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Real Estate as an Investment Alternative in an Environment with Low Interest Rates and Inflation

-A comparison between Japan and Sweden

Samuel Roihjert and Viktor Åhlander

ROYAL INSTITUTE OF TECHNOLOGY

DEPARTMENT OF REAL ESTATE AND CONSTRUCTION MANAGEMENT

Master of Science thesis

Title: Real estate as an investment alternative in an environment with low interest rates and inflation – A comparison between Japan and Sweden

Author(s): Samuel Roihjert and Viktor Åhlander

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Abstract

Today's market situation for real estate and property developers in Sweden is very unique. It is characterized by low to negative interest rates and low to no inflation. However, many of the existing economic theories are based on positive interest rates and a positive inflation. This has resulted in uncertainties for investors and market players how to assess this new situation and be able to adequately predict how this will affect the real estate market.

The purpose of this thesis has been to investigate how a low interest rate and inflation environment affects real estate, as an investment alternative. The thesis looks closer on the Japanese market since they have had a low interest rate and inflation environment from the middle of 1990's. The thesis has investigated what kind of relationship that exists between the return but also the prices from real estate and different macroeconomic variables such as the interest rate, the inflation and the GDP growth. The thesis has been performed at Vasakronan, a leading property company in Sweden. Vasakronan management has provided valuable guidance and assisted in making prioritizations of the very extensive data material.

Real estate can be considered a good investment alternative and that they still generate a rate of return over time in a low interest rate and inflation environment. Furthermore the findings show that the interest rates and the inflation do not have any direct effect on the real estate returns in a low interest rate and inflation environment. However, we have found that it exist other variables that affect the real estate returns which in turn are affected by the interest rates and the inflation meaning that the returns for real estate are indirectly influenced by the interest rates and inflation. One of the most important variables is the GDP growth, which has an influential impact on the real estate returns. The demand and supply for real estate as well as the expectation concerning the future is also variables that influence the real estate market and returns. As long as the economy is growing as well as the demand is high and future expectations is positive, real estate can still be considered to be a relative secure and good investment.

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Examensarbete

Titel: Fastigheter som investeringsalternativ i en miljö med låga räntor och inflation – en jämförelse mellan Japan och Sverige

Författare: Samuel Roihjert och Viktor Åhlander

Institution: Fastigheter och Byggande

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Sammanfattning

Dagens situation på fastighetsmarknaden är väldigt unik. Den är präglad av låga och negativa räntor och låg inflation. Många av de existerande ekonomiska teorierna är baserade på positiva räntor och en positiv inflation. Detta har resulterat i osäkerheter på marknaden hur denna situation kan komma att påverka fastighetsmarknaden i framtiden.

Syftet med detta arbete är att undersöka hur fastigheter som ett investeringsalternativ uppför sig i en miljö med låga räntor och inflation. I arbetet undersöker vi närmare Japans fastighetsmarknad eftersom de har haft låga räntor och inflation enda sedan mitten av 1990-talet. Vi kommer vidare undersöka vad för relation som existerar mellan både avkastningen på fastigheter och fastighetspriserna gentemot olika makroekonomiska variabler. De makroekonomiska variablerna är räntan, inflationen och ekonomisk tillväxt i form av BNP. Detta arbete har skrivits i samarbete med Vasakronan, Sveriges största fastighetsbolag där de har assisterat oss i nödvändig vägledning under arbetsprocessen.

Beträffande hur fastigheter uppför sig i en miljö med låga räntor och inflation som är observerat idag har vi funnit att de fortfarande genererar en avkastning över tid och kan anses som ett bra investeringsalternativ. Vi har funnit att räntorna och inflationen inte verkar ha samma direkta effekt som kunde förväntas gällande avkastningarna för fastigheter i en miljö med låga räntor och inflation. Däremot har vi funnit att det existerar andra variabler som påverkar fastigheters avkastning, vilka är direkt påverkade av räntorna och inflationen. Det betyder att räntorna och inflationen ändå indirekt påverkar fastigheters avkastningar. En av de viktigaste faktorerna är den ekonomiska tillväxten som har en tydlig påverkan på fastigheters avkastning och priser. Utbud och efterfråga tillsammans med framtida förväntningar är också viktiga variabler som påverkar fastighetsmarknaden och deras avkastningar. Så länge det existerar ekonomisk tillväxt tillsammans med optimistiska förväntningar på framtiden och en hög efterfrågan så kan fastigheter betraktas som en god och ett säkert investeringsalternativ.

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1. Introduction

In the first chapter the reader is introduced to the study through a presentation and a description of the background and the purpose with this thesis. Furthermore the methodology, the data collection, which has been used, and the overall limitations are presented.

1.1 Background

The positive features that real estate provides to investors have resulted in that the interest for real estate as an asset class and investment alternative has increased during the past decades. For investors, real estate investment has become an important asset component in their asset portfolios. The overall reason for investors to include real estate in their investment portfolio is, according to Andonov et al. (2013) mainly for three reasons. The first reason is that they contribute with diversification and thereby also a reduction of the overall risk of the portfolio due to the low correlation towards stocks and other securities. Secondly, real estate has the positive feature that they provide a hedge against inflation and the final reason is that real estate delivers a stable income to the portfolio through their cash flows (Andonov et al., 2013). However, at the moment Sweden is characterized with a very low inflation and interest rates and how this influences real estate over time is still uncertain.

When it comes to real estate and property development in Sweden, the situation the last couple of years has been that the value of the inflation and the interest rates has been positive with a margin to zero when performing investment analysis and decisions. Today, the situation is different. Ever since the last financial crisis in 2007-2008, the inflation has gradually decreased to very low levels and fluctuated around zero the past years. Recently, in order to try to boost the economy and increase the inflation to the Swedish inflation target of two percent, the Swedish central bank has lowered the repo rate to very low levels and at the moment it is on -0,5% (Riksbanken, 2016, a). The interest rates that banks today provide to investors are therefore very low. During the past decades, such low interest rates and inflation values has not been experienced in Sweden.

One country that has experienced this kind of economic environment with extreme low interest rates and inflation over a long period of time is Japan. The collapse on the Japanese real estate and stock market in the early 90's, forced the bank of Japan to lower their interest rates which affected the inflation and has since then fluctuated around zero. Today these values are basically on the same low level but the real estate market has slowly recovered itself after many years of decline and has started to grow the last couple of years (Finanshistoria, 2010).

Even in a market with extreme macroeconomic variables, which have been seen during the past years, investors are showing interest in the real estate market. At the moment

when the inflation is low it is hard to predict what kind of effect this will have on real estate assets in the future. With low interest rates, the initiative from investors could be to invest even more in real estate. Low interest rates make it possible for investors to borrow more money at cheaper cost and thereby invest more. However, due to the extreme increases in prices observed in popular metropolitan areas such as Stockholm, investors might think once or twice before deciding where and when to invest their money. Since today's low values on the interest rate and inflation are an unusual situation for the Swedish market it has contributed to different fears, reservations and indecisions. Uncertainties on the market such as if this is the new "normal" has led to questions as, how this will affect the markets in the future, or how real estate actually will behave if this extreme situation continues into the future. As it is an entirely new situation, it exist a gap in previous research on how an environment with low interest rates and inflation with values around zero or even negative ones affects different investment alternatives such as real estate. This leads to the overall purpose with this thesis.

1.2 Purpose

The purpose with this thesis is to investigate how real estate as an investment alternative is affected in a long lasting environment with low interest rates and inflation.

1.3 Methodology

In order to conduct the research, we will look closer on the Japanese market and analyze it due to their ongoing low interest rate and inflation environment which they have had since the beginning of the 90's. An equal analysis will then be performed on the Swedish market in order to find similarities and differences between the two markets. The research looks closer and analyzes what kind of impact the interest rates, inflation and also a country's GDP growth have on the real estate returns. To get a greater picture of how real estate has acted compared with other assets, a comparison is done with stocks and government bonds.

The thesis is conducted through a combination of secondary research (literature review), a quantitative analysis of specific data sets and finally a qualitative one, through face to face interviews to support and supplement the findings. The thesis starts by looking at the historical relationship between the assets, with focus on commercial real estate, and different macroeconomic variables (interest rate, inflation through CPI and GDP). The analysis continues further with studies on how the real estate has been affected by changes in the variables and the subsequent lowering of the interest rate and the inflation. After having studied these relationships the thesis has investigating the various correlations that the different assets might have towards the macroeconomic variables. The correlation analysis

also includes a closer look on the correlation between the different assets. The research and the data analysis are followed by interviews with two institutional investors working for a big Pension fund and insurance company. The interviews were conducted through face-to-face interviews. The goal is to get an idea and understand how institutional investor's investment strategies on the market are affected by the current low levels of interest rates and the inflation.

1.4 Data collection and limitations

Besides assessing previous literature and research on the subject, statistic data has been collected for the qualitative research and analysis. Data over the assets yields and prices as well as values on the macroeconomic variables has been collected. In order to limit the size of the thesis, some limitations have been done. A lot of the data that has been collected differed from each other as daily-, weekly-, monthly- or annual data. To have consistency throughout the thesis and to be able to analyze the data within the same frames the data has been converted and limited to annual, average values. The research only focuses on the Swedish and Japanese market. The thesis is further limited in that it has a focus on the asset classes such as the real estate, stocks and bonds. The different assets are investigated in the extent of their relationship towards different macroeconomic variables. The macroeconomic variables that have been examined are inflation, interest rates and GDP growth. These variables are used to examine the relationships and the correlation against the assets yields and prices. The inflation and the interest rates were chosen after relevance of the research since we wanted to understand how low values on these variables affect the different assets, specifically real estate.

The interest rate that is focused on, is for Japan, the overnight rate and for Sweden, it is the repo rate. The inflation is measured through the consumer price index, CPI. The rate of return of the assets in this thesis is different depending of which kind of asset we are studying due to limitations in the collected data. Concerning the direct real estate and the stocks for both the Japanese and the Swedish stock market we look at the total return. For the Japanese and the Swedish indirect real estate assets we look on the capital growth as the rate of return. For the bonds for both the Japanese and the Swedish market we look on the five-year yield that they generate.

1.4.1 Real estate data for Japan and Sweden

The real estate data is divided into two different categories, indirect and direct real estate. The direct real estate data that has been used in this thesis has been received from MSCI, through IPD data for both Japan and Sweden. This data covers the commercial real estate market returns from offices, industrial and retail but also residential real estate. The indirect real

estate data for Sweden is data from real estate stock index and has been gathered from NASDAQ Nordic, while the indirect real estate data for Japan is represented by J-REITs collected from Sumitomo Mitsui Trust Research Institute. The real estate data for the Swedish market stretches over the time period 1984-2014. However, there exist limitations in the extent of the repo rate's lifespan due to the fact that this rate only has existed since 1994 until today. Due to this limitation, when performing and conducting the research we have limited it to the time period of 1994 to 2014 when analyzing Sweden. Concerning the data for the Japanese real estate market, gathered from MSCI, it only stretch back to 2002 which is a limit to consider. Due to these limitations, data from the housing market has been collected from OECD.org and used in order to observe what actually happened when the overnight interest rate was lowered in Japan. As all real estate are affected by the same macroeconomic factors an analogy was drawn from this data on the assumption that the commercial real estate should have performed similar to the housing market for the years from 1990 – 2002.

1.4.2 Data for stocks and bonds

The data collection for the stock market has been limited to following markets. For the Japanese market the index used is the Nikkei 225 stock index which covers the 225 largest stocks on the Japanese stock market. For the Swedish market the stock index that has been used is the OMX30. This stock index covers the 30 largest stocks on the Swedish stock market. The Nikkei 225 index data has been collected from Nikkei indexes official site while the OMX30 data has been collected from NASDAQ. The collected data for the government bonds has been limited to five year government bonds for both the Japanese and the Swedish market. The data for the Japanese and the Swedish five year government bonds has been collected from the Swedish central bank, Riksbanken.

1.4.3 Macroeconomic variables data

The data covering the macroeconomic variables such as the inflation, the interest rates and the GDP growth for Japan and Sweden has been collected through different sources. All the data for the inflation and the GDP growth is collected from the World Bank for both Japan and Sweden. While the data for the interest rate in Japan, the overnight rate, has been collected from the Bank of Japan while the data for the Swedish interest rate, the repo rate, has been collected from Swedish Central Bank.

2. Literature review

In this chapter previous studies that have been made which touches upon the subject will be presented for the reader.

2.1 Previous studies

Real estate and property development are known to be affected by different macroeconomic factors, such as interest rates, inflation and the GDP growth to mention a few. The same macroeconomic variables also have an impact on other assets such as stocks and bonds. During the last couple of years the world economy has experienced decreases in the interest rates and the inflation. One reason for this is from the financial crisis in 2008, where the governments started to expand their monetary policies in order to try to reduce the fall and damage from the crisis. This expansion in monetary policy has resulted in that the interest rates have been reduced in belief that the inflation should turn around and rise again. However, the inflation has not turned around and increased to expected levels, which have resulted in low interest rates. It is known that low interest rates stimulates the real estate market in the way that it encourage the investment activity and it gets easier for individuals and businesses to borrow more money to invest in real estate (DePersio, 2015).

With today's extreme low interest rates and inflation, new concerns and unanswered questions has become a reality for investors and market makers. According to Harald Uhlig (2000) there is no reason for an economy to try to escape a situation with an environment where it exist an interest rate close to zero as long as it is believed that the market are in equilibrium (Uhlig, 2000).

One country that has had low interest rates and inflation for a long period of time is Japan. Japan's interest rate decreased from the beginning of the 90's due to the burst of their bubble economy. In the middle of 1990, the overnight interest rate in Japan went below 1% and the inflation started to fluctuate around zero. Between 1999 and 2000 the bank of Japan (BOJ) introduced a zero interest rate policy called ZIRP. The policy was not only a zero bound short-term interest rate but also a commitment from the bank of Japan to maintain it until the concerns of deflation had vanished (Oda and Ueda, 2005). Real estate prices as well as stock and bond prices are all affected from the interest rates and by the economic activity level on the market which Quan and Titman (1996) argued about in their report. In their study it is argued that the expected level of economic activity also has a positive impact on these markets (Quan and Titman, 1996).

A previous study have found that the variation in property returns can be explained through the changes of the interest rates as well as the level of inflation. Properties and their return are likely to be affected by other factors as the demand and supply, which can be

measured on a macro level (West and Worthington, 2006). In absence of inflation or with very low levels of inflation, as it is today, the supply and demand for space could become the dominating factor when looking on commercial properties ability to generate an increasing net operating income and return (Etter and Hunt, 1997, a).

When carrying through an investment, investors and market makers valuation, future forecasts and predictions are important and a key factor in the real estate market. In an environment with low inflation or no inflation at all, real estate analytics are unlikely to forecast increases in property values unless it doesn't exist expectations of increasing demand for office space. Another possible effect from an environment with little or no inflation is the increased financial risk, in the way that the property's NOI will not increase and be able to reach the necessary income that is needed to meet the increased debt service expenses and costs (Etter and Hunt, 1997, b).

Previous studies have shown that economic factors such as GDP and interest rates react more negatively just after a crisis when it exist uncertainties on the market as can be observed from the latest crisis. At the same time the further away an economy is from a crisis, the more positive is the economic factors on this market. This can be explained by the more positive future expectations that exist when the current situation on the market is positive (Fredriksson and Winkler, 2015). Case et al. (2000) found through their research that real estate around the world have a high correlation with the own country's GDP and that this variable can help explaining the variations in real estate returns. Nordlund and Lundström (2011) discusses in their research that the economic growth is by itself the most important variable that has an influence on rents, real estate prices and the development activity. They argue that the economic growth can explain variations in real estate returns and price changes by 70 % in some cases. They continue to argue in their report that the economic growth that has an effect on the return on the commercial real estate market is on a local and a regional as well as a global level (Nordlund and Lundström, 2011). However, if the future expectations on the market are negative and poor, it doesn't matter if the GDP is increasing and the interest rates decreases. The propensity to invest will be low (Fredriksson and Winkler, 2015).

3. The Macroeconomic Factors

In this chapter the macroeconomic factors that are used and analyzed in the thesis is presented in order for the reader to get a deeper understanding of them. Firstly the interest rate and the differences that exist between different rents are described. Furthermore the inflation, the gross domestic product and the yields and returns are described. Finally the demand and supply and correlation are described in this chapter.

3.1 Interest rate

The demand of money is affected by the current interest rate on the market and the nominal income. The interest rate has a negative impact on the demand of money. In other words the lower the interest rate is the higher is the demand for money and vice versa. Economic theory states that, for a certain price and level of interest rate, money supply must equal the money demand to have equilibrium on the market. If the demand or the supply changes, it will affect the market price and the interest rate level (Blanchard et al, 2013).

The interest rate is a tool that is used by nation's central banks to control the supply and demand of money in order to steer and affect the economy. In modern economy, central banks use monetary policies to affect this supply and demand in order to reach financial stability. By executing monetary expansion the bank injects the economy with more money by buying government bonds. This action in increasing the supply of money leads to a decrease in the interest rate. The decrease in the interest rate leads to an increased demand of money so that it matches the increased supply. The interest rate also has an effect on the inflation depending on whether the interest rate is increasing or decreasing. When the interest decreases it results in theory an increase in the consumption and as the demand increases the general prices on the market rises leading to an increase in the inflation. The opposite can be expected if the interest rate increases leading to a decrease in the overall inflation (Blanchard et al, 2013).

3.1.1 Overnight rate

The rate that banks get when borrowing or placing money in the central bank is called the "overnight rate" and it's the day to day rate. By determining this rate, the central bank can affect the short-term market rates. When talking about the Japanese interest rate it's often referred to the overnight rate which will be used as the reference rate in this thesis (global-rates.com, 2016).

3.1.2 Repo rate

The repo rate is the most important and recognized interest rate in Sweden as it works as a reference rate and signals what the "overnight rate" should be one week ahead. In other words

it signals what the short market rates should be. The rate the banks borrow money from the central bank is directly affected by the repo rate and it has an effect on the market rates that are offered to institutions, companies and private lenders (Riksbanken, 2015, a).

3.2 Inflation

The definition of inflation is that it is a general rise and increase in the price level for goods and services over time and it contributes to decrease the overall value of money with time (Riksbanken, 2011). In theory, inflation is good in the way that it promotes consumption and investments. It leads to economic growth because it is more motivated to invest in an asset today if it is expected that the price of that asset will increase tomorrow. The inflation can be measured in many different ways and the most commonly used is through the consumer price index (CPI). The consumer price index is calculated by looking at how much the consumption of household goods has increased during a twelve-month period (Riksbanken, 2011). In Sweden, the inflation goal is set to 2 % by the central bank. If the inflation is 2% it means that the current value of a commodity is 2% higher than it was twelve months ago. This level is considered appropriate as it creates a situation where economic growth is encouraged and the fact that it is in line with other industrial countries inflation goals (Carlgren, 2015).

3.2.2 Deflation

The opposite of inflation is called deflation and it means that the general price level of goods and services decreases in time. Deflation is something that nations battle against, as it can paralyze the economic activities and lead to depreciation of the economy. As price level decreases, the beliefs among people and companies are that prices will continue to decrease, resulting in postponed consumption and investments (Riksbanken, 2014).

3.3 Gross Domestic Product

The gross domestic product (GDP) is a value that measures a country's aggregate output. This means the total value of all goods and services produced in a country during a year. It is conventionally measured as the percent rate of increase in real gross domestic product. When the economy is doing well and the GDP grows it is called an expansion, the opposite scenario is called a recession.

3.4 Demand and Supply

Besides the interest rates, inflation and GDP there exists other factors in the market, which have an impact on the asset prices. In order to understand and be able to describe both the current price and also the changes in asset prices better, it is important to investigate the

relationship of the demand and supply. The demand and supply for a specific asset is related to what the current price of that particular asset actually is.

Regarding real estate or other assets as well, demand and supply plays a very important role when defining the actual price level existing on the market. When the demand for an asset coincides with the actual supply of the asset, the market is in a price and market equilibrium (Mishkin, 2010). If however, the demand is greater for a specific asset compared with the supply, it contributes to that the price will rise. In the same way, if the supply is greater than the demand, the price will decrease until it reaches the equilibrium price.

3.4.1 Vacancy and Rents

Vacancy rate means the percentage of the total real estate stock that isn't occupied, standing empty at a given time. The higher the vacancy rate the more square meters are available for rental. A high vacancy rate shows that the supply is higher than the demand, which could result in that the prices on the market decreases. The opposite could be expected if the vacancy rate is low, then the demand is higher than the supply which pushes the rents upwards. The vacancy rate goes hand in hand with the actual rent levels on the market. Depending on the level of vacancy or the level of rent, the two variables influence each other depending on the existing demand and supply on the market (The Economic Times, 2016).

3.5 Correlation

The correlation measures how different assets are related and how they behave towards each other. Correlation is measured on a scale from -1.0 to +1.0. If the correlation is +1.0, this means that the assets are perfectly positively correlated. The result is that the assets are substitutes to one another meaning that if one asset goes up the other one will follow the exact same pattern. If, however the assets have a correlation of -1.0, they are perfectly negatively correlated. The result of this is that if one asset goes up, the other one goes down and vice versa. If the assets don't correlate at all, the correlation coefficient between them simply is zero (Sandberg, 2005). By carefully choosing and including the assets, which don't correlate towards each other the risk could be reduced while possibly maintaining approximately the same rate of return for the investment portfolio (Marling and Emanuelsson, 2012).

4. Asset classes and the relationship towards the macro economic variables

In this chapter the three different asset classes that are focused on in this thesis and their relationship towards the macro economic variables is presented. Finally a section where real estate behaves in a multi asset portfolio is presented.

4.1 Real Estate

Real estate is a good investment complement and is today considered to be one of the best investment alternatives to stocks and bonds by many institutional investors (MSCI, 2014). There are several upsides that real estate investments will bring with them to investors. During periods with inflation, real estate tends to outperform stocks and due to the hedge against inflation, real estate is suggested to be a good long-term investment (Greer and Kolbe, 2003). Previous studies argues that commercial real estate offers a number of advantages compared to common stocks when looking closer on the expected returns and the growth of the cash flows paid (Plazzi et al. 2010). However, direct real estate is known to be very illiquid and comes with rather high transaction costs.

4.1.1 Direct and indirect real estate

Nowadays investors can access the real estate market in two ways, through either direct or indirect investments in real estate. While both of these types of available assets classes have the same underlying asset base they differ in the performance and in characteristics. The ownership of direct real estate is through directly owning the property and the values are mainly based on valuations through future cash-flow analysis, potentials and market expectations. The ownership of indirect real estate on the other hand is through purchased equities of listed real estate companies or through buying share in companies consisting only of real estate. The values for indirect real estate investment are priced daily on the exchange market and are thereby more liquid than the direct real estate investments (Holland, 2006). A type of indirect real estate investment is the real estate investment trusts, known as REIT's. Advantages with investing in REITs are that anyone can invest in real estate without buying it directly or a whole property (REIT.com, 2016). J-REITs are Japan's real estate investment trust and is today one of the most powerful real estate buyers in Japan (IBRC & Japan REIT Inc., 2013).

Due to that valuation on direct real estate is mainly updated once a year, direct property returns are often less volatile compared to indirect real estate returns. The reason is a consequence of that these appraisal based valuations consist a smoothing effect and leads to an underestimation of the volatility (West and Worthington, 2006). Indirect real estate on the other hand often has a higher volatility since they are purchased in the same way as stocks

and bonds are on the exchange market. Direct property returns are more correlated with economic cycle through changes in the demand fundamentals that exist. While indirect property returns is more in line with changes in the liquidity cycle, which reflects the conduction of the monetary policy (West and Worthington, 2006).

4.1.2 Macro variables vs. the real estate market

Real estate prices are known to be affected by the level of economic activity as well as by the interest rates and inflation. With decreasing interest rates the common belief and response on the real estate market is that the prices should increase. At the same time it has been observed that low interest rates lead to lower real estate yields on the market (Krainer, 2013).

Svensson (2014) looked on the possible cost that will appear if the actual inflation falls below the inflation target. His findings show that the average expectations concerning the inflation have been close to the goal of 2 percent. Interestingly, is that the actual average inflation has been about 1.4 percent and not higher during the last couple of years. An issue with this difference between the real inflation and the expected inflation is a substantially increase in household's debt.

Case et al. (2000) findings through their research are that real estate around the world has the best correlation towards the effects from common GDP. The main factor that can help explaining the variation in the returns that real estate provides is considered to be a country's specific GDP. Furthermore, it has been showed according to Quan and Titman (1996) that the level of economic activity has a positive impact on real estate prices.

4.2 Bonds

Bonds are a contractual agreement between the borrower and the buyer. The contract states that the holder get paid a fixed amount of interest during a period of time until a specific date, referred to as the maturity date, when the final payment is done. As other assets are dependent of the interest rate so are also the bond yields, which are dependent on the current and future expectations of the interest rates. Thus, the government bond yields reflect the future expectations concerning short-term interest rate (Mishkin, 2010).

4.2.1 Macro variables vs. Bonds

When it comes to interest rates and bond price of a fixed-rate bond, the fundamental principle is that they are negatively correlated meaning that they tend to move in opposite directions. Thus, when the value of the interest rate rises, the bond price will fall and vice versa. This phenomenon is called interest rate risk (Mishkin, 2010). Interest rate risk is common for all kinds of bonds and it is further known that it is very important for investors to consider the interest rate risk when purchasing bonds in an environment with low market interest rates.

When the market interest rates are low the relationship tells us that the bond prices should be high, giving a greater interest rate risk. If the interest rates go up, the price on the bond should fall while the yield to maturity should rise (SEC, 2013). However, at the moment the interest rates are low but so are also the bond prices and yield which make the current market situation unique (Riksbanken, 2016, b). When it comes to the inflation, the return of bonds is also affected by the expected inflation. If the expected inflation rises, the expected return of the bond will fall (Mishkin, 2010).

4.3 Stocks

Another investment alternative, which investors can invest in, is equities, such as stocks on the exchange market. By purchasing a stock, the buyer claims a share in the assets of a specific business. Since equities don't have any determined expiration date, they are referred to as long-term securities. By holding shares, the main advantage is that the shareholder's benefit directly from the increased profitability of the company that issues the shares. Nevertheless, stocks are a more risky investment alternative than bonds due to bigger changes in price. Depending on what kind of company that is the issuers, the growth of the stock can be quite radical and strong. At the same time this is one major disadvantage as the losses can be equally big and radical (Mishkin, 2010).

4.3.1 Macro variables vs. the stock market

The stock market is a considerable part of the economy. The stock market depend on performance of the listed company's profits and losses and companies investment plans, investments in new markets, production and technology, as well as investors' expectations and their liquidity. With a lower interest rate, investors can easily borrow more money at a cheaper cost, which would contribute to an increase in the consumption. If the interest rate increases however, the opposite should be expected (Christensen, 2012). A decrease in the amount of investments on the stock market leads to decreases in the prices due to a decreased demand. Rigobon and Sack (2001) talks about that the stock market is an important factor when the monetary policy is determined and they find that an increase or decrease in the S&P 500 index on the stock market has a direct impact on the monetary policy (Rigobon and Sack, 2001).

4.4 Real estate in a Multi Asset Portfolio

It is known that real estate contributes with preferable benefits when including them into a mixed-asset portfolio otherwise consisting of stocks and bonds. Real estate tends to provide risk diversification and has historically had low correlation towards the stock and bond markets. Real estate assets are also known to work as an inflation hedge but this shall not be

taken for granted and finally, direct real estate investment also provide a stable income through their cash flows generating a high cash yield (Falk, 2012). For investor managers that seek to optimize their mixed portfolio of stocks, bonds and real estate, Brounen and Eichholtz (2003) found that, the optimal allocation concerning real estate in a multi asset portfolio is to have a minimum of or at least 10%. They concluded that even under pessimistic assumptions, allocation in real estate shall be substantial (Brounen and Eichholtz, 2003). In an economic environment where the consumption is low or very volatile Sa-Aadu et al. (2010) found that real estate, alongside with precious metals and commodities, are the asset classes that delivers the highest profit in a portfolio with mixed-assets. Meaning that these asset classes outperform others when investors turn more risk-averse and such investor managers should increase and overweight their allocation in these asset classes when the consumption decreases (Sa-Aadu et al, 2010).

5. The Macro variables appearances and their impact

In this chapter the appearance of the macro variables in different ways are presented. Liquidity trap, zero bound interest rate, low inflation and if negative interest rates can occur are presented. Furthermore, why the interest rate can continue to be on low levels are presented followed by a section where different kinds of possible mortgages are looked upon and overvalued markets.

5.1 Liquidity trap and zero bound interest rate

A zero bound interest rate means that the interest rate stays on a level of zero and can't go beneath it. When looking closer on the macroeconomic terms there exists an inverse relation between interest rate, consumption and investments. When the interest rate increases this leads to that consumption and investment decreases. On the other hand, when interest rates decreases the opposite effect can be expected (Romer, 2000). Many of the existing economic theories are based on positive interest rates and a positive inflation. A situation with negative rates on these values is often precluded. In a situation with negative interest rate, the case is that people would rather hold on to their money instead of paying the bank for taking care of them. Setting a negative interest rate also questions many of the elemental economic theories that exist today (Chen and Thand, 2015).

Normally when the interest rate is positive and have a marginal to zero, central banks can relatively easy affect the interest rate with monetary expansion or contraction. By buying government bonds and thereby injecting money to the market the central banks can decrease the interest rate. If however a country has a zero bound interest rate the implementation of the policy and impact on the interest rate changes get more complicated. Eggertsson and Woodford (2003) found in their research that, in an environment with low inflation and different occurrences of real disturbances, a zero bound interest rate provides an important limitation in what monetary stabilization policy can achieve. In such conditions, a monetary expansion does not have the same effect on the interest rate. Why a zero bound interest rate are introduced can be derived from the fact that if the interest rates were negative, actors on the market would rather hold their money than placing them in interest bearing assets (Orphanides and Wieland, 2000) However, Eggertsson and Woodford (2003) argues that a zero bound interest rate that is temporarily binding can lead to a lower welfare than if the restraint was absent and the interest rate could become negative (Eggertsson and Woodford, 2003). When the central bank continues to increase the money supply in a zero interest rate environment it is called a quantitative easing. This measure can affect the expected inflation which is positive. A higher expected inflation leads to lower current and future expected interest rates, which results in increased spending today (Blanchard et al, 2013).

5.2 Low or no inflation

As described through previous research, supply and demand plays a very important role when defining the value and the price of an asset, such as real estate, stocks or bonds. Looking aside from the supply and demand, the low or non-existing inflation as can be observed on today's market definitely have an effect on defining the values. Studying real estate, the net operating income (NOI) is the income a property generates every year throughout leases contracts with different tenants which has a fundamental role in estimating the total value for real estate. Therefore it is important to understand the impact on the NOI that comes with little or no inflation. Normally, contractual rents are adjusted for inflation resulting in that the rents increases with the inflation rate every year. In a market with a positive increasing inflation, the owner can thereby easily demand a higher rent every year. In a market where the inflation is low as today, it is harder for the property owners to argue for higher rents. In such a case, the supply and demand becomes decisive for establishing new leases and increasing rents (Mishkin, 2010).

5.3 Negative interest rate, can it occur?

A negative interest on an asset would mean that an investor is willing to pay more for the asset today than he or she would receive in the future. For that reason it seems rather impossible for such a situation to occur. Existing economic theories, all assume that the interest rate can't go below zero, something that has been observed to not be entirely true in recent years (Blanchard et al., 2013). In Japan, in November in 1998, the treasury bills became negative, resulting in a yield with an interest rate of -0.004 percent. In September 2008, in the United States, the interest rates of three-month treasury bills fell below zero to a negative value for a short period of time. Recently in Sweden the value of the Swedish central bank interest rate, the repo rate, became negative in February 2015. Low and even negative interest rates combined with falling prices and a contracting economy is a sign that the economy is not doing well in a country. However, the situation in Sweden is that the interest rates have become very low due to the negative repo rate, while the prices on the market and the whole economy are looking rather strong with a positive economic growth at the moment (Mishkin, 2010).

5.4 Why can the interest rates continue to be low?

5.4.1 Digitizing and the Currency War

A reason why the central banks keep lowering their interest rates is to increase and reach a more preferable inflation. Along with the existing technology on today's market, the increased digitization affects the market in a greater deal than before. With today's computers and

smartphones, the consumption through internet has seen an increase. The possibility to consume over the internet gives people the possibility to compare and find the cheapest goods on both a national and an international level. The result is that the prices of goods and services are constantly under pressure. This in turn, leads to that it becomes more difficult for prices to increase and therefore also the inflation to start increasing again. As for the relationship between the inflation and the interest rate, this means that the interest rate will have a harder time starting to increase again as well. Nevertheless, it is hard to say exactly how large the impact the digitalization had on the inflation and thereby the interest rates as well (Sveriges Riksbank, 2015).

Another factor that has an impact on a given country's economy is the country's export and import industry. During recent years a new term referred to as "Currency War" has been established. Currency war is a situation on the world market where countries try to weaken their currency rate in order to increase their export and gain market shares (Bénassy-Quéré et al., 2014). A weaker domestic currency compared to other foreign currencies is therefore preferable in an export perspective and therefore motivates a lowering of the interest rate. However, it contributes to a negative impact on the import side as it gets more expensive. Then there is the inflation goal which has to be remembered. As long as the inflation is on low levels low interest rates are motivated in an attempt to increase and reach the inflation goal.

5.5 Mortgages, fixed or floating interest rate

When making an investment, investors normally take a loan in order to cover some of the investment costs. At the moment where interest rates are low the incentive to borrow more increases, which increases the general indebtedness. Depending on which type of interest rate that is chosen for the mortgage it exist some risks and uncertainties. By choosing a fixed interest rate, the investor gets constant mortgage rate for the whole period. The benefit with the fixed rate is that the investor knows exactly what he has to pay during the mortgage time and does not have to worry about the interest rate risk. By choosing a floating interest rate, the interest rate costs during the mortgage time fluctuates depending on what the current interest rate on the market is. An advantage with a floating interest rate is the mortgage costs can decrease during the mortgage period. However, the floating interest rate comes with a risk and is more sensitive against interest rate changes. The interest rate risk and uncertainty that exist with a floating interest rate contribute to consequences for the monetary transmission mechanism. Banks, in a greater degree, have to take the existing loan to value in consideration when future changes in the interest rates are made. If the mortgages are based on a fixed

interest rate instead, changes in the interest rates will have smaller effects on the actors on the market and the overall consumption (Holmberg et al. 2015).

5.6 Over valued markets

As the interest rates are on very low levels today, more loans are issued which has led to that more liquidity is injected into the market. This has led to concerns that the market maybe could be overvalued. An overvalued real estate market that leads to a crash tend to spill over to the financial market due to that the global economy is more globalized and integrated today. This scenario has been seen in the early 90's in both Sweden and Japan or in the latest financial crisis in 2008. If a real estate bubble burst, prices on the market would fall drastically and it cannot be ruled out that this would affect the financial market especially if the increase of the real estate values is dependent on high indebtedness for the households. The risk with high indebtedness is that, in a situation where prices fall drastically, mortgages with bad securities could lead to a lack of coverage of the loans. It means that the loan has a higher value than the actual value of the underlying asset (Sveriges Riksbank, 2011).

6 Assumptions, Uncertainties and Expectations

In this chapter the various difficulties, such as assumptions, uncertainties and expectations, that exist on the market when doing different kind of investments are described and discussed.

6.1 Assumptions and Uncertainties

Around the world, companies and organizations use valuation and forecasts of different kinds as a process to value their assets, estimate future prices or predict the future outcome of the economy. In order to provide an estimated price or future forecast, investors and market makers have to make assumptions concerning the future based on historical data, which contributes to uncertainties. Uncertainties from the beginning will lead to uncertainties in the final outcome (French and Gabrielli, 2005).

As it is very hard to predict the future it is difficult to estimate how long an up- or downturn will last in a specific market. This leads to uncertainty to determine the specific number of years that a cycle should last (market trends in Japan, 2014). Concerning cycles, previous studies often address the average duration of different phases leading to the absence of describing the actual lengths of the up- and downturns. When analyzing cyclical trends one should keep in mind that the peaks and downturns vary in duration as well as amplitude depending of what one are looking for. Historically upturns tend to last longer than downturns (Bracke, 2011). At the same time longer upturns often result to that the following downturns tend to be more unstable and disastrous (market trends in Japan, 2014).

6.2 Expectations

As described earlier, investments and forecasts depends and are based on the current and expected interest rate. A decrease in the current and the expected future interest rates often leads to an increased investment activity. However, changes in only the current interest rate do not necessarily affect and change the present value. Because investors will not change their investment strategies if they don't expect a change in the future interest rate. The same goes for sales and profits. If investors believe that the variables values will remain on a high level in the future, no changes will be made in the investment strategy. If fiscal and monetary policies changes make investors change their expectations concerning the future the effects of the changed policies may have a very large impact. However, if investor's future expectations are not affected by the changes in the interest rate or other policy changes the effects will be rather small (Blanchard et al, 2013).

One important factor to discuss is the actual length and the time horizon investors use and what they base their expectations concerning future values on. How investors form their expectations is unclear but usually debtors tend to have a variety of debt contracts leading to

an amount of different interest rates depending on the contract. Forecasting something as complex as the real estate market is difficult because it is impossible to take into account such things as natural disasters or unexpected news that have a direct impact on the decrease or increase in value (market trends in Japan, 2014). Nevertheless, analyzing historic trends tend to give an understanding and reliable prognosis about the future.

7. Market Research and Analysis

In this chapter a closer world analysis with focus on the Japanese and the Swedish market are performed and described. The analysis for both countries starts to look closer on their modern economic history, forecasts and current conditions for the two markets with focus on real estate.

7.1 Economic history for both Japan and Sweden

7.1.1 The interest rate effects on the housing market

After decades of strong economic growth and a time with favorable conditions, as low interest rates and low real estate taxes, overconfidence and speculative mania controlled the Japanese market, which boomed the real estate transaction market and the stock prices. This period between the beginning of 1980 to 1990 is referred as the bubble period. The heavy speculations on the stock and real estate market concerning new land resulted in that the bank of Japan in 1989 started to tighten their monetary policy and increased the interest rates in order to reduce these speculations (Housing Japan, 2011). The consequence of it led to a significant decline in the stock and land price which eventually resulted in a collapse on the market and the bubble economy to burst which sent Japan into a period of deflation and recession (Ohno, 2006).

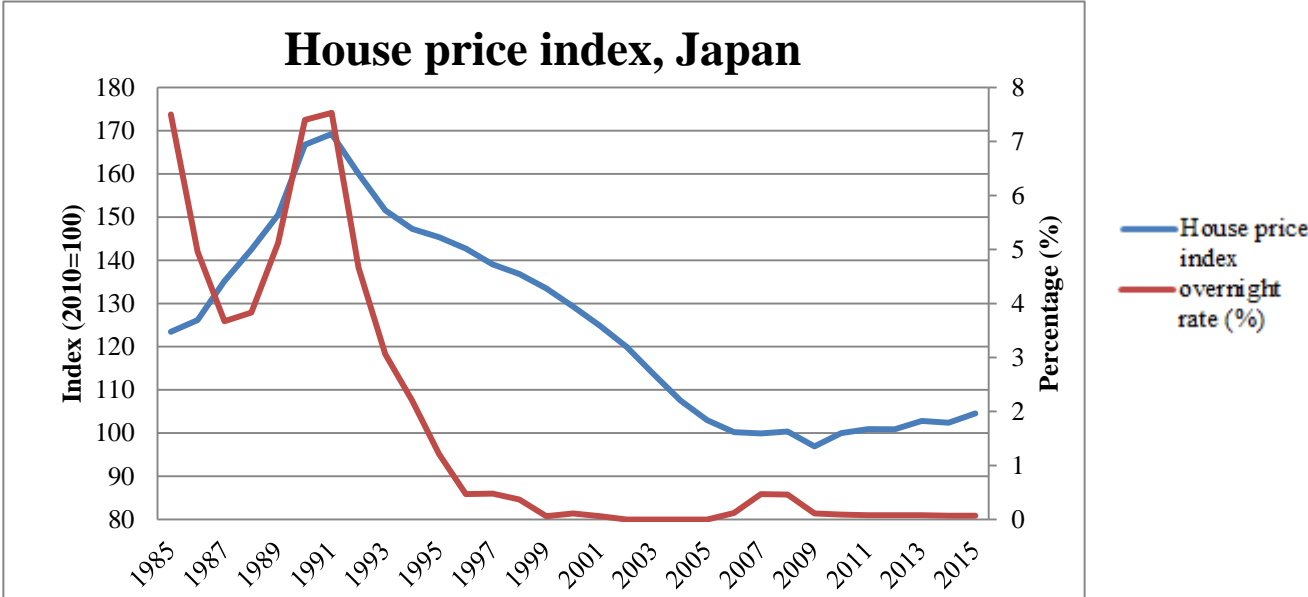


Figure 1: Illustrating the change in the house prices and the overnight rate in Japan (source: OECD, World bank).

The prices on the Japanese real estate housing market started to fall during 1992, as can be seen in figure 1, caused by the burst of the bubble economy. The prices decreased heavily from 1992 to 2002 with an overall decrease in the real estate prices of 80% (Housing Japan,

2011). The rapid decrease in land and stock prices led to less spending. The central bank tried to compensate this by lowering the interest rate to boost the economy and the consumption.

At the same period in time as the collapse on the Japanese market, the Swedish central bank implemented in February 1995 a flexible exchange rate for the first time. This was a result of depreciation and weakening of the Swedish currency relative to other foreign currencies. By introducing the flexible exchange rate the inflation became a more important variable and led the central bank to set an inflation target of 2 % (Riksbanken, 2015, b). By steering the interest rate with monetary policy instruments, the Swedish central bank has tried to reach this target in order to maintain a stable economic growth. At this period in time, during the 1990s, the Swedish real estate market had the image of being an opportunistic and an inefficient market with low liquidity and transparency. The market has since then developed the last 20 years into a more profitable market, with lower transaction costs, higher liquidity and transparency. The Swedish central bank has over the years increased and decreased the repo rate with a downward sloping trend, which can be observed in the figure 2. This kind of action on the repo rate has had a positive effect on the house prices over the past decades.

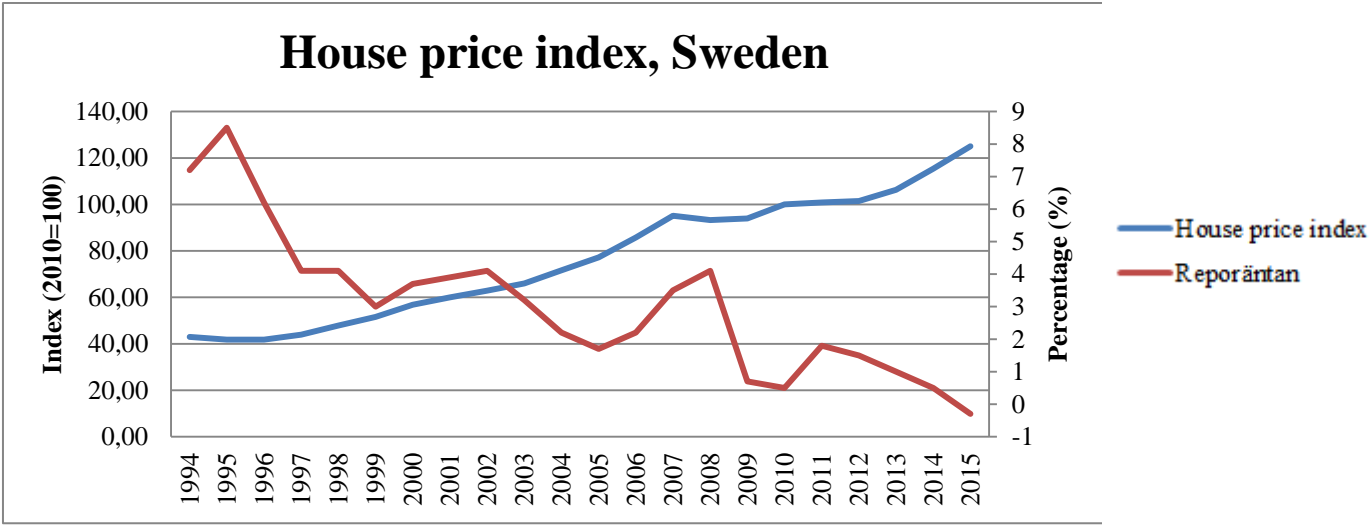


Figure 2: Illustrating the change in house prices and the repo rate in Sweden (source: OECD, Riksbanken).

7.1.2 The historical pattern of the macroeconomic variables

The overnight interest rate in Japan was under 1 % by the middle of the 1990s and in 1999 it reached zero and has been kept at that level until today. The zero interest rate policy, called ZIRP that was implemented was a commitment from the bank of Japan (BOJ) to maintain it until the concerns of deflation had vanished (Oda and Ueda, 2005). Today, Japan has implemented the so called "Abenomic"-economic policy, which was introduced in 2012,

which purpose is to keep a low interest rate and lower the exchange rate and by that increase the exports and increase the inflation to meet their inflation goal at 2%.

Generally yields are at historical low levels but real estate is still a popular investment alternative as real estate yields are higher than the 5-year government bonds in Japan. However, the economy as a whole is moving rather slow and the GDP growth increased by almost 1 % between 2012 and 2015. With high government spending the hopes has been to get the economy restarted. Unfortunately this has not been the case as the increased spending has led to higher government debt relative to GDP and in 2014 the public debt was 246 % of the GDP (IMF, 2015). During the period with the overnight on a level of zero the GDP growth has had a decreasing trend and the inflation has fluctuated around zero. A great threat against Japanese economy and real estate in the long run is the fact that Japan as a country have experienced a slowdown in the population growth the past decade. The population is forecasted to go from 127 million - 80 million by 2060 if the current population rate persists. At the same time that the working force would decrease with 50% (Akagi et al., 2015).

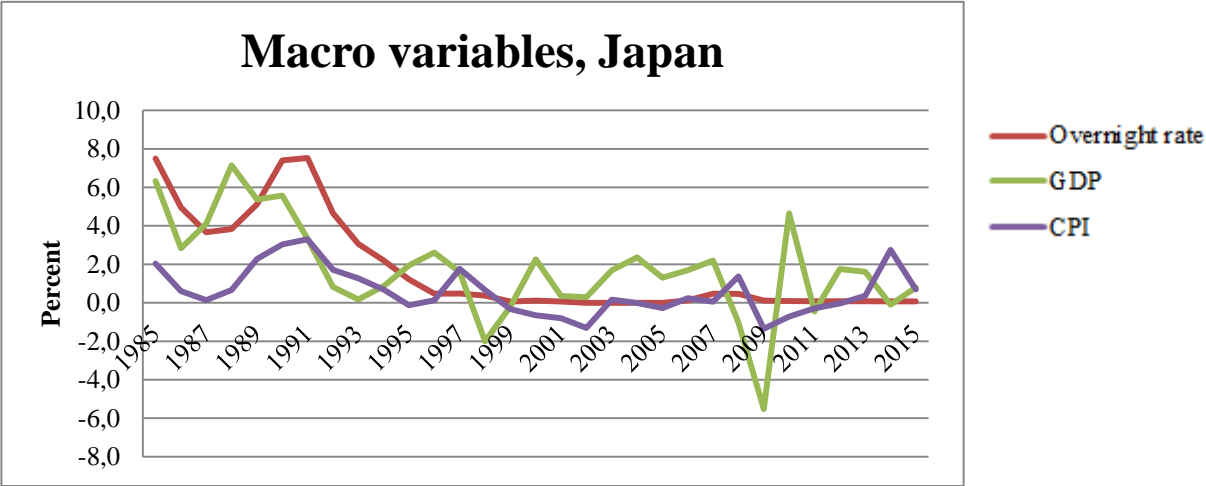


Figure 3. Illustrating the macroeconomic variables in Japan (source: Bank of Japan, IMF and the World Bank)

In Sweden on the other hand, all the transactions and investments strategies on the market were made under an existing positive repo rate up until a year ago. In February 2015 Sweden found them self in a new, historical situation. The Swedish central bank lowered the repo rate to a historically low level of -0.10 percent at this time (Jansson and Kapple, 2015). They assured that they would keep lowering the interest rate combined with buying treasury bonds to ensure the stabilization and a rise of the inflation to meet their inflation target on 2 percent (Riksbanken, 2015, b). During the past year the central bank of Sweden has lowered their interest rate three more times in belief that the inflation will turn around and increase to higher positive levels again. In March 2015 they lowered it to a level of -0.25 percent and in

July 2015 to a level of -0.35 percent (Riksbanken, 2015, c and d). The most recent was in February 2016 when the central bank lowered the repo rate to -0.5 percent, which also is the current level today (Riksbanken, 2016, a). Concerning the inflation, it has slowly started to recover itself after also being negative for a period of time and at the moment it is on a level of 0.8 (Riksbanken, 2016, c). There are divided opinions on how the negative repo rate will affect the real estate market. One opinion is that it will have a positive effect on the market and that the low interest rate will stimulate transactions. Another opinion is that the future is more uncertain and that we are close to reaching the top of the current real estate cycle (Fredriksson and Winkler, 2015). This belief is based on the history of real estate cycles within Sweden which have followed the pattern with real estate booms every 8 to 10 years during the past 25 years (Newsec, 2015).

The GDP growth has been positive, 2-4% for a longer period of time except after the crisis in 2007-2008, when it was negative for several quarters. Low interest rates and an increased demand from both the domestic and foreign market have increased the exports. This in combination with a strong monetary expansion has driven the GDP growth during the recent years and when it comes to the government debt it has increased the past 5 years and is today around 45 % of the GDP.

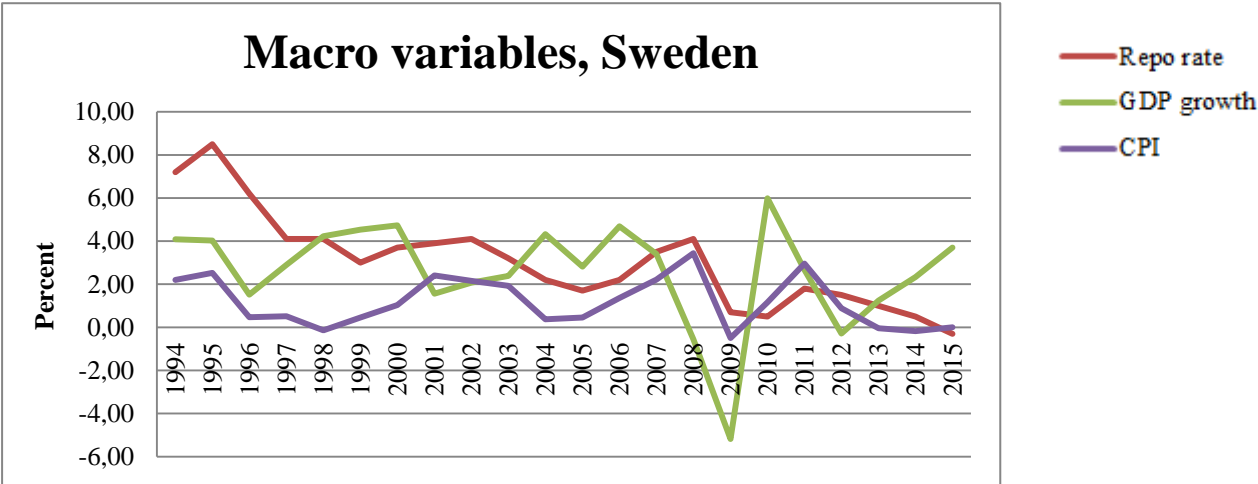


Figure 4. Illustrating the macroeconomic variables for Sweden (source: SCB, Riksbanken and the World Bank)

7.1.3 Forecasts for Japan and Sweden

The Japanese economy is forecasted to have a steady economic growth throughout 2016 and continuing in 2017. GDP is forecasted to increase by 1.1 % in 2016 and 1.2 % in 2017 (Cushman and Wakefield, 2016). Looking on the interest rates, the forecast is that the short-term interest rates will continually stay on a zero percentage level. The long-term interest rate is forecasted to continue to remain on low levels as well. The Inflation however is predicted to reach 2 % in the second half of 2017 (Bank of Japan, 2016).

The rise of the inflation in Sweden in the end of 2015 can be explained by the weak Swedish crown, which has resulted in more expensive international goods and services. The inflation is also affected by the households low interest rate costs, and the recent interest rate reductions will contribute to keep the inflation on a low level. However, by 2017 the inflation is expected to reach the inflation target as a result of increases in export and a general positive development in the global economy. The GDP is expected to continue to grow as a result of the aggressive central bank monetary policy. Besides a strong household- and real estate sector, the export segment and business investments will also contribute to the GDP growth. A forecast by the Swedish central bank shows that the GDP growth will be around 3 % the coming years (NaiSvefa, 2015).

Table 1: *Illustrating the forecasts from the Swedish central bank concerning the inflation, GDP, and the repo rate (source: Riksbanken, 2016, a)*

	2014	2015	2016	2017	2018
Inflation	(-)0.2	0.0	0.7	2.1	2.9
GDP	2.3	3.7	3.5	2.8	2.5
Repo rate	0.5	(-)0.3	(-)0.5	(-)0.4	0.2

7.1.4 The real estate market the recent years in Japan and Sweden

During the period of time where the overnight rate has been kept on a zero bound levels and with a very low inflation in Japan it can still be observed that the real estate market has been alive. As can be seen in the figure below the rents in Tokyo CBD has fluctuated from 1999 until 2014 with a peak in year 2000.

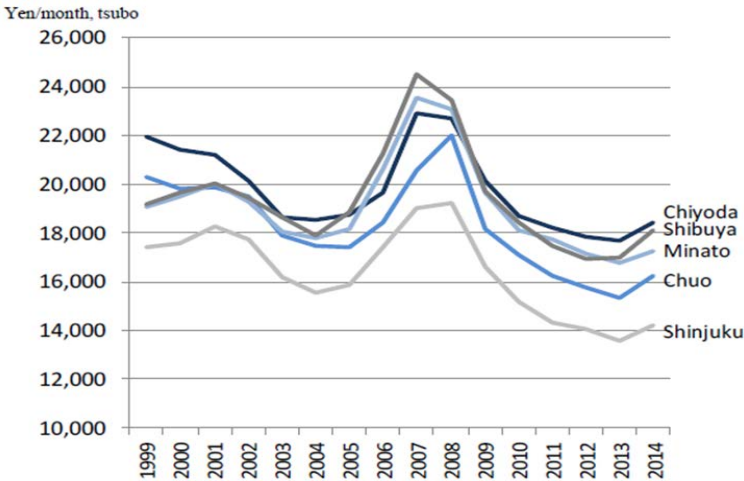


Figure 5. *Illustrating the rent movements and development in Tokyo CBD, Japan, for the time period 1999-2014 (source: Nomura Research Institute NRI, June 2015).*

It can also be observed in figure 6 below that it has existed fluctuations in the vacancy rates as well. As can be observed, the vacancy rate has fluctuated over the time period 1998-2014. With the highest values of around 10 % in 2012-2013 and the lowest values of around 2 % in 2006-2007 just before the financial crisis struck.

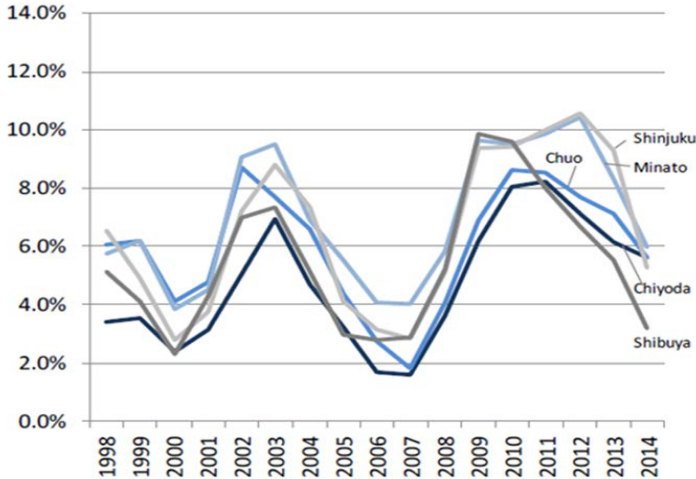


Figure 6. Illustrating the vacancy rate movement and development in Tokyo CBD, Japan, for the time period 1998-2014 (source: Nomura Research Institute NRI, June 2015).

Ever since the Abenomics were introduced it has affected the Japanese exchange market in a positive way, due to depreciation of the yen, as well as other investment markets (Ito et al, 2015). The interest in the Japanese real estate market from foreign investors has slowly started to grow again with Tokyo in the lead. This has made the general prices to increase (pwc, 2014). High expectations on the Olympics that will be held 2020 also make the Japanese real estate more attractive which helps increase the demand (Chu and Kuwako, 2015).

Low interest rates has led household loans to increase, which also has helped to push the house prices and demand to rise the last years (Deimendo, 2015). An observed trend the last couple of years, as can be seen in the figure below, is that borrowers have chosen fixed-rate mortgages rather than floating mortgages (Ujikane and Allan, 2015).

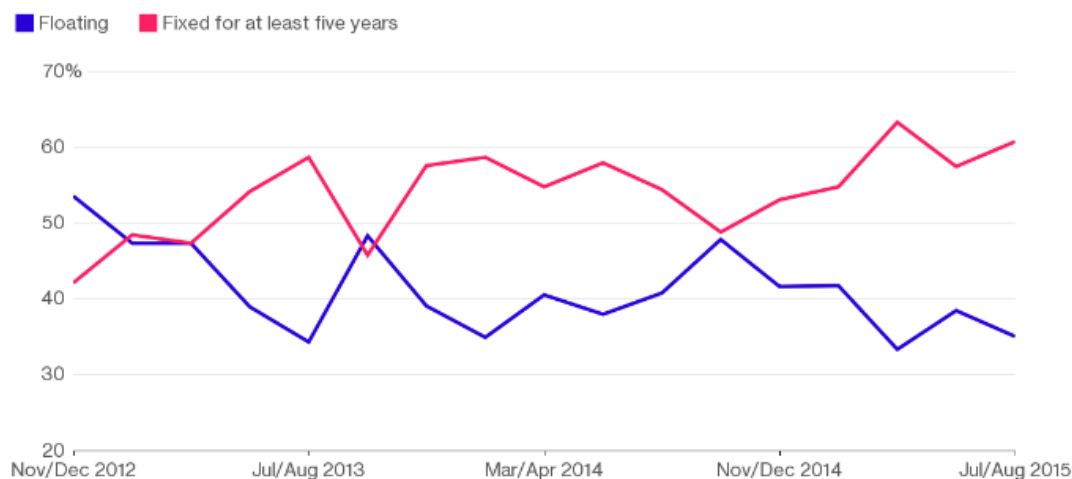


Figure 7. Illustrating the amount of floating and fixed mortgages in Japan during the past couple of years (source: Bloomberg).

In Sweden on the other hand a historical trend that can be observed the last couple of years in figure 8 are that the lending rates for the household mortgages have gone from being fixed to more floating rates. As can be seen the mortgages with floating rate have increased from 8 % to around 60 % during the last 20 years. Today, approximately 76 % of all new mortgages that are signed in Sweden is with a floating interest rate and only 6 % is done with a fixed one (Holmberg et al. 2015). This makes households more sensitive to changes in the interest rate but at the same time it increases the possibility for monetary policies to affect the economy (Sveriges Riksbank, 2011).

The improved possibility to borrow money, an increased population and urbanization has resulted in increased real estate prices. While the credits have increased, the central bank, politicians and the government have expressed their concern about the increasing indebtedness among households (Chen and Thand, 2015).

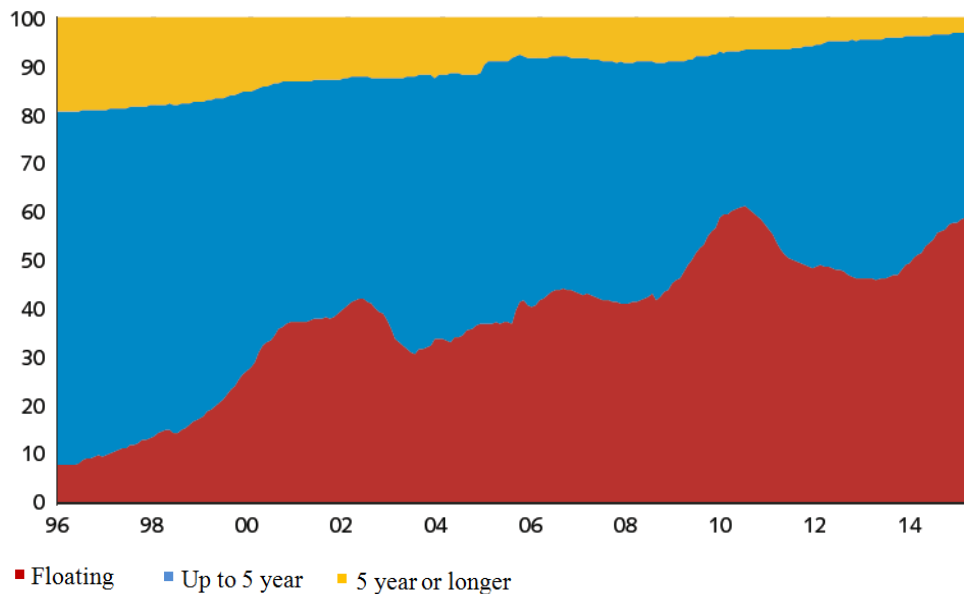


Figure 8. Illustrating the amount of floating and fixed mortgages in Sweden during the time period of 1996 to 2014(source: Riksbanken).

In year 2000 the IT-bubble burst which led to that more concrete and fundamental investment alternative became attractive. From being a less attractive investment with low upside, real estate became a more attractive and safer investment alternative. The result of the crash was that the general rents on the market fell which led to higher vacancy rate and some real estate companies were forced to declare bankruptcy. From 2004-2007 the market showed a clear change in trends where vacancy levels and yields declined and prices increased. The market bloomed and the supply of capital was high as investments were done by both domestic as foreign investors. In the autumn of 2008 the financial crisis hit the Swedish real estate market. In an attempt to boost the economy, the interest rates were lowered which led the yields down to record low levels and prices to increase rapidly. Housing real estate is the segment that has seen the strongest value development followed by retail and offices. At the same time, while prices have increased, a decrease in the 5-year government bond yield can be observed from 10 % to almost zero percent today. A factor that indirectly affects the real estate and office market is the population growth. As urbanization continues, the demand for offices has increased in big city regions, like Stockholm. New requirements and a higher willingness to pay for modern office solutions and applications have the recent years led to a higher interest in investing in new production. Due to this, the demand of offices with lower quality could decrease in the future (NaiSvefa, 2015).

Regarding offices, the prices have seen an increase the last couple of years and the vacancy levels are between 4 – 4,5 % in Stockholm CBD. It is observed that the prices are starting to reach the same record heights that could be observed during the record years around 2000 before the IT-bubble burst (Newsec, 2015). Due to the low interest rate levels, the domestic demand for real estate has increased and more investors choose to allocate their capital in real estate. An increased interest from foreign investors has also been seen and in 2014 they stood for 30 % of the real estate investments in Stockholm. This number is predicted to increase the coming years (Newsec, 2015). With the rising prices, there exists a historical large gap between the property yields and the risk-free interest rate (Fastighetsverige, 2015).

8. Results from the world analysis

In this chapter the results from the analysis for both the Japanese and the Swedish market is presented. The historical relationship between the macro economic variables and the real estate returns are presented followed by the historical relationship between the returns from the different asset classes. The chapter continues with presenting the results from the correlation tests that have been performed and finally the results from the interviews are presented.

8.1 Total return versus the macroeconomic variables

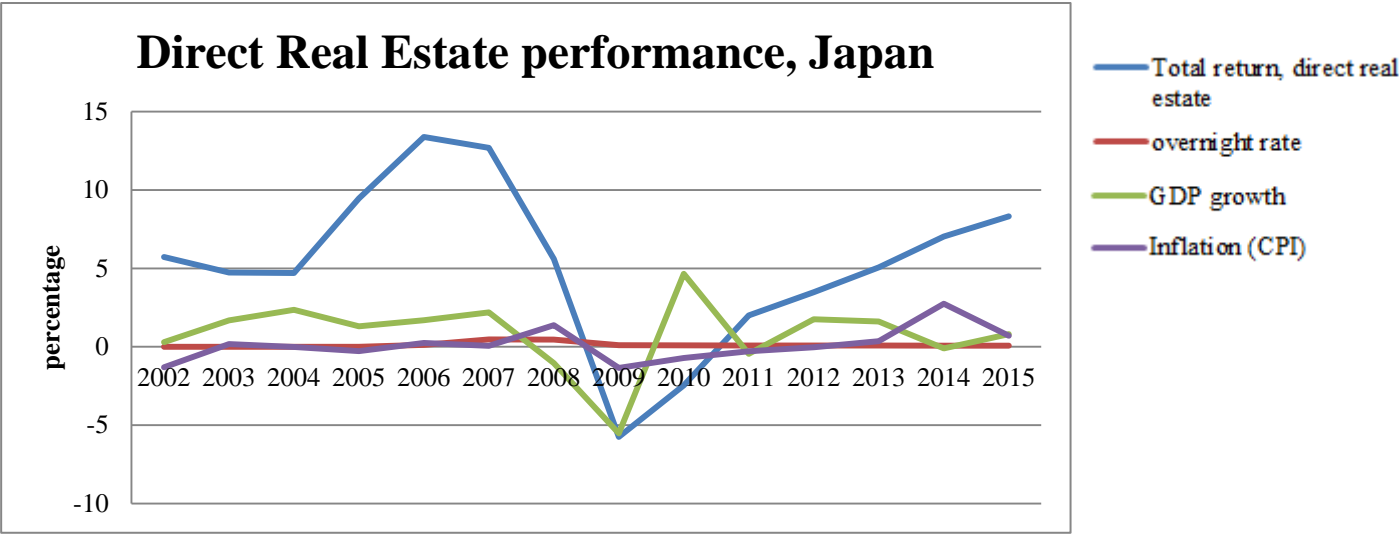


Figure 9: Illustrating the relationship between the return from real estate in Japan and the macroeconomic variables such as the overnight rate, GDP growth and the inflation (source: MSCI, World bank).

When looking at the figure above it can be seen how the real estate return, the GDP growth and the inflation have performed during the time period where the overnight rate has been zero in Japan. As can be observed, the inflation has fluctuated around zero. Even though Japan has had a zero bound interest rate during the last two decades the real estate has provided a fluctuating rate of return. The GDP growth has been rather low during the recent years and has had a negative value just after the financial crisis.

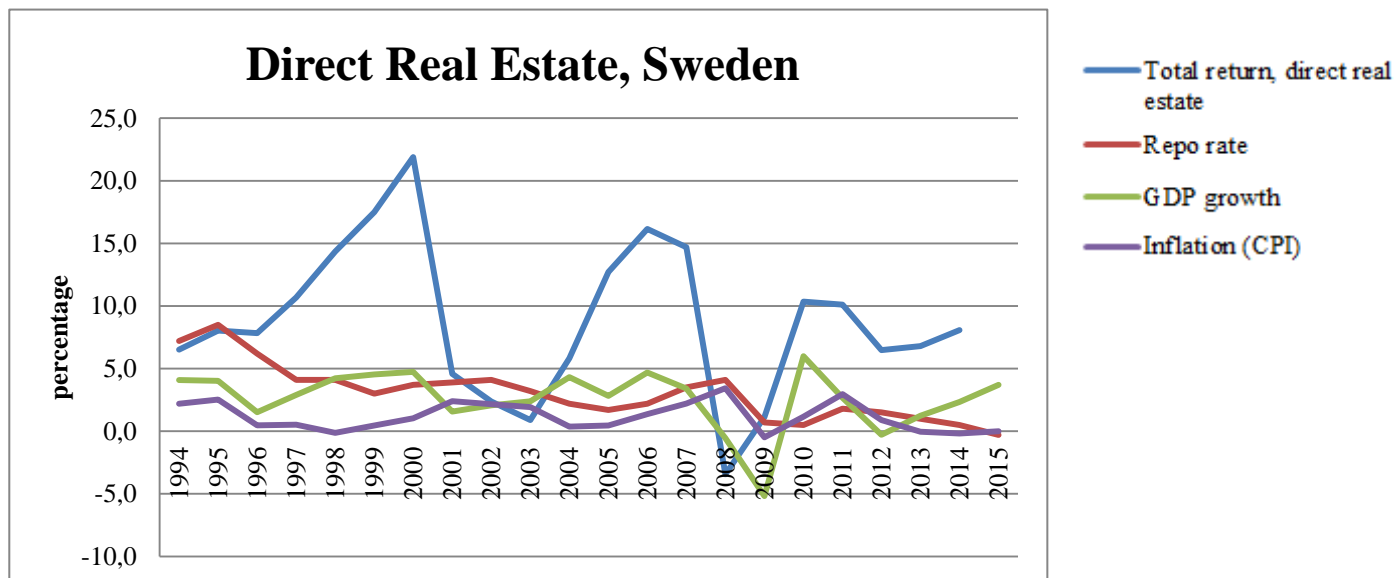


Figure 10: Illustrating the relationship between the return from real estate in Sweden and the macroeconomic variables such as the repo rate, GDP growth and the inflation (source: MSCI, Riksbanken and the World bank).

In figure 10 it is presented how real estate in Sweden have performed ever since the central bank introduced the repo rate and how it has been affected by the lower interest rate and inflation environment. As can be observed from it, it is possible to see some sort of existing relationship between the total return from direct real estate and the macroeconomic variables. It can be observed that the real estate return and the GDP growth has followed each other rather well in their performance over the time span illustrated in figure 10. A last observation that should be head lighted is that the overall trend from 1994 until today is that we can see a downward sloping pattern in the real estate returns and that the fluctuations have become smaller.

8.2 The performances of the assets

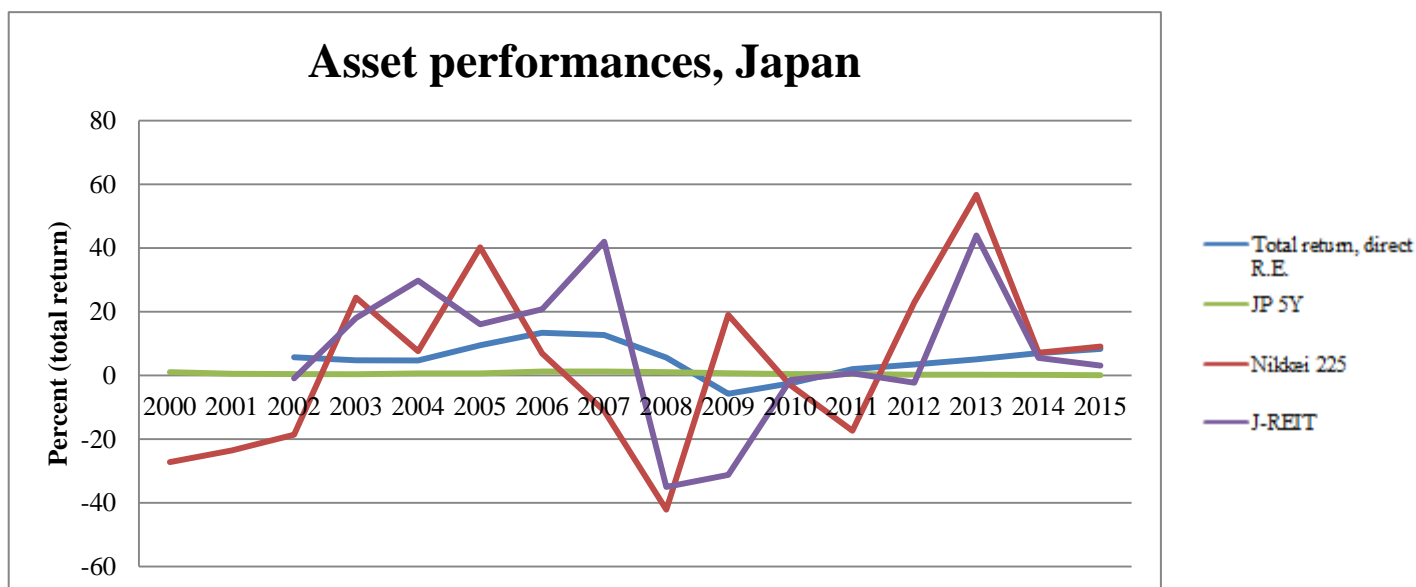


Figure 11. Illustrating the performance from the different asset classes, direct real estate, stocks (Nikkei 225 index) and five year government bonds (JP5Y) in Japan (source: MSCI, Nasdaq and Nikkei indexes official site).

Due to the lack of data over the total return from the direct and the indirect (J-REITs) real estate market in Japan when looking closer on how the different asset classes has performed, we can only get an image over the last decade. The pattern can be studied in figure 11 above. The yield from the five year government bond yield has stayed on very low levels close to zero during this time period due to the low interest rate. The return from the J-REIT and the stock market through the Nikkei 225 stock index has more or less followed each other with a similar pattern. Ever since the introduction of J-REITs in the Tokyo stock exchange the price return index has risen except from the years after the financial crisis in 2007/2008. Concerning the direct real estate, it has had a fluctuating rate of return during the time period observed in figure 11. As can be observed it has not reached the same heights or lows as the indirect real estate or the stock market. Nevertheless, direct real estate has had a more stable rate of return although the overnight interest rate has been on zero bound level during the time span.

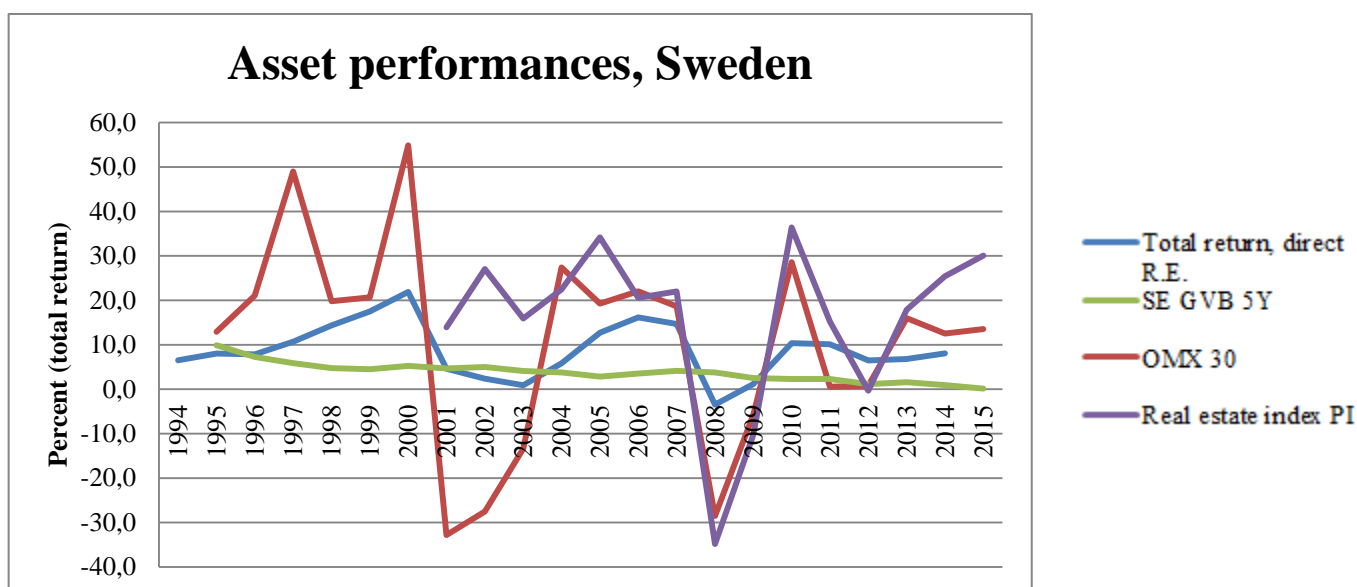


Figure 12: Illustrating the performance from the different asset classes, direct real estate, stocks (OMX30 index) and five year government bonds (SE5Y) in Sweden (source: MSCI, Nasdaq and Riksbanken).

As can be seen in figure 12 above the yield from the five-year government bonds in Sweden has been on a decreasing pattern, following the repo rate, ever since 1995 towards today's low levels around zero. Since July 2014 a five year government bond has had a yield to maturity below one percent. Concerning the indirect real estate returns and the Swedish stock index OMX30, these two have more or less followed a similar pattern ever since it became possible to invest in indirect real estate assets. The stock market returns during the recent couple of years has had no influence by the repo rate as also can be observed later in table 4 further down in the analysis. The direct real estate in Sweden has during this time period had a rather similar pattern to the indirect real estate and the stock market although it can be observed in the figure above that the variation and fluctuations in these returns has been smaller due to the lower overall risk.

8.3 Correlation analysis

In order to get a wider understanding of the relationship between the returns and the yields from the different asset classes and the macroeconomic variables, a simplified analysis through correlation tests has been performed.

8.3.1 Correlation between the assets and the macro variables in Japan

Table 2. Correlations from the different assets towards the macroeconomic variables for the time period 2002-2015 from Japan.

Correlation					
	JP 5Y	House price	J-REIT	Total return, R.E.	Nikkei 225
Overnight rate	0,62	0,35	-0,13	0,26	-0,46
GDP growth	0,00	0,18	0,62	0,38	0,06
Inflation, CPI	-0,16	0,33	0,07	0,42	0,06

As there was limited amount of data (14 points of data) for the Japanese real estate market, this may affect the results when looking closer on the correlation between the different macroeconomic variables and the assets returns and yields. Only by looking on the results for the time period of 2002 to 2015 it is interesting to see that the overnight rate in Japan have a positive correlation towards the house prices and the total return. This result is interesting since it isn't what could be expected. Referred to previous studies, DePersio, (2015), the expected results should rather be the opposite. The negative correlation between the overnight rate and the J-REITs is in fact what should be expected even though it is not as significant. The same thing is applied for the correlation between the overnight rate and the Nikkei 225 stock index. If looking closer on figure 1, in the section 7.1.1 the interest rate effects on the housing market, (overnight rate vs house prices 1985-2015) it can be observed that the house prices and the overnight rate have followed a similar pattern which also corresponds to the correlation test above. When looking on a longer time horizon, this positive correlation is even more significant, measured to be 0,55 for the time period 1985-2015, which isn't according to what should be expected.

Looking at the correlation that the GDP growth have towards the different asset classes it corresponds better to previous studies, arguing that the GDP growth can explain the changes in real estate prices and yields, especially for the indirect sector, in the best way. The inflation has had a rather strong positive influence on the direct real estate sector but not so significant in the other sectors.

Table 3. Correlation results between the different asset classes in Japan.

Correlation, assets					
	Total return, R.E.	House price	JP 5Y	Nikkei 225	J-REIT
Total Return, R.E.	1				
House Price	-0,1	1			
JP 5Y	0,4	-0,3	1		
Nikkei 225	0,0	-0,1	-0,4	1	
J-REIT	0,6	-0,1	0,1	0,5	1

Finally, let's have a look on the results over the correlation that exists between the different asset classes in Japan. Looking closer on the first column it is interesting to see that the correlation between the total return from real estate in Japan has a positive correlation towards the Japanese government bonds and J-REITs. The result shows that it doesn't exist any correlation between the total return and the Nikkei 225 stock index. It can also be observed that it exist a negative correlation between the total return and house prices. This value though is rather small meaning that both assets classes are quite independent towards each other.

When looking on the correlation that the house prices have towards the stocks, bonds and the J-REITs, these values are all negative. The results from this analysis are in line with what could be expected and are in order to what previous studies have found. The finding that it exist a positive correlation of 0.5 between the Nikkei 225 stock index and the J-REITs could be explained by the fact that both these indexes are exchanged on the stock market.

8.3.2 Correlation between the assets and the macro variables in Sweden

Table 4. Correlations from the different assets towards the macroeconomic variables for the time period 1995-2015 from Sweden.

Correlation					
	SE GVB 5Y	House price	Real estate index PI, Sweden	Total return, R.E.	OMX30
Repo rate	0,96	-0,38	-0,32	-0,04	-0,04
GDP growth	0,20	0,58	0,75	0,64	0,54
Inflation, CPI	0,34	-0,38	-0,32	-0,27	-0,51

Looking on table 4 it can be observed that house prices and the real estate index PI (representing the indirect real estate in Sweden) has a negative correlation towards the repo rate, which is what could be expected. The correlation between total return and the repo rate

are close to zero, meaning that this return maybe depends on other factors than the repo rate and its changes. The fact that the five-year government bond yield has a high positive correlation of almost 1 with the repo rate is not a big surprise.

As can be observed in the table above as well, the OMX30 have a negative correlation towards the inflation and the repo rate. However, the negative correlation towards the repo rate is near zero, meaning that they are independent. It can be observed that the total return from real estate, as well as the house prices and the real estate index PI has a rather high positive correlation towards the GDP growth. This result confirms what previous studies have found. It clearly exist a positive correlation between the GDP growth and the stock market.

Finally when looking at what kind of correlation that exist with the inflation and the asset classes, it can be observed that it is rather similar to the correlation that is observed from the repo rate, at least when looking on the sign. The existing difference is that this correlation is smaller in value towards the government bonds with a value of 0,34 while it is larger towards the total return from the direct real estate with a value of -0,27 and the OMX30 with a value of -0,51.

Table 5. Correlation results between the different asset classes in Sweden.

Correlation, assets					
	Total return	House price	SE GVB 5Y	OMX30	Real estate index PI, Sweden
Total Return, R.E.	1				
House Price	0,7	1			
SE GVB 5Y	0,1	0,2	1		
OMX30	0,8	0,6	-0,1	1	
Real estate index PI, Sweden	0,7	0,8	-0,1	0,6	1

The results from the correlation calculations between the different assets in Sweden can be observed in table 5 above. Starting by taking a closer look on the results in the first column it can be observed that it exist a relative high positive correlation between the real estate total return and three asset classes, house prices, the OMX30 and the real estate index PI. The same thing applies for the correlation between house prices towards the OMX30 and the real estate index PI, which also has a relative high positive correlation of 0.6 and 0.8. It can be observed that the house prices and the government bonds have a small but positive correlation of 0.2 as well as it exist a low but slight positive correlation between the total return and the

government bonds. Both these correlations are so low that it can be assumed that these asset classes are independent from each other.

The correlation between the government bonds, OMX30 and the real estate index PI are all negative but not very significant and it can be assumed that these assets classes also are independent from each other.

8.4 Interviews responses

Q1) How do you believe the low inflation and interest rate environment will affect the real estate market in the future?

At the moment the real estate yields in Sweden are at record low levels. However, one opinion is that if the low interest rate and inflation conditions continue it is not impossible to see an even further decrease. Today's yields around 4% in Stockholm CBD could go down to around 3%. This yield gap that possibly exists could lead to a 10-15% value increase in real estate due to an existing gap between the yield and the financial costs. A future value increase could also be motivated by the fact that real estate is an illiquid market which results in that real estate market reacts with a delay to interest rate changes. Therefore changes in real estate prices and appraisals occur later on after that transactions has been made and not just because the interest rate is reduced.

Another opinion is that the real estate yields will continue to stay on the same levels as it is today and that the expected increase in value will depend more on the demand and supply. Due to that the return from interest-bearing assets are low because to the low interest rates, investors on the market seek more stable and higher returning investments. If the situation continues, which is the main scenario on the market, more investors will seek out real estate investment. It is also believed that the interest from foreign investors will increase due to the favorable exchange rate arbitrage. According to institutional managers, real estate values are believed to continue to increase in value if the low interest rates and inflation environment continues in the future.

Q2) Do you believe that the existing low interest rate environment will continue to last for the coming years?

Historically it has been observed that what is believed to happen is often interrupted with an unexpected event which changes the conditions and expectations on the market. A clear example is the aftermath of the financial crisis in 2008 where most people thought that it would end up in a huge crash and recession, instead the financial market has flourished the past couple of years. Institutional managers believe that it is the main scenario on the market. At the moment it exist few signs that the inflation will increase rapidly and thus lead to an increase in the interest rate. However, the managers have a very clear opinion that unpredictable events can happen which could affect the future economy and therefore they still have other scenarios with lower probability to occur.

One of these scenarios with less probability that could occur is that the prices suddenly starts to decline for several years as in Japan and another is that the inflation picks up speed to suddenly reach a level of 4-5%.

Q3) Will you invest more in real estate in the future?

The managers know that with today's favorable condition for real estate, the current prices are at very high levels. They still believe real estate is a good investment and will probably continue to invest in real estate in the future. This would lead to that the current possession of real estate in their multi asset portfolios would increase in the future. However, if the economic conditions changes for the negative it could lead to a situation where real estate market is extremely overvalued. Today, they currently have a 10% allocation in the real estate sector, both through indirect and direct real estate. However, the investment strategies concerning real estate are not predetermined, but rather dependent on the market condition for the different segments.

Q4) How do you allocate your portfolio in today's low interest rate environment concerning the return from real estate versus alternative investments?

The most important aspect is to think in an overall perspective and have a portfolio that gives a good and secure return with relative low risk. In today's environment real estate is an attractive asset as the returns are solid relative to the risk. However, it's also important not to only invest in one asset sector but rather diversify the investment allocations in order to spread the risk. The managers have the responsibility towards their customers to ensure that every investment is the best one at the investment moment. Therefore it is important to compare every investment with other alternatives on the capital market.

9. Discussion

What's interesting in Japan and difficult to understand is how house prices could decrease for so many years even though Japan's central bank and government drastically lowered the overnight rate and conducted aggressive monetary and fiscal policies. It took almost 20 years before house prices started to increase again. The demand factor can't explain the event either, as the population still was growing at that specific time and the GDP growth was still positive even though it was decreasing. The biggest factor could be the extreme speculative behavior on the market in the 1980's and then favorable investment conditions.

From the data used in this thesis we have observed that historically real estate generates a fluctuating rate of return in an environment with low interest rates and inflation. The house prices in Sweden have had the opposite trend and prices have nothing but increased during the past 20 years. The return for real estate has still been generated but a decreasing and downward sloping trend in the fluctuations can be seen, which could be explained by the declining interest rate during this time period. For the moment, it is hard to say if the real estate market in Sweden will follow the same direction as the Japanese market did in the beginning of the 1990's. Some factors on the market are the same and similar and some are not. The biggest difference is that Sweden already has a negative repo rate while Japan was forced to lower the overnight rate as an effect of the crash.

The main scenario on the Swedish market today is that the low interest rates policy will continue in order to be able to increase the inflation. Two factors that complicate any increase of the inflation is the ongoing globalization and digitalization since asset prices are more easily compared and the current over-supply on the market pushes them down. It is important to remember that other scenarios could possibly occur in the future. As discussed in the interviews, after the crisis in 2008 almost everyone in the financial market feared a huge global crash and decrease in prices. Instead we have seen a seven-year long lasting increase within the financial markets thanks to the increased money supply from central banks worldwide. The inflation has not yet taken off as expected and with the increased money supply the possibility exists that the inflation could gather speed. Another possibility is that the inflation will decrease to negative levels leading to a deflationary economy. Another factor that could motivate the expectations of low future interest rates is the large percentage and increasing trend of floating mortgages. This behavior could be explained by that the general expectations concerning the Swedish future interest rate is that it will continue to be low or maybe even decrease more. However, Swedish households would be much more vulnerable to the interest rate increases which could have negative effect on the whole market.

The low inflation has led the interest rates to a decreasing pattern the past 10-15 years. Leading to that the majority of the assets on the market has increased during this period of time.

A clear difference between the asset classes is that the more liquid a market is, the faster the assets react on a change in the market rates such as a decrease or increase in the interest rate or inflation. An example of this is the stock market. Less effective and illiquid markets such as the direct real estate market reacts with a delay on changes in the market rates. Besides illiquidity, there exist a form of conservatism within the real estate market that contributes to inertia. It's the result from that the investors and market makers appraise real estate carefully and don't change their values until a transaction is made on the market. Due to that real estate market react to falling interest rates with a delay, referring to the interviews, one opinion is that the low interest rates have not yet fully affected the prices on the market. Even though the direct yields are near an all-time-low level, around 4 % in the central parts of Stockholm, there still exist a positive yield gap between the yield and the financial costs. If the low inflation and the negative repo rate endure the yield-gap could decrease further and even hit low levels of 3%, then we could see a further 10-15 % value increase within the real estate sector in the future.

Foreign investors interest is also a factor that helps boosting the real estate market, which we already have seen in the Swedish real estate market. A further increased interest from foreign investors could be expected, if low interest rates endure, on the Swedish real estate market in the future which would increase the demand and contribute to increased real estate prices and eventually the returns as well. As the Swedish Central Bank has lowered the repo rate to -0.5 % in order to boost the inflation another effect that has followed is that the Swedish currency has weakened relative to foreign currencies. The weakening of the Swedish currency could make it more attractive for investors from other countries to invest in Sweden. A further factor that could have an effect on the real estate prices and returns is the demographics. The population is increasing in Sweden which will further increase the demand for real estate.

Another effect of the low interest rate is that it affects how the funding for real estate investments is made. When purchasing a property the payment often consist of both equity and borrowed capital. As loaning costs are low at the moment, external bank financing becomes more attractive and constitutes a bigger part of the funding. A big risk factor in today's society is the existing bank and credit system, which are responsible of over floating the market with liquidity after the last financial crisis. It is not only private individuals and organizations that have large amount of debt, but also whole countries, such as Japan with a public debt of 246% of their own GDP. It is not a sustainable system to finance investments

on borrowed money in this extent but for the moment when interest rates are at such low levels the system works. Once interest rates start to increase, the system that has helped increase values on the asset market could see a fall or even a possible collapse. The effect and the outcome of such an event are difficult, not to say impossible to predict but a possible scenario is that an asset bubble would burst which could spill over and affect the whole economy.

What's interesting to see is that, even in an environment where the interest rate is zero and the inflation are at very low levels, as has been the case for Japan, is that fluctuations are observed not only in the returns but also in the vacancy rates and the rents on the real estate market. This indicates that it exist other factors than the interest rate and inflation that have a more direct impact and effect on the real estate prices and returns. An influential factor, and possibly one of the most important ones when it comes to the possibility to change the rents, is the relationship between the demand and supply that exist on the market as Etter and Hunt, 1997, a, discusses. As long as the demand and supply differ for properties this enables the possibility to change the rents, which contributes to value changes. In Stockholm today, the demand is so strong and the vacancy levels are so low that rents increase even though the inflation is practically zero. At the moment, Sweden has a good economic growth and a low new building construction rate, which enable rents to increase since the demand increases. Together with the low interest rates, resulting in cheaper finances and the relatively low yields, the real estate values on the market could see a further increase, yet not in the same extend as observed the last couple of years. The decreasing interest rates the past 20 years has helped to push the real estate values up in Sweden. If interest rates have reached their bottom level, asset values would not get that extra push as previously seen on the market. When comparing direct real estate returns with other assets it is clear that it generates rather stable returns in a low interest and inflation environment. Stocks and indirect assets generate more volatile returns and the government bonds give a very low rate of return.

The correlation analysis has shown that all the assets, both from Japan and Sweden, have a positive correlation towards the GDP growth. Resulting and strengthening the fact that the GDP growth is, not only, one of the most important variables explaining real estate returns and its fluctuations but also the returns for the stock and bond market. The only exception is the five-year government bond in Japan, which has a correlation of zero. As long as a countries economy is growing, the GDP growth will have a positive effect, especially, on the returns from real estate but also stocks and bonds, which corresponds to what Case et al. (2000) and Quan and Titman (1996) has written.

It is impossible to predict the future but something that is certain is that the trends cannot be positive forever. The peak will be reached someday, based on historical patterns,

and we will see a turnover on the market towards more negative trends. As long as the economy is growing and the expectations the current macroeconomic conditions remain the same with an existing demand for real estate, both commercial and private, today's prices and the future prices could be motivated. However, if expectations on these factors start to change and they move towards economic reduction and higher interest rate we could end up in a scenario where the market is extremely overvalued, which would have devastating effects on the market for both individuals and organizations.

10. Conclusion

Real estate can be considered a good investment alternative where they still generate a rate of return over time in a low interest rate and inflation environment. Furthermore the findings show that the interest rates and the inflation do not have any direct effect on the real estate returns in a low interest rate and inflation environment. However, we have found that it exist other variables that affect the real estate returns which in turn are affected by the interest rates and the inflation meaning that the returns for real estate are indirectly influenced by the interest rates and inflation. One of the most important variables is the GDP growth, which has an influential impact on the real estate returns. The demand and supply for real estate as well as the expectation concerning the future are also variables that influence the real estate market and returns. As long as the economy is growing as well as the demand is high and future expectations is positive, real estate can still be considered to be a relative secure and good investment.

The data used in the analysis is based on historic performance and a question is how representative this data is in this new and unexplored situation we are in today. As written before, the majority of the economic theories are based on positive interest rates, Blanchard et al. (2013), but at the moment we are observing extremely low and negative interest rates and low inflation, not only in Sweden but globally as well. Since it is such and unique and entirely new situation and it exist a lot of uncovered ground to explore within this topic, future research have to continue. It would be interesting and necessary to do a similar research on the topic in five to ten years in order to get a better understanding and knowledge of what kind of impact an environment with low interest rates and inflation will have on the Swedish real estate market.

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