensive package and not just a separate apartment [8]. The tenant thus obtains a guarantee of certain standards that are given, and everything must work according to them [9]. The management of the building itself is different when it is decided by one owner than when it is decided by a community of owners [8].

All institutional landlords are trying to sell their product, which creates a healthy competitive environment, and the quality of this product will be constantly increasing.

It is crucial for an institutional landlord to follow several principles that will ensure a high level of his product, reduce costs, and maximize his revenues. These include, for example using the services of an interior designer. According to [10], high-quality and design-equipped flats are rented quickly and repeatedly, with a possible increase in rent of up to 30%. In addition, thanks to his contacts and experience, the interior designer is able, to furnish the apartment with a reasonable price / performance ratio. Using the services of a real estate professional will ensure that the landlord will offer the right services. The tenants usually do not care about the technical parameters of the property, the first impression and how they feel in the apartment is more important to them. Other principles are, for example, building a relationship with the tenant, implementing facility management as much as possible, or providing virtual tours of their apartments in virtual reality. This and much more can make a positive contribution to the success of an institutional landlord.

2.3 Housing situation in Taiwan

In the following chapter will be described the situation in Taiwan. Reader will have the opportunity to compare Taiwanese real estate market with the Czech Republic one.

2.3.1 Real estate economy situation in Taipei

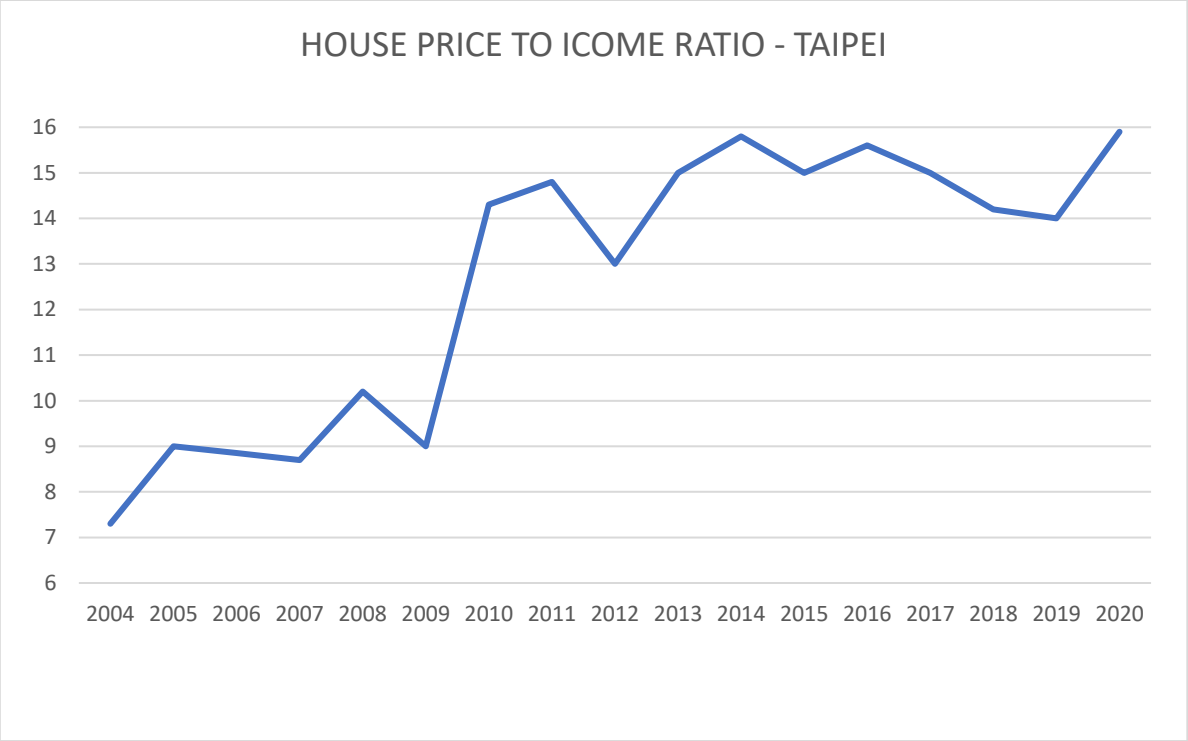
Taiwan, island with something over 36 thousand square kilometres [15] and 23,8 million inhabitants [31] is located east from China mainland in the Pacific Ocean. The capital city of Taipei is located in the north of the island and has a population of 2.59 million. [27]

In current times is Taipei challenged by similar problems as Prague. One of the main problems here is the big difference between supply and demand. Taipei is an attractive place to live, but the housing supply is low.

The pace of urban renewal is slow and there is not enough public housing. Taiwan is located in seismic area, so all buildings over 50 meters are subject to strict safety standards. That is why residential skyscrapers are very rare. [34] In Taipei, where population density reaches almost 10 000 per square kilometre [32] is the importance of skyscrapers way higher than in Prague where the density of population

reaches almost 4 600 per square kilometre. [33] The area of the Taipei is relatively small, only 270 square kilometres, 114 of which belong to the national park, leaving the city with only 156 square kilometres. [34]

According to [34], average flat in Taipei costs 14,5 times the median annual household income. In this relationship is buying an appartement in Taipei more expensive than in New York, Tokyo, London, or Singapore. The mortgage burden when buying real estate in Taipei averages 59% of the average household's income. Real estate prices are very high, and homeownership is unattainable for many Taiwanese. This as well follows from following picture.



Picture 15, House price to income ratio [own processing by source 35]

Since 2004 has the mortgage burden associated with the purchase of real estate risen twice.

Despite of this fact, Taiwanese have a culturally deep-rooted preference for owning their homes. In Taiwan is the homeownership rate almost 85%, making it one of the highest rates among the developed countries. For Taiwanese people it is essential to own a home. Taiwan has quite good capital markets, nevertheless, for

people who want to invest their money is residential real estate still the option number one. [34]

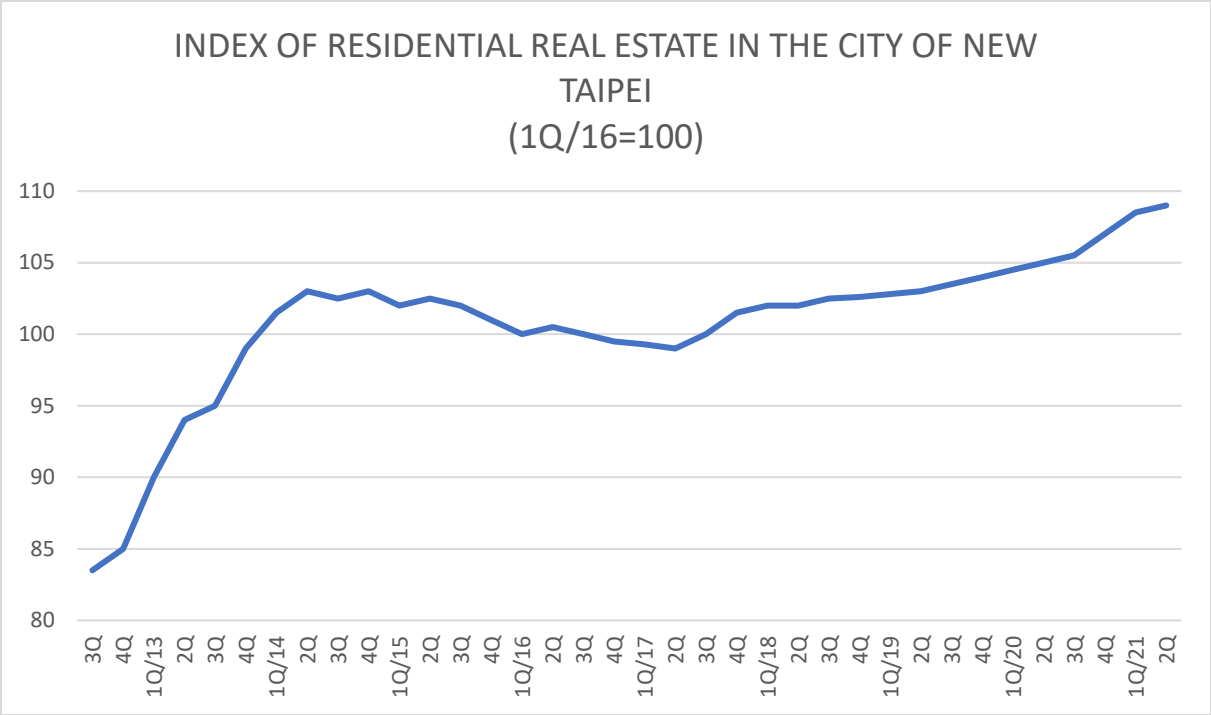
According to [34], in Taiwan the demand for homeownership will never decrease.

[35] claims, that landlords in Taipei earn literally next to nothing on their real estates. It is true, that they realize only 1-2% annual yields. That could be a signal that the market is overvalued. At the same time, the trend of owning a home is intensifying, for these reasons the Taiwanese rental market is very small - about 8% of the total number of about 7 million households.

2.3.2 Controlling the real estate market and solving the housing problem

Taiwanese government is trying to fight ascending housing prices through tax reforms to avoid uncontrollable price increases. [37]

There are tax reforms which are aimed on people and corporates who are trying to “hoard” real estates. Basically, anyone who owns more than one residential real estate is obligated to pay higher taxes. This tax reform was firstly introduced in 2014. Since then, property prices have been rising by average 1-2% per year. In long-term it should make vacant properties available and thus reduce housing prices. However, it was necessary to ensure that landlords cannot avoid the increased tax burden by increasing rents. This would clearly have had a negative impact on tenants. [37]



Picture 16, Index of residential Real estate in the city of New Taipei [own processing by source 38]

Taiwan's Central Bank (CBC) is trying to fulfil the same goal by limiting the loan-to-value ratio for individual buyers who want to buy third residential real estate to 50%, and to 55% for buyers purchasing a fourth one. This will have more of a short-term impact on buying multiple or luxury properties, which will become more expensive. [37]

Tax reforms are of course not going to solve all of the problems with housing, since they are only able to stop the rising of real estate prices but are not able to significantly reduce them. [34]

Note: The change in property prices depends on many factors, and the factors listed in this chapter are not the only ones that have affected property price developments in Taiwan.

2.3.3 Government's efforts to provide affordable housing

According to [34], even if it were possible for the government to dramatically reduce the price of real estate, it probably would not do so. This would affect the wealth of most Taiwanese families, which is tied to the real estate. In addition, of course, it would have many other economic consequences.

Taiwanese government has chosen another path, which is to build more residential real estates and supply the market with affordable housing. One of the plans is to build 85 000 public housing units by the year 2024. These should be available for fixed prices for all those who meet the criteria. [34]

Another example could be “Social Housing development plan”. This plan should be implemented for 8 years (approved in 2017) during which the government is supposed to build 120 000 housing units directly. And “Project of Incentive for Privately-Owned Subsidized Housing” which consist of 80 000 housing units. 200 000 social housing units together. This program is aiming to provide an assistance to landlords who rent their properties to disadvantaged families or students. As a result, they will become more accessible to these groups of people and they will be able to rent real estate in the existing market. This will reduce the financial burden on municipalities and districts caused by the construction of new social housing. This plan provides landlords with tax exemptions, household insurance, or other subsidies. Rent for ordinary families with a 20% discount and disadvantaged families with a 30-50% discount, which will be covered by the government. This plan should solve problems as high rent prices, high vacancy rates, high self-ownership rates and lack of social housing. [39]

Apart of building social housing and meditation of social housing, there are also “Housing Subsidies for Repair Loan Interest”. These subsidies are aiming on improving the living quality of families who needs to repair their houses. [40]

To help low-income and middle-income families, part of their loan interests can be subsided by the government when buying their new home in program “Housing Subsidies for Loan Interest for Self-purchase”. [41]

It is clear, that Taiwan is facing similar problems with unattainable homeownership as Czech Republic. Unlike the Czech Republic, Taiwan has chosen a different way of solving the problem. It should be interesting, to see the difference between these two countries home crisis in few years.

2.3.4 Taiwanese development

In Taiwan, especially in Taipei can be found a full range of residential real estates. From projects aimed on the lower price group, to high quality luxurious project designed for the wealthiest only. Individual projects are similar to the Prague ones, of course, there are some differences, which are mainly based on cultural, climatic and socio-economic differences. Here are some examples of how development projects in Taipei might look like.

Picture 17, Minglun [source 50]

Minglun Social Housing, project entrusted by government, completed in year 2021 is located in Taipei. Complex has 11 above ground floors and 2 below ground floors. The main objective of this project is to mediate affordable rental units for people who cannot afford to buy their home. Complex is certified smart, green and barrier – free. People must submit applications in order to win the possibility to rent a unit in this building. [50]

Picture 18, Nangang Depot Public Housing [source 52]

Taipei Nangang Depot Public Housing, project entrusted by government is located in Taipei. It has 26 above ground floors and consists of two buildings. The main supporting structure is made of steel reinforced concrete. Project is designed for lower price segment. [51]

Picture 19, Dong Men Fu-Yu [source 53]

Dong Men Fu-Yu, located in Taipei is residential project with 7 above ground stories and 3 below ground stories. The main supporting structure is made of reinforced concrete. [53]

Picture 20, 55Timeless [source 55]

55Timeless is located in Taipei. It was completed in 2018 and has 31 above ground and 4 below ground floors. The main supporting structure is made of steel. It could be described as a project designed for the middle / upper price segment. [54]

Picture 21, Agora Tower [source 47]

Agora Tower. Luxury residential tower located in Taipei. Construction of this building started in 2013 and was completed in 2017. It was designed to accommodate 42 luxury apartments and rooftop clubhouse on 20 above ground floors. Each floor contains two or four apartments of area of 540m² or 250m². In the centre of the building there are two staircases, four high-speed elevators and one car elevator. Each apartment has also two sky garages at the entrance. There are also 4 car parking floors below ground. These were built on pre-existing foundations of the Agora Garden hotel, which was standing here before. On the below ground floors are also gym facilities and swimming pool. There is circular light well, thanks to which there is sunlight and fresh air naturally ventilating all four below ground floors. [48]

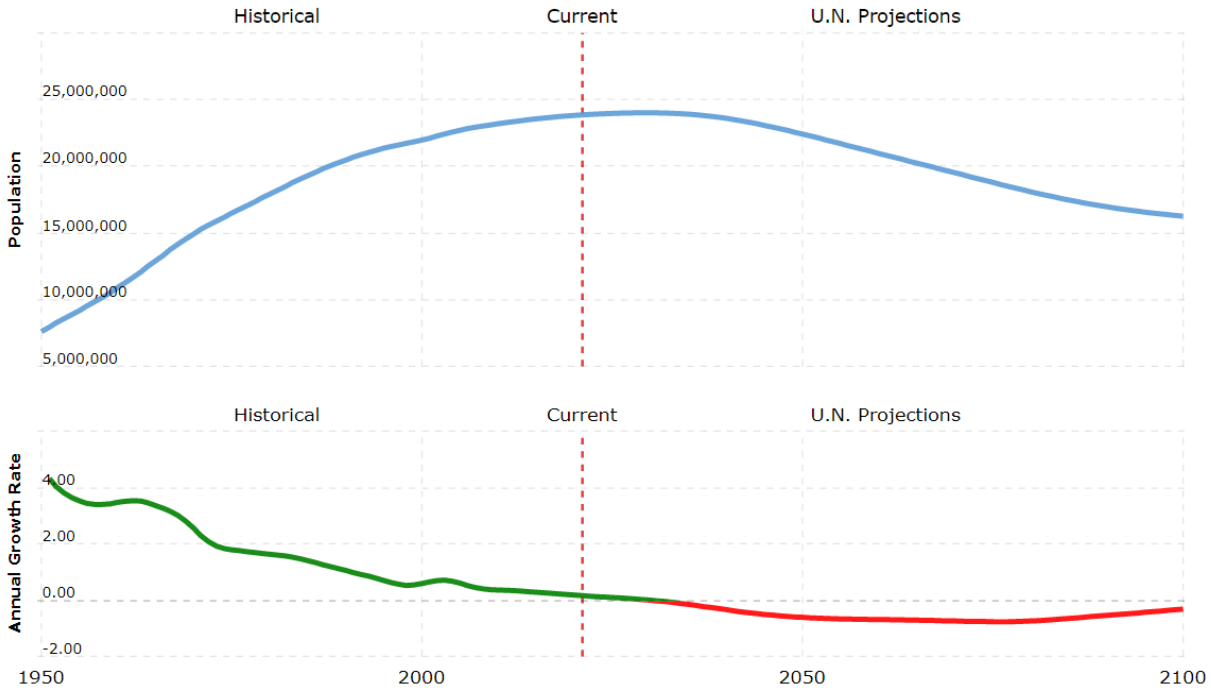
Tower was designed with many environmental precautions. It has LEED gold certification. Façades are multi-layered with blinds for solar protection in summer and thermal loss protection in winter. All around the tower at each floor can be found beautiful balconies full of green plants. Here can be found fruit trees and organic

vegetable gardens. Gardens generate organic fertilisers by inbuilt compost system and capture rainwater for irrigation. [48] It is said that there are 23 000 trees growing on the surface of this building, consuming 130 tons of carbon dioxide a year [49]. 100m above ground is located a 1000m² photovoltaic pergola, that contributes to the ecological friendliness of the whole building. Under the pergola are two clubhouses surrounded by roof gardens, which are capturing and purifying rainwater, which is then injected into the water distribution system by gravity. [48]

Of course, living in apartment in such building comes very expensive. It is said that the price for 1m² was around 50 000$. Therefore, it is considered, to be the most expensive housing in Taipei. [49]

Tower was designed to withstand 300 years of service, earthquakes, global warming, and climate change. [49]

As can be seen on the example of Agora Tower, and in accordance with [45] has the focus of urban development in the last years moved from continuous expansion of the cities to regeneration and renewal of the city centres. Old real estates are being reconstructed or rebuild. It happened so with the slowdown of population growth, which is also shown in the following picture.



Picture 22, Taiwan population growth [own processing by source 46]

2.4 Methods for evaluating the effectivity of investment

Every investment project should have clearly defined objectives and intentions from the outset for which it is to be implemented. To be able to determine the objectives of the project that would also fulfil its maximum economical potential every project owner has to analyse all possible objectives. The investment must be analysed from several perspectives. Thorough analysis can help the investor minimize risks, avoid large loses and avoid the cost of missed opportunities.

Project evaluation and selection lead to two basic decisions – financial decision and investment decision. The financial decision - decision on the structure, and number of financial resources that the implementation of the selected project will require. An investment decision - decision on subject of the investment, or what the investor will specifically invest in. Investment and financial decisions are closely linked. It is often necessary to reject an attractive project due to a lack of resources. Their common element is the fact, that the basis for both of them is the cash flow of the project [1 p. 68].

Both decisions must be made based on specific criteria for evaluating the investment, depending on whether the methods are subject to the effects of time. According to [2, p. 76] can methods be divided into static and dynamic. Static can only be used if the time factor does not have a significant effect on the evaluation and selection of the relevant variant. These methods should be used only in the case of projects with short payback period (1-2 years). On the other hand, dynamic methods are used in cases with a longer payback period, or in the case of a longer period of projects economic life. In this case, time is reflected in all investment calculations. According to [1 pp.68-9], in the case of investment in real estate intended for long-term lease, dynamic indicators are principally used. Examples of such indicators are internal rate of return (IRR), net present value (NPV) or profitability index (PI). For their calculation, according to [1 p. 92] it is necessary to compile the cash flow of the project during its entire life.

Cash flow represents the actual movement of money over period of time and represents a key role in the evaluation of investment projects. It is usually also the most difficult task, because the cash flows of the project contain a larger number of quantities

and a larger number of entities such as individuals and individual departments of the company participate in their quantification. Errors in the compilation of cash flow can lead to an erroneous decision to accept or reject the project [1 p. 92].

There are several basic rules for cash flow [1 p. 93-94].:

1. They are processed throughout the whole life of the project.
2. They consist of all incomes and expenses that occur during this time.
3. It is characteristic of the pre-investment and investment phase that there are only expenditures (of an investment nature).
4. The period of the operational phase is associated with revenues and expenditures, and expenditures have both an operational and an investment character.
5. Liquidation of a project can be associated with both income and/or expenditure.

Another aspect by evaluating an investment project may be when referring to [2, p. 77] the concept of effects from investment projects:

1. Cost criteria of effectiveness evaluation.
2. Profit criteria of efficiency evaluation.
3. Criteria for expected cash income.

With the cost criteria, the main goal is to save investment and operating costs. The investment costs are disposable and relate to the initial realization of the project, while the operating costs are most often added to the so-called annual average costs. With their help, only comparable investment cost efficiency can be calculated, but not absolute efficiency [2, p. 77-8].

According to [2, p. 78], the investment effect is defined as profit minus income tax. The method focused on profit evaluation criteria is a bit more complex and perfect than the previous method, because it includes, as its name suggests, the amount of profit achieved by the volume of performance of individual project variants. On the other hand, profit does not show the total flow of financial income (income in the form of depreciation). Therefore, even this method is not 100% correct.

Methods based on expected cash income criteria are the methods that are most emphasized. Cash flow shows profit after tax as well as depreciation, as well as other possible income. According to [2, p. 78], the methods used most commonly for evaluating the effectiveness of investments are the following:

1. Average annual cost.
2. Discounted costs.
3. Average profitability.
4. Payback period (PP), Discounted payback period (DPP).
5. Net present value (NPV).
6. Profitability index (PI).
7. Internal rate of return (IRR).

For the purposes of this work, the methods from points 4, 5 and 7 will be used, because thanks to them most relevant results will be achieved. These methods are also a good tool for comparing investment options of this type.

2.4.1 Payback period (PP)

This is the time needed to balance the financial cost of the investment project and the income from this project. The shorter the payback period, the more positive the project is evaluated [2, p. 135].

Formula 1, Calculation of payback period [source 2, p. 135].

$$0 = -I + \sum_{t=1}^{DPP} \frac{C_t}{(1+i)^t}$$

I = purchase price (capital expenditure).

PP = payback period.

t = years of lifetime.

Ct = annual profit from the operating phase after tax + annual depreciation of the investment in the relevant period of time.

The resulting payback period is determined as the year in which the cash flow reaches positive numbers. For projects with a classic financial flow, this situation occurs only once in their lifetime. The classic financial flow could be characterized as a flow that is composed of expenditures in the investment phase and of revenues and expenditures in the operational phase, with revenues exceeding expenditures. If an investment project with a classic financial flow returns with the investment associated with it, the project will never fall into negative numbers again. The condition of the calculation is the cumulative addition of income and expenditure from individual years [2, p. 135].

There are several cases where it is appropriate to use this method. In the case of an investment project such as the one that is the subject of this work are:

1. For projects with uncertain returns, especially in more distant periods of life.
2. With high costs of external capital, when the maturity of capital and the costs associated with it is very important.
3. For projects that have a similar lifetime and approximately the same pattern of expected cash flows.

The payback period is a measure of project liquidity and ranks among static methods, in contrast to the discounted payback period (DPP), which ranks among dynamic methods because it respects the time factor [2, p. 135].

2.4.2 Discounted payback period (DPP)

As stated at the end of the previous subchapter, the discounted payback period respects the time factor, making it one of the dynamic methods of project evaluation.

Formula 2, Calculation of discounted payback period [source 2, p. 135].

$$0 = -I + \sum_{t=1}^{DPP} \frac{C_t}{(1+i)^t}$$

I = purchase price (capital expenditure).

DPP = discounted payback period.

t = years of lifetime.

Ct = annual profit from the operating phase after tax + annual depreciation of the investment in the relevant period of time.

i =required yield in %.

The similarity with the classic payback period is easily visible. The difference is that the DPP is adjusted for the required yield [2, p. 135].

2.4.3 Net present value (NPV)

NPV represents the difference between the present value of all future revenues and the present value of project expenditures [1, p. 74].

Formula 3, Calculation of net present value [source 1, p. 74]

$$\mathrm{NPV} = -I + \sum_{t=1}^{n} \frac{C_t}{(1+i)^t}$$

NPV = net present value.

I = purchase price (capital expenditure).

t = years of lifetime.

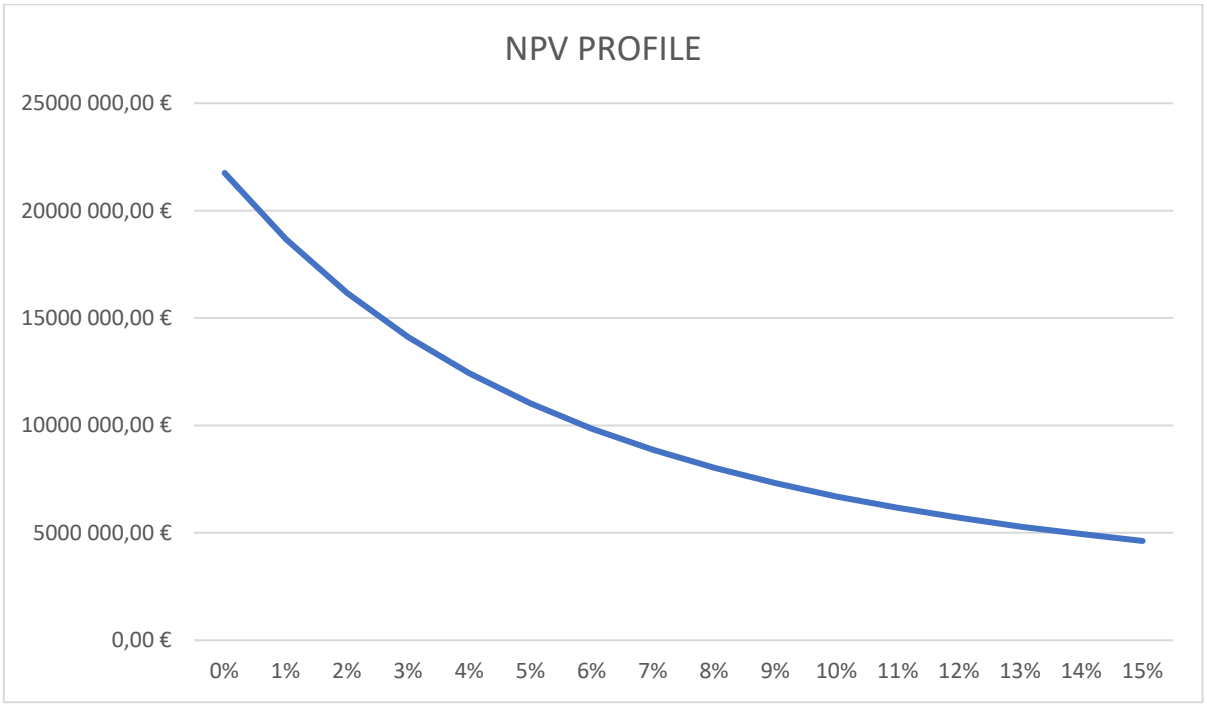
Ct = the amount of cash expenditures and revenues of the operating phase (cash flow).

i = required yield in %.

n = project lifetime.

[1, p. 74] argues that if the NPV is positive, it means that the expected profitability of the project exceeds its required profitability. If the NPV is negative, it does not exceed the required profitability. It follows that based on the value of the NPV, which is the basic criterion for deciding whether to accept or reject a project, the investor can decide whether the project will be implemented or not. If the NPV is negative, the investor should decide to reject the project, and if it is positive, he may decide to implement the project.

In financial theory, according to [2, p. 103] is NPV considered to be the most appropriate way of economic evaluation of the project. It respects the time factor affecting cash income (not just profit) and takes into account lifetime earnings. However, the choice of the required yield - the discount rate of the project (i) can be a problem. In the following picture it is possible to see the course of NPV depending on the selected required yield.



Picture 23, NPV profile [own creation]

It can be seen from the picture that the higher the required yield, the lower the resulting net present value.

2.4.4 Profitability index (PI)

According to [2, p. 103] the net value is related to the profitability index. Unlike NPV, it is expressed as a ratio and not as the difference between discounted cash inflows and outflows.

Formula 4, Calculation of profitability index [source 2, p.103]

$$PI = \frac{\sum_{t=1}^{n} \frac{C_t}{(1+i)^t}}{\mathrm{I}}$$

PI = profitability index.

I = purchase price (capital expenditure).

t = years of the operational phase.

Ct = the amount of cash expenditures and revenues of the operating phase (cash flow).

i = required yield in %.

n = project lifetime.

The result is the PI - profitability index. It becomes a decisive criterion in case it is necessary to choose the most suitable one from several projects with a positive NPV. Based on this index, the investor selects only those projects that bring the highest possible present value and are also capitalized. When calculating PI, we can get three groups of results. Greater than one, less than one and equal to one. They are interpreted as follows:

PI> 1 - the project is acceptable.

PI = 1 - the amount of discounted revenue is equal to the amount of discounted expenditure.

PI <1 - the project is not economically advantageous. If the PI is less than 1, it also means that the NPV is less than 0.

2.4.5 Internal rate of return (IRR)

According to [1, p. 80], the IRR is a discount rate at which the NPV is zero. Projects that show an IRR higher than the discount rate (required project return) IRR>i are evaluated positively.

Formula 5, Calculation of internal rate of return [source 1, p.80]

$$0 = -I + \sum_{t=1}^{DPP} \frac{C_t}{(1 + IRR)^t}$$

IRR = internal rate of return.

I = purchase price (capital expenditure).

t = years of the operational phase.

Ct = the amount of cash expenditures and revenues of the operating phase (cash flow).

DPP =discounted payback period.

The disadvantage of this method is that if it is not a project with a classic cash flow, that is, the cash flow changes the sign more than once, the IRR can acquire more values, or even none [1, p. 82]. (The classic cash flow was described in more detail at the end of Chapter 2.4.1.)

3 Practical part

In the practical part the reference project will be introduced, and all required information will be summarized. 3 scenarios of constructing an apartment building built for the purpose of renting will be processed. Scenarios will be compared with each other and final evaluation of the BTR project from the developers perspective will be made.

3.1 Introduction of the scenarios

This chapter describes 3 scenarios that will be evaluated in the thesis.

Scenario 1 – Sale of the building after completion

It is assumed, that whole building will be sold as a portfolio to investor and the transaction will be finalized after using permit is issued.

This scenario will be processed with investment capital consisting of both the developer's own resources and loan financing. Financing will be used up to the maximum possible amount of actual LTV. In the end the leveraged investment will be compared with the unleveraged one.

Scenario 2 – Sale after two years of operating

It is assumed, that whole building will be sold as a portfolio to investor and the transaction will be finalized after lease of all building at full occupancy and after two years of operation by developer.

This scenario will be processed with investment capital consisting of both the developer's own resources and loan financing. Financing will be used up to the maximum possible amount of actual LTV. In the end the leveraged investment will be compared with the unleveraged one.

Scenario 3 – Sale of the land with forward funding agreement

Sale of the land to investor, with forward funding agreement for construction.

Forward funding will be covering developers construction expenses so that he does not need to use his own resources.

Basic assumptions under which all calculations will be performed apply to all scenarios:

The calculations are not burdened by inflation, changes in rental income or changes in rental-related expenses over time, as determining these changes is too complex and the result could be too far from reality.

The total transaction price (exit value) will be based on NOI and applied net initial yield. (see chapter 3.2.7.)

All scenarios will be processed from developers point of view.

In terms of determining the relevant credit conditions, the developer was defined as a medium-sized company, the bank has no specific experience with it, its relationship with the bank is neutral. Based on the bank's analysis, it is a financially sound company. The credit conditions used in the work were determined based on consultation with source [57].

The tax conditions related to individual scenarios are not subject of this work and it is assumed that developer is selling a special purpose vehicle (SPV) which is owning the built apartment house and is therefore able to avoid taxation connected with the sale of the real estate. Possible tax consequences will be at the level of shareholders of the sold SPV. In scenario 2 is income tax set at 19%. Base for calculations is calculated as NOI minus depreciation. Depreciation is set for 30 years period and loan interest (if any) are added to investment value. These facts were determined based on consultation with source [57].

By the developer required project's rate of return is 15% [57]

Scenarios will be calculated with realistic numbers and it is possible that estimates stated in this thesis will differ from the values achieved in the future.

3.2 Reference project

All economy evaluations and assessment of suitability of renting an apartment house instead of selling it to end users will be performed on specific reference project which will be introduced in this chapter. It is a real-life project, which is being built right now, with estimated date of finishing in august 2023. As input will be used real information and costs of the project.

The project itself is strictly confidential, therefore only necessary information will be revealed. Information about the project was provided by an unnamed developer, that wishes to remain anonymous. Source number 57 will refer to this information.

Apartment house is expected to be finished in year 2023. As a new building it meets all the requirements of modern housing such as underground garage for tenants, cellars, various common areas and more (see technical parameters in chapter 3.2.3). Apartment house is developed as a BTR project since its inception. Around the project there is a modern housing development which fulfils the concept of large urban units and create a fully self-sufficient district with all civic amenities and facilities. [57]

3.2.1 Locality

Project is localized in a modern and dynamically developing part of Prague. The area is very well accessible, nearby is metro station, tram and bus stops. A new transport and engineering infrastructure is being created within the nearby development complex, which will bring the inhabitants closer to all public and civic amenities in the area. The area is located near an attractive trail that is widely used for recreation and sports. This trail is connecting reference project with few other development projects. Most apartments in the apartment building are oriented to the south, others to the east or west. Based on factors mentioned above, locality is considered as suitable for rental project. [57]

On the following picture can be seen the orientation of the apartment building, north is upwards. Project in question is painted blue.

Picture 24, situation drawing [source 57]

3.2.2 Visualization

On the two following pictures visualizations can be seen, for a better idea of the project. On the first, the project is shown from the northeast and on the second from the southwest.

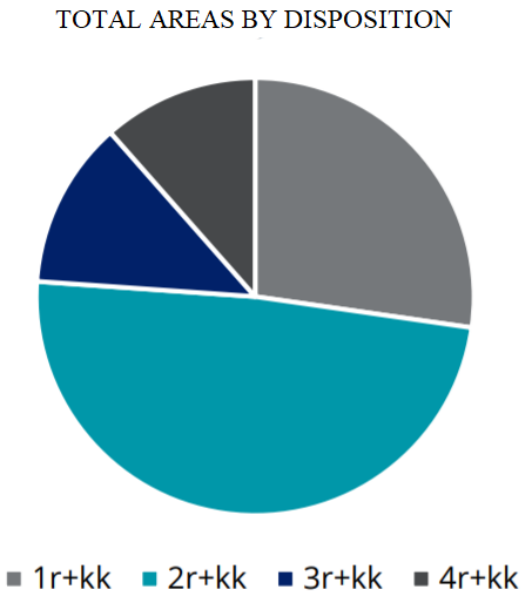
Picture 25, Visualization northeast [source 57]

Picture 26, Visualization southwest [source 57]

3.2.3 Technical parameters of an apartment building

Reference project has 7 above-ground and 1 underground floor. It consists of two sections, each with a separate entrance, staircase, and elevator. They are connected by an underground floor, in which are located garages, cellars and technical facilities of the house. On the ground floor there are 3 non-residential commercial premises in each section (a total of 6 units) and 4 flats (a total of 8 flats). From the 2nd to the 7th floor there are only flats, in total there are 98 flats in the house, including the 1st floor. There are 74 parking spaces in the common basement and the 1st floor. Furthermore, another 16 parking spaces in the field are proposed (visitors). [57] There are prefabricated bathrooms designed in this project.

Total area of all flats according to NV 366/2013 Coll. is around 4300 m2. Project disposition structure is attractive for rental housing due to high share of 1 and 2 rooms apartments with higher rental levels which consequently increase landlord profitability. Shares of individual apartments can be seen on the following picture.



Picture 27, Total areas by disposition [source 57]

Thermal technical properties of building structures and fillings of openings [57]

The thermal insulation properties of the designed "building envelope" structures meet the requirements of ČSN 73 0540-2.

According to Act No. 406/2000 Coll., On energy management, and Decree No. 78/2013 Coll., On the energy performance of buildings, the building will meet the requirement for a building with almost zero energy consumption.

Apartment house is currently in the construction phase - therefore some technical parameters may still change a little bit. The rest of technical elements of the building are characterized in the chart below.

CONSTRUCTION		
horizontal load-bearing structures		reinforced concrete, masonry, elements of prefabrication
Partitions	partition walls	reinforced concrete or masonry, alternatively plasterboard
	internal partitions	bricks, plasterboard or aerated concrete, partly also of reinforced concrete; installation forewords from plasterboards or aerated concrete
Others		to solve the constructions of the house are used principles of unification - some of the bathrooms are prefabricated
SURFACE TREATMENTS		
Interior plaster of apartments	interior walls	plaster or trowel
	ceilings	plaster or trowel
Painting	residential premises	white painting
Floors	living rooms including kitchenettes	floating laminate floor
	in the apartment: bathrooms, toilets, storage rooms, corridors	ceramic tiles
	balcony	waterproofing coating or trowel 1 /
	terrace	concrete frost-resistant paving 1 /
	entrance, common areas	in common areas tiles, paint / trowel
Ceramic tiles	bathroom	ceramic cladding up to the height of the upper edge of the door frames or soffit, if installed
	WC	ceramic tiling up to a height of at least approx. 1200 mm
Ceiling	WC / bathrooms / corridors...	plasterboard ceilings or boxes can be installed

EQUIPMENT OF HOUSING UNITS		
Windows / Balconies	windows and balcony doors	plastic, insulating glass
		above the windows of the facades east, south, west are prepared louvered boxes
		windows and balcony doors in apartments with a window sill level up to 2.5 m above the adjacent terrain equipped with safety glazing, fittings, handle
		the lining and lintel of window openings can be chamfered according to the selected technology
Door	Entrance apartment door	smooth solid, safety, in laminated finish, steel door frame, safety fittings, peephole, wooden threshold
	Interior door	door leaf full, partially glazed in the living room incl. cladding frames
Furnishing items	WC	Wall-hung ceramic toilet, seat hardened plastic, two-button
		ceramic washbasin, chrome freestanding tap, tap lever
	Bathroom	ceramic washbasin, free-standing tap, tap lever, chrome
		bath or shower tray, tap - chrome, shower set-chrome
Heating	heat source	exchanger station located in the technical room in the basement, central heating
	heaters	panel radiators with thermostatic heads, white color
		in the bathroom - ladder bodies, white color + heating cartridge
Cooling		without
Electro	sockets, switches	sockets into common frames
		home phone
		data and TV socket in 1 room
	drainage divide	residential switchboards located in the halls / chambers / corridors of apartments
Ventilation	kitchenette	only a closed cycle hood can be used
	apartment	drainage within the central recuperation system
Elements of fire protection	apartment	ceiling smoke detector located in the hallway of the apartment

Table 1, Technical parameters of the reference project 1 [own processing by source 57]

EXTERNAL ADJUSTMENTS AND OTHERS		
Landscaping and front gardens	landscaping, fencing	substrate / soil spreading, wire fencing, front gardens and terrain can be in the slope
	vegetation	establishment of a lawn by sowing; planting of shrubs and trees in the range according to PD
Garages		above the garage parking spaces there are distributions of the technical equipment of the building (installation) - the garage parking spaces are thus limited in height, but in accordance with binding regulations.
		garages can be equipped with a grating or drain in the floor
		the dimensions of the garage parking spaces are limited
		garages are not designed for LPG / CNG vehicles
		some garage parking spaces may be marked with a sign for people with reduced mobility and disabilities (disabled).
cellars		above the cellars in their space can be located wiring of technical equipment of the building (eg installation)
		the right of use is linked to the obligation to make cellars accessible for repair, modification, maintenance or elimination of accidents
		from solid walls (plasterboard or brick or reinforced concrete), from sheet metal system slats with gaps, eg wire partitions, with a gap under the ceiling, all types with full doors, with a padlock eye
terraces and common roofs		the right to use these premises accessible from a specific unit is linked to the obligation to make such a unit accessible for access to the roof or terrace of the building for inspection, maintenance, repair of the roof and installation superstructures and associated elements and in other cases of necessity.

TECHNICAL EQUIPMENT OF THE BUILDING	
heating	central hot water heating system; locally possible el. direct heaters
Central heat source and DHW preparation	exchanger station, heat meters with direct reading located in common areas
Heavy current installations	electricity switchboards are in common areas
Water supply	water meters with remote reading, in some apartments there may be more reading points
	location of installation niches of residential water closures and water meters mostly in the area of bathrooms or toilets, in some apartments location also in the kitchen corner or hallway, etc.!
Weak current installations	common antenna on the roof of the building
	door control in garages remotely, eg chip, pager (1 pc per 1 parking garage space) or by mobile phone via GSM module
	chips for entering the building (2 pcs per apartment unit size 1 + kk, 2 + kk; for larger apartments 3 pcs of chips)
Bell table and home phone	at each main entrance to each section, the front door is equipped with an electric intercom, in each apartment a panel of a home phone

Table 2, Technical parameters of the reference project 2 [own processing by source 57]

Some of the technical drawings and their parts are part of the appendices 1-6 in the end of the thesis.

3.2.4 Cost of the project – Total cost

Total direct cost of the reference project are as follows. The land on which the apartment building stands was purchased by the developer for CZK 72 303 000 (at the time of purchase, the building permit was already issued). A contract for the construction in the style of a design build in the amount of CZK 369 130 682 (excl. finishing and furnishing) has been concluded for the apartment building. Estimated cost of finishing and furnishing is CZK 24 500 000. Tax on the purchase of land and

furnishing in the amount of 21% of its price and tax on the construction of an apartment building in the amount of 15% of its price. Total value added tax is CZK 74 816 240. Altogether, the total investment value is CZK 540 749 920. All these costs are meant to be paid once. For a better overview, see the chart below. [57]

INVESTMENT BUDGET	Total
Land plot purchase	72 303 000 CZK
D&Bulid (excl. Finishing, furnishing)	369 130 680 CZK
Finishing, furnishing	24 500 000 CZK
Undeductible VAT 15%	57 574 610 CZK
plot + furnishing VAT 21%	17 241 630 CZK
Total VAT	74 816 240 CZK
TOTAL INVESTMENT VALUE	**540 749 920 CZK**

Table 3, Investment budget [own processing by source 57]

3.2.5 Expected operating expenses

Developer had another finance consulting company to estimate the operating expenses, which consist of several items. The biggest portion of these expenses are taken by utilities in sum of 2,2mil CZK. Second biggest item is furniture renewal in sum of 621 760 CZK. Altogether, it is estimated, that CZK 4 425 910 will be spent on operating expenses in every year of the operational phase. [57]

OPERATING EXPENSES	CZK/yr
Utilities	2 203 610 CZK
Property maintenance	544 500 CZK
Cleaning	295 200 CZK
Property and tenant management	396 000 CZK
Property tax/Land lease	106 000 CZK
Insurance	104 040 CZK
Furniture renewal	621 760 CZK
Running repairs	154 800 CZK
TOTAL	**4 425 910 CZK**

Table 4, Operating expenses [own processing by source 57]

3.2.6 Expected gross revenue

Also, the gross revenue had the developer estimated by another finance consulting company. The most important part of income is rental income, which should be almost CZK 24,7 mil. per year. The location, type of building, vicinity of services, public transport, floor area, floor level, balcony or terrace size, parking, storage, and many other factors, that affect the rental rate were taken into account. Then there are some other payments from tenants in amount of CZK 3 559 290 per year, payments for utilities or additional services can be included here. And of course, the long-term vacancy estimate, which is editing the gross rental income by unoccupied flats and spaces. Average vacancy has been estimated to be 5%. Altogether, it is estimated, that the annual revenue should do CZK 27 005 570 per year. For better overview please see chart below. [57]

GROSS REVENUE	CZK/yr
GROSS RENTAL INCOME	24 680 300 CZK
Flats (4299,85 sqm)	20 639 280 CZK
Parking -underground	1 281 960 CZK
Commercial (502,15 sqm)	1 868 000 CZK
Other (Warehouse) (235,73 sqm)	891 060 CZK
OTHER PAYMENTS FROM TENANTS	3 559 290 CZK
Fixed payments	1 355 690 CZK
Variable payments	2 203 610 CZK
LONG-TERM VACANCY ESTIMATE	1 234 020 CZK
Apartments	1 031 970 CZK
Parking	64 100 CZK
Commercial	93 400 CZK
Other	44 560 CZK
TOTAL	**27 005 570 CZK**

Table 5, Gross revenue [own processing by source 57]

Therefore, it is possible to determine the estimated annual net operating income (NOI) by subtracting operating expenses (chapter 3.2.5.) from gross revenue. In the scenarios will be calculated with annual NOI in amount of CZK 22 579 660. For better overview please see chart below.

NET OPERATING INCOME	CZK/yr
Gross revenue	27 005 570 CZK
Operating expenses	4 425 910 CZK
TOTAL	**22 579 660 CZK**

Table 6, Net operating income [own processing by source 57]

3.2.7 Partial calculations - valid for all scenarios

It is necessary to estimate the real market value of the project at the time of its sale, to assess, whether the required profit can be achieved by the developer. The most common method for similar estimates is the share of NOI in the year immediately following the transaction with the required return of the investor.

According to several sources [57-61], current yields on rental projects are around 4%. Rental projects in older real estate and in real estate located in less lucrative locations exceed 4%. On the other hand, yields from new residential buildings range between 3-4%. None of these sources is anticipating a larger increase any time soon.

As a new building, the reference property can be included in the group of lower-yields residential projects. In addition, it is located in an area that is expected to develop rapidly in the coming years.

For these reasons, exit value of the real estate will be estimated by the share of the estimated NOI and 3,5% yield. It should be noted that such a low yield for many investors does not achieve the desired economic effect. However, the assumption of an increase in rents in the next 2-3 years and an increase in the price of the property during its holding by investors remains a major influence. This does not affect the change in yield, but it certainly affects the efficiency of the entire investment from the investor's point of view. Yield 3,5% can therefore be considered as the yield required by the investor and it can be assumed that the exit value of the real estate estimated by this method and this yield will be realistic and there will be no problem in finding a suitable investor. The following table shows the calculation of estimated exit value. The result of this calculation will be used in all three scenarios. Estimated exit value is CZK 645 133 150.

EXIT VALUE OF THE REAL ESTATE	CZK
NOI (czk/yr)	22 579 660 CZK
required yield	3,50%
TOTAL	**645 133 150 CZK**

Table 7, Exit value of the real estate [own processing]

As stated in chapter 3.2.4., developer has closed design build deal with the constructor and is paying him pre-determined amounts based on completed construction milestones. Provided that the construction production proceeds according to plan and without increasing prices or extending time, developer should be paying the constructor 40% of construction costs in 2021, 35% of construction costs in 2022 and 25% of construction costs in 2023. It is expected that the works on the apartment building should be done in august 2023. Following table shows time allocation of investment costs.

ALOCATION OF CONSTRUCTION COSTS OVER TIME		
2020	plot	87 486 630 CZK
2021	40% construction	181 305 320 CZK
2022	35% construction	158 642 150 CZK
2023	25% construction	113 315 830 CZK
Total	**plot+100% construction**	**540 749 930 CZK**

Table 8, allocation of construction costs over time [own processing]

3.3 Scenario evaluation

In this chapter, all three scenarios of handling the BTR project will be evaluated separately. For the purposes of evaluation, the information from chapter 2.4 of this diploma thesis, dealing with the methods of evaluation of investment plans, will be used. The scenarios will be evaluated from the perspective of the developer's working capital used to finance the project. Cash-flow will be compiled for each scenario first. After calculating cash-flows, the scenarios will be evaluated according to efficiency indicators. Each scenario will be assessed in terms of net present value, internal rate of return and payback period. In addition, the scenarios will be evaluated in terms of the risks involved. At the end of the chapter, the individual scenarios will be compared with each other and conclusion will be made.

3.3.1 Scenario 1 – sale after construction completion

In this scenario, developer will be selling the built project to one institutional investor. This sale is arranged since before the beginning of the construction via forward purchase agreement. Transaction will be finalized after using permit is issued.

Developer has used bank financing as a source of external finance. Based on source number [57]. Following credit parameters were used. Maximal possible loan to value ratio (LTV) is set at 75%. Arrangement fee in amount of 0,8% of the used LTV ratio is paid once, at the first drawdown of the loan. Commitment fee in amount of 0,45% of the undrawn value of the loan is paid annually. Total interest in amount of 2,1%+3,14%=5,24% is paid annually from the drawn part of the loan. Following table shows used credit parameters.

CREDIT PARAMETERS	
Maximal LTV	75%
Arrangement fee	0,80%
Commitment fee	0,45%
Interest	2,10%
PRIBOR	3,14%

Table 9, Credit parameters, scenario 1 [own processing]

Financing was used up to the maximum possible amount of LTV.

When compiling cash flow describing the leveraged investment, chapters 2.4 to 3.2.7. of this thesis were used as a basis.

Evaluation of leveraged investment efficiency, sale directly after construction		Investment phase			
		2020	2021	2022	2023
	Total	0	1	2	3
Total investment	**540 749 930,00 CZK**	87 486 630,00 CZK	181 305 320,00 CZK	158 642 150,00 CZK	113 315 830,00 CZK
Capital emloyment	135 187 482,50 CZK	87 486 630,00 CZK	47 700 852,50 CZK		
Debt employment	405 562 447,50 CZK		133 604 467,50 CZK	158 642 150,00 CZK	113 315 830,00 CZK
Loan repayment	**454 106 748,33 CZK**		11 469 184,59 CZK	15 823 643,99 CZK	426 813 919,75 CZK
Arrangement fee	3 244 499,58 CZK		3 244 499,58 CZK		
Commitment fee	1 733 732,15 CZK		1 223 810,91 CZK	509 921,24 CZK	
Interest	43 566 069,10 CZK		7 000 874,10 CZK	15 313 722,76 CZK	21 251 472,25 CZK
Loan ammount	405 562 447,50 CZK				405 562 447,50 CZK
Exit value (2023)	**645 133 150,00 CZK**				645 133 150,00 CZK
CF (2023)		-87 486 630,00 CZK	-59 170 037,09 CZK	-15 823 643,99 CZK	218 319 230,25 CZK
CCF (2023)	55 838 919,17 CZK	-87 486 630,00 CZK	-146 656 667,09 CZK	-162 480 311,08 CZK	55 838 919,17 CZK
DCF (2023)		-87 486 630,00 CZK	-51 452 206,16 CZK	-11 964 948,20 CZK	143 548 437,74 CZK
CDCF (2023)	-7 355 346,62 CZK	-87 486 630,00 CZK	-138 938 836,16 CZK	-150 903 784,36 CZK	-7 355 346,62 CZK

Table 10, Scenario 1- sale after completion [own processing]

As can be seen on the table above, the construction is planned to be finished in 2023 (august). Total investment value (including VAT) is CZK 540 749 930. Developer has used external financing in amount of CZK 405 562 447, which is 75% of the total investment value. Building costs are allocated over time accordingly to chapter 3.2.7. After construction completion the project will be sold for exit value of CZK 645 133 150, as stated in chapter 3.2.7. The cumulated cash flow of the project is negative throughout the construction period, meaning that the developer must be able to cover the negative cash flow from his working capital. The minimum is reached in the year 2022, when the developer must be able to prefinance CZK 162 480 311, which is 30% of the total investment value.

Furthermore, the net present value was calculated using formula number 3. The inputs were the CF row values from the previous table and the required yield of 15%. The result of this calculation is the sum of CZK - 7 355 347. This means that the current value of revenue is lower than the current value of expenditure and the project is therefore unacceptable from this point of view.

Next, the internal rate of return, which in this scenario is 12,72%, was calculated using the IRR function in Excel (Office 365). Another evaluation element to be taken into account in the final comparison is payback period. From the cash-flow table can be seen that the assumed final exit from the project is in year 2023 therefore the payback period is 3 years.

It follows from the above that the investment as such will not reach the required appreciation of 15% and is therefore unacceptable from the point of view of the overall resources invested by the developer. If unleveraged investment efficiency would be estimated, efficiency indicators would reach even lower values and the project would not be acceptable as well. The following table shows the result values for both leveraged and unleveraged investment.

SCENARIO 1 RESULTS		
Eff. Indicators	Leveraged	Uleveraged
NPV	-7 355 346,62 CZK	-15 421 166,50 CZK
IRR	12,72%	12,42%
PP	3	3

Table 11, Scenario 1 results [own processing]

Only leveraged investment which is reaching higher effectiveness indicators values will be compared with other scenarios.

3.3.2 Scenario 2 - renting for 2 years and then selling

In this scenario it is assumed, that whole building will be sold as a portfolio to investor and the transaction will be finalized after fitting out realization, lease of all building at full occupancy and after two years of operation by developer.

Calculations will be processed with investment capital consisting of both the developer's own resources and bank financing. Based on source number [57] following credit parameters were used. Maximal possible LTV is set at 75%. Arrangement fee in amount of 0,8% of the used LTV ratio is paid once, at the first drawdown of the loan. Commitment fee in amount of 0,45% of the undrawn value of the loan is paid annually. Total interest in amount of 2,1%+3,14%=5,24% is paid annually from the drawn part of the loan in the investment phase and total interest in amount of 1,6%+3,14%=4,74% is paid annually from the drawn part of the loan in the investment phase. Following table shows used credit parameters.

CREDIT PARAMETERS	
Maximal LTV	75%
Arrangement fee	0,80%
Commitment fee	0,45%
Interest investment phase	2,10%
Interest operational phase	1,60%
PRIBOR	3,14%

Table 12, Table 9, Credit parameters, scenario 2 [own processing]

Financing was used up to the maximum possible amount of LTV.

When compiling cash flow describing the leveraged investment, chapters 2.4 to 3.2.7. of this thesis were used as a basis.

Evaluation of leveraged investment efficiency, sale two years after construction		Investment phase			
		2020	2021	2022	2023
	Total	0	1	2	3
Total investment	**540 749 930,00 CZK**	87 486 630,00 CZK	181 305 320,00 CZK	158 642 150,00 CZK	113 315 830,00 CZK
Capital emloyment	135 187 482,50 CZK	87 486 630,00 CZK	47 700 852,50 CZK		
Debt employment	405 562 447,50 CZK		133 604 467,50 CZK	158 642 150,00 CZK	113 315 830,00 CZK
Gross revenue	**60 762 532,50 CZK**				6 751 392,50 CZK
Gross rental income	74 040 900,00 CZK				24 680 300,00 CZK
Other payments from tenants	10 677 870,00 CZK				3 559 290,00 CZK
Long term vacancy estimate	3 702 060,00 CZK				1 234 020,00 CZK
Total expenditure	**9 958 297,50 CZK**				1 106 477,50 CZK
Operating expenses	13 277 730,00 CZK				4 425 910,00 CZK
NOI	**50 804 235,00 CZK**				5 644 915,00 CZK
Income tax	**485 160,16 CZK**				0,00 CZK
Loan repayment	**491 369 068,35 CZK**		11 469 184,59 CZK	15 823 643,99 CZK	26 251 472,25 CZK
Arrangement fee	3 244 499,58 CZK		3 244 499,58 CZK		
Commitment fee	1 733 732,15 CZK		1 223 810,91 CZK	509 921,24 CZK	
Interest	80 828 389,13 CZK		7 000 874,10 CZK	15 313 722,76 CZK	21 251 472,25 CZK
Repayed loan	405 562 447,50 CZK				5 000 000,00 CZK
Exit value (2028)	**658 035 810,00 CZK**				
CF (2028)		-87 486 630,00 CZK	-59 170 037,09 CZK	-15 823 643,99 CZK	-20 606 557,25 CZK
CCF (2028)	81 798 333,99 CZK	-87 486 630,00 CZK	-146 656 667,09 CZK	-162 480 311,08 CZK	-183 086 868,33 CZK
DCF (2028)		-87 486 630,00 CZK	-51 452 206,16 CZK	-11 964 948,20 CZK	-13 549 145,89 CZK
CDCF (2028)	-33 626 955,16 CZK	-87 486 630,00 CZK	-138 938 836,16 CZK	-150 903 784,36 CZK	-164 452 930,25 CZK

Table 13, Scenario 2 - sale after two years of operation (1) [own processing]

Evaluation of leveraged investment efficiency, sale two years after construction		operational phase	
		2024	2025
	Total	4	5
Total investment	**540 749 930,00 CZK**		
Capital emloyment	135 187 482,50 CZK		
Debt employment	405 562 447,50 CZK		
Gross revenue	**60 762 532,50 CZK**	27 005 570,00 CZK	27 005 570,00 CZK
Gross rental income	74 040 900,00 CZK	24 680 300,00 CZK	24 680 300,00 CZK
Other payments from tenants	10 677 870,00 CZK	3 559 290,00 CZK	3 559 290,00 CZK
Long term vacancy estimate	3 702 060,00 CZK	1 234 020,00 CZK	1 234 020,00 CZK
Total expenditure	**9 958 297,50 CZK**	4 425 910,00 CZK	4 425 910,00 CZK
Operating expenses	13 277 730,00 CZK	4 425 910,00 CZK	4 425 910,00 CZK
NOI	**50 804 235,00 CZK**	22 579 660,00 CZK	22 579 660,00 CZK
Income tax	**485 160,16 CZK**	242 580,08 CZK	242 580,08 CZK
Loan repayment	**491 369 068,35 CZK**	33 986 660,01 CZK	403 838 107,51 CZK
Arrangement fee	3 244 499,58 CZK		
Commitment fee	1 733 732,15 CZK		
Interest	80 828 389,13 CZK	18 986 660,01 CZK	18 275 660,01 CZK
Repayed loan	405 562 447,50 CZK	15 000 000,00 CZK	385 562 447,50 CZK
Exit value (2028)	**658 035 810,00 CZK**		658 035 810,00 CZK
CF (2028)		-11 649 580,09 CZK	276 534 782,41 CZK
CCF (2028)	81 798 333,99 CZK	-194 736 448,42 CZK	81 798 333,99 CZK
DCF (2028)		-6 660 685,23 CZK	137 486 660,31 CZK
CDCF (2028)	-33 626 955,16 CZK	-171 113 615,47 CZK	-33 626 955,16 CZK

Table 14, Scenario 2 - sale after two years of operation (2) [own processing]

As can be seen on the tables above, the construction is planned to be finished in 2023 (august). Total investment value (including VAT) is CZK 540 749 930. Developer has used external financing in amount of CZK 405 562 447, which is 75% of the total investment value. Building costs are allocated over time accordingly to chapter 3.2.7. After construction completion the project will be operated by developer

for two years. In this time NOI will be generated from leasing the building. After two years period of operation, the building will be sold for exit value of CZK 658 035 810 which is 102% of the value stated in chapter 3.2.7. This 2% surcharge is charged because the building is sold filled with tenants. The cumulated cash flow of the project is negative throughout the whole investment and operational phase, meaning that the developer must be able to cover the negative cash flow from his working capital. The minimum is reached in the year 2024, when the developer must be able to prefinance CZK -194 736 448, which is 36% of the total investment value.

Furthermore, the net present value was calculated using formula number 3. The inputs were the CF row values from the previous table and the required yield of 15%. The result of this calculation is the sum of CZK - 33 626 955. This means that the current value of revenue is lower than the current value of expenditure and the project is therefore unacceptable from this point of view.

Next, the internal rate of return, which in this scenario is 9,07%, was calculated using the IRR function in Excel (Office 365). Another evaluation element to be taken into account in the final comparison is payback period. From the cash-flow table can be seen that the assumed final exit from the project is in year 2025 therefore the payback period is 5 years.

It follows from the above that the investment as such will not reach the required appreciation of 15% and is therefore unacceptable from the point of view of the overall resources invested by the developer. If unleveraged investment efficiency would be estimated, efficiency indicators would reach even lower values and the project would not be acceptable as well. The following table shows the result values for both leveraged and unleveraged investment

SCENARIO 2 RESULTS		
Eff. Indicators	Leveraged	Uleveraged
NPV	-33 626 955,16 CZK	-85 450 697,36 CZK
IRR	9,07%	8,12%
PP	5	5

Table 15, Scenario 2 results [own processing]

Only leveraged investment which is reaching higher effectiveness indicators values will be compared with other scenarios.

3.3.3 Scenario 3 – Sale of the land with forward funded construction

In this scenario it is assumed, that investor acquires land from a developer. The developer will construct development paid for by the investor with an additional, profit-related, payment to the developer at completion assuming all has gone well.

Developer does not need source of external financing since forward funding provided by investor will be covering the construction expenses.

When compiling cash flow describing the forward funding scenario, chapters2.4 to 3.2.7. of this thesis were used as a basis.

Evaluation of forward funding by fond, from developers point of view		Investment phase				
		2020	2021	2022	2023	2024
	Total	0	1	2	3	4
Total investment	**540 749 930,00 CZK**	87 486 630,00 CZK	181 305 320,00 CZK	158 642 150,00 CZK	113 315 830,00 CZK	
Forward funding	**645 133 150,00 CZK**		285 679 858,84 CZK	158 642 150,00 CZK	113 315 830,00 CZK	87 495 304,02 CZK
CF (2024)	87 495 304,02 CZK	-87 486 630,00 CZK	104 374 538,84 CZK	0,00 CZK	0,00 CZK	87 495 304,02 CZK
CCF (2024)	104 383 212,86 CZK	-87 486 630,00 CZK	16 887 908,84 CZK	16 887 908,84 CZK	16 887 908,84 CZK	104 383 212,86 CZK
DCF (2024)	50 025 724,05 CZK	-87 486 630,00 CZK	90 760 468,55 CZK	0,00 CZK	0,00 CZK	50 025 724,05 CZK
CDCF (2024)	53 299 562,60 CZK	-87 486 630,00 CZK	3 273 838,55 CZK	3 273 838,55 CZK	3 273 838,55 CZK	53 299 562,60 CZK

Table 16, Scenario 3 – sale of the land with forward funded construction [own processing]

As can be seen on the table above, the construction is planned to be finished in 2023 (august). Total investment value (including VAT) is CZK 540 749 930. Building costs are allocated over time accordingly to chapter 3.2.7. Developer must use his own resources to acquire the land, which is in year 2021 sold to the fund, after the selection of the general constructor. The construction is forward funded by the investor and therefore, the cash-flow in years 2022 and 2023 is zero. After construction completion in year 2023 the fund can start operating the building. After set period the fund will pay the developer the last profit-related payment. Altogether the fund will pay the developer same amount of money as in 2 previous scenarios. The cumulated cash flow of the project is negative only until the sale of land, meaning that the developer must not be able to cover the construction costs from his working capital. The minimum is reached in the year 2020, when the developer must be able to prefinance CZK 87 486 630, which is 16,2% of the total investment value.

Furthermore, the net present value was calculated using formula number 3. The inputs were the CF row values from the previous table and the required yield of 15%. The result of this calculation is the sum of CZK 53 299 563. This means that the current value of revenue is higher than the current value of expenditure and the project is therefore acceptable from this point of view.

Next, the internal rate of return, which in this scenario is 49,33%, was calculated using the IRR function in Excel (Office 365). Another evaluation element to be taken into account in the final comparison is payback period. From the cash-flow table can be seen that the assumed final exit from the project is in year 2024 when the last profit-related payment from the fund is made, but the payback period is equal to time during which is the cash-flow in negative values and in this case the payback period is one year.

It follows from the above that the investment will reach the required appreciation of 15% and is therefore acceptable from the point of view of the overall resources invested by the developer. The following table shows the result values for this scenario.

SCENARIO 3 RESULTS	
Eff. Indicators	forward funding
NPV	53 299 562,60 CZK
IRR	49,33%
PP	1

Table 17, Scenario 3 results [own processing]

It should be noted that the IRR of 49,33% is unusually high. In the scenario it is calculated with an ideal situation, where the investor is covering all the construction costs and developer does not need to use his own capital. Whereas in reality there may be a situation where for example: the financing agreement will consist of several payments for completed construction stages. However, the developer will be obliged to pay the construction costs to the general contractor monthly, thus creating the need to prefinance one construction phase at a time by the developer. This would have big impact on the reached economic indicators values.

A variation of scenario 3 was calculated as well. In this variation was scenario 3 assessed from investors point of view. Investor is financing the construction through

forward funding and after the construction is finished, he starts renting the apartment house. Operational phase lasts for 5 years, after which investor sells the project with exit value estimated by the same method as in previous scenarios. Assumptions used to calculate this scenario 3 variation were the same as by scenarios 1 to 3, with one difference in NOI calculation. Investors NOI was calculated with average 3% annual incline in investors gross revenues and average 2% annual incline in investors operating expenses. This also changed the exit value for which is the real estate sold after the operational phase ends. Investor has used external financing with maximal possible LTV ratio and credit parameters same as in scenario 2. (Cash-flow of this scenario variation is part of the appendix number 10.) This variation has reached IRR of 8,95% after the sale of the apartment house. This IRR might mean, that exit value used to calculate scenarios 1, 2 and 3 really is acceptable and that scenario 3 would be economically acceptable by investors in case they would be satisfied with IRR achieving almost 9%.

3.3.4 Risks, pros, and cons

It is important to consider also non-financial assumptions when comparing different scenarios. Scenarios must also be assessed in terms of the various risks, difficulties or complications that may arise in connection with their implementation.

Each of the evaluated scenarios contains specific risks that set it apart from the other scenarios. The developer must take these risks into account to be able to choose the best investment option for him. Next follows a list of some of them and a description of their impacts and ways to mitigate or eliminate these impacts.

Increase in construction costs.

In the case of scenario 1, where the selling price is determined in advance, the developer overtakes this risk and the increase in construction costs is therefore equal to a reduction in its profit. It is necessary to be aware of this risk and try to avoid it, or to transfer it to the supplier. Scenario 3 is subject to the same risk as the payment schedule for forward funding is drawn up before construction starts. In this scenario it can be mitigated by properly set up contract with the investor. On the contrary, in scenario 2, where the exit value of the project is determined after the end of

construction, it is possible to reflect this increase in costs in the selling price and thus try to pass it on to the future investor.

Extension of construction time.

In all scenarios, this is likely to have the effect of extending the project's exit period and increasing the cost of borrowed capital due to the need to refinance the loan. However, in Scenario 1, it is very likely that the investor would require the developer to reimburse him for the lost profit or costs incurred due to the delay in starting operations. Because the investor undoubtedly plans to start renting an apartment house as soon as possible. In scenario number 3, the investor could refuse to pay a profit-related payment. For developer it is important to transfer this risk to the supplier or at least define in the contract with the investor how such a situation will be approached and thus ensure more suitable conditions for himself.

Incorrectly estimated exit value.

This risk does not play a role in scenario 2, as the exit value is determined approximately at the time of the sale. However, it is very important for scenarios 1 and 3. During the construction period of 2 and a half years for this reference project, market conditions may change dramatically, and the predetermined exit value of the project may be too low, for example due to an increase in expected construction costs or in the case of estimating exit value by the share of NOI and required yield by increasing rents and thus increasing NOI. This risk cannot be avoided and must be taken in. For developer it is obviously important to ensure the exit value to be as high as possible. It is possible that market conditions would change in such a way that if the price of the property were determined at the time the property was sold, it could be sold for more.

Project exit and market development.

Scenarios 1 and 3 are expected to exit the project in 2023, but in scenario 2 it is expected to exit the project in 2025. This entails certain risks associated with the probability of greater market variability related to the longer duration of the project. Ultimately, this can have both positive and negative effects. It is important for the developer to take into account the possibility that the market will develop in an unfavourable direction for him. Also, the longer it takes to exit the project, the longer

developer must wait to see profit. For developer it is possible to mitigate this risk by choosing shorter lasting projects, with estimated exit year in near future rather than far future.

At the same time, the exit from the project can in all scenarios be affected by the change in the time needed for construction, as mentioned before. However, in scenario 2 the exit from the project can be delayed also because of the inability to occupy the apartment building by tenants during the selected period of time, and the long-lasting process of investor selection and the sale itself. Therefore, developer must be ready to undergo this delayed exit and try to avoid it at the same time.

Investor failure

This risk does not apply to scenario 2 since the future owner is selected only after the work is completed. In the case of scenario 1, there is a possibility that the future owner who signed the forward purchase agreement will become insolvent, for example. This situation would extend the exit time from the project for the developer by the time of looking for a new investor. However, this would have the worst impact in scenario 3, where the developer would lose the financing of the construction and would have to finance the construction from his own resources or to quickly seek for another source of financing. The impact of this risk can be mitigated by obtaining a bank guarantee to finance the work in the event of a default on the part of the fund.

The above-mentioned risks are simplified in the following table for better overview.

Risk allocation	scenario 1	scenario 2	scenario 3
Increase in construction costs	x		x
Extension of construction time	x		x
Incorrectly estimated exit value	x		x
Project exit and market development		x	
Investor failure	x		x

Table 18, Risk allocation [own processing]

Of course, each scenario contains a large number of additional risks. The developer should devote sufficient time and resources to identifying and assessing these risks before deciding on a particular scenario.

Each of the compared scenarios can be associated with certain advantages and disadvantages, which the developer should also be aware of. The developer must take these facts into account to be able to choose the best investment option for him.

Scenario 1

The disadvantage of this scenario is the higher level of risk associated with increasing construction costs, project delays, determining exit value and others. One of the disadvantages is also the need to prefinance almost CZK 162,5 mil in 2022.

On the other hand, the undeniable advantage is the short duration of the project.

Scenario 2

This scenario can be associated with disadvantage, that the developer must have the capacity to occupy the property with tenants, take care of them, maintain a positive relationship with them, solve all the complications and situations that arise in connection with renting the property. Another disadvantage, when comparing to other scenarios is, that the exit year is 2025. That means that developer must wait 2 years longer to see profit from the project. One of the disadvantages is also the need to prefinance CZK 194,7 mil in 2024. Main advantage of this scenario is, that risks associated with other two scenarios have rather low impact and that the exit value must not be estimated in advance. This may cause, that with favourable market development could this project reach much higher efficiency coefficient results, as it has reached in chapter 3.3.2.

Scenario 3

The biggest advantage of the forward funding structure form is, that it offers significant cash flow from the early land sale and certainty of construction financing. The risks are allocated between developer and investor more balanced than in the scenario 1.

The cooperation between fond and developer is usually very close. This can be seen as an advantage, because if the relationship is good, there is a chance that the fond would want to cooperate in the future as well. But it can be seen as disadvantage too, because the fund 's entries into the construction process may have an impact on

extending the construction period and raising construction costs or other complications. Another disadvantage in comparison with scenario 1 and 2 is, that if anything goes wrong with the construction, it is very easy for the fond to hold back the last profit related payment.

The above-mentioned pros and cons are simplified in the following table for better overview.

Pros and cons	scenario 1	scenario 2	scenario 3
Duration of the project	+	-	+
Operational phase realted obligation	+	-	+
External financing	-	-	+
IRR	-	-	+
Cash - flow	-	-	+
Potential for improvement*	-	+	-
Risk	-	+	-

Table 19, Pros and cons [own processing]

* The ratio of the positive change in market conditions to the increase in yield from the given scenario (increase in NOI, increase in exit value, etc.) In case the market would develop in unfavourable way, this would have opposite effect.

3.3.5 Final comparison and evaluation

Thanks to the evaluation methods described in Chapter 2.4., the 3 investment scenarios can be compared relatively easily. The following table shows the values created under chapter 3.3.1. for scenario 1 - sale of the project after the using permit is issued, chapter 3.3.2. for scenario 2 – sale of the apartment house after filling it with tenants and 2 years of operation by developer and chapter 3.3.3. for scenario 3 - sale of the land to investor, with forward funding agreement for construction.

Following table shows the results of all three scenarios.

SCENARIO RESULTS			
Scenario	1	2	3
NPV	-7 355 346,62 CZK	-33 626 955,16 CZK	53 299 562,60 CZK
IRR	12,72%	9,07%	49,33%
PP	3	5	1
CCF min.	-162 480 311,08 CZK	-194 736 448,42 CZK	-87 486 630,00 CZK
CCF max.	55 838 919,17 CZK	81 798 333,99 CZK	104 383 212,86 CZK
Exit year	2023	2025	2024

Table 20, Final results [own processing]

When comparing the investment variants on the base of their net present value (NPV, required return 15%), in scenarios 1 and 2 this value is negative. The internal rate of return (IRR) turned out to be lower than the required rate of return. Based on this information, the investor could be advised not to accept either of these scenarios. It is clear, that from finance point of view is scenario 3 unequivocally most appropriate. Scenario 3 reaches positive net present value (NPV) of CZK 53 299 563 and internal rate of return (IRR) of 49.33%, which is more than 3 times higher than required. Also, the payback period (PP) is shortest with this scenario - only 1 year, which is 2 years shorter than scenario 1 and 4 years shorter than scenario 2.

In scenario 3, the minimum cumulated cash flow (CCF min.) Is almost CZK 74 mil. higher than in scenario 1 and by almost CZK 107 mil. higher than in scenario 2. This means that in scenario 3 the developer must prefinance from his own resources less than in scenarios 1 and 2. The maximum cumulated cash flow (CCF max.) is after the sale of the real estate highest again in scenario 3. These facts confirm that scenario 3 is the most financially appropriate scenario.

Based on the above information, it can be argued that scenario 3 - forward funding structure, is more economically advantageous than scenarios 1 and 2, while bringing lower capital expenditures. If the investor chooses this scenario, it will also result in a smaller number of obligations (it does not address, for example, project financing, real estate management, or finding and managing tenants). On the other hand, developer should have the funds available as a reserve in case of increase in construction costs, when needed to use financing other than forward funding from the investor, or other reasons. It is important that the design build contract with the general constructor and forward funding agreement with the investor contains both the most

appropriate payment conditions for the developer. If this does not meet the conditions envisaged in this scenario calculations, the impact on the achieved values of economic indicators could be very significant.

In terms of risks, scenario 2 probably brings the lowest risks out of the three evaluated scenarios but is the least economically advantageous. As stated in previous chapter, market development in future has the biggest impact on this scenario (when compared to other two scenarios). This fact may be seen as an opportunity, but also as a threat. It is up to the developer to decide which risks are acceptable to him, which he can avoid and which he can pass on to someone else in each scenario, before deciding to implement one of the scenarios. Since the market is expected to develop in rather favourable way (see market analysis in theoretical part of this thesis), it may be advantageous to implement scenario 2 from this point of view.

Based on the above it is possible to recommend the forward funding structure of BTR project as the most suitable one.

The claim that scenarios 1 and 2 are economically unacceptable was intentionally NOT made in this chapter. Although these scenarios do not reach the required values of efficiency indicators, this fact might change dramatically if slightly different values would be used in calculations.

For example, if the exit value of the project in scenario 1 would be calculated from annual NOI which would be 5% higher (this value seems relevant according to chapter 2.1.1, where based on the research is stated, that rents will be growing in the next 2-3 years), the IRR of the project would reach 19,1%, making it economically acceptable (cash-flow of this variation of scenario 1 is part of the appendix number 7).

Or in scenario 2, which is planned to be sold in year 2025, could be the exit price alternated even more, since the locality where the development is localized is considered to be rapidly evolving. For example, if the apartment house would be sold for 11% higher value as calculated in chapter 3.2.7. (this means, that the building value would increase 11% in 4 years), the IRR would reach 15,27%, making it economically acceptable too. (cash-flow of this variation of scenario 1 is part of the appendix number 8).

Or if the interest on loan in scenario 1 would be lower for example 4% instead of 5,24%, the IRR of the project would reach 15,04%, making it economically acceptable as well. (cash-flow of this variation of scenario 1 is part of the appendix number 9).

Therefore, it is not possible to claim, that none of the BTR projects assessed similarly as in scenarios 1 and 2 could reach the required 15% IRR. It is up to each developer to determine the values achievable for him and assess the project based on them.

4 Conclusion

The aim of the diploma thesis was to evaluate the economic efficiency of the BTR project. This evaluation was made from the developer's point of view. 3 scenarios with different approaches to the BTR project were compared.

In the theoretical part, the market situation from the perspective of BTR projects was analysed and related concepts were clarified. An important part of the theoretical part of the work are chapters dealing with the definition of BTR project and methods of evaluating economic efficiency.

The practical part was focused on defining individual scenarios - sale of an apartment house after the using permit is issued (scenario 1), sale of an apartment house after 2 years of operational phase and after filling the building by tenants (scenario 2) and sale of land and subsequent construction financed through forward funding (scenario 3). Defining a reference project that served as the basis for all calculations and, of course, evaluating individual scenarios by creating financial flows for each of them. Information obtained during the creation of the theoretical part was used, thanks to which it was possible to compare the variants and evaluate which of them is more economically advantageous.

Scenario number 3 - sale of land and subsequent construction financed through a forward funding was evaluated as the most advantageous scenario. Net present value (NPV) was calculated at CZK 53,3 mil, internal rate of return (IRR) at 49,33%. The payback period was set at 1 year - after the sale of the land.

When comparing scenario 3 with other scenarios, each of the used investment efficiency indicators indicates, that the forward funding structure is the most economically advantageous approach to the BTR project from the developer's point of view.

Scenarios 1 and 2 did not achieve the required return under the conditions used for the calculations.

If the developer were able to obtain more suitable conditions for external financing or sell the property at a higher exit value, it would be possible to achieve remarkably better economic indicators results in all three scenarios.

The overall conclusion of the work is that BTS projects intended for sale to end users will always be built. But it is possible to expect more BTR projects in the future than before. From the point of view of economic efficiency, BTR projects can be considered feasible. Thanks to forward funding, it is possible to achieve a very short payback period under suitable conditions. As noted in the theoretical part of the work, "BTR projects are and will be represented in the market", the practical part of this work confirms the perspective of BTR projects as well.

This diploma thesis can help anyone who is considering the implementation of a BTR project or is deciding between the implementation of BTS and BTR project and wants to get an overview of the current market situation, a suitable way to design the project, what to look out for or what are the benefits of the chosen project. If it doesn't help directly, it will broaden horizons.

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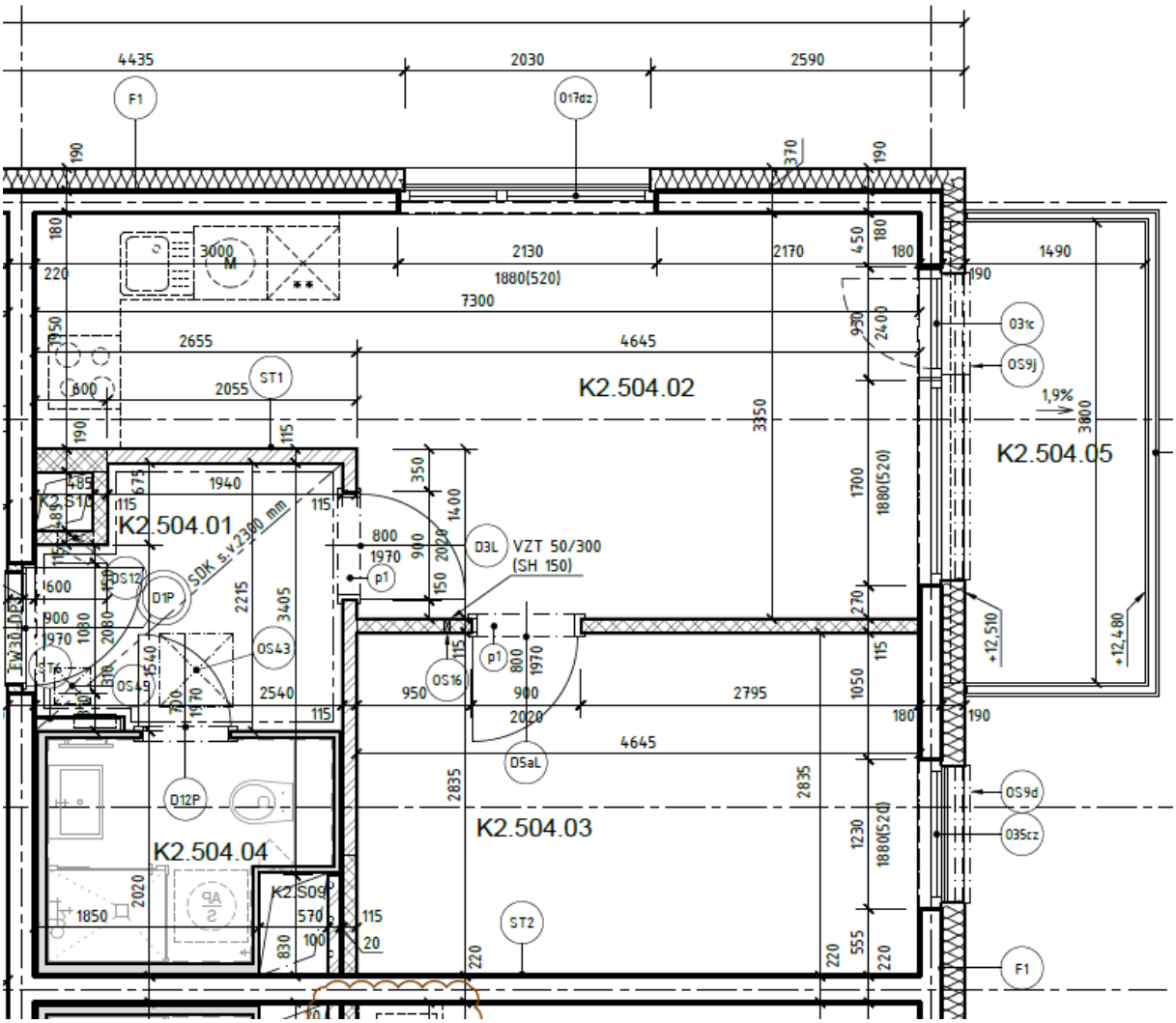
SPOLEČNÉ PROSTORY K2							
K2.500.01	CHODBA, SCHODIŠTĚ	17,55	KERAMICKÁ DLAŽBA	P4a,P7,P8	STĚRKA/OMÍTKA+MALBA	STĚRKA+MALBA	KERAMICKÝ SOKL
K2.500.02	CHODBA	38,63	KERAMICKÁ DLAŽBA	P4a,b	STĚRKA/OMÍTKA+MALBA	STĚRKA+MALBA	KERAMICKÝ SOKL
K2.500.03	SKLÍPKY	6,67	KERAMICKÁ DLAŽBA	P9	STĚRKA/OMÍTKA+MALBA	STĚRKA+MALBA	KERAMICKÝ SOKL
V.K2	VÝTAH	-	-	-	-	-	-

BYT K2.501 1+KK							
K2.501.01	PŘEDSÍŇ	6,10	KERAMICKÁ DLAŽBA	P2	OMÍTKA+MALBA/MALBA/ /SDK+MALBA	SDK+MALBA	KERAMICKÝ SOKL
K2.501.02	POKOJ + KK	23,47	DŘEVĚNÁ TŘÍVRSTVÁ	P1	OMÍTKA+MALBA	OMÍTKA+MALBA	SOKLOVÁ LIŠTA
K2.501.03	KOUPELNA + WC	3,51	-	-		-	(prefabrikovaná koupelna)
	ČISTÁ PLOCHA: HRUBÁ PLOCHA:	33,08 35,3					
K2.501.04	BALKON	5,79	HYDROIZOLAČNÍ NÁTĚR	S5	-	-	HYDROIZOL. NÁTĚR SOKLU

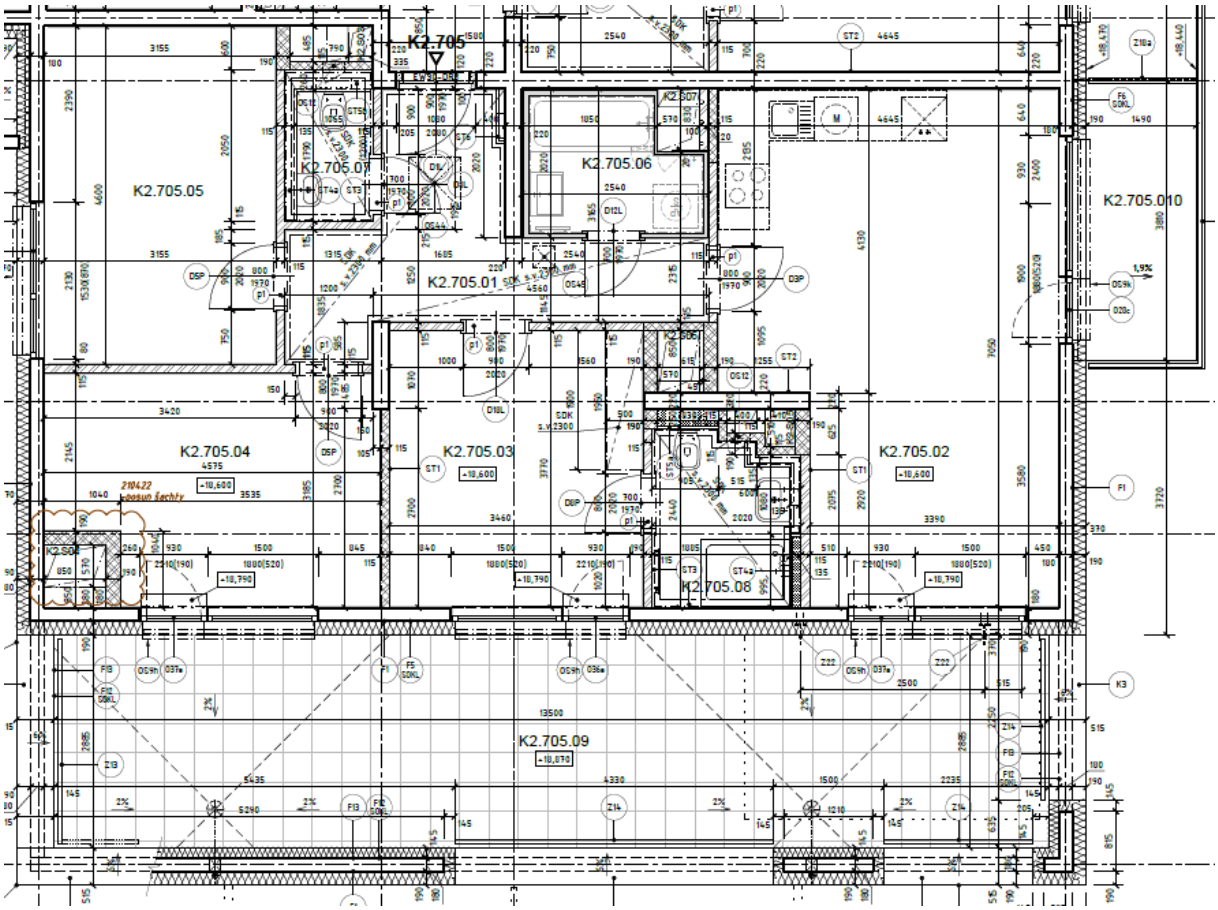
BYT K2.502 2+KK							
K2.502.01	PŘEDSÍŇ	8,59	KERAMICKÁ DLAŽBA	P2	OMÍTKA+MALBA/MALBA/ /SDK+MALBA	SDK+MALBA	KERAMICKÝ SOKL
K2.502.02	OBÝVACÍ POKOJ + KK	21,84	DŘEVĚNÁ TŘÍVRSTVÁ	P1	OMÍTKA+MALBA	OMÍTKA+MALBA	SOKLOVÁ LIŠTA
K2.502.03	LOŽNICE	16,48	DŘEVĚNÁ TŘÍVRSTVÁ	P1	OMÍTKA+MALBA	OMÍTKA+MALBA	SOKLOVÁ LIŠTA
K2.502.04	KOUPELNA + WC	3,51	-	-	-	-	**(prefabrikovaná koupelna)**
	ČISTÁ PLOCHA: HRUBÁ PLOCHA:	50,42 54,4					
K2.502.05	BALKON	5,62	HYDROIZOLAČNÍ NÁTĚR	S5	-	-	HYDROIZOL. NÁTĚR SOKLU

BYT K2.503 3+KK							
K2.503.01	PŘEDSÍŇ	15,59	KERAMICKÁ DLAŽBA	P2	OMÍTKA+MALBA/MALBA/ /SDK+MALBA	STĚRKA+MALBA/OMÍTKA+MALBA	KERAMICKÝ SOKL
K2.503.02	OBÝVACÍ POKOJ + KK	19,69	DŘEVĚNÁ TŘÍVRSTVÁ	P1	OMÍTKA+MALBA	OMÍTKA+MALBA	SOKLOVÁ LIŠTA
K2.503.03	LOŽNICE 1	12,96	DŘEVĚNÁ TŘÍVRSTVÁ	P1	OMÍTKA+MALBA	OMÍTKA+MALBA	SOKLOVÁ LIŠTA
K2.503.04	LOŽNICE 2	12,96	DŘEVĚNÁ TŘÍVRSTVÁ	P1	OMÍTKA+MALBA	OMÍTKA+MALBA	SOKLOVÁ LIŠTA
K2.503.05	KOUPELNA	3,84	-	-	-	-	(prefabrikovaná koupelna)
K2.503.06	WC	1,64	KERAMICKÁ DLAŽBA	P3	KER.OBKLAD/OMÍTKA+MALBA/ /SDK+MALBA	SDK+MALBA	-
	ČISTÁ PLOCHA: HRUBÁ PLOCHA:	66,66 72,3					
K2.503.07	BALKON	5,62	HYDROIZOLAČNÍ NÁTĚR	S5	-	-	HYDROIZOL. NÁTĚR SOKLU

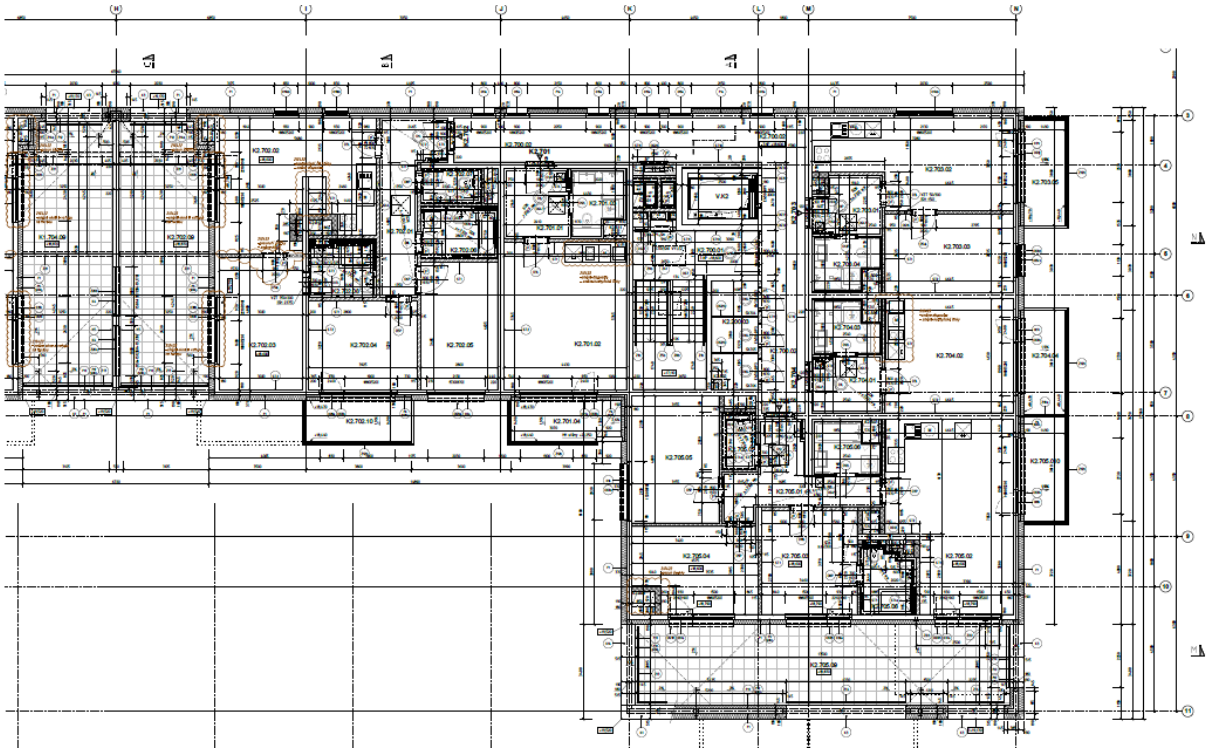
Appendix 1, Table of rooms [source 57]



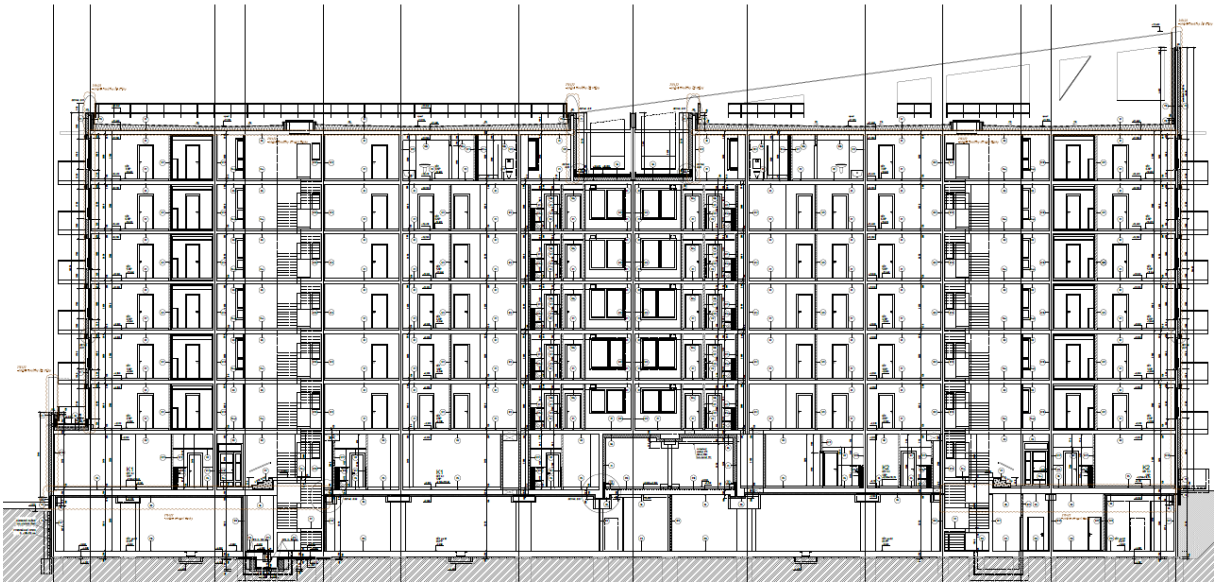
Appendix 2, model apartment 1 [source 57]



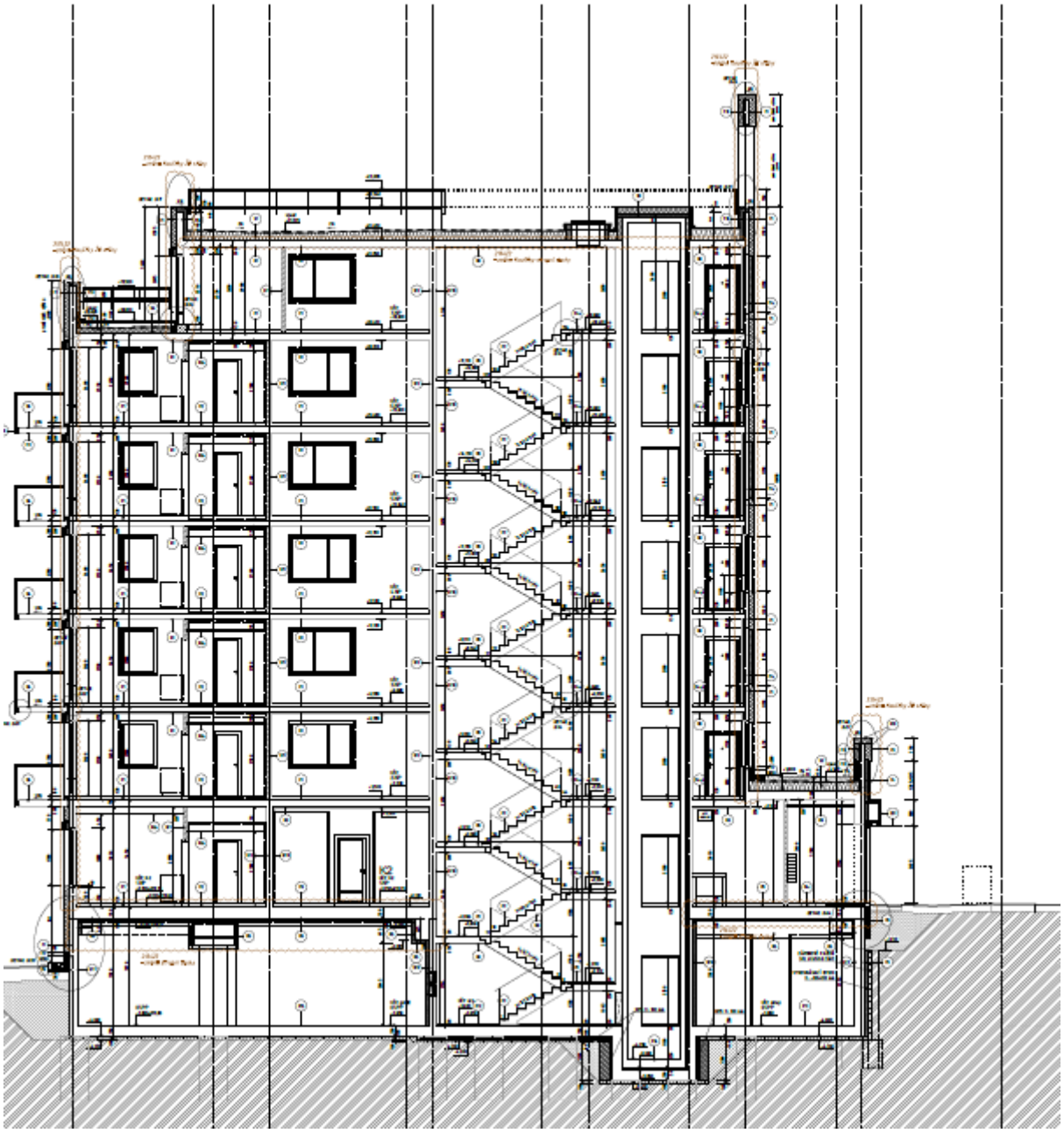
Appendix 3, model apartment 2 [source 57]



Appendix 4, One half of floor [source 57]



Appendix 5, Section drawing 1 [source 57]



Appendix 6, Section drawing 2 [source 57]

Scenario 1, variation 1, exit price		Investment phase			
		2020	2021	2022	2023
	Total	0	1	2	3
Total investment	**540 749 930,00 CZK**	87 486 630,00 CZK	181 305 320,00 CZK	158 642 150,00 CZK	113 315 830,00 CZK
Capital emloyment	135 187 482,50 CZK	87 486 630,00 CZK	47 700 852,50 CZK		
Debt employment	405 562 447,50 CZK		133 604 467,50 CZK	158 642 150,00 CZK	113 315 830,00 CZK
Loan repayment	**454 106 748,33 CZK**		11 469 184,59 CZK	15 823 643,99 CZK	426 813 919,75 CZK
Arrangement fee	3 244 499,58 CZK		3 244 499,58 CZK		
Commitment fee	1 733 732,15 CZK		1 223 810,91 CZK	509 921,24 CZK	
Interest	43 566 069,10 CZK		7 000 874,10 CZK	15 313 722,76 CZK	21 251 472,25 CZK
Loan ammount	405 562 447,50 CZK				405 562 447,50 CZK
Exit value (2023)	**677 389 800,00 CZK**				677 389 800,00 CZK
CF (2023)		-87 486 630,00 CZK	-59 170 037,09 CZK	-15 823 643,99 CZK	250 575 880,25 CZK
CCF (2023)	88 095 569,17 CZK	-87 486 630,00 CZK	-146 656 667,09 CZK	-162 480 311,08 CZK	88 095 569,17 CZK
DCF (2023)		-87 486 630,00 CZK	-51 452 206,16 CZK	-11 964 948,20 CZK	164 757 708,72 CZK
CDCF (2023)	13 853 924,36 CZK	-87 486 630,00 CZK	-138 938 836,16 CZK	-150 903 784,36 CZK	13 853 924,36 CZK

Appendix 7, Scenario 1, variation 1, higher exit price [own processing]

Scenario 2, variation 1, exit value		Investment phase				operational phase	
		2020	2021	2022	2023	2024	2025
	Total	0	1	2	3	4	5
Total investment	**540 749 930,00 CZK**	87 486 630,00 CZK	181 305 320,00 CZK	158 642 150,00 CZK	113 315 830,00 CZK		
Capital emloyment	135 187 482,50 CZK	87 486 630,00 CZK	47 700 852,50 CZK				
Debt employment	405 562 447,50 CZK		133 604 467,50 CZK	158 642 150,00 CZK	113 315 830,00 CZK		
Gross revenue	**60 762 532,50 CZK**				6 751 392,50 CZK	27 005 570,00 CZK	27 005 570,00 CZK
Gross rental income	74 040 900,00 CZK				24 680 300,00 CZK	24 680 300,00 CZK	24 680 300,00 CZK
Other payments from tenants	10 677 870,00 CZK				3 559 290,00 CZK	3 559 290,00 CZK	3 559 290,00 CZK
Long term vacancy estimate	3 702 060,00 CZK				1 234 020,00 CZK	1 234 020,00 CZK	1 234 020,00 CZK
Total expenditure	**9 958 297,50 CZK**				1 106 477,50 CZK	4 425 910,00 CZK	4 425 910,00 CZK
Operating expenses	13 277 730,00 CZK				4 425 910,00 CZK	4 425 910,00 CZK	4 425 910,00 CZK
NOI	**50 804 235,00 CZK**				5 644 915,00 CZK	22 579 660,00 CZK	22 579 660,00 CZK
Income tax	**485 160,16 CZK**				0,00 CZK	242 580,08 CZK	242 580,08 CZK
Loan repayment	**491 369 068,35 CZK**		11 469 184,59 CZK	15 823 643,99 CZK	26 251 472,25 CZK	33 986 660,01 CZK	403 838 107,51 CZK
Arrangement fee	3 244 499,58 CZK		3 244 499,58 CZK				
Commitment fee	1 733 732,15 CZK		1 223 810,91 CZK	509 921,24 CZK			
Interest	80 828 389,13 CZK		7 000 874,10 CZK	15 313 722,76 CZK	21 251 472,25 CZK	18 986 660,01 CZK	18 275 660,01 CZK
Repayed loan	405 562 447,50 CZK				5 000 000,00 CZK	15 000 000,00 CZK	385 562 447,50 CZK
Exit value (2028)	**729 000 460,00 CZK**						729 000 460,00 CZK
CF (2028)		-87 486 630,00 CZK	-59 170 037,09 CZK	-15 823 643,99 CZK	-20 606 557,25 CZK	-11 649 580,09 CZK	347 499 432,41 CZK
CCF (2028)	152 762 983,99 CZK	-87 486 630,00 CZK	-146 656 667,09 CZK	-162 480 311,08 CZK	-183 086 868,33 CZK	-194 736 448,42 CZK	152 762 983,99 CZK
DCF (2028)		-87 486 630,00 CZK	-51 452 206,16 CZK	-11 964 948,20 CZK	-13 549 145,89 CZK	-6 660 685,23 CZK	172 768 633,32 CZK
CDCF (2028)	1 655 017,85 CZK	-87 486 630,00 CZK	-138 938 836,16 CZK	-150 903 784,36 CZK	-164 452 930,25 CZK	-171 113 615,47 CZK	1 655 017,85 CZK

Appendix 8, Scenario 2, variation 1, higher exit price [own processing]

Scenario 1, variation 2, interest		Investment phase			
		2020	2021	2022	2023
	Total	0	1	2	3
Total investment	**540 749 930,00 CZK**	87 486 630,00 CZK	181 305 320,00 CZK	158 642 150,00 CZK	113 315 830,00 CZK
Capital emloyment	135 187 482,50 CZK	87 486 630,00 CZK	47 700 852,50 CZK		
Debt employment	405 562 447,50 CZK		133 604 467,50 CZK	158 642 150,00 CZK	113 315 830,00 CZK
Loan repayment	**443 797 220,53 CZK**		9 812 489,19 CZK	12 199 785,94 CZK	421 784 945,40 CZK
Arrangement fee	3 244 499,58 CZK		3 244 499,58 CZK		
Commitment fee	1 733 732,15 CZK		1 223 810,91 CZK	509 921,24 CZK	
Interest	33 256 541,30 CZK		5 344 178,70 CZK	11 689 864,70 CZK	16 222 497,90 CZK
Loan ammount	405 562 447,50 CZK				405 562 447,50 CZK
Exit value (2023)	**645 133 150,00 CZK**				645 133 150,00 CZK
CF (2023)		-87 486 630,00 CZK	-57 513 341,69 CZK	-12 199 785,94 CZK	223 348 204,60 CZK
CCF (2023)	66 148 446,98 CZK	-87 486 630,00 CZK	-144 999 971,69 CZK	-157 199 757,63 CZK	66 148 446,98 CZK
DCF (2023)		-87 486 630,00 CZK	-50 011 601,47 CZK	-9 224 790,88 CZK	146 855 070,01 CZK
CDCF (2023)	132 047,66 CZK	-87 486 630,00 CZK	-137 498 231,47 CZK	-146 723 022,35 CZK	132 047,66 CZK

Appendix 9, Scenario 1, variation 2, lower interest [own processing]

Scenario 3, variation 1, investors point of view		Investment phase			Operational phase				
		2021	2022	2023	2024	2025	2026	2027	2028
	Total	1	2	3	4	5	6	7	8
Total investment	**645 133 150,00 CZK**	285 679 858,84 CZK	158 642 150,00 CZK	113 315 830,00 CZK	87 495 304,02 CZK				
Capital emloyment	161 283 287,50 CZK	161 283 287,50 CZK							
Debt employment	483 849 862,50 CZK	124 396 571,34 CZK	158 642 150,00 CZK	113 315 830,00 CZK	87 495 304,02 CZK				
Gross revenue	**163 833 639,55 CZK**			7 162 552,30 CZK	29 509 715,49 CZK	30 395 006,95 CZK	31 306 857,16 CZK	32 246 062,88 CZK	33 213 444,76 CZK
Gross rental income	156 272 847,19 CZK			13 091 665,14 CZK	26 968 830,18 CZK	27 777 895,08 CZK	28 611 231,94 CZK	29 469 568,89 CZK	30 353 655,96 CZK
Other payments from tenants	22 537 018,69 CZK			1 888 025,38 CZK	3 889 332,28 CZK	4 006 012,25 CZK	4 126 192,62 CZK	4 249 978,40 CZK	4 377 477,75 CZK
Long term vacancy estimate	7 813 674,02 CZK			654 585,91 CZK	1 348 446,97 CZK	1 388 900,38 CZK	1 430 567,39 CZK	1 473 484,41 CZK	1 517 688,95 CZK
Total expenditure	**25 593 572,78 CZK**			1 151 179,19 CZK	4 696 811,10 CZK	4 790 747,32 CZK	4 886 562,27 CZK	4 984 293,51 CZK	5 083 979,38 CZK
Operating expenses	26 744 751,97 CZK			2 302 358,38 CZK	4 696 811,10 CZK	4 790 747,32 CZK	4 886 562,27 CZK	4 984 293,51 CZK	5 083 979,38 CZK
NOI	**138 240 066,78 CZK**			6 011 373,11 CZK	24 812 904,39 CZK	25 604 259,63 CZK	26 420 294,90 CZK	27 261 769,36 CZK	28 129 465,38 CZK
Income tax	**120 332,65 CZK**			0,00 CZK	0,00 CZK	0,00 CZK	0,00 CZK	0,00 CZK	120 332,65 CZK
Loan repayment	**647 426 585,05 CZK**	12 006 719,02 CZK	15 734 879,10 CZK	21 162 707,36 CZK	22 934 483,14 CZK	22 934 483,48 CZK	22 934 483,48 CZK	22 934 483,48 CZK	506 784 345,98 CZK
Arrangement fee	3 870 798,90 CZK	3 870 798,90 CZK							
Commitment fee	2 914 918,75 CZK	1 617 539,78 CZK	903 650,10 CZK	393 728,87 CZK					
Interest	156 791 004,90 CZK	6 518 380,34 CZK	14 831 229,00 CZK	20 768 978,49 CZK	22 934 483,14 CZK	22 934 483,48 CZK	22 934 483,48 CZK	22 934 483,48 CZK	22 934 483,48 CZK
Repayed loan	483 849 862,50 CZK								483 849 862,50 CZK
Exit value	**829 262 546,74 CZK**								829 262 546,74 CZK
CF (2028)	350 487 333,49 CZK	-173 290 006,52 CZK	-15 734 879,10 CZK	-15 151 334,25 CZK	1 878 421,25 CZK	2 669 776,15 CZK	3 485 811,41 CZK	4 327 285,88 CZK	350 487 333,49 CZK
CCF (2028)	158 672 408,32 CZK	-173 290 006,52 CZK	-189 024 885,62 CZK	-204 176 219,86 CZK	-202 297 798,62 CZK	-199 628 022,47 CZK	-196 142 211,05 CZK	-191 814 925,17 CZK	158 672 408,32 CZK
DCF (2028)	189 357 400,70 CZK	-160 453 709,74 CZK	-13 490 122,69 CZK	-12 027 617,62 CZK	1 380 695,69 CZK	1 817 004,79 CZK	2 196 652,48 CZK	2 524 929,75 CZK	189 357 400,70 CZK
CDCF (2028)	11 305 233,36 CZK	-160 453 709,74 CZK	-173 943 832,42 CZK	-185 971 450,04 CZK	-184 590 754,35 CZK	-182 773 749,56 CZK	-180 577 097,09 CZK	-178 052 167,34 CZK	11 305 233,36 CZK

Appendix 10, Scenario 3, variation 1, investors point of view [own processing]