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**School of Business**

**Finance**

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**Real Estate Investment in Helsinki**

Bachelor Thesis in Finance

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# Preface

The Finish education system provides great opportunities to deepen the understanding on the economics not only what is taught here in Finland but also through the student exchange programs around the world. Lappeenranta University of Technology sent me first to Taegu, South Korea to deepen the understanding in the Korean and Japanese business. Right after the year in Korea another year was spent in Melbourne, Australia also in the finance studies. Thereafter was a period of three years of self study in India and in Thailand and great openings to understand the local cultures and the businesses. On top of all this I had an opportunity to work hard all those four years seven days a week with combined groups of locals and westerners. Finally after seeing most of the Asia it is a point in time to finalize the remaining studies.

Numerous people, friends and close related have bought several apartments during the last three years. Enthusiasm for this study is to find out a model to calculate long term revenues for real estate investments including an understanding of the most necessary variables for more precise investment calculations.

# Acknowledgement

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# 1. Introduction

A real estate can be a consumption article or an investment object or both at the same time, which means that the consumers can purchase apartments for themselves to use or for investment purposes. When an apartment is an investment, it is rather necessary to calculate the risk and the return it provides, even if the investor is not going to actively speculate the real estate markets (Kuosmanen 2002).

Kauppalehti (2006) wrote how international investors have come to Finland to find profitable investments. These big European companies are able to get funds cheaper than the smaller Finish real estate companies. Low interest rate costs allow the big foreign companies to be profitable also during the tight market situations. Another impressive news revealed by Talous Sanomat (2008) is, how Nordic Retail Fund bought the Kamp Mall located in the Helsinki city center from the Boultbee real estate company. According to the two companies involved it was the biggest single real estate investment in Europe on that year.

In newsletter from Vuokraturva 17.3.2009, Asuntoturva Oy which is a part of Vuokraturva company is prepared to buy 800 apartments more on the coming year on top of the 500 apartments they already bought during the beginning of the current year from private owners. Because of the high demand, the company wants to offer more the size of the apartments which are the most needed on the markets at that moment. The bought apartments are meant to keep as part of Asuntoturva capital funds for the long term renting purposes (Asuntoturva 2009).

These three news were mentioned to show the activity of the real estate markets in Finland even though this study is focused on apartment investments.

## ***1.1 Topic of the Study***

The purpose of this study is to see whether a real estate investment in one-bedroom, two-bedroom and in three plus-bedroom size apartments were financially beneficial during the second quarter in 2009, and also to show the risks involved in the investments. As the result of this study, the reader will understand how the size of the bank loan, the length of the investment period and the size of the apartment affect the revenue of the investment. Not to forget the effects caused by the bank loan interest rates and the inflation. Rent income will be invested in the end of the month with 5% interest rate. Tilastokeskus (2009c, d, e, f) has provided the material and figures this study is based on. The reader also receives understanding on the relation between the risk and the return in the housing markets.

## ***1.2 Frame of the study***

The topic of the study is to reveal the profits the real estate investments will create during the investment periods of 10, 15 and 25 years. Place and time of the investments are Helsinki city center in the second quarter in 2009.

Bank loan:	0%, 25%, 50%, 80% from the price of the investment
Pay back period:	10 years, 15 years and 25 years
Loan type:	Annuity
Area of study:	Helsinki city center; area's post codes are 00100-00180
Apartment size:	One-bedroom, two-bedroom and three plus-bedroom size apartments
Test period:	10 years, 15 years and 25 years

### ***1.3 Presumptions***

An investor buying a real estate must pay 4% transfer tax from the value of the investment. Transfer tax needs not to be paid if a person at age 18 to 40 buys her first apartment for herself, not as an investment (Korpela 2008: 171-173). In this study the investor needs to pay transfer tax. The mentioned 4% transfer tax is included in the calculations.

From the rent income, expenses are subtracted; from the remaining amount the capital income tax is 28% (Korpela 2008: 13). This is included in the calculations.

The profit from the assignment is the difference between the transfer price and the acquisition costs where the expenses of acquiring the profit from assignment have been subtracted. The profit from assignment is categorized as a part of the capital income where the tax load is 28% (Korpela 2008: 26). Taxation on the profit from the assignment is included in the calculations.

The tax reduction of housing loan is 28%. A family with two children will get maximum 3600€ tax reduction per year. 1400€/year per adult, one child benefit is 400€/year and two or more children 800€/year (Korpela 2008: 85). In the calculations the presumption is a single investor who does not take housing loan tax reduction benefit into account at this point.

### ***1.4 Adequacy and Problems***

In the model which is used the real estates increases in value every year but the rent income stays the same. This means that year after year the return decreases when comparing it to the property value. In reality the rent income changes every year, but it was not possible to include it in the calculations.

The calculations show the more bank loan, the less revenue because of the bank loan interest payments. It is beneficial to have a bank loan when the return on the investment is higher than the bank loan's interest rate. Never the less, the bank loan leverage is not part of the calculations.

## 2. Real Estate Markets

Here are introduced two studies on close related topics. First, evidence which Liu & Mei (1994) found suggested that all asset returns are predictable to some extent and to forecast excess returns on real estate markets is relatively easy. They created two active trading tactics together with a passive buy and hold strategy to evaluate the success of market timing performance. "Value-weighted portfolio consisting of various types of exchange traded real estate firms using either active trading strategy outperforms a passive strategy from either an unadjusted or risk-adjusted return perspective" (Liu & Mei 1994). In contrast to real estate firms, the two chosen active trading strategies do not necessarily outperform buy and hold strategy for large-cap stocks and government bonds. In other words moderate evidence is found to support the proposition that it is possible to predict the real estate markets using various active market timing strategies for superior performance over a buy and hold strategy.

Quan D.C. & S. Titman (1997) follows with their finding in their study consisting of 17 countries that relation between real estate values and stock prices is strong and positive. Another factor found out is that previous-period stock return appears to be a dominant factor in determining this period's real estate price changes.

## **2.1 *Importance of Real Estate Investments***

Vuorinen (1994: 9) find that the Finnish national wealth consists mainly of apartments, other real estate properties, national resources (mainly forests), and of corporate capital. 60% of this consists of apartments and other real estate properties. There have been plenty of studies which calculated the recommended proportion of the real estates in the investors' portfolios. Liang, Myer & Webb (1996) ended up in a conclusion of minimum 15% weight in the real estates in investors' portfolios. Kallberg, Liu & Greig (1996) ended up to 9% allocation to the real estates, rather than 20% which other studies they studied suggested. Ziobrowski, Cheng & Ziobrowski (1997) concluded not to put more than 10% of investors' portfolio in the real estate.

## **2.2 *Risk and Return***

The yield from a property investment comprises both the property's rise in value and the rent income taking in consideration the property's decrease in value and the necessary restoration expenses. In the real estate risk calculations the evaluation process should include both of these aspects (Puttonen & Kivisaari: 168).

Investment means to invest money or other resources for gaining future returns. For the investor the most important quality of the investment is the risk and the return profile (Nikkinen, Rothovius & Shalström 2002: 9). First, the estimates are prepared for the available investments' risk and return over a forward holding period. Second, the estimates are done on the allocation between available investments and funds (Fischer & Jordan 1991:58). Risk can be defined as the probability of realized return to differentiate from the expected return (Nikkinen, Rothovius & Sahlström 2002:28).

Investors in commodity markets in general are averting risk (Fama 1968: 29). If they agree to hold investments with higher risks they demand higher returns during the chosen investment period. On the other hand, if the earnings of the investment are

smaller, the risk the investor is taking is smaller. This is a basic principle, even though till to day a simple way to define risk and return has not been created. Risk is often defined as the investment commodity's variation of the price in the chosen time frame. The difference between the risk and the uncertainty is that if the risk unfolds it will create financial losses to the risk bearer. If the future is seen to resemble the past, then the variance of the past performance can be used to estimate the future risk (Kuosmanen 2002: 11).

Risk can be directed to only one investment commodity when it is calculated from the past performance. Decentralization of a risk concerning a single investment commodity is the basic principle of the portfolio theory, which means that a price change of a single investment commodity loses its importance. The risk of an effectively decentralized portfolio behaves as a systematic risk in the whole market. At this point the investor is more interested in the volatility of the markets and the reactions of different investment commodities. For the investor it is interesting if they earn extra from riskier investments and how much is the compensation. The risk and return calculations are as relevant for the stock markets as they are for the real estate markets (Kuosmanen 2002: 12).

In the real estate markets the investors face a variety of risks which are affected by the economic situation, the legislation and the political decisions. To take these risks into account when estimating future revenues is important (Heiskanen 2007c: 49). The most common risks can be divided in six categories:

1. *Liquidity risk.* The liquidity risk means how easy, fast and cost effectively a real estate can be traded. When the liquidity is weak, it is difficult to sell a real estate profitably. For example the liquidity of the real estate markets is worse comparing to the stock markets. The liquidity of the real estate markets is highly affected by the location and the economic situation (Heiskanen 2007b: 49).
2. *Information risk.* The real estate markets are practically not efficient rather the markets are ruled by the professional institutional investors, who have a strong

information advantage comparing to the small investors. The information risk can also be an advantage if friends are able to provide inside information on affordably priced investments. A special character of the real estate investments is that every trade is a separate action and that the seller has always a specific control over the selling price as well as an information advantage of the target product comparing to the buyer (Heiskanen 2007b: 49).

3. *Rent risk.* The rent risk is divided in two parts. The first one; difficulties to find a tenant. The second; the tenant does not pay the rent. To the first part of the rent risk is possible to hedge against by purchasing the real estate from a good location. This makes it easier to find a tenant. The second part of rent risk is if a tenant or a corporation does not pay the rent or damages the property. The solution to minimize this risk is to increase the number of the tenants (Heiskanen 2007c: 49).
4. *Political Risk.* The political risks are the changes in the rental activity, in the land ownership and in the tax law. Especially changes in the taxation affect the rent income and the profit when selling the real estate. The planning risk is essentially part of the political risk, since political decisions are often affecting the size of the planning risk. For example the local infrastructural decisions have remarkable influence to the real estate prices. By decentralizing the real estate investment to various areas is possible to minimize the effects of the planning risk (Heiskanen 2007: 50).
5. *Building cost risk and repair cost risk.* The condition of a real property is a significant risk factor for an investor. It is essential to go carefully through the condition of a real estate before a purchase decision. Also the condition of the housing corporation has a significant value in investment decision making process (Heiskanen 2009c: 50).
6. *Interest rate risk.* When a real estate is financed with loan money the interest rate risk is evident. The loan period is often long in real estate loans meaning high

probability for interest rates to rise during the loan period. The interest rate risk becomes real when the loan expenses exceed the rent income (Heiskanen 2009c: 50).

### **3 Background of Real Estate Prices in Finland**

During the second quarter in 2009 the new comers in real estate markets were active while many of the expert real estate investors were standing back and observing the situation of overpriced apartments changing owners (Ahotupa 2009). According to Kauppalehti (2006: 3) profit demand for real estate investments have decreased down to 5.3% in Helsinki city area.

Tilastokeskus (2009a) find the prices of apartments increased 220 per cent since 1983 as figure 1 shows. In the same time span general income has increased almost the same amount and general price level has doubled as figure 1 shows. During the apartment price boom 1987-1989 the apartment prices increased 72% and the salaries 25%. During the recession in the beginning of 1990 the prices of apartments declined 40 per cent in the time span of four years. The salaries increased 19 per cent. Purchasing power for apartments was the highest in 1995.

The prices of apartments started to increase in 1996 and at the end of the decade the prices went up almost 50 per cent. There was a miniature recession in 2001 when the prices went down almost one per cent. After that episode the apartment prices have increased till half way of 2008. During the years 1996-2008 apartment prices increased 127 per cents. During the same time salaries increased 53 per cents and general price level increased 24 per cents.

Purchase power in the 21th century has increased rather quickly. There has appeared a ‘price bubble’ in housing markets in the year 2006, when the long term apartment price curve raised over the general income index. Since the decrease in apartment prices in 2008 the “price bubble” has melted.

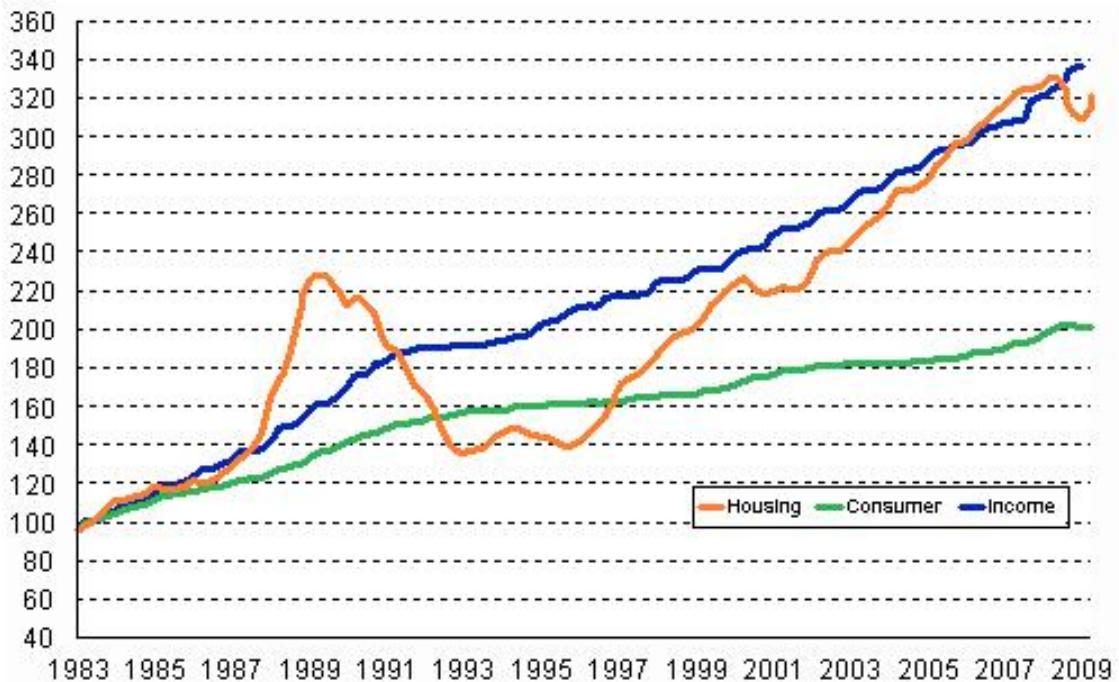


Figure 1. Housing price index, consumer price index, earned income index.  
(Tilastokeskus 2009a).

New apartments’ and row houses’ prices decreased during the second quarter of 2009 in Finland for one percentage comparing to previous quarter. In Helsinki area the prices increased for 1.6% where as in the other parts of Finland the prices decreased for 2.4%. Comparing to the second quarter 2008 the prices decreased 4.5% in whole Finland. In Helsinki area the prices decreased 0.7% and in the other parts in Finland 6.5%. Figure 2 illustrates the historical price development of old apartments (Tilastokeskus 2009b).

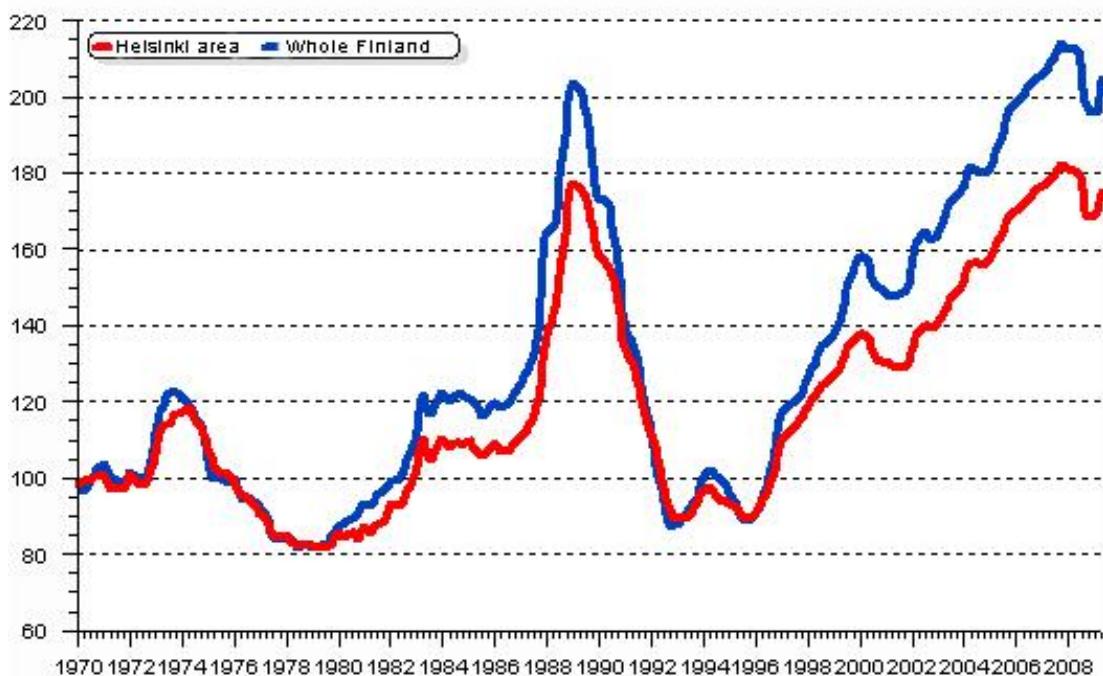


Figure 2. Old apartment's real price index in quarter years I/1979 – II/2009, index 1970=100 (Tilastokeskus 2009b).

## 4. Literature Review

Antell and Vaihekoski (2001) calculated whether to buy an apartment to live in it or to rent one. The results of their study showed the more funds the apartment buyer has, the more beneficial it is to rent a home and invest the funds. The less the apartment buyer has funds, the better financially it is to buy a home with a bank loan. According to their study the break-even point is 60.2%, which means when apartment buyer has 60.2% of the needed funds together it is more profitable to live in a rented place and invest the money.

Seiler, Chatrath and Webb (2001) studied the effect of a real asset ownership on the risk and the return for firm's stockholders since many corporations own significant amount of real assets including real estates. Their research attempts to ascertain the

effect, if any, of the corporate real asset ownership on the risk and return to stockholders. The data is from a period from 1985 to 1994. Their results provide no evidence in support of a diversification benefits for corporations due to holding real assets, both in terms of risk (beta) and risk-adjusted returns. However, this does not mean the firm to be disadvantage with real asset holdings in terms of risk and risk-adjusted return. Further research is needed to draw any generalizations.

Kuosmanen (2002) illustrated in his study the positive price correlation between the real estate and the stock markets in short term and in medium term in main cities in Finland. He also found that the stock market development reflects to the real estate prices in areas where the most of the stock capital is accumulated. To hedge against the inflation in medium term proved to be challenging for the real estate and for the stock investments. Decline in the interest rates and increase in the cross national product increases the prices for real estates and stocks.

## 5. Test

### 5.1 *Test Figures*

Tilastokeskus (2009c, d, e, f) and Suomen Pankki (2009) provided the necessary statistics for the calculations for the time period of second quarter 2009. The inflation percentage used in calculations is the average yearly inflation calculated from a data between years 1861 to 2008 (Tilastokeskus 2009c). Inflation rates which are higher or lower than 24% are cut out from the data. There are all together 8 years with higher inflation rate than 24%. To use the inflation rate which was valid during the second quarter of 2009 would not give a real picture of the future inflation since the investment periods are long; 10, 15 and 25 years.

Apartments change in value year after year. Tilastokeskus (2009d) provided the index of price change between 1983-2001 and 2005-2009. The value used in this study is the average value from this material. The nominal profit demand was chosen to be 5%, which is the average long term profit demand for 10 year government bonds (Antell, J. & M. Vaihekoski 2001). The apartment size, the size of the rent, the maintenance payment and the purchase price are all figures given by Tilastokeskus (2009 e) for the second quarter 2009.

One of the risks in real estate investments when investing with loan funds is an interest rate risk. For accuracy an average house loan interest rate from Finnish banks calculated month by month from June 1989 to June 2009 is used (Suomen pankki 2009).

The invested rent income and the future sell price of the apartment are discounted to present value with a real rate; formula in equation (1) is used, where i is the interest rate, r is the real rate, and h is the inflation (Crundwell 2008:139).

$$(1) \quad i = r + h + rh$$

The future value of a principal amount, PV, at an interest rate of i per period after n periods is shown by the equation (2), (Crundwell 2008:129).

$$(2) \quad FV = PV (1 + i)^n$$

The present value of an amount that is expected in the future is determined by the interest formula given in the equation (3). The equation is arranged to express the present value in terms of future value where PV is the present value, FV is the future value, i is the interest rate, n is the number of the periods (Crundwell 2008: 147).

$$(3) \quad PV = FV \frac{1}{(1+i)^n}$$

An ordinary annuity is one in which the first payment is at the end of the first payment or investment period and the payments are made in equal installments thereafter. In future value annuity (FVA) formula, in equation (4); A is the installment, i is the interest rate per period, and n is the total number of the periods (Crundwell 2008: 140-141).

$$(4) FVA = A \left( \frac{(1+i)^n - 1}{i} \right)$$

Crundwell (2008) taught return on investment as shown in the equation (5):

$$(5) \text{Return on investment} = \frac{\text{Total income} - \text{Original investment}}{\text{Average book value}}$$

In this study a Simple ROI term is used as in the equation (6) to calculate the first year revenue to have a simple comparison for ROI calculations:

$$(6) \text{Simple ROI} = \frac{12(\text{Monthly rent} - \text{monthly maintenance payment})}{\text{Purchase price}}$$

The ROI calculations include the effect of the invested rent income and the selling of the apartment at the end of the investment period as shown in the equation (7):

$$(7) ROI = \frac{\text{Gain from investment} - \text{Cost of investment}}{\text{Cost of investment}}$$

The expected return, the variance, and the standard deviation formulas are shown in the equations (8),(9) and (10).

Where:

R = expected return

$\sigma^2$  = variance of expected return

$\sigma$  = standard deviation of expected return

P = probability

O = outcome

n = total number of different outcomes (Fischer 1991: 104).

Expected return:

$$(8) \quad R = \sum_{i=1}^n P_i O_i$$

Variance:

$$(9) \quad \sigma^2 = \sum_{i=1}^n P_i (O_i - R)^2$$

Standard deviation:

$$(10) \quad \sigma = \sqrt{\sigma^2}$$

## 5.2 Calculations

Tables below shows the revenue on investments according to the size and price of the apartment, the monthly rent, the yearly price change of the apartment, the inflation, the nominal profit demand, the bank loan interest rate and the loan amount.

### 5.2.1 Investment for 10 Years

10y investment, 2nd quarter 2009	One-bedroom	Two-bedroom	Three+-bedroom
Investment period (years)	10	10	10
Size (m <sup>2</sup> )	40	60	80
Rent (€/m <sup>2</sup> )	20,12 €	15,89 €	13,87 €
Purchase price (€/m <sup>2</sup> )	4 748,00 €	4 543,00 €	4 519,00 €
Purchase price (€)	189 920,00 €	272 580,00 €	361 520,00 €
Price change of the apartment (p.a.)	4,30 %	4,30 %	4,30 %
Inflation (p.a.)	3,17 %	3,17 %	3,17 %
Nominal profit demand (p.a.)	5,00 %	5,00 %	5,00 %
Bank loan interest rate (p.a.)	6,76 %	6,76 %	6,76 %
Return on investment (%):			
Simple ROI	4,14 %	3,25 %	2,76 %
ROI/year, with 0% loan	4,04 %	3,55 %	3,26 %
ROI/year, with 25% loan	3,30 %	2,81 %	2,53 %
ROI/year, with 50% loan	2,62 %	2,13 %	1,85 %
ROI/year, with 80% loan	1,86 %	1,38 %	1,10 %

Table 1.

The One-bedroom apartment provides the best rent income comparing to the Two- and Three+- bedroom apartments. The rent income is 45% better with the One- bedroom apartment comparing to the Three+-bedroom apartment and 27% better for the One-bedroom apartment comparing to the Two-bedroom apartment.

Simple ROI is 4.14% for the One-bedroom apartment, whereas the Two-bedroom and Three+-bedroom apartments' performance is slightly weaker. ROI with 0% loan shows higher income in the Two- and in the Three+-bedroom apartments than Simple ROI. There are numerous reasons for this, one being that in ROI calculations rent income has been reinvested and in the end of the investment period the real estate is being sold. Other reasons which affect ROI value are the yearly price change of the apartment, the inflation, the nominal profit demand, the bank loan interest rate, the loan amount and the taxes. According to the calculations, the Two-bedroom and the Three+-bedroom apartments provide smaller revenue comparing to the One-bedroom apartment.

### 5.2.2 Investment for 15 Years

<b>15y investment, 2nd quarter 2009</b>	<b>One-bedroom</b>	<b>Two-bedroom</b>	<b>Three+-bedroom</b>
Investment period (years)	15	15	15
Size (m <sup>2</sup> )	40	60	80
Rent (€/m <sup>2</sup> )	20,12 €	15,89 €	13,87 €
Purchase price (€/m <sup>2</sup> )	4 748,00 €	4 543,00 €	4 519,00 €
Purchase price (€)	189 920,00 €	272 580,00 €	361 520,00 €
Price change of the apartment (p.a.)	4,30 %	4,30 %	4,30 %
Inflation (p.a.)	3,17 %	3,17 %	3,17 %
Nominal profit demand (p.a.)	5,00 %	5,00 %	5,00 %
Bank loan interest rate (p.a.)	6,76 %	6,76 %	6,76 %
Return on investment (%):			
Simple ROI	4,14 %	3,25 %	2,76 %
ROI/year, with 0% loan	3,94 %	3,51 %	3,25 %
ROI/year, with 25% loan	3,24 %	2,81 %	2,56 %
ROI/year, with 50% loan	2,62 %	2,19 %	1,94 %
ROI/year, with 80% loan	1,94 %	1,51 %	1,26 %

Table 2.

The investment period is increased to 15 years; the other figures are the same as in the table 1. Simple ROI is the same since no figures which affect it have been changed.

ROI figures are close to the table 1 10 year investment horizon figures; only minor changes in revenues.

### 5.2.3 Investment for 25 Years

<b>25y investment, 2nd quarter 2009</b>	<b>One-bedroom</b>	<b>Two-bedroom</b>	<b>Three+-bedroom</b>
Investment period (years)	25	25	25
Size (m <sup>2</sup> )	40	60	80
Rent (€/m <sup>2</sup> )	20,12 €	15,89 €	13,87 €
Purchase price (€/m <sup>2</sup> )	4 748,00 €	4 543,00 €	4 519,00 €
Purchase price (€)	189 920,00 €	272 580,00 €	361 520,00 €
Price change of the apartment (p.a.)	4,30 %	4,30 %	4,30 %
Inflation (p.a.)	3,17 %	3,17 %	3,17 %
Nominal profit demand (p.a.)	5,00 %	5,00 %	5,00 %
Bank loan interest rate (p.a.)	6,76 %	6,76 %	6,76 %
Return on investment (%):			
Simple ROI	4,14 %	3,25 %	2,76 %
ROI/year, with 0% loan	3,73 %	3,38 %	3,17 %
ROI/year, with 25% loan	3,11 %	2,76 %	2,56 %
ROI/year, with 50% loan	2,58 %	2,23 %	2,03 %
ROI/year, with 80% loan	2,02 %	1,68 %	1,47 %

Table 3.

In the table 3 all the other values are the same but investment period is increased to 25 years. Simple ROI is the same as in previous tables and ROI shows better performance with the 80% bank loan in the 25 year investment period comparing to the 10 and to the 15 year investment periods.

## 5.3 Analyzes

### 5.3.1 What if-Analyze

#### 5.3.1.1 Pay Back Period

Pay back period	One-bedroom 1	One-bedroom 2
	Buy and keep	Sell in the end
Investment period (years)	20,25	20,25
Size (m <sup>2</sup> )	40	40
Rent (m <sup>2</sup> )	20,12 €	20,12 €
Purchase price (€/m <sup>2</sup> )	4 748,00 €	4 748,00 €
Purchase price (€)	189 920,00 €	189 920,00 €
Price change of the apartment (p.a.)	0,00 %	4,30 %
Inflation (p.a.)	3,17 %	3,17 %
Nominal profit demand (p.a.)	5,00 %	5,00 %
Bank loan interest rate (p.a.)	6,76 %	6,76 %
Return on investment (%):		
Simple ROI	4,14 %	4,14 %
ROI/Year, with 0% loan	0,00 %	4,04 %

Table 4.

The table 4 shows the pay back period for the One-bedroom apartment in column one; where the price change of the apartment is not part of the calculations; neither will it be sold in the end of the investment period. ROI with the 0% loan is 0% which shows the length of the pay back period, all the other bank loan options give negative returns with the 20.25 year investment period. If the investment period is increased enough from the 20.25 years will ROI give positive values for the loan options of 25%, 50% and for the 80%. These calculations are not shown on the table. The longest pay back period is with the 80% bank loan which is 32.5 years. In the column two the apartment raises in value every year and it will be sold in the end of the investment period.

### 5.3.2 Scenario Analyzes

#### 5.3.2.1 Real Situation in 2<sup>nd</sup> Quarter 2009

Situation 2nd quarter 2009	One-bedroom	Two-bedroom	Three+-bedroom
Investment period (years)	10	10	10
Size (m <sup>2</sup> )	40	60	80
Rent (€/m <sup>2</sup> )	20,12 €	15,89 €	13,87 €
Purchase price (€/m <sup>2</sup> )	4 748,00 €	4 543,00 €	4 519,00 €
Purchase price (€)	189 920,00 €	272 580,00 €	361 520,00 €
Price change of the apartment (p.a.)	4,09 %	4,09 %	4,09 %
Inflation (p.a.)	0,23 %	0,23 %	0,23 %
Nominal profit demand (p.a.)	2,20 %	2,20 %	2,20 %
Bank loan interest rate (p.a.)	2,60 %	2,60 %	2,60 %
Return on investment, (%):			
Simple ROI	4,14 %	3,25 %	2,76 %
ROI/year, with 0% loan	3,46 %	3,02 %	2,76 %
ROI/year, with 25% loan	3,18 %	2,75 %	2,49 %
ROI/year, with 50% loan	2,92 %	2,48 %	2,23 %
ROI/year, with 80% loan	2,61 %	2,17 %	1,92 %

Table 5.

The table 5 shows all the figures as they were during the second quarter in 2009. The One-bedroom apartment is the most profitable investment out of the options. Simple ROI is 4.14% and ROI with the 0% loan is 3.46%. The nominal profit demand is 2.2% (Valtiokonttori 2009), which is the rate of Finish government T-bill being sold in August 2009.

### 5.3.2.2 Situation 2<sup>nd</sup> Quarter 2009 with Low Purchase Price

Situation 2nd quarter 2009, low price	One-bedroom
Investment period (years)	10
Size (m <sup>2</sup> )	40
Rent (€/m <sup>2</sup> )	20,12 €
Purchase price (€/m <sup>2</sup> )	2 810,00 €
Purchase price (€)	112 400,00 €
Price change of the apartment (p.a.)	4,09 %
Inflation (p.a.)	0,23 %
Nominal profit demand (p.a.)	2,20 %
Bank loan interest rate	2,60 %
Return on investment (%):	
Simple ROI	7,00 %
ROI/year, with 0% loan:	4,77 %

Table 6.

In the table 6 all the other figures are the same, as in the table 5 except in this case the investor has found an apartment with a better price. The price is 2810 €/m<sup>2</sup>. With this the outcome of Simple ROI is 7% and ROI 4.77%. The reason for this table is to find out the purchase price which provides the real estate investor 7% Simple ROI revenue.

### 5.3.2.3 The Effect of the Tax Payments on the Revenue

Tax effect	Taxes paid	No taxes
Purchase price €/m <sup>2</sup>	2 810,00 €	2 810,00 €
Simple ROI	7,00 %	7,28 %
ROI, 0% loan	4,77 %	6,62 %

Table 7.

In the table 7 are the same base figures as in the table 6. This scenario shows the difference in the revenue before and after the tax payments. The ‘taxes paid’ column

includes the transfer tax, the capital income tax, and the profit from assignment tax. Simple ROI calculation includes the transfer tax in ‘taxes paid’ column which is the reason for different Simple ROI value between the columns. The ‘taxes paid’ column: purchase price 2810 €/m<sup>2</sup>; Simple ROI 7,00% and ROI 4,77%.

In the ‘no taxes’ column; purchase price 2810€/m<sup>2</sup>, Simple ROI 7.28% and ROI 6.62%.

The housing loan tax reduction need not to be taken in consideration since in this example is no bank loan. What can be seen from the results is that the transfer tax decreases Simple ROI revenue for 0.28 percentage units. Further more, the total weight of the taxes in ROI is -1.85 percentage units which is the difference between ROIs with 0% loan.

### **5.3.2.3 Worst Case Analyze**

Worst case	One-bedroom
Investment period (years)	10
Size (m <sup>2</sup> )	40
Rent (€/m <sup>2</sup> )	19,11 €
Maintenance payment (€/m <sup>2</sup> )	4,00 €
Purchase price (€/m <sup>2</sup> )	5 256,00 €
Purchase price (€)	210 240,00 €
Price change of the apartment (p.a.)	-5,00 %
Inflation (p.a.)	2,00 %
Nominal profit demand (p.a.)	2,50 %
Bank loan interest rate (p.a.)	3,00 %
Return on investment, (%):	
Simple ROI	3,32 %
ROI/year, with 0% loan	-0,70 %
ROI/year, with 25% loan	-1,05 %
ROI/year, with 50% loan	-1,38 %
ROI/year, with 80% loan	-1,77 %

Table 8.

In the worst case scenario the rents decrease for 5%. The expenses have increased; the housing corporation have to raise the maintenance payment up to 4€/m<sup>2</sup> which was statistically 3.08€/m<sup>2</sup> for the given time period (Tilastokeskus 2009e). Sudden renovation costs for water pipe system for the apartment building is 508€/m<sup>2</sup> (Autio 2009). This amount increases the purchase price accordingly to the size of the apartment. The apartment decrease in value for 5% p.a. The inflation stabilizes in 2%, the nominal profit demand is 2.5% and the bank loan interest rate is 3%.

Simple ROI is 3.32% since it does not take into account the other figures starting from the yearly price change of the apartment to the bank loan interest rate and the bank loan amounts. ROI calculations give maximum -0.70% return in the 0% loan situation, in other cases the loss is greater.

#### **5.3.2.4 Best Case Analyze**

<b>Best case</b>	<b>One-bedroom</b>
Investment period (years)	10
Size (m <sup>2</sup> )	40
Rent (€/m <sup>2</sup> )	21,13 €
Maintenance payment (€/m <sup>2</sup> )	3,08 €
Purchase price (€/m <sup>2</sup> )	4 748,00 €
Purchase price (€)	189 920,00 €
Price change of the apartment (p.a.)	6,00 %
Inflation (p.a.)	4,00 %
Nominal profit demand (p.a.)	5,00 %
Bank loan interest rate (p.a.)	4,50 %
Return on investment, (%):	
Simple ROI	4,39 %
ROI/year, with 0% loan	5,91 %
ROI/year, with 25% loan	5,37 %
ROI/year, with 50% loan	4,87 %
ROI/year, with 80% loan	4,29 %

Table 9.

The rent increases with 5% p.a. The apartment prices increase yearly with 6%. The inflation is 4%. The nominal profit demand is 5% and the bank loan interest rate is 4.5%. The table 9 shows the results for the One-bedroom apartment since the investors are most probably more interested in it comparing to the bigger One-bedroom and Two-bedroom apartments. Simple ROI is 4.39% since the higher rent income. ROIs are higher than in the previous cases, since now the figures represent a situation where the economy is growing. ROI with the 0% bank loan is 5.91% and with the 80% loan 4.29%.

### **5.3.2.5 Measuring the Risk**

Economic situation	Probability	Return, %
Best case	0,15	5,91
2nd quarter 2009 situation	0,7	3,46
Worst case	0,15	-0,70

Table 10.

In this table are three different economic situations which can happen during the following 12 months from the test period onwards with the strongest 70% probability for the 2<sup>nd</sup> quarter 2009 situation, 15% probability for the best case and 15% probability for the worst case. These calculations are done with the One-bedroom apartment example with the 0% bank loan since the One-bedroom apartment give the best profit out of the options. Reason for the chosen 0% bank loan amount is that it gives the closest to reality picture of returns since the bank loan leverage and the housing loan tax reduction are not part of the calculations.

Test	Value, %
Expected return	3,20
Standard deviation	1,85

Table 11.

The expected return for the investment is 3.20% and the standard deviation 1.85%. In comparison a 5 year US government treasury bill average return is 5.26% and a standard deviation 6.39% according to a material collected from 1926 to 1998 (Nikkinen 2005:37). From the treasury bill returns no taxes have been paid where as from real estate returns the taxes have been subtracted. After the 28% capital income tax the US government treasury bill return is 3.79%.

## 6. Results

### **10,15 and 25 year investments**

The lengths of the real estate investment periods are 10, 15 and 25 years and the test period is the second quarter in 2009. Simple ROI for the 10, 15 and 25 year test periods for the One-bedroom apartment is 4.14%, for the Two-bedroom apartment 3.25% and for the Three+- bedroom apartment 2.76%. ROI for the One-bedroom apartment 10 year investment horizon with 0% bank loan is 4.04% which is the highest revenue ratio out of the apartment options, the bank loan options and the investment periods. The other combinations give lower returns. The One-bedroom apartment is the most profitable according to the calculations since the highest rent per m<sup>2</sup>.

In the calculations for 10, 15 and 25 year investments the ratios used were the average ratios calculated from a historical data which can be valid during the whole investment period instead of using the second quarter 2009 values which can change dramatically during the following 10, 15 and 25 year investment periods.

### **Pay back period**

The pay back period is calculated to see the effectiveness of the investment. The pay back period calculations are done with same figures as the 10, 15 and 25 year investment examples except not taking into account the apartments rise in value and

the selling of the apartment in the end of the investment period. The result for the One-bedroom apartment investment's pay back time with the 0% bank loan is 20.25 years. The longest pay back period from the One-bedroom apartment category is with the 80% bank loan; 32.5 years.

### **2<sup>nd</sup> quarter 2009 values for the 10 year investment**

The scenario analyze calculations are done with the test period values for the 10 year investment period. Simple ROI being 4.14% for the One-bedroom apartment, 3.25% for the Two-bedroom apartment and 2.76% for the Three+-bedroom apartment. The One-bedroom apartment with the 0% bank loan gives the highest revenue of 3.46% out of the One-bedroom, the Two-bedroom, and the Three+-bedroom categories and from the different bank loan options.

### **2<sup>nd</sup> quarter 2009 values for 10 year investment with a low purchase price**

For an investor who wants to have a minimum of 7% Simple ROI for the One-bedroom apartment with the 0% bank loan the purchase price per square meter is 2810€. This price is 40.8% lower than the test periods prevailing square meter price.

### **The effect of tax payments on the revenue**

This scenario shows the tax payments effect on the revenue. The taxes which are part of the calculations are the transfer tax, the capital income tax, and the profit from assignment tax. Simple ROI calculation includes the transfer tax which is the reason for different Simple ROI values between the examples. The taxes paid figures are: 2810 €/m<sup>2</sup>, Simple ROI 7.00% and ROI 4.77%.

The same calculation when no taxes paid are: 2810€/m<sup>2</sup>, Simple ROI 7.28% and ROI 6.62%.

The housing loan tax reduction does not need to be taken in to consideration since in this example is no bank loans. The results show that the transfer tax decreases Simple ROI revenue with 0.28 percentage units. Furthermore, the total effect of the

taxes on the revenue in chosen example is -1.85 percentage units which is the difference between ROIs with 0% loan.

### **Worst case analyze**

In the worst case analyze the values are changed to represent the worst possible case for the 12 following months onwards from the test period. With these figures Simple ROI is 3.32% and ROI for the One-bedroom apartment with the 0% bank loan is -0.70%. All the other investment options give more loss.

### **Best case analyze**

In the best case analyze the figures were modified to represent the best possible case which can happen during the 12 following months onwards from the test period. With these figures Simple ROI for the One-bedroom apartment is 4.39% and ROI with the 0% bank loan is 5.91% which is the highest revenue out of the investment options.

### **Risk measurement**

The 2<sup>nd</sup> quarter 2009 situation is being used for the risk measurement with the worst case and with the best case. The probability for the test period situation to remain the same for coming 12 months is estimated to be 70%, the best case probability estimation is 15% and the worst case probability is 15%. With these values the expected return is 3.20% and the standard deviation is 1.85%. The reason for the chosen 0% bank loan amount is that it gives the closest to reality picture of the returns since the bank loan leverage and the housing loan tax reduction are not part of the calculations.

## 7. Conclusion

ROI for the One-bedroom apartment for the 10 year investment plan with the 0% bank loan during the second quarter in 2009 is 4.04% p.a., the same investment with the 0% loan for 15 years estimates 3.94% p.a. revenue and for 25 years 3.73% p.a. revenue. From these calculations all the taxes are already subtracted.

The average long term profit demand for 10 year government bonds is 5.00% p.a. (Antell, J. & M. Vaihekoski 2001). From the bond revenue the capital income tax need to be subtracted. After the capital income tax the 5.00% government bond revenue becomes 3.60%

Comparison between the revenues of the real estate investments in Helsinki in the second quarter in 2009 and the 10 year government bond investment give the understanding on the returns of each investment. Things which count in the real estate investment decision making process are the standard deviation and the way the calculations are accomplished. In the real estate revenue calculations the purchase price, the price change of the apartment, the rent income, the change in rent income, the inflation, the nominal profit demand, the bank loan interest rate, the taxation and the future risks affects the result enormously.

## 8. Further Studies

A necessary topic to research is the way the institutional investors invest in real estates during the periods when general real estate price level is high. Another necessary detail is to include the effect of the rising rent income to be part of the calculations to see more accurately the average yearly revenue.

## 9. Thesaurus

Old apartment = the apartment was constructed one calendar year before the year when the figures were calculated.

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