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EVALUATION OF A REAL ESTATE INVESTMENT PROJECT OF CreoX OÜ

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ABSTRACT

This bachelor´s thesis examines an Estonian company CreoX OÜ's real estate investment project in Tallinn by using data of the housing cooperative of the investment project and previous literature on investment project evaluation and capital budgeting methods. Starting with the theories of investment project evaluation by finding out what are the most important things to go through before making an investment decision by using calculations of capital budgeting methods, such as net present value, internal rate of return and modified internal rate of return. Also, discounted payback period and risk analysis is included in this thesis. After theoretical part there is an anaysis of the project where the company is introduced and all the necessary project evaluation calculations are presented and the decision whether the investment project should be carried out is proposed.

Keywords: real estate investment, capital budgeting methods, corporate investing

INTRODUCTION

Investing in real estate has been always considered to be a good and safe way to invest excess assets. It has become more and more usual both for companies and individuals. When it comes to making investment decision, it is highly important to know the risks of the investment and to find out that the investment is suitable to the company´s future goals. If the company has planned long term investments, then real estate is a good choice because of the possible increase in periodical net cash flows from rent and the future market value increase. Also, real estate investments have lower risks compared to, for example, bonds and stocks, which makes it quite safe and stable way to invest.

The author of this thesis is evaluating an Estonian company´s real estate investment project. The company has been established in Estonia and it operates mainly in Estonia also. The company is planning to purchase investment apartments in bulk, approximately 3-5 apartments from a new construction. In this thesis, the author will be concentrating all of the apartments as a one project, since all of the apartments are more or less alike. For yet a small company, it is important to evaluate every investment decision carefully so that reaching planned goals comes possible.

The author of this bachelor thesis chose this topic because the company for which she is making this project analysis asked her if she would like to use their real estate investment project as an evaluation project. The company is currently making a decision whether or not invest in new construction in Tallinn, Estonia and following this thesis they are willing to get a point of view on the investment decision. If this project brings positive outcome, they are considering of investing more in real estate in Tallinn in future. Since the prices are relatively higher in Helsinki than in Tallinn, the company is planning possible investments in Tallinn.

The aim of this thesis is to find out is this investment worth to take, what kind of benefits they would get out of it and does it match to the target that the company has set up.

The main research tasks are:

1) to give an overview of capital budgeting methods;
2) to give an overview of apartment market dynamics of Tallinn;
3) to give an overview of the project and the company;
4) to use the capital budgeting methods to make a decision if the projects should be carried out;
5) to make a risk analysis of the investment project.

The author is using capital budgeting methods (NPV, IRR, PI, MIRR, payback period, discounted payback period) and risk analysis method (Monte Carlo and scenario analysis) in the cost benefit analysis of this project. By using previous literature of investment project evaluation and capital budgeting methods, the author can find out that what are the most important factors when it comes to making an investment decision.

The company is at the time of writing the thesis considering of buying investment apartments form Tallinn City Centre, in a thought of increase their net cash flow. They are making a decision of whether or not to buy some apartments from a new construction and put them on rent and, if necessary, to Airbnb. Their goal is to reach a positive net present value of these apartments and if the outcome is positive, they will be considering of purchase more of these kinds of investments. Though all of the apartments are more or less alike the author is going to calculate cash flows of each apartment in order to examine whether the company should invest in the project or not. The author of the thesis received the apartment and housing cooperative information from the relator, and those documents are used also to obtain data for the analysis of the thesis.

In the first chapter the author is giving an overwiew of the theoretical/methodologigal framework of evaluation of a project information with the theory of payback periods, net present value (NPV), IRR, MIRR, PI and risk assessment methods. By using these methods, the author is able to conclude whether or not this investment project is profitable or not.

The second chapter of this thesis is going through the basic information about the investment project and the company itself. There is also information about the current real estate market situation in Tallinn, Estonia and a short comparison to the real estate markets in Helsinki Metropolitan Area. Also, the taxational benefits will be gone through shortyly since they play quite big role in this project.

The last chapter is about empirical analysis of this investment project. There are calculations of the discounting of cash flows, and applying different capital budgeting methods in order to reach a decision whether or not the project should be carried out. Also the risk analysis is in the very last chapter in order to check the reliability of the evaluation results.

1. THEORY OF INVESTMENT PROJECT EVALUATION

To select and identify a good investment projects companies and individuals have to go through the analysis of the project to find out whether or not to invest in the project. When companies are making an investment decision, they are normally evaluating investment opportunities by calculating the payback period and expected rates of return (Lane, Rosewall, 2015). Other capital budgeting methods are used, when the company is planning to make a new relatively large long term investment. Most common capital bugdeting methods used when evaluating potential large or expensive investment are payback period analysis, net present value, internal rate of return and modified internal rate of return. When making the decision to take up the project or leave it out, a company has to think the outcome that the project would bring as the value of a project depends on the future benefits that it will generate to the investor. In all of the investment cases the reliability of the data used is crucial in the evaluation process since the aim of the project is to develop sustainable and successful future for the company.

Beside the project evaluation, both companies and individuals need to evaluate what type of investment suits them the best. For companies buying the property itself can be possible due to amount of assets, but for individuals, having enough assets to invest straight in property purchase can be hard. What comes to real estate investing, there are many things to take into account when deciding . Real estate can be invested in couple of ways such as buying straightly an apartment and rent it out or then by investing in real estate investment trusts (REIT). By investing in REIT, the investor does not have to worry about the property maintenance or any legal problems that the property might have to overcome. In addition, by investing in REIT, investor will avoid obligations of the landlords, such as the search of the tenant. REIT´s invest in real estate on a decentralized basis with the aim of getting profit through the rental income or trading on real estate. When investing via REIT, companies and individuals can easily invest in a number of properties in a decentralized manner, which reduces the risk of one property (Chung *et al* 2010). If the possibility to invest in straight property is low, there are also other optios which makes real estate investing possible. Besides the REIT and classic property investing, which are the most common ones, there is possibility to invest in commercial mortgage-backed securities (CMBS) and real estate operating

companies (REOCs), which are one type of real estate inevsting in the modern world (Hudson-Wilson *et al* 2015).

It is important to know as an investor, what kind of risks he or she is willing to take and evaluate the net cash flow that is in the targe. The higher the risk the higher the possible return and vice versa. When those factors are clear for the investor, making the investment decision comes easier (Korkeamäki, 2008). Also, determining the amount that is possible to invest, is realy important. Especially when buying the real estate as an investment, it is a key factor to know how much possible to invest in it. Housing prices play a huge role when it comes to decision making. It is important to find an apartment with fair price and good expected return (Guo 2010).

1.1. Capital budgeting methods

For any kind of capital budgeting method, the model is a valuation equation (Booth, 2014). When making investment decision and especially in real estate investments, companies may evaluate how many years it would take for the capital outlay to be returned by the cash flows generated by the project by calculating the payback period. In real estate investments the payback period is the number of years that it will take the investment to pay back the amount there has been put into it. And it includes the initial invested capital as well as the costs for maintenance the investment property. The payback method calculation is simple since it is consists of cash outlay and net cash inflow. The cash outlay is assumed to occur entirely at the beginning of the project and the net cash inflow is assumed to remain the same in every year. When calculating payback period, it gives different view of the project when comparing it to NPV and IRR (Mota, 2015).

When analysing real estate payback periods, the most common one is discounted payback period. There are many things to take into account when it comes to calculating the cash flows to find out the property´s discounted payback period (DPP). Monthly utility costs plus the other costs such as loan payments and insurance costs per aparment affect to the payback time of the property. The idea of discounted payback period is to determine the profitability of a project. It gives the anwer how many years it will take to cover the initial investment by discounting future cash flows and realizing the time value of money (Bhandari, 2009).

$$Payback\ period = \frac{initial\ investment}{annual\ net\ cash\ flow} \qquad (1)$$

Where initial investment is the price of the property, which is in this investment project the price to be paid of the property, and the annual payback is the total rental income that the company, considered that there have been taken out the sunk costs such as loan payments, taxes etcetera. This exact formula can be used only then when the periodical cash flows are equal.

$$DPP = \ln\left(\frac{1}{1-\frac{O_{1\times r}}{CF}}\right) \div \ln(1+r) \qquad (2)$$

Where: O_1 = Initial investment,
r = Rate of return,
CF = Net cash flow.

Net Present Value (NPV) is used in most of the investment planning process to analyze and evaluate the profitability of the project. The NPV calcualtion shows the present value of the cash inflows of the set period of time minus the initial cost of the project. When calculating net present values of investment, the invesor needs to take in to account the net cash inflow during the single period (t), discount rate that could be earned in alternative investments (i) and the time period of the investment or project (t). The deisred rate of return for the both scenarios are decided and later in the caclulations presented. Time period for the planned investment project is ten years in both scenarios.

$$NPV = \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t} - I_0 \qquad (3)$$

Where: CF_t= Net cash inflow in the period *t,*
r = Rate of return,
t = Number of time periods,
I_0= Initial investment.

When the NPV shows positive results the project should be accepted but if negative then not. Positive NPV represents that the project is worth more than it costs. But in every investment project the value of NPV should be analyzed carefully since every investment project has different plans for the future. If the NPV is close to negative, there is still a risk that the project will fail even though the NPV shows positive signs. Though the NPV is considered to be the most important and valued tool to measure correctly shareholders value creating the NPV is not the only factor that affects on the project acceptance decision (Marchioni and Magni, 2018).

To calculate the NPV, it is helpful to find out first the discounted cash flows of the project. Discounted cash flow analysis is a method of valuation used to estimate the value of an investment based on its future cash flows. By using DCF analysis, we are able to find the present value of expected future cash flows by using discount rate. If the net present value is positive for the chosen discount rate, the firm should invest in it (Lane and Rosewall, 2015).

$$DCF = \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \cdots + \frac{CF_n}{(1+r)^n} \qquad (4)$$

Where: CF = Cash flow,
n = Time,
r = Rate of return.

When evaluating should the project be accepted or not, companies should not only focus on that the NPV shows the positive sign but they should also find out that the internal rate of return of project is above its required rate of return. Internal rate of return (IRR) is globally used index to help make decision concerning to upcoming investments (Magni 2010). Internal rate of return is maybe the most important alternative to the NPV and it is widely used to measure profitability. IRR calculation relies on the same formula as the net present value. IRR is a one type of rate of return at which point NPV equals to zero (Lane and Rosewall, 2015). So, when evaluating IRR, the higher the IRR is the more prefereable the project is to undertake.

$$\sum_{t=1}^{n} \frac{CF_t}{(1+IRR)^t} = I_0 \qquad (5)$$

Where: CF_t= Cash flow in the period *t,*

t = Time,

IRR = Internal Rate of Return.

Though IRR is highly appreciated when evaluating investment projects, sometimes it might overrate the profitability of the project and then lead to capital budgeting mistakes. When using modified internal rate of return (MIRR), it can compensate those flaws that IRR might bring up.

$$MIRR = \sqrt[n]{\frac{FV(Positive\ Cash\ Flows \times Cost\ of\ Capital)}{PV(Initial\ Outlays \times Financing\ Cost)}} - 1 \qquad (6)$$

Where: FV= Future value.

PV= Present value.

n = Number of periods.

The modified internal rate of return provides a more specific percentage measure of the economic attractiveness. MIRR is made to be more accurate to reflect the cost and profitability of the certain project. When making the calculations, MIRR is the discount rate that makes the investment to be equal to the future value of cash flows of the investment. In the MIRR calculations NPV equals to zero value as well as in IRR calculations. The project should be accepted when the MIRR exceeds the project´s hurdle rate (Kierulff, 2008).

Though all of the previously mentioned capital budgeting methods, when evaluating an investment project, are important, profitability index (PI) exemplifies to the ratio of discounted benefits over the dicounted costs. Like all the other capital budgeting methods leads to the help of deciding whether or not to invest and is the investment profitable, so does the profitability index. In the profitability index the net present value of an initial expense is indicated to equal to a monetary unit. Usually those projects that have profitability index under 1.0 are not recommended to take

since it means that the project´s present value is lower than the actual initial investment (Gurau, 2012).

$$PI = \left[\sum_{t=1}^{n} \frac{CF_t}{(1+r)^t}\right] \div I_0 \qquad (7)$$

Where: PI = Profitability index,
CF_t = discounted cash flow in the period *t,*
t = number of years,
r = rate of return,
I_0 = initial investment.

The benefits of using profitability index as a part of the investment projet evaluation is that it takes into account the time value of money, it shows whether the project increases or decreases the value of the company, all of the cash flows are taken into account, notices the risk what comes with the evaluation of the future cash flows and it helps in the decision making when choosing the project (Gurau 2012).

1.2. Risk assessment methods

When making an investment decision, it is highly important to know the risks of the investment. Risk management can be a crucial process when making the decision. In risk management the company finds out the amount of risk that is involved with an investment and by that they can either accept that risk or mitigate it. Risk management can be divided into two sections as systematic risk and unsystematic risk. Systematic risk management is associated with the market and the risk calculated affects the overall market of the security. In systematic risk, the risk can be mititgated through hedging but it is still unpredictable and undiversifiable. By hedging the company can lower its cash flow risks. As in unsystematic risk management, the risk is associated with a company or sector. Unsystematic risk can be mitigated through asset diversification but this risk is only implicit to a specific stock or industry (Bolton *et al* 2011).

In real estate risk management, a company needs to take into account also the polital risks, economic risks and credit risks. In political risk index every country is ranked by a sample and a higher level of political risk observed corresponds to the lower position index. The main idea of observe political risk is to indicate the likelihood of financial losses due to government actions that may engage, limit or prevent investment projects (Brink 2017). Economic risk, on the other hand, includes the weak or negative economic growth, inflation and indebtedness. Higher required return is connected with a higher economic risk. Credit risk may occure, when company does not receive, for exampe, rental payment for each month. Then if company has mortgage from bank, they might not be able to pay the monthly payments back to bank (Geurts, Jaffe 1996).

Insuraces pay also a big role in real estate risk management. One of the greatest way to smaller any kind of risk is to transfer it by purchashing insurance. So when anything happens, you can contact straight to the insurance company who knows how to deal with such problems. What comes to managing risks with cash flows, property owner should keep on track of the rental transactions and know how to calculate the possible losses of so called vacant months.

Also, Monte Carlo simulation is used to analyze the risks of the real estate investments/developments. It is a further development of a scenario analysis that attempts to reflect the uncertainty of real life. The main idea of Monte Carlo simulation is to measure out the NPV calculation and then simulate a large number of draws. When knowing the NPV distributions, the reliable valuation of cost benefit analysis is possible. The result of several different scenarios, it is possible to obtain the most realistic risk assessment by using the Monte Carlo analysis (Stæhr 2006).

2. INVESTMENT PROJECT

In this part of the thesis, the author gives an overview of the planned investment project and general information about the company.

2.1. Introduction of the company

The company CreoX OÜ has been established in the year 2012 in Tallinn, Estonia. It is a subsidiary to another Estonian company. The company CreoX OÜ itself does not have any official purpose, but the company is established to be an investment company. In this case study of company CreoX OÜ´s real estate investment project, the company has not planned to take loan to finance the investment project, in case they decide to invest in these apartments.

2.2. Investment project

CreoX OÜ has been thought for, approximately a year, to invest in real estate. The main criteria for the investment apartments usually are price, location, expected return, condition and sustainability. They have found a new real estate development project which is about to be ready in the spring 2019.

The company has been considered of investing in four apartments in the new construction in the center of Tallinn, Estonia. The investment project locates in the heart of Tallinn. It is right across from Tallinn and culture, entertainment and the green parks of Kadriorg area are just a short walk away from the property. Since the location is the key factor in apartment pricing, this property has high value due to its location and good services near. The property itself has been made targeting investors since mainly all of the apartments are only studio apartments or maximum one bedroom apartments. The building contains a private gym, laundry room and a rooftop terrace which are all in free use of the people living in the building. The company has considered the investment project

to be reasonable due to growing number of foreign students in the area of Tallinn and sure the location is the best for the students who are studyig right across the street in Tallinn University.

Most of the real estate investments are financed through bank loans (Cocconcelli and Medda, 2012) but the company has planned not to take any loan to finance the investment. The company plans to invest their excess assets to apartments due to the promising growth of net cash inflow. They have intention that when they have saved enough money from the returns of the possible investment apartments, they will most likely purchase more similar apartments as an investment. Since there are need for good condition rental apartments in the area of Tallinn city centre, this investment would be more than suitable. The cost of the project amounts to approximately 450 000€ and it includes the design, preparation, installations of plumbing fixtures, kitchen, electricity and also the rights to use the laundry room and the private gym of the building. The expected time period that the investment would have paid itself back varies between five to twenty years depending on the type of rent decision.

The company has determined a required rate of retrun for each apartmnet, since the apartments vareis in size and the possible rental income. In this thesis, the average of the required rates used in applying capital budgeting methods. The company has made two scenarios: first that all of the apartments are rented as a long-term rent and second that they are rented short-term. In the long-term scenario the investors rate of return is 6,25% and for the short-term 16,56%. The required rate of return is used as a discount rate in the calculations. In the year 2018, the average gross rental yield of apartments in Tallinn was between 5,0-6,0%. The variation of the rental yield depends mainly on the location of the property, but sure the condition is also a key factor (Ober Haus 2019).

Table 1. Project information

Apartment	Price	SqM	Rent	Yield from rent	Price/night	Yield from short-term
40-306	122 106,00 €	37,6	600,00 €	5,90 %	95,00 €	17,03 %
40-311	128 686,00 €	30,2	580,00 €	5,80 %	85,00 €	15,40 %
40-405	98 606,00 €	21	500,00 €	6,50 %	80,00 €	18,90 %
40-406	93 906,00 €	21,1	500,00 €	6,80 %	60,00 €	14,90 %

Source: Sales information is gathered from the realtor

Note: The calculation of the short-term rental yield is based on an average of 60% of expected annual occupancy.

The company has went through a thought that some of the apartments would be on a long-term rent and the rest would be on short-term rent. All of the apartments are designed to be either in long-term rent or in short-term, such as, for exampe, AirBnB. Here in after the author of this thesis is refrring to a short-term rental type as "AirBnB". Since AirBnB rentals has growth their demand all over the world, the profit from reting it out in short term makes the expected cash flow be higher than in long term rentals. If the company decides that they would put the apartment in short-term rent, the expected payback period is relatively smaller compared to long-term rentals. Since the apartments are planned to be either on long-term rent or short-term rent, putting the apartments to AirBnB, for example, will offer higher opportunity to get better cash inflow compared to long-term rent. But there are bigger risks on annual occupancy if comparing to long-term rentals where they make a contract for example for a year or so.

Under the decision of putting all of the apartments to short-term rent, such as AirBnB as before mentioned, the company needs to take into account the fact that they have to pay then the utility cost in addition to the insurance cost and renovation foundation payment, as compared to the long-term rentals where the tenant pays the utilities. This will increase the payback period time but the approximate utility cost of this size apartments (20-37 m^2) is around 50 euros per month.

As sustainability was one of the criteria that the company had when they were deciding to invest, this project suits to their criteria well. The plumbing fixtures (toilet, faucets, showers etc.) are all eco smart, so that the water- and electricity bills would be lower approximately 60% compared that if they would have used normal plumbing fixtures. The property is still under construction but will be ready in the end of the spring 2019. During the construction work, they have tried to keep the historical part still attached to the building and they have kept all the original staircases, windows and bricks as they have been so that the building costs have not raised to sky high. Sustainability as a part of the real estate developments has growth its popularity in the past decade and it seems to keep continuing to grow (DeLisle *et al* 2013).

The sales information about the investment project is from the realtor and the CEO of the company.

2.3. Residential real estate market in Tallinn, Estonia

According to the real estate company Ober Haus, the past years have been successful for the Baltic countries. New business developments, growing income of the population and the further economic growth has affected to the real estate markets scientifically. The Baltic real estate market has shown strong growth after the recent global recession (Ober Haus 2018). As the results shows, the year 2018 was successful in the real estate business in the Baltics (Ober Haus 2019). Sure, the growth in economy has also affected to the growth of real estate markets. In 2018 the gross domestic production (GDP) grew 3,9% from the year 2018 in Estonia (Statistics Estonia 2019). The value of real estate has grown in the Baltics rapidly in the last ten years. Already in the year 2018 the average square meter (sqm) price for an apartment grew by 3,5% in the area of Tallinn. Due to low interest rates, growing income levels and the growth of the purchase of apartments for investment purpose, have increased the prices in Tallinn. The other reason for increase of the apartment purchases is also that the development of technology which can provide energy efficiency which can lower the heating costs. The average sqm prices in the city center are between 2 300€ - 5 000€. In the residential area the prices vary between 1 700€ - 2 500€ per sqm. The location and condition affect to the apartment prices and that is why there is a price gap between the prices of the city center and the residential area. The buildings that include history and great architectural features may raise the price of the apartment and sometimes exceed to 3 000€ per sqm. The area of Tallinn Old Town has a lot of history and architect, so the prices vary between 2 300€ - 5 000€ per sqm (Ober Haus 2019). One of the reasons why company is planning to invest in Tallinn city center, to a new construction, is that the demand for rental apartments is the highest in the center. As the Ober Haus wrote on the market report, the demand for newly constructed apartments is high, since most of the apartments in the center of Tallinn are built between 1960-1990 and those apartments have high utility costs due to heating and electricity arrangements (Ober Haus 2019). So, the probability to have all of the apartments rent out, due to fair utility costs and excellent location, is good.

The second reason why the company has decided to invest in real estate in Estonia, rather than in Finland, is due to lower prices in real estate. The average sqm price for the apartments in the Helsinkin Metropolitan area vary between 5 200€-10 000€, so the difference compared to Estonian´s real estate markets is remarkably big. (Asuntojen Hintatiedot 2019) With the amount that the company is planning to invest in Estonia, they would get maybe one studio apartment or maximum one bedroom apartment in the Helsinki Metropolitan area. But since the prices are so

high in Finland, they have made the decision that as the return that they get from Estonia compared to Finland is higher, it is smarter to invest in Estonia.

2.4. Taxation on real estate

When comparing the corporation taxation between Finland and Estonia, there is a big difference when it comes to company income received and withdrawing them. When it comes to corporate taxation on rental income, in Estonia companies has to pay 20% corporate tax upon the distribution of profits. So basically, if the company does not distribute any income received, they do not have to pay taxes of the rental income in year. Value added tax (VAT) is exempt from the taxation on rental income since the option to VAT is not possible. Also, sale in real estate is exempted from the VAT. In Estonia land tax is relevant on the taxable value of land. Land tax can vary between 0,1-2,5% of the taxable value of land annually. Regarding on the project, that is observed in this thesis, the land tax is exempted since the project locates in the city center and the land plot area is not more than 1 500 m2 (Ober Haus 2019).

Compared to Finnish corporate taxation system, the corporate tax rate is currently 20% and it needs to be paid whether or not the company income received is paid or not. Companies in Finland have to pay also the withholding tax which is calculated from the previous year's income tax paid. Withholding tax is the estimation of the taxes paid in the end of the upcoming year. If the company receives more income that has been planned in the beginning of the year, they need to pay the difference from the 20% income tax. If company in Finland distributes dividends for individuals, then personal capital income tax needs to be paid, which is currently 30% exceeding 30 000€, the tax rate is 34%. When dividends are distributed between the subsidiary and parent company, no taxes are paid.

So, one of the reasons, why the company decided to invest in Estonia, is the taxational aspect. As from the comparison of the corporate tax between Finland and Estonia, for a company who is not planned to distribute its dividends to shareholders, it is smart to invest in Estonia and get the rental income to there too (KTI Kiinteistötieto Oy, 2019).

3. EMPIRICAL ANALYSIS

In this part of the thesis, the project related calculations are shown and evaluated.

When analyzing the long-term payback (Appendix 3) period in this investment project, the company has decided that if they would have tenant to each apartment, the tenant will be the one who pays the monthly utility costs of the apartment. So, the only cost per month for the company will be the insurance payment per months which is approximately 12 euros depending on the size of the apartment (Swedbank Home Insurances) in addition to the renovation foundation payment which is roughly 0,05 euros per square meter. The total cash outflow of the long-term rental is annual 630,06€ per month which includes the monthly insurance and repair fund cost. The payback period for long-term rentals is approximately 20 years if the apartments are rented all the time. For the long-term rentals the expected vacancy rate has been set to be 85% of the year so it has noticed the seasonal variation and the possibility that some of the months are not rented out.

Table 2. Discounted Cash Flow, long-term rent, ten years

Year	Cash Flow	Cumulative
0	-443 304,00 €	
1	21 605,94 €	21 605,94 €
2	21 605,94 €	43 211,88 €
3	21 605,94 €	64 817,82 €
4	21 605,94 €	86 423,76 €
5	21 605,94 €	108 029,70 €
6	21 605,94 €	129 635,64 €
7	21 605,94 €	151 241,58 €
8	21 605,94 €	172 847,52 €
9	21 605,94 €	194 453,46 €
10	21 605,94 €	216 059,40 €

Source: Kiiskinen (2019), author´s calculations

When calculating the cash flows in the short-term rental apartments, the expected 60% annual occupancy per apartment is used. So, the expectation is that the apartments will not be all the time on rent. The payback period is presumably smaller since the expected cash flow is higher compared if all of the apartments are in the long-term rent. Sure, if having all of the apartments in the short-time rental, such as AirBnB, there is a risk that the apartments are empty more, but the expected occupancy rate has been estimated to be 60% of the year. So, the company has been prepared that the apartments would not be occupied more than the estimated 60%. The cash outflow of the project, if all apartments in short-term rent, is annual 3 090,06€ which includes monthly insurance cost, repair fund cost and utility costs. The payback period for short-term rental is approximately 6,5 years if the occupancy rate stays at least at 60% annual. In both of the cases the payback period is calculated with the estimation that all of the periodical cash flows equal the same so that the approximate payback period would be estimated. Due to company request, both of the cash flows are calculated to be equal each year.

Table 3. Discounted Cash Flow, short-term rent, ten years

Year	Cash Flow	Cumulative
0	-443 304,00 €	
1	66 989,94 €	66 989,94 €
2	66 989,94 €	133 979,88 €
3	66 989,94 €	200 969,82 €
4	66 989,94 €	267 959,76 €
5	66 989,94 €	334 949,70 €
6	66 989,94 €	401 939,64 €
7	66 989,94 €	468 929,58 €
8	66 989,94 €	535 919,52 €
9	66 989,94 €	602 909,46 €
10	66 989,94 €	669 899,40 €

Source: Kiiskinen (2019), author´s calculations

The net present value calculations (Appendix 1 and 2) in this investment project showd a positive value for each of the apartments. There is not that a big difference in the value of NPV when comparing the long-term rentals ans short-term rental calculations. The long-term rentals proved to be better in the NPV calculations than the short-term rentals. So, when looking through the calculations, the investment project should be accepted in terms of the positive value of all of the apartments. The possibility of incresing company assests are good due to this project. For the first

year there has been added the sunk cost as to show the possible furniture expences that the company would over come. The approximate sunk cost in the first year is 8 000€ which includes all of the furniture that they need to buy (bed, sofa, TV, kitchen table and chairs, garderobe etc.). By adding the sunk cost to the first year, it makes the expected annual discounted cash flow to be smaller compared to the second year and by that the NPV also lowers a bit down, but still keeping the NPV in the positive side. The project sale has been included to the NPV calculations, since the company may sell the apartments after ten years. The sales price is the estimation of the value of the investment after the ten years. Future value of the investment has been calculated with the expected 4% annual real-estate value growth rate which makes the future value to be 656 198,21€.

Due to total cash inflows (Tabe 2 and 3), the short-term rentals provide better income for the company but the discount rate and the annual cash outflows effects the way that the value of NPV is better if all putted in the long-term rentals than short-term. The NPV of the long-term rentals (Appendix 1) is relatively higher than investment price at the year zero, which proves that keeping the apartments in the long-term rent is more profitable than keeping short-term. The possible reasons for the such big difference between the values of NPV can be found from the expected occupancy rate of the short-term rentals and the discount rates that are higher in the short-term rentals compared to long-term.

As the calcualtions proved, all of the NPV´s are positive but there is still differences between the short-terms and the long-terms. All of the NPV calculations are just hypothetically calculated that if all of the apartments would be either on the long-term or short-term rental. The NPV of the long-term rentals is more reliable than the short-term since the expected annual occupation rate is 60%. The long-term rental will provide stable cash inflow since tenants are usually taking aparments for rent for more than one year. Putting all apartments in the short-term rental, such as the AirBnB, can provide high cash inflow and then lead to better NPV, but there is still a huge risk that the apartments can be vacant for many months. Sure if, for example two of the apartments would be in the long-term and two in short-term, the possibility to better outcome is possible by that.

When making cost-benefit analysis of an investment project, it is important to calucate also the IRR and MIRR of the project. IRR is a discount rate at which stage the present value equal to zero. For long-term rent the IRR is 8,3% (Appendix 4) and for short-term 17,35% (Appendix 4). The criteria for IRR evaluation, the project can be accepted when the IRR is compared to required rate of return. In the evaluation of this project, both of the IRR´s are approximately 2% higher than the

required rate of return, so the project should be accepted. In the MIRR calculations (Appendix 5) the reinvestment rate was taken from the required rate of return so for long-term it was 6,25% and for short-term 16,56%. The value of MIRR in the long-term is 8% and in short-term 17,0% so approximately 1,5% higher than the required rate of return.

In the calculations of the profitability index (PI) (Appendix 6), both of them are showing positive sign. If the decision to put all in long-term rent, the PI is 1,67 and if in short-term, then it would be 2,60. Since both of the profitability indexes are above one, the project should be accepted.

3.1. Risk analysis

In this part of the thesis the risks of the project are analyzed. To evaluate the risks that the project carries are calculated by the Monte Carlo simulation and scenario analysis. When analyzing the risks of this project, there is many factors to be taken into account. Both of the analyses are calculated for the next ten years when in the last year the project would be sold.

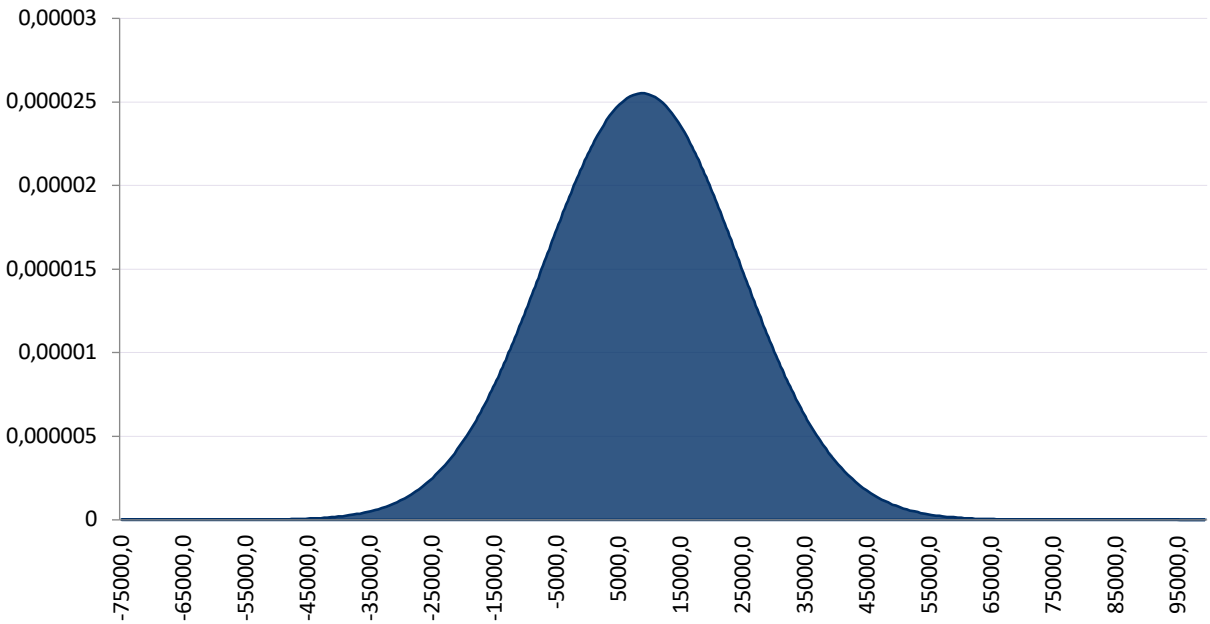
In the scenario analysis are taken into account the annual costs of the project (cash outflow), rate of return and the expected cash inflows. The scenario analysis showed that the project is most sensitive for the equation of cash inflow and – outflow, for both the long-term rental and short-term rental. Long-term rental has lower cash outflows and – inflows compared to short-term rental, but it is more likely that the apartments would be more on the long-term rent. The expected annual occupancy rate for the short-term rental is approximately 60% which leaves there 40% to be vacant which produces unstable cash inflow since no-one is living there. Due to scenario analysis, the possible changes in cash flows effect on the NPV of the project either positively or negatively.

By using Monte Carlo simulation, there is a possibility to see the possible distribution about the change in cash inflow during the certain period with random rate of return. Though, the previous risk analyze methods are good when making project risk analysis, Monte Carlo simulation shows better the risks of the cash inflows, which is one of the most important things in investment projects. So, for that reason the thesis uses also Monte Carlo´s risk analysis simulation. The main idea of executing Monte Carlo simulation in real estate investment project evaluation is that it puts real estate cash flows through tens of thousands risk scenarios as possible. To make the Monte

Carlo simulation, there has been used Excel and its Quantum XL tool to get the simulation correctly.

When staring to make the Monte Carlo simulation, the author chooses how many scenarios the simulation will run and, in this simulation, there has been run 10 000 scenarios to get the following results.

Table 4. Monte Carlo risk-analysis, cash flow in long-term rent

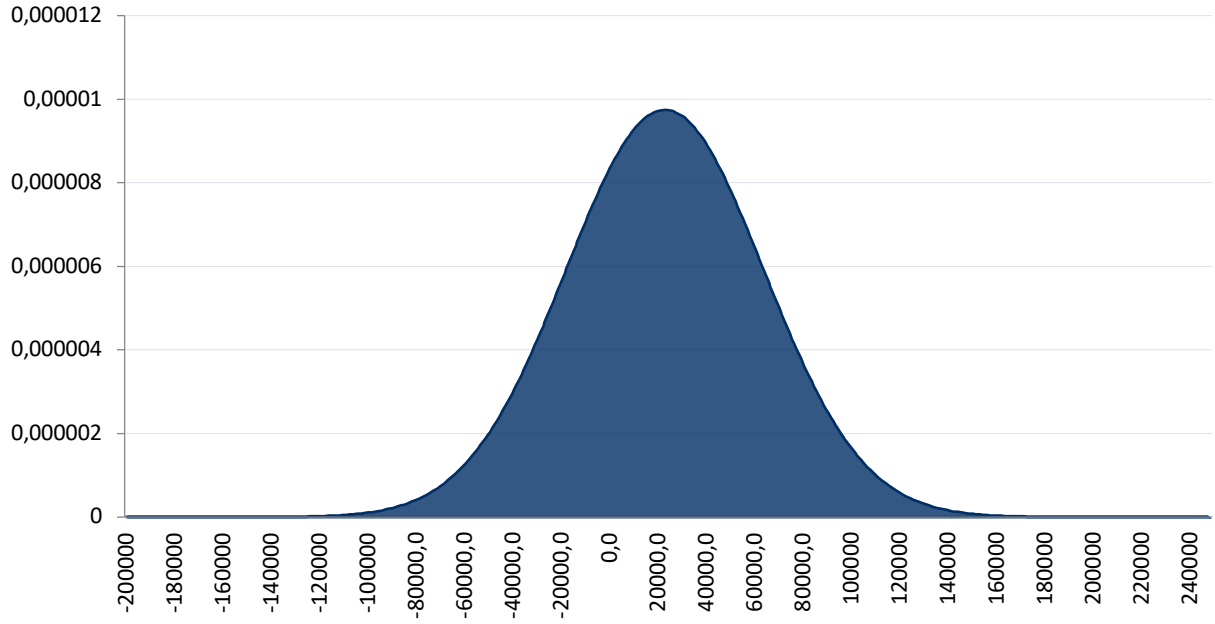


Source: Kiiskinen (2019), author´s calculations

In table 4 and 5, are analyzed the possibilities for cash inflow for random return. In table 4, where the long-term rental cash inflow is analyzed, the change in cash inflow, in the given rate of return varies from – 44 250€ at worst to 55 250 € at its best. In the calculations the growth rate is 4% expaected inflation, standard deviation is 1%, discount rate is 6,25% and the time is 10 years. Initial investment is 443 304€ and the terminal price, which indicates the expected future value of the project, is 668 927€. The average from the Monte Carlo simulation, for long-term rental, the value of cash inflow is 15 583,2€ which is relatively smaller than the base scenario of the calculated cash inflow.

In the Monte Carlo simulation, for short-term rental, the maximum cash inflow that the project would profit is 159 500€ at its best and thw lowest profit is -108 500€ at its worst. The average for the short-term simulation was approximate 40 831€ which is also lower compared to base scenario of the calculations in the expected cash inflows. In short-term calculation the expected growth rate is 4% inflation, standard deviation is 1%, discount rate is the expected rate of return of 16,56% and the time is 10 years. Initial investment is 443 304€ and the terminal price is expected future value of the project which is calculated to be 668 927€. In the simulation the other risk factros, such as political risk, credit risk and economic risk, are not taken into account since the company does not find them as important as the cash flow risk.

Table 5. Monte Carlo risk-analysis, cash flow in short-term rent



Source: Kiiskinen (2019), author´s calculations

When analyzing both of the Monte Carlo simulations, in both of the results most of the scenarios are in the positive side so it means that the riskines of the project is not that high and there is a good chance for good profits. Sure other risk factors like, the political risk, econoimic risk and credit risk needs to be taken into account when measuring the risk factors of the investment project.

Monte Carlo simulation was also run for the value of the project. In the simulation was also run 10 000 scenarios, as well as in the cash flow simulations. The point of running the simulation for the value of the project was to see what would be the lowest and the highest price to invest in the

project to get the rate of return wanted. Time perdiod for the simulation is ten years, as the project is expected to be sold after ten years. In the simulation for the long-term rental scenario, the minimum value to invest is 359 435,48€ and highest 731 417,75€ to get the 6,25% return of the project, which makes the mean value to be 454 423,87€. When going through the short-term rental scenario, the mininum value to invest is 378 850,60€ and highest 564 884,39€ to get the 16,56% return of the project, which makes the mean value to be 463 690,00€. The minimum and maximum values tells that there are scenarios where the company is only able to pay the mininum value to reach the targeted return of the investment and scenarios where the maximum value could also be invested but then the return would be higher than the targeted one. Based on the assumptions the mean value is the investment value to be paid and as both of the mean values are above the real investment value, the probability to get higher return on investment is possible in both scenarios. The reason for running the Monte Carlo simulation was to see the possible losses of the cash flows but also that are the risks higher than what the company could take. The investment value is also important to be analyzed so that the company is not paying too much of the project and by having 10 000 scenarios, it givest relatively reliable results.

CONCLUSION

There is demand for new furnished apartments in Tallinn since the population and economy seems to be growing year by year. New developments are coming every year and the prices are relatively smart at the moment for investors. Due to growing demand of newly constructed apartments in the area of Tallinn, the need for good priced and furnished apartments are in need.

The current thesis gives an overview of capital budgeting and risk analysis methods and presents an empirical analysis of a real estate investment project. The author of this thesis examines a real estate investment project of the company CreoX OÜ, which is planning to invest in four newly constructed real estate development in the center of Tallinn. The company has excess assets for covering all the expenses of the investment project and therefore is not planning to take a loan. This analysis is important for the company since they are planning to invest their excess assets, but they are not sure if they should invest in this exact project.

The company itself has not yet made a clear decision whether or not they are going to put the apartments in the long-term or short-term rent. If they decide to take a tenant, as for the long-term rental plan, they will be sure that the cash flow is stable and comes every month. If deciding to rent the apartments for long-term purpose, they have decided that the tenant will pay the monthly utility costs with the rent so that the company itself does not have to pay them.

The initial investment is relatively high since it totals almost close to half a million euros. But the company has excess assets so investing in real estate would be smart. It is important to evaluate the annual costs and the expected vacancy rates when it comes to real estate investment. Also, the annual expected net cash inflow and the risk analysis is very important. The aim of this thesis is to evaluate the profitability of this project and compare which way of renting the apartments out would be more cost beneficial.

According to the results of the calculations and the risk analysis the project should be accepted. Since the IRR and MIRR were approximately 1,5% higher than the desired rate of return and the

value of NPV was also greater than zero, in both scenarios, the project should be accepted. As the company was planned to sell the investment after ten years, the payback period showed that if all of the apartments was on the long-term rent, the investment would have not paid itself back after the ten years but if the apartments were on a short-term rent, it would pay back itself less than ten years.

The risk analysis of the project was carried out in two ways as the scenario analysis and the Monte Carlo simulation for cash flows and investment value scenarios. The scenario analysis indicated that the project was most responsive to the change in equation of the cash inflow and outflow.

Monte Carlo simulation was carried for the two scenarios as for long-term rent and short-term rent. For both of the scenarios were analyzed the cash flows and the investment values. The sensitiveness of the analyze was carried form the rental income, expected growth of rent, expense costs and its annual growth, rate of return, sales price after ten years and the terminal cap rate. All of the scenarios were performed 10 000 times to get the most reliable results of the possible changes in all variables.

All in all, the cost-benefit analysis proves that, according the results of the calculations and the risk analysis, the project should be accepted. The possibility to grow the investment value after ten years is possible. The risk analyses confirm that the possible change in the cash outflows effect on the ten-year value of the project. By the possible changes in cash flows the desired rate of return lowers down in both scenarios. By accepting this project, the company is able to growth owners´ wealth in the future.

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APPENDICES

Appendix 1. Net Present Value (NPV), long-term rent

Year	0	1	2	3	4	5	6	7	8	9	10
Initial cost	- 443 304,00 €										
Sunk Costs (furniture)		8 000,00 €									
Additional annual cost		630,06 €	630,06 €	630,06 €	630,06 €	630,06 €	630,06 €	630,06 €	630,06 €	630,06 €	630,06 €
Annual discounted cash flow		12 212,59 €	18 580,71 €	17 487,73 €	16 459,04 €	15 490,86 €	14 579,63 €	13 722,01 €	12 914,83 €	12 155,13 €	11 440,13 €
Project sale											668 927,18 €
Total discounted cash flow at year 10											680 367,31 €
Discount rate											6,25 %
Net Present Value											**472 062,10 €**

Source: Kiiskinen (2019), author´s calculations

Appendix 2. Net Present Value (NPV), short-term rent

Year	0	1	2	3	4	5	6	7	8	9	10
Initial cost	- 443 304,00 €										
Sunk Costs (furniture)		8 000,00 €									
Additional annual cost		3 090,06 €	3 090,06 €	3 090,06 €	3 090,06 €	3 090,06 €	3 090,06 €	3 090,06 €	3 090,06 €	3 090,06 €	3 090,06 €
Annual discounted cash flow		50 609,08 €	49 307,22 €	42 302,01 €	36 292,04 €	31 135,93 €	26 712,37 €	22 917,27 €	19 661,35 €	16 868,01 €	14 471,52 €
Project sale											668 927,18 €
Total discounted cash flow at year 10											683 398,70 €
Discount rate											16,56 %
Net Present Value											**316 697,10 €**

Source: Kiiskinen (2019), author´s calculations

Appendix 3. Discounted Payback Period (DPP)

LONG				SHORT		
Initial Investment	443 304,00 €			Initial Investment	443 304,00 €	
Cost of Capital	2 %			Cost of Capital	2 %	
Year	**Cash Flow**	**PV of future cash flows**		**Year**	**Cash Flow**	**PV of future cash flows**
0	- 443 304,00 €			0	- 443 304,00 €	
1	21 605,94 €	21 182,29 €		1	66 989,94 €	65 676,41 €
2	21 605,94 €	20 766,96 €		2	66 989,94 €	64 388,64 €
3	21 605,94 €	20 359,76 €		3	66 989,94 €	63 126,12 €
4	21 605,94 €	19 960,55 €		4	66 989,94 €	61 888,35 €
5	21 605,94 €	19 569,17 €		5	66 989,94 €	60 674,85 €
6	21 605,94 €	19 185,46 €		6	66 989,94 €	59 485,15 €
7	21 605,94 €	18 809,27 €		7	66 989,94 €	58 318,77 €
8	21 605,94 €	18 440,46 €		8	66 989,94 €	57 175,27 €
9	21 605,94 €	18 078,88 €		9	66 989,94 €	56 054,19 €
10	690 533,12 €	566 477,67 €		10	735 917,12 €	603 708,36 €
DPP		20,5		**DPP**		6,6

Source: Kiiskinen (2019), author´s calculations

Appendix 4. Internal Rate of Return (IRR)

LONG			SHORT	
Year	Cash Flow		Year	Cash Flow
0	-443 304,00 €		0	-443 304,00 €
1	21 605,94 €		1	66 989,94 €
2	21 605,94 €		2	66 989,94 €
3	21 605,94 €		3	66 989,94 €
4	21 605,94 €		4	66 989,94 €
5	21 605,94 €		5	66 989,94 €
6	21 605,94 €		6	66 989,94 €
7	21 605,94 €		7	66 989,94 €
8	21 605,94 €		8	66 989,94 €
9	21 605,94 €		9	66 989,94 €
10	690 533,12 €		10	735 917,12 €
IRR	8,3 %		IRR	17,35 %

Source: Kiiskinen (2019), author´s calculation

Appendix 5. Modified Internal Rate of Return (MIRR)

LONG			SHORT	
Year	**Cash Flow**		**Year**	**Cash Flow**
0	-443 304,00 €		0	-443 304,00 €
1	21 605,94 €		1	66 989,94 €
2	21 605,94 €		2	66 989,94 €
3	21 605,94 €		3	66 989,94 €
4	21 605,94 €		4	66 989,94 €
5	21 605,94 €		5	66 989,94 €
6	21 605,94 €		6	66 989,94 €
7	21 605,94 €		7	66 989,94 €
8	21 605,94 €		8	66 989,94 €
9	21 605,94 €		9	66 989,94 €
10	690 533,12 €		10	735 917,12 €
Safe Rate	4 %		Safe Rate	4 %
Reinvestment Rate	6,25 %		Reinvestment Rate	16,56 %
MIRR	8,0 %		**MIRR**	17,0 %

Source: Kiiskinen (2019), author´s calculations

Appendix 6. Profitability Index (PI)

LONG				SHORT		
Initial Investment	443 304,00 €			Initial Investment	443 304,00 €	
Cost of Capital	2 %			Cost of Capital	2 %	
Year	Cash flow	PV of Future Cash Flows		Year	Cash flow	PV of Future Cash Flows
1	21 605,94 €	21 182,29 €		1	66 989,94 €	65 676,41 €
2	21 605,94 €	20 766,96 €		2	66 989,94 €	64 388,64 €
3	21 605,94 €	20 359,76 €		3	66 989,94 €	63 126,12 €
4	21 605,94 €	19 960,55 €		4	66 989,94 €	61 888,35 €
5	21 605,94 €	19 569,17 €		5	66 989,94 €	60 674,85 €
6	21 605,94 €	19 185,46 €		6	66 989,94 €	59 485,15 €
7	21 605,94 €	18 809,27 €		7	66 989,94 €	58 318,77 €
8	21 605,94 €	18 440,46 €		8	66 989,94 €	57 175,27 €
9	21 605,94 €	18 078,88 €		9	66 989,94 €	56 054,19 €
10	690 533,12 €	566 477,67 €		10	735 917,12 €	603 708,36 €
Total		**742830,47**		**Total**		**1150496,11**
Profitability Index		**1,68**		**Profitability Index**		**2,60**

Source: Kiiskinen (2019), author´s calculations