Credit risk management

Possibilities for a housing price insurance on the Swedish market - lessons from Canada

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Abstract

The deregulation of the financial markets that started over two decades ago in the developed countries has led to increased house prices and loan to value ratios. Home owners in western countries have over the last two decades steadily decreased their savings and at the same time increased the size of their mortgages and the amount of leverage used to purchase their homes. This development has increased the financial risk for homeowners which recently became clear in the United States when prices on homes started to fall rapidly in 2007.

Due to this development Finansinspektionen in Sweden has enforced new regulation on mortgage lending making it more expensive for home owners to use high leverage ratios. Finansinspektionen is responsible for consumer protection in terms of financial products and the new regulation aims to protect mortgage borrowers. Finansinspektionen suggests that an insurance that protects the borrower from loss could be used as an alternative to the regulation restricting the amount of leverage. Finansinspektionen also mentions the Canadian mortgage market as an example where compulsory mortgage insurances are enforced today.

In Canada the borrower must take out a mortgage insurance when the mortgage exceeds 80 percent of the house value. However, we find that the Canadian mortgage insurance system would not fulfil the aim of Finansinspektionen’s regulation. The Canadian mortgage insurances are constructed to protect the lender against default and there purpose was initially to increase lending.

When examining the basic structure of mortgage and home value insurance products we find that such products and systems are complicated to construct to match the Finansinspektionen requirements and purpose due to issues such as moral hazard, adverse selection, price, willingness to pay and systemic risk.
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1. Introduction

1.1 General background

The action of lending money causes a risk of not being repaid. The investors’ risk of loss occurring from a borrower who defaults on a loan is called the credit risk. In order to price the risk, lending institutions estimate the creditworthiness of their customers. For mortgage loans, borrowers generally need to come up with a sufficient amount of equity to reduce the credit risk for the lenders.

The Swedish housing market experienced a strong price increase in the end of 1980s. This increase was mainly explained by the deregulation of the credit market, the system of government-subsidized loans and the possibility of 50 percent tax deduction of interest rates. The deregulation resulted in galloping real estate prices and lead to a market downturn in Sweden. In the beginning of the 1990s, Sweden experienced a severe financial crisis originated from the real estate market (Östman, 2010).

In the early 1990s several events came about in a short span of time which led to an economic recession in the country. The major international downturn, the already low domestic growth and the tax reorganization were the most important factors. The latter decreased the credit demand and lowered the price of assets, real estate in particular. The result was increased unemployment rates, risen national debts and reduced GDP in the aftermath. In addition, the huge affect on the credit risk in the residential mortgage market was probably the biggest cause for concern, at least from a housing finance perspective (Östman, 2010).

The great importance of credit risk management has even more recently been visualized in reality. In the sub-prime crisis in the U.S. credit rating agencies and investors failed to accurately price the risk in securitized mortgage products (The Geneva Association, 2010). This mispricing led to an increased demand for securitized vehicles which resulted in a severe explosion in the sub-prime lending activity and the ability to make mortgages became extraordinary easy. The mortgage originators did not need to worry about the poor credit rating since they easily could repack the loans and sell them as investment vehicles.

These financial misbehaviours within the credit market resulted in a massive collapse of the international economy. In other words, the credit risk management failure within the real estate sector basically caused the global financial crisis. In the aftermaths of the crisis, several countries are currently tightening up their credit rating requirements in order to establish more soundness in the financial markets.

Sweden has responded by implementing a new general guideline for mortgages collateralized by homes. Other countries have instead adapted different insurance products in order to reduce the risk within the mortgage market. The question is which approach satisfies the purpose of risk reduction in the best manner.

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1 The tax deduction rights were limited to no more than 30 percent when the market upswing wore off in the beginning of the 1990s. This combined with lower inflation resulted in a sharp increase in real mortgage interest rate after tax.
1.2 Aim and objectives
The purpose of this thesis is to examine how the new general guideline on the Swedish mortgage market could be extended or subsidized through an insurance product in order to better satisfy the purpose of the regulation and reduce the credit risk.

The further objective is to give the reader a better understanding of credit risk management within the residential real estate business as well as to describe how different insurance product and hedging procedures could be applied.

1.3 Limitation
This thesis is geographically limited to the Swedish and Canadian markets with some comparisons with the United States. Moreover, the thesis will only focus on the real estate markets and not take the general finance markets into account. Since the thesis focuses on the specific credit risk involved in mortgage lending, the macroeconomic credit risk will be given no attention. Further, mathematical elements will be excluded in the theoretical framework and house price expectations will not be considered in the analysis.

1.4 Methodology
The scientific method in this thesis has been based on a qualitative study in which quantitative data has been analysed. The following figure shows the most important steps involved in our process.

![Figure 1.1](image)

Various methods have been applied to obtain the information in this thesis. All information gathered from external sources has been carefully reviewed in order to ensure its trustworthiness.

Chapter two consists of material gathered from literature and articles on the subject of credit risk, from both national and international authors.

Chapter three which entirely focuses on the Canadian mortgage system relies on information from written articles by Canadian authors. In order to get a better understanding and insight of this foreign market we increased our knowledge through additional material which is not directly sources of reference in the thesis.
Chapter four consists of information mainly gathered from The Swedish Supervisory Authority, Finansinspektionen. We found it crucial to understand Finansinspektionens implemented general guideline and its underlying purpose why we have relied on their written articles.

Chapter four is built up as a comparative analysis with the purpose to examine the aim of the thesis by analysing the Swedish requirements for an introduction of a Canadian insurance product. The material of the chapter consists of information from the previous chapters as well of some reflections made by the authors of this thesis and e-mail correspondence with representatives from Canada Mortgage and Housing Corporation (CMHC).

Chapter five consists of conclusions made by the authors and should be seen as a final subjective statement in which the aim and objectives of the thesis are being discussed.

1.5 Disposition
The thesis is divided into five major parts, namely; The theoretical background and framework, Mortgage insurance in reality, The Swedish market conditions, Competitive analysis and Conclusions. The first three parts are intended to give the reader the knowledge required to follow the comparative analysis and conclusions in the last two parts.

The first part focuses on the credit risk in the mortgage market and how such risk has increased during the last decades. Different methods to manage the increased risk will be discussed and also the theories behind them.

The second part focuses on how the above risk is reduced in reality. The Canadian housing system and its mortgage insurance product is introduced and explained in order to give the reader a great understanding of credit risk management in reality.

The third part examines the demand for an insurance product in Sweden in relation to its market characteristics and credit risk circumstances. Moreover, the new general guideline is introduced and its underlying purpose is explained.

The forth part analyses the previous chapters with respect to the aim and objectives. This chapter is divided into five different sections in which different topics are discussed and compared.

The fifth part states the conclusions of the thesis.

1.6 Glossary
Annuity Loan: A loan structure in which the periodic payments, interest and principal, are constant throughout the lifetime of the loan. The payments consist of a larger part of interest in the beginning and an increasing part of principal toward the end of the loan period.

Mortgage: A financial loan with a real property as collateral.

Mortgage loan: A loan collateralized by a real property. Usually constructed as an annuity loan with an amortization period of 25-40 years.
**Adverse selection:** A problem caused by a person using asymmetric information to his advantage at the expense of another party, usually an insurance company. For example people with high risk and high damage taking out insurance without disclosing the information.

**Morale Hazard:** Carelessness or indifference to a loss because of the existence of insurance. Insurance analysts distinguish this from moral hazard (Luthardt & Wiening, 2005)

**Moral hazard:** Dishonesty or character defects in an individual, which increases the chance of loss (faking accidents, inflating claims amounts).

**Finansinspektionen:** Financial Supervisory Authority, Swedish governmental agency responsible for financial regulation and consumer protection in terms of financial products.
2. Housing finance theory

This chapter is divided into three parts. The first section focuses on the credit risk development in the mortgage market, both from an international and Swedish perspective. The deregulations of the financial markets across the globe have resulted in a more liberal bank lending. We will look at how the recent development has increased the credit risk in the property market in terms of loan to value ratios and housing prices.

The second part describes different general theories which are aimed to reduce the credit risk in the financial markets.

The third part considers how the increased credit risk in the mortgage market could be managed and reduced through different tools. These tools are based on the theories explained in the previous section.

2.1 Mortgage credit risk development

In the mortgage market, credit risk deals with the risk that the borrower for some reason refuses or becomes unable to make payments on a loan. In other words, credit risk treats the credit worthiness of the mortgagor. When estimating the credit worthiness of a customer several variables are of interest. The foremost is the value of the house and how it changes. If the borrower defaults on the loan, the first solution is to sell the house and repay the loan. However, the ability for such action depends on another important variable; the loan-to-value ratio (hereafter, LTV ratio) which is the percentage relationship between the loan amount and the house price. In order to enable the borrower to pay back the full loan amount, the house price must consequently exceed the debt. Two additional factors to consider in credit risk management is the ability to make a sufficient downpayment and the ability to manage fluctuating levels of interest rates (Östman, 2010).

In general terms, credit risk is seen from the lender’s point of view. The lower the LTV ratio, the lower risk for the credit lender since the borrower will bear a bigger share of the eventual losses. The credit risk in the mortgage market can be measured in different ways. The LTV ratio, the debt ratio and the real amount of the total outstanding debt per house will be used in this thesis above all.

2.1.1 Global perspective

Financial deregulations started in the advanced economies in the early 1980s and were followed by the emerging markets liberalization and globalisation from the late 1980s and early 1990s. The deregulation and liberalization lead initially to a more volatile financial environment. This was because of the availability of the previously inaccessible investment outlets and more risk taking due to the increased level of competition within the banking sector (Hull L., 2003). The deregulation has led to increased house prices for a long and consistent period in the developed countries, see figure 2.1.
Figure 2.1 shows the development of house prices according to indices in Sweden, the UK, USA and Canada between 1991 and 2010, with 1991 as index 100. Between the years 1994 and 2007 house prices in the UK increased by almost 360 percent (Nationwide, 2011) (Statistiska Centralbyrån, 2011) (National Bank of Canada, 2011) (Federal Housing Finance Agency, 2011).

One of the most important reforms of the financial deregulation was the abolishment of compulsory reserve ratios on financial institutions. These included reserve asset ratios and lending ratios, which served as means to constrain credit growth. The ratio requirements forced financial institutions to invest in government securities that had below-market yields which acted as a sort tax. This “tax” was passed on to the customer in the form of lower interest rates on deposits and higher rates on lending (Hull L., 2003). As the regulation for the ratio requirements were softened both the lending rates and saving rates decreased, see fig 2.2 and 2.3.
Figure 2.2 shows the development for long term interest rates in Europe and the US (Reuters, 2011).

Figure 2.3 shows households saving rates as a percentage of disposable income 1992-2011 (Aridas & Magno, 2011).

Low interest rates has made it less favourable for consumers to save and increased incentives to borrow. Figure 2.2 and 2.3 show how households have decreased their savings as interest rates have decreased and house prices increased. The same effects have been observed for households in most developed countries (Hull L., 2003).

Since both house prices and household mortgage liabilities have increased steadily (for example see the US figures 2.4 and 2.5) and other types of savings have declined, households’ financial diversification has decreased in the last two decades. At the same time that lowered interest rates resulted in declining mortgage rates which made funding more affordable, other institutional changes have also affected households’ demand for debt. In the two last decades the down payment required by home buyers has steadily decreased. In many western countries LTV ratios of as high as 90 percent
have not been uncommon during recent years. In the United States the percent of new home buyers with no down payment increased from 5 percent in 2001 to 16 percent in 2009 (Taylor H., 2010).

Figure 2.4 shows the development of US house prices with 1991 as index 100 (Federal Housing Finance Agency, 2011).

Figure 2.5 shows the development of household mortgages in billions of dollars in the US (U.S. Census Bureau, 2011).

A second phenomenon that has been most common in Anglo-Saxon countries, especially the US, is refinancing. As the values of homes have steadily increased banks have offered home owners to refinance their mortgages and increase the amount of debt. This has made it possible for home owners to use their homes as a form of credit cards (Harris R., 2010).
2.1.2 The Swedish market

In Sweden, the crisis of the 1990s stressed the importance of how to handle credit risk in the housing finance sector since the market was more or less totally shaken up. Between 1982 and 1992, the total amount of outstanding debt per house almost doubled from about 157 000 SEK to 302 000 SEK. During this period of time, the steadily growing increase in indebtedness almost followed the inflation; the first increased by 92 percent while the latter grew by 90 percent. From 1992 to 1995, the outstanding debt per house was however quite stable but house prices were not, which caused big movements in the LTV ratio, fluctuating between 36 and 51 percent. Such low levels of LTV ratios should be considered as indications of low credit risk in the market (Finansinspektionen, 2010).

However, above figures account for both old and new loans which lead to some distortions. Many households with old loans decided their capital structure the day when the house was bought. In general terms, the Swedish housing market has experienced a steady growth in prices over the last decades (see fig 2.6). These householders have consequently not increased their loans in the same speed as the house prices have grown which have resulted in low LTV ratios on average (Östman, 2010).

![Figure 2.6. The development of the Swedish consumer price index (CPI) and the Swedish house price index (Statistiska Centralbyrån, 2011).](image)

In order to measure the households’ indebtedness from a credit risk perspective, it is more relevant to analyse only new mortgage loans. Figure 2.7 indicates that the LTV ratio for new mortgages for small houses has increased from being 62 percent in 2005 to 68 percent in Q3 2010. The corresponding ratio for condominiums has increased even more during the same period, from 68 percent to 75 percent. Increasing property prices over the past years have required greater mortgages which in turn resulted in higher LTV ratios. It is an obvious trend that the home composes a bigger and bigger share of the households’ total assets, currently representing more than 90 percent on average (Finansinspektionen, 2010).
Property prices fluctuate over time, just like other assets. This became particularly visible in Sweden during the property crisis of 1990s when prices fell rapidly. Finansinspektionen shows through a simulation to what extend householders would have been exposed if they had bought a house in 1991, just before the crash, and then fore some reason been forced to sell. This is revealed by measuring the number of quarters the mortgage exceeded the average market value of the house, given different sizes of initial down-payments.

The study indicates that a house in Stockholm needed almost 5 years of recovery before the market value became bigger again than the mortgage value, given 15 percent down-payment. A house in Gothenburg needed 4.5 years, in spite of as much as 20 percent in initial equity. Those households that meanwhile were forced to sell their properties were consequently left with a significant outstanding debt.

Moreover, the debt ratios have increased during the last decades (see fig 2.8). In this context, the debt ratio either refers to the households’ total debt in relation to their disposable income or to households’ total debts in relation to GDP. The first relationship has increased from being 92 percent in 1995 to almost 170 percent in 2009 while the latter has risen from less then 50 percent to almost 90 percent during the same period of time (Finansinspektionen, 2010).
2.2 Hedging and insurance theory

In order to reduce the credit risk in the financial sectors different theories are applied. These are general theories frequently used in a more widely context and adapted to many different business segments. The following sub-sections will introduce two common theories that could be applied in order to reduce the credit risk in the mortgage market. These theories will be explained in general.

2.2.1 Insurance theory

Within finance, risk is usually seen as the product of the probability for a harmful event to occur multiplied with the average loss that would occur. An entity can protect itself against a defined risk by using insurance (Weiss, 2010).

Insurance can be seen as the transfer of the risk of loss from one party to another. The party taking on the risk of the loss will require a payment, premium, for doing so. An insurer usually takes on the risk from a large number of policyholders. This brings diversification benefits to the insurer which allows the individual premiums to be much smaller than the individual compensation claimed by policy holders. By pooling funds from a large number of policyholders insurance companies are able to gain sufficient funds for the claims made by policyholders. Pooling involves the law of large numbers to make losses more predictable, thereby relieving risk that individual policyholders would have to bear. The individual financial burden for each policyholder is often much larger than the premiums that has to be paid. The risk for the event occurring that will trigger the event is often quite low and by using statistical averages in combination with pooling, insurance companies are able to calculate sustainable levels on premiums (Weiss, 2010).

The most common risks to insure are risks caused by “real events” such as fire, theft and natural hazards (Weiss, 2010). Investment in several securities with low correlation reduces the total variance of the portfolio of insurance. An insurer can thereby diversify not only between the individual
policyholders but also by taking on different types of risk. Further diversification can be achieved by geographical diversification by issuing insurances in different areas and countries.

**Premiums**

Insurance premiums are in general paid in advance. An insurer must thereby calculate the expected losses to be able to determine the correct premiums before issuing the insurance (Weiss, 2010). In insurance theory it is concluded that an insurance premium should reflect both the expected claims and certain loadings. The expected claims are calculated through different probability models and statistical data. There are three types of loadings that affect the level of the premium required to cover the cost of the insurance.

1. A loading to cover commissions, administrative costs and claim settlement expenses.
2. A loading to cover a profit.
3. A loading to cover the risk taken by the insurer.

The main concern for the insurance companies and regulators is to find appropriate measurement for the risk taken by the underwriter (Kahane, 1979).

The insurer invests the pooled funds arisen from the premiums in order to generate a certain return but takes at the same time on an increased financial risk. The financial risks mainly consists of market, credit and mispricing risks, since the major types of assets are usually bonds (Weiss, 2010).

Furthermore an insurer must take great care in calculating the adequate reserves for future loses. Although pooling makes losses more predictable there is no way in exactly predicting how large they are going to be. Therefore an insurer must hold a sufficient amount of capital to be able to absorb larger than expected losses and unexpected investment losses.

Estimating the capital requirements is done by considering payment patterns and sizes for losses which vary largely between different types of insurances. The annual losses for auto insurance are far more predictable than for example insurances that cover natural disasters. Unpredictable losses require insurance companies to hold sufficient liquid assets to prevent them liquidating assets during bad times (Weiss, 2010).

An insurer that would have to pay a substantial amount of money for an unlikely and unpredictable event of great magnitude, like an earthquake in a city, must keep a large amount of capital in proportion to its annual losses. Whilst the auto insurance industry can rely on annual statistics with rather low variation between each year, mortgage insurance cannot. In Canada the auto insurance industry has an annual pay-out ratio of 76 percent and other types of insurances such as life and health are on similar levels. The pay-out ratio in insurance is the amount of total premiums that is paid out in claims. Whilst the auto insurance industry can rely on annual statistics with rather low variation between each year, mortgage insurance cannot. In Canada the auto insurance industry has an annual pay-out ratio of 76 percent and other types of insurances such as life and health are on similar levels. The pay-out ratio in insurance is the amount of total premiums that is paid out in claims. In comparison to the mortgage insurance business, the countries largest mortgage insurer had an annual pay-out rate over the last 10 years of less than 45 percent. During the years of high economic growth, such as 2004, the claims were as low as 5 percent. The huge capital requirements for mortgage insurance companies are motivated by the large potential losses that could occur in a major economic downturns (Taylor P. , 2005).

**Systemic risk**

Systemic risk refers to the risk or probability of a collapse in an entire system or market. The transmission and spread of shocks in financial systems and the impact of these shocks differentiate the financial sector from most other sectors. The phenomenon of systemic risk in banking and financial
institutions does not appear to exist in other, nonfinancial sectors of more or less equal importance, such as manufacturing industries or even energy and agriculture. One popular definition of systemic risk is “a big chock that produces near simultaneous adverse effects for most or all of the domestic economy or system” (Kaufman, 2000).

A systemic crisis usually establishes itself as a breakdown in the functioning of financial markets. These crises are typically triggered by a sharp decline in value in a particular asset or type of asset (Hendricks, Kambhu, & Mosser, 2006). For example the crises in 1929 and 1987 where triggered by the collapse of the stock market while the crisis in Sweden in 1993 and the US in 2008 where triggered by a sharp decline in property prices.

To understand the inherent fragility of the banking system it is useful to start from the basics of banking. Banks create credits that allow the real economy to expand by borrowing short and lending long. Banks accept short-term deposits and make longer term loans (maturity mismatch). Their deposits are larger in numbers but smaller in denomination relative to their assets (size mismatch). Their liabilities are mostly liquid whereas their assets cannot easily be liquefied (liquidity mismatch). If a large number of depositors decide to withdraw their deposits at the same time, banks are unable to satisfy these withdrawals as their assets are illiquid. A bank run is usually initiated by a loss in confidence of the soundness of a bank from its customers. As the bank run gains momentum it serves as a self-fulfilling prophecy as more depositors are gripped by the distrust (The Geneva Association, 2010).

A liquidity crisis that starts off with just one bank can easily spread and become a solvency crisis in the entire financial system. When banks are hit by a large number of sudden withdrawals they have to sell assets to gain liquidity to confront the withdrawals. As banks start to rapidly sell off assets this leads to a decline in asset prices, reducing the value of banks assets. As the bank’s assets are reduced in value this will erode the equity base in the balance and lead to solvency problems for the banks (The Geneva Association, 2010).

The insurance business model has specific features that make it more stable than commercial and investment banking. Insurance is funded by upfront premiums, giving insurers strong operating cash-flow without requiring wholesale funding. Insurance policies are generally long-term, with controlled outflows, enabling insurers to act as stabilisers to the financial system (The Geneva Association, 2010).

Although the insurance model in its traditional form is of little concern for financial instability and systematic risk, developments in the last 20 years have raised some concern. Financial services are broadly classified into four traditional areas: Commercial banking, Investment banking/brokerage, Asset management, and Insurance services. These four areas were traditionally (functionally and also legally) segmented with independent organizations operating within each boundary and there was little interaction amongst them. This started to change around mid-1980s when financial deregulation started in most advanced countries. In the recent financial crises several insurance companies, most of them with large quasi-banking operations, where affected by the crises. The insurance companies who were in the most serious difficulties were not brought down by there traditional insurance business but by their quasi-banking activities. The most notable distressed insurance company was AIG that got into a state of bankruptcy and had to be bailed out by the U.S Government. AIG had taken a large position in selling credit default swaps (CDS). CDS can be thought of as a sort of insurance and was used to insure large pools of mortgage backed securities (MBS) against default. The product could
also be used for speculating and mispricing of the credit risk for the MBS’s led to distress for the companies that had issued large amounts of CDS’s when the U.S property market collapsed (The Geneva Association, 2010)

2.2.2 Hedging theory
Hedging is a financial tactic used to offset the risk of an exposure caused by price fluctuations. The aim is to take a position that has a negative correlation with the initial position. In a negative correlation the values in the first position will increase as the values in the second position decreases, and vice versa. An example of negative correlation is economic growth rate and unemployment rate. As the economic growth rate increases the unemployment rate will decrease.

Negative correlation can be used to hedge. For example; say that the price of gold has a negative correlation to the overall stock market. That is, when the stock market turns down investors seeks for safer placements such as gold and therefore the price of gold increases as the value stock market decreases. The owner of a company can therefore hedge his position, the ownership of the company, by using its dividend to buy gold.

The purpose of hedging is to reduce risk but this comes to the cost of reduced gains. When the value of the initial position increases the value of the one used to hedge will decrease. A perfect hedge is rare but such hedge would completely eliminate the risk. It is important to be aware of that two perfectly hedged positions would also eliminate the profit.

Many companies use hedging strategies to insure themselves against for example currency exposures. A negative correlation is not necessary to be able to hedge. This can be done by using financial instruments such as options and futures and other derivatives. How derivatives work and can be constructed to reduce the risk of a homeowners financial exposure will be presented later on in this chapter (Hull J. C., 2009).

2.3 Mortgage risk management tools

2.3.1 The demand for products
For most homeowners, the home is their most valuable financial asset. In the beginning of the 1990s national regulators started deregulating the financial markets across the globe. This led to lower interest rates and increased availability of credit. Since then, house prices have risen in most countries, and a major reason to this is the increased leverage taken by homebuyers. Subsequently, the homes of homeowners are not only their most valuable asset, but are often an un-proportionally big part of the households’ total wealth too, often making up for several of hundreds of percent of their total financial assets. Households are not only a highly leveraged but since most households own just one property, the geographical diversification of their property portfolio is extremely poor. Most often when households choose their residence their choice is driven not by optimal portfolio weighting but rather by the need to consume living space (Englund, 2009).

Especially for new homeowners, the combination of high leverage and fluctuations in house prices puts households at risk. A decrease in home prices can quickly erase the equity part of the home and leave households white negative equity. This was recently experienced by a large number of
households in the US housing market after the collapse of the market leading to the global financial crisis. A negative equity position by the household is further worsened when it is combined by a rising unemployment rate forcing homeowners to sell their properties without receiving enough capital to repay the outstanding mortgage. As mentioned earlier several Swedish households found themselves in this distressful position after the Swedish financial crisis in the beginning of the 1990s.

For households with low leveraged homes, price fluctuations are of no huge concern. If the market drops in value at the same time that the household wants to buy a larger property there will be enough equity to cover the mortgage on the existing property. If the household is relocating within the same geographical area the acquired property will most likely have dropped proportionally in value leaving the household at status quo. However property prices tend to vary considerably depending on the geographical location of the market. A drop in the local property market due to for example the loss of a large employer will be of great concern for households considering moving from that region to another (Englund, 2009).

There are today different methods of reducing the credit risk in the mortgage market. These methods could be divided into two groups that can be seen as two far ends of a scale of products that can be developed. Most of the products that have been developed and tested in different markets are in fact a combination and would fit in somewhere in the middle of the scale.

- On the one hand of the scale there are hedging methods that are basically pure financial index based products. This type of product is on the far end of the scale a pure financial product that can be used as an investment to hedge a position, both long and short, in the property market. This product does however not provide a full insurance for a household’s individual home. The product could be favourable for the household, but it takes no concern to the individual home and will only pay when a certain index has moved in the favourable direction.

- On the other far end of the scale there are full coverage default insurance products. These products will cover the loss on the individual home based on the purchase and sales price for the specific object. These products would give a full protection for homeowners but they are always surrounded by strict terms on when and under what circumstances a claim can be made. These products also tend to be very expensive and great concern has to be taken to moral hazard and adverse selection when constructing them.

2.3.2 Derivatives

Index based financial products

An index based financial product is a type of financial instrument known as a derivative. They are primarily designed to be used in risk management. A derivative is a financial instrument that derives its value from an underlying asset. The security itself is merely a contract between two or more parties and its value is determined by fluctuations in the underlying asset. The variables that the derivative depends on are often the prices of traded assets. A stock option derives its value from the price of the underlying stock. However a derivative can derive is value from almost any variable, for example the price of wheat after harvest or the value of a property index (Hull J. C., 2009).

A relative simple derivative is a forward contract which is an agreement to buy or sell an asset at a future time for a certain price. One of the parties assumes a long position and agrees to buy the underlying asset and the other party assumes a short position and agrees to sell the asset. If the price of
the asset falls to a value that is lower than the spot price, the contract of the short position will attract a value in itself. The same is true if the price of the asset becomes higher than the spot price. Then the contract for the long position will have a value. Forward contracts are commonly used by companies that want to hedge their currency exposure. For example a Swedish company that exports metal to the U.S and gets paid in USD but has all its costs in SEK might want to lock in the price on the dollar for a large order that will be paid sometime in the future. The company will then take a long position in a forward contract agreeing to buy a certain amount of SEK for a fixed price in USD. If the price of the SEK falls the company will then miss out on the profit that it would otherwise have gained. But the forward contract insures the company from the risk of the dollar falling in value (Hull J. C., 2009).

A property derivative derives its value from real estate assets. In some cases this is done by using real cash flows from specific assets. A large real estate company can sign a contract with a financial institution to swap the return from some of its assets against a fixed rate. The value of this contract will then depend on the outcome and prospects of the return on the specific real estate assets. This type of deal can also be constructed by using an index to determine the return on the real estate assets. This will be less accurate in the specific case but enables larger scale of trade and avoids some moral hazard issues. Also because real estate assets fall victim to market insufficiencies and are hard to accurately price, indices are often used to determine the price development for properties.

**Property indices**
A larger scale of trading in property derivatives requires a well-constructed, broadly based index to measure the performance of the underlying asset. There exists several exchange markets around the world that offer derivative trading in property indices. Large end-users such as pension funds, hedge funds, property investors and insurance companies can use trading in property derivatives to hedge their positions in real estate assets or gain exposure to the property market.

Every attempt to measure the correct prices of properties faces two problems. First of all, properties are heterogeneous products, each one being different from the other. Secondly, properties and the property market are illiquid. The process of buying and selling a property is far more hazardous than for example stocks and even cars and other commodities. Also, only a small proportion of property stocks is bought and sold each year. The combination of these three aspects gives the fact that a property index never can be fully representative for an individual house. Nevertheless it can give a fairly accurate indication on the development of the market in large (Englund, 2009).

A property index for home prices could be used to construct a derivative market enabling homeowners to hedge their position in the property market. Studies indicate that from an optimal portfolio point of view, those households that own their homes are overinvested in the market whilst those who live in rental units are underinvested. These households could hedge their respective exposure by trading in derivatives so that those homeowners with rental units would gain on a positive development of the index and those that own their own home would gain from a negative development from their position. It is unlikely though that those individuals will show enough interest in this active insurance buy hedging their position to make it effective. The concept of hedging involves transferring the risk, but also the return, from one entity to another. In this case it would mean transferring some of the returns from homeowners to those with rental units and other investors and speculators. Most homeowners intend on living in their homes for quite some time and by owning their homes they insure themselves from increased living expenses in the future. Households are instinctively negative to the concept of hedging because it involves missing out on returns from investments (Englund, 2009).
2.3.3 Mortgage and home insurance

There are two major causes for the demand of home value insurance. The first is the demand caused by the homeowners need for protection against the personal financial risk. The second is caused by the lender requiring the borrower to acquire such a protection in order to fulfil lending requirements. The lender of course requires this in order to reduce the risk caused by issuing the loan.

The insurance used by the lender to insure the mortgage is called mortgage insurance or mortgage default insurance. Payment from mortgage insurance to a lender upon default is usually based on the proceeds from the individual home and not an index. If a lender finds that a borrower is in arrears with instalments the usual reaction from the lender is initially to try to rehabilitate the borrower by rescheduling the repayments. When it becomes clear that the borrower is unable to repay the mortgage the lender will foreclose on the property. The foreclosure procedure is usually well described in both the mortgage and the insurance agreements. If the sales proceeds exceed the mortgage no claim will be made and the homeowner will acquire the exceeding proceeds. If there is a shortfall, the mortgage insurance will be invoked to reimburse the lender for the shortfall. The shortfall in this case, which is the normal procedure, is based on the individual house and mortgage and not any index (Taylor G., 1993).

An individual homeowner could protect himself against the financial risk caused by owning a property by using different kind of insurance products. The two most common types of insurance are mortgage protection and home value insurance.

Mortgage protection is not associated with the value of the home rather the size of the mortgage instalments. Also called payment protection or job loss insurance, these types of products helps the policy holder to pay the monthly instalments. It usually covers the borrower from unemployment, sickness, accident or other circumstances that prevents them from servicing the debt. These types of insurances are often quite expensive and only cover the payments for a finite period of time.

Home value insurances are often a lot more expensive than mortgage insurances and surrounded by several conditions for the sales procedure. This is because these insurances protect the individual, and often to full amount of the purchase price. This means that compared to mortgage insurance, where the individual always stands to lose the equity part of the value, the insurer has less of a buffer. Also often these types of insurance products, depending how they are constructed, struggle with morale hazard and adverse selection issues. Because of these issues claims from home value insurances are most often determined by the development of an index to make them affordable.
3. Mortgage insurance in reality – the Canadian Model

In Canada, mortgage insurance is a mandatory product for high leveraged mortgages. This chapter will focus on how the Canadian mortgage insurance market is built up and how it works. The first section gives an introduction of the Canadian economy and is followed by general financial regulations. The following section will describe the mortgage market in Canada and explain its characteristics. The final section will focus on the mortgage insurance market and its history as well as current products and features.

The purpose of this chapter is to give the reader insight into the Canadian mortgage market in order to understand how its insurance market works. The reader should see this chapter as a great example on how a specific country has built up its housing finance system through mortgage insurance as well as a realistic comparison to the Swedish housing finance market.

The Canadian mortgage model serves as a great comparison to the Swedish, not only because of its presence of mortgage insurance but also since its fundamental structure in many aspects is similar to the Swedish market.

3.1 Economic introduction

The Canadian housing finance system is in an international context known to be very stable and well functioned. The market is built up through several regulations which together work as an elementary foundation for the mortgage lending business. Canada has, in terms of GDP, the tenth largest economy in the world according to the International monetary fund. The membership of both the Organization for Economic Cooperation and Development (OECD) and Group of eight (G8) makes it an important actor in the overall macro economy.

Canada enjoyed a solid economic growth from 1993 to 2007. This growth was highly correlated with an increased export to the U.S. The trading between the countries was however particularly touched off when the 1989 US-Canada Free Trade Agreement (FTA) and the 1994 North American Free Trade Agreement were signed. Today, the U.S. stands for approximately 80 percent of the total Canadian export each year.

Canadian financial institutions are better positioned in relation to the American and European counterparts with respect to the degree of risk exposure and level of indebtedness. One way of examine this is to measure the asset-to-capital ratio which shows to what extent assets are being financed through debts. The major Canadian banks have a ratio of 18 which satisfies the Canadian regulatory system requiring no more than a multiple of 20. Canada has a low ratio in an international view. The equivalent ratio among American investment banks is above 25, for European banks around 30 while some of the world’s largest banks are facing a ratio over 40. Consequently, Canadian banks have great capital adequacy and are well risk-managed (Bones, 2009).

The International Monetary Fund recently concluded that the Canadian financial system is sophisticated, highly matured and well-managed. The risk of defaulting or declaring bankruptcy is extremely low. This was recently experienced in reality during the global financial crisis. The Canadian banks had a very low exposure to the subprime mortgage market which kept them out of the deep problems the U.S. banks were afflicted with. In the summer of 2007, when the crisis was about to
surface, subprime mortgages were only just beginning in Canada. In order to further limit the exposure of such products, Canadian financial institutions put a damper on this type of growth. As a result, the market never grew large and peaked at less than 5 percent of the total originations. Moreover, the major share of the subprime mortgages in Canada was not as bad as the NINJA\(^2\) loans in the U.S.

The Bank of Canada reported that Canadian banks had 12 CAD billion in total writedowns during the third quarter of 2008. This amount was just a small fraction in comparison with the U.S. which experienced 497 CAD\(^3\) billion during the same period, estimated by the Institute of International Finance. It is further notable that the Canadian writedowns were not related to the domestic residential mortgage lending.

During the last years when the U.S. real estate market experienced significant price drops and increases in defaults, the Canadian market had a much sounder development. Even if some regions were facing a minor decline, most major cities in Canada benefitted from growth in prices. The combination of real estate price increases and the low exposure to the subprime mortgage market was beneficial for the Canadian financial market, particularly in comparison with the U.S (Canada Mortgage and Housing Corporation, 2009).

Although the financial crisis did not hit Canada as badly as it hit the U.S., the Canadian economy was still affected. During the last quarter of 2008 the economy dropped into a sharp recession and Ottawa was in 2009 facing its first fiscal deficit after 12 years of surplus. The national unemployment rate increased from 6.0 percent in 2007 to 8.1 percent in June 2010. The GDP of Canada had a negative growth during the fourth quarter of 2008 and the first and second quarter of 2009 (Central Intelligence Agency , 2011).

In accordance with global economy and in response to the crisis the Bank of Canada began to lower its overnight lending rate on December 4, 2007. At this time, the rate dropped from 4.50 to 4.25 percent. This was follow by eight additional reductions of a total of 325 basis points down to 1 percent on January 20, 2009. The Bank of Canada motivated this massive decrease by a tightened credit market and a retreated stock market, among other reasons. The bottom was however reached on April 21 2009 when the overnight lending target rate went down to 0.25 percent. This level was then kept for just over a year until an increase by 25 basis points as of June 1, 2010. The rate is as from September 8 2010 at 1 percent (Bank of Canada, 2011)

Even if Canada was affected by the global crises, its financial system recovered very fast. The fast revival implies that the country’s very strong tradition of conservative actions in the financial market is beneficial. In fact, the Canadian financial system has actually been criticized for being too conservative and not dynamic enough. This could, for example, lead to underserved households demanding for welfare improvements in the financial sector. Past researches are though arguing that this is not the case. (Klyuev, 2008) came to the conclusion that even if financial options sometimes are very limited in Canada, the overall market for housing finance is nothing but very sophisticated and highly advanced (Kiff, 2009).

\(^{2}\)NINJA – No Income, No Job or Assets

\(^{3}\)1 USD = 0.9576 CAD 2011-04-10
3.2 General regulations

The housing finance sector of Canada has always been a well-functioned segment in the country’s overall financial system. The very conservative and well-regulated structure has conducted to a very stable and healthy financial market. The housing finance market is national in the aspect that the same lending conditions and mortgage products are applied all over the country.

Institutions in Canada that provide mortgage loans must be approved by a specific regulator on either a federal or a provincial level. The Office of the Superintendent of Financial Institutions, OSFI, is the primary regulator and supervisory in Canada. OSFI, which was established in 1987, is an independent agency of the Government of Canada and reports the Minister of Finance. The agency sets the same requirements on federal level in terms of mortgage lending for chartered banks, life insurance companies and the vast majority of trust and loan companies. These different types of companies face the same requirements set by the OSFI regarding maximum LTV ratio, mortgage insurance and disclosure of borrowing costs regarding residential mortgages. OSFI uses different legal frameworks for these different types of companies, namely the Bank Act, the Insurance Company Act and the Trust and Loan Companies Act. Legislation for mortgage activities from credit unions and mortgage brokers generally parallels with that for federally regulated financial institutions even though they are regulated on a provincial level (Traclet, 2006) (The Office of the Superintendent of Financial Institutions, 2011).

Canada Mortgage and Housing Corporation, CMHC, is the national housing agency of Canada. The agency’s main function is to provide mortgage insurance for residential homebuyers in Canada. CMHC was established in 1946 and is owned by the Government of Canada (Canada Mortgage and Housing Corporation, 2011).

3.3 Mortgage characteristics

3.3.1 Mortgage originators

The origination of Canadian mortgages has changed significantly during the last 40 years. Today, deposit-taking financial institutions still account for the majority of the market. They basically fund their lending by selling interest bearing instrument, called guaranteed investment certificates (GICs), to savers. This is called on-balance sheet lending since such lending are funded through the banks deposits and hence viewable on the balance sheet. Such institutions were, as of December 2007, holding 69 percent of the total outstanding amount of Canadian residential mortgage debt. Among these institutions, the chartered banks stood for the major part by holding as much as 54 percent. The latter has increased from 10 percent in 1970 of which the major growth came after the 1992 Bank act revision. The total Canadian outstanding mortgage credit was as of December 2007 819 billion CAD (Kiff, 2009) (Canada Mortgage and Housing Corporation, 2009).

These numbers have however been decreased to 64 percent for deposit-taking financial institutions of which chartered banks had 49 percent, as of August 2009 (Dunning, 2009). In spite of that, the total Canadian outstanding mortgage credit increased by 14.8 percent during the same period of time to 940 billion CAD. This was mainly explained by a rapid increase in amount of Mortgage-Backed Securities (MBS) over the past years which currently represent more than 31 percent (295.5 billion CAD) of the market, as of August 2009. In spite of the great expansion, the market is still small in relation to the
U.S. where about 60 percent of the mortgages are securitized (Canada Mortgage and Housing Corporation, 2009) (Dunning, 2009).

The vast majority (29 percent) of the Canadian securitized mortgages are National Housing Act Mortgage-Backed Securities (NHA MBS). These pools of amortizing residential mortgages are insured by the Canadian Mortgage and Housing Corporation (CMHC) or a private mortgage insurance company. They open up opportunities for investors to invest in the secondary mortgage market by purchasing these pools and receiving monthly instalments of principal and interest. These products were launched by CMHC in 1987 and provide an additional source of funding for the lenders in their mortgage operations. The majority of the NHA MBS are held by the Canada Housing Trust (CHT), funded by the Canada Mortgage Bonds (CMBs) and guaranteed by CMHC. In other words, CHT basically uses the proceeds from their bonds to purchase NHA MBS. This type of funding was introduced in 2001 in order to increase the lenders sources of funding and to improve the liquidity of the mortgage market. Both NHA MBS and CMBs are examples of off-balance sheet lending (Canada Mortgage and Housing Corporation, 2009).

Besides these major lending originators there is a very small additional category of actors, the unregulated lenders. They represent just a small fraction of the mortgage market of only 3 percent in August 2009 (Dunning, 2009). They do not need to abide to the mandatory insurance requirements for high loan-to-value lending, since they are not subject to federal regulations. This type of lending is addressed to a specific set of clients who in general do not qualify under the GDS and TDS tests (to be explained further on). For example to people with high wealth but low income, people with high income but low savings or self-employed individuals with unpredictable cash flows (Lascelles, 2010).

This market has experienced some problems during the last years. The problems were not only related to the global economic downturn, but also caused by the disappearance of the Canada Non-Bank Asset-Backed Commercial Paper (Non-Bank ABCP) market. The fact that unregulated lenders do not have the same rights like deposits-taking financial institutions, to match deposits against their lending, they really suffered when this market was shut down. The Non-Bank ABCP market had to that point in time been an important loan-financing vehicle for the unregulated lenders (Lascelles, 2010) (Dunning, 2009).

3.3.2 Mortgage terms and amortizations periods

A typical Canadian Mortgage has recently been a five-year fixed-rate loan, amortized over 25 years. Current regulation permits an amortization period of up to 35 years, reduced down from 40 years in 2008 by the Department of Finance (Lascelles, 2010). In the forth quarter 2009, approximately 18 percent of all mortgage consumers had amortization periods of more than 25 years. This rate has increased recently and been doubled in two years from being only 9 percent in 2007. Longer amortization periods are consequently becoming more popular. In Q4 2009, almost half (47 percent) of all new mortgages on new purchased homes had amortization periods of more than 25 years (Dunning, 2009).

The most common mortgage term is five years in Canada. Approximately 56 percent of all mortgages were on five year terms in Q4 2009 (Dunning, 2009). (Kiff, 2009) argues that this has basically two different reasons, the five-year maturity cap on government guaranteed deposit insurance and the limitations on prepayment penalties on residential mortgage loans. The first refers to the banks’ attempt to match the maturity of their assets and liabilities in order to decrease their risk and hedging
needs, the so called asset-liability gap management. Since the Canadian Deposit Insurance Corporation (CDIC) only guarantees term deposits of up to five years, banks will have to pay more for longer term funding. The second refers to the increased prepayment risk that banks are facing due to the reduction in penalties for prepayment actions. The new regulation implies that the borrower has the right to prepay mortgages with terms longer than five years once the first five years have past, with a penalty of no more than three months of interest. Banks must therefore hedge against the increased prepayment risk when lending money on terms greater than five years which results in higher interest rates (Kiff, 2009).

When the mortgage term has passed it is actually theoretically possible for a lender to decline to refresh the mortgage term if the borrower’s credit risk, for example, has been deteriorated. This is however very uncommon and lenders would only seriously consider such action if the payment history is uneven. The borrower is, however, not without options if such scenario occurs since the customer is protected through the ability of transferring mortgages. At the end of the term, the mortgagor is free to move her mortgage to another lender without suffering from any penalties or fees. This stimulates the competition among credit lenders since the borrower is free to “shop around” for superior rates even when the pre-existing lender is willing to renew the mortgage contract (Lascelles, 2010). However, only 12 percent of all mortgagors who renewed their loans between Q4 2008 and Q4 2009 changed their lender and fully 88 percent stayed with the same lender (Dunning, 2009). Moreover, the borrower also enjoys the option of paying down the mortgage at the end of each the term (Lascelles, 2010).

3.3.3 Downpayment size

The standard downpayment size for Canadian mortgages is 20 percent of the home’s value. Homeowners who are below that threshold are required to insure their mortgage by paying monthly premiums. The amount of equity in relation to the home’s value has experienced a decreasing trend over the years. In spite, fully 80 percent of all mortgage holders had 20 percent or more in equity of the total home value in Q4 2009. Only 4 percent had less than 5 percent of equity and 5 percent of the mortgagor had equity between 5 and 9.9 percent, see table 3.1 (Dunning, 2009) (Lascelles, 2010).

Table 3.1. The equity position among the Canadian mortgage holders (Dunning, 2009).

<table>
<thead>
<tr>
<th>Equity as percentage of home value</th>
<th>Percent of mortgage holders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative</td>
<td>1%</td>
</tr>
<tr>
<td>0 - 4.9%</td>
<td>3%</td>
</tr>
<tr>
<td>5% - 9.9%</td>
<td>5%</td>
</tr>
<tr>
<td>10% - 19.9%</td>
<td>11%</td>
</tr>
<tr>
<td>20% and over</td>
<td>80%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

Among those householders with less than 10 percent of equity only 2 percent were in the situation of being very much concerned about a potential job loss, as of Q4 2009. Notable is that among the 16 percent of all borrowers who were very much concerned about potential job loss irrespective of their equity position, fully three-quarters had 20 percent or more in equity. In addition, 51 percent were less
concerned about losing their jobs and more than three-quarters of these had a substantial financial reserve in the form of home equity (20 percent or more). This implies that the vast majority of Canadian mortgagors have a very healthy financial situation either due to low loan-to-value ratios or strong senses of job security, or both (see table 3.2) (Dunning, 2009).

Table 3.2. Levels of concern about potential job loss in relation to equity position (Dunning, 2009).

<table>
<thead>
<tr>
<th>Levels of concern about potential job loss</th>
<th>Equity position</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Negative</td>
</tr>
<tr>
<td>1. Very High</td>
<td>0%</td>
</tr>
<tr>
<td>4.6 Somewhat</td>
<td>0%</td>
</tr>
<tr>
<td>7.10 Less concerned</td>
<td>1%</td>
</tr>
<tr>
<td>Does not apply</td>
<td>0%</td>
</tr>
<tr>
<td>Total</td>
<td>1%</td>
</tr>
</tbody>
</table>

3.3.4 Interest rates and payment approaches

Historically, five-year fixed rate mortgages have been the foremost used mortgages in Canada. Fixed rate mortgages represented as much as 68 percent of the total outstanding mortgage stock, as of Q2 2010. Over the past years, however, floating rate mortgages have become more common much due to a falling interest rate environment and represented 27 percent of the total market at that point in time. The remaining 6 percent were some kind of combination of the two types (Lascelles, 2010).

Fixed rate mortgages are more common among young mortgagors. Of those in the age between 18 and 34 years old as much as 71 percent were having fixed rate mortgages and only 21 percent were applying floating rates, as of Q4 2009. On the other hand, mortgagors with an age of 55 years or older use floating rate mortgages to a greater extend. Fully 35 percent were having such rate structure while “only” 59 percent used fixed rate mortgages at the same point in time (Dunning, 2009).

In fact, actual Canadian mortgage rates are a little bit difficult to identify since there is a tradition in offering discounts of posted rates. This approach gives the lender more discretion to adapt the interest rates more individually in relation to the perceived credit risk of the borrower (Lascelles, 2010). The average interest rate for a five-year fixed mortgage was 159 basis points below the average posted rate in 2008 (Canada Mortgage and Housing Corporation, 2009). The average percentage discount was however decreased the following year down to the, however still significant, level of 123 basis points (Dunning, 2009). This reduction was according to the Canadian Real Estate Association due to the simple fact that lenders chose to reduce the discounts and in some cases even completely eliminating them (Canada Mortgage and Housing Corporation, 2009).

In accordance to the decreased overnight lending rate in the past years, government bond yields tumbled in 2007 and 2008. The five-year government bond yield declined almost 300 basis points between July 2007 and December 2008. The decline in mortgage rates was more moderate during the same period in time due to increased funding costs for lenders. The spread between the five-year fixed mortgage rate and the five-year variable mortgage rate widened however in 2008. In fact, the five-year variable rate averaged 4.87 percent while the fixed rate averaged 7.06 resulted in an average spread of 219 basis points in 2008. The latter peaked in July by as much as 273 basis points. This could be compared to 2007 when the average spread was 145 basis points. However, the posted five-year fixed
rate fell to 5.79 percent in January 2009 which resulted in a diminished spread (see figure 3.1) (Canada Mortgage and Housing Corporation, 2009).

Figure 3.1. Mortgage rate and the five-year government bond yield between 2001 and 2009 (Canada Mortgage and Housing Corporation, 2009).

The mortgage payment approach differs among different types of mortgages. First of all, in order to reduce the risk of late payments all payments are automatically extracted from the customers account. The payment schedule is individually composed in order to match the paycheque frequency (such as bi-weekly, weekly or monthly). The fixed rate mortgages create constant payments every time and are very predictable to both the borrower and the lender. The floating rate mortgages are, however, slightly more complicated and divided into two different types (Lascelles, 2010).

The first one, called Adjustable Rate Mortgages (ARM), has the U.S. standards characteristics meaning that the monthly payment rises as interest rate rises. The ARMs have in other words a fixed principal amount and a variable interest rate resulting in variable monthly payments. The second one, called Variable Rate Mortgages (VRM), has both a variable principal amount and a variable interest rate. This means that an increase in interest rate is offset by an equivalent reduction in principal, resulting in constant monthly payments. These constant monthly payments are possible through extensions in the amortization periods (Lascelles, 2010).

3.3.5 Delinquency rates and payment liabilities
Canadian mortgage loans are in almost all cases recourse loans. This means that the mortgagor or guarantor remains responsible for the mortgage even after a foreclosure on the mortgage and irrespective of whether the loan is insured or not. If a borrower misses payments during the term of the mortgage, or fail to fully pay it off at the end of the term the lender can legally gain title to the property and obtain conduct of sale. If the property sells for less than the debt due, the lender may still
pursue the mortgagor or guarantor, and file a deficiency judgment. This allows the lender to attach the borrowers other assets and even garnish the borrower’s future wage (Property Law Act, 1996)

There exists two types of procedures in Canada when a mortgage holder takes legal action to foreclose a mortgage property. The property is either foreclosed by a judicial sale of the property, in which a court supervises the sale, which occurs in British Columbia, Alberta, Saskatchewan, Manitoba and Quebec. In Ontario, New Brunswick, Prince Edward Island and Newfoundland the mortgage lender is provided with power of sale, and the property is sold without supervision (Traclet, 2006).

Homeowners mutually have equity worth about two thirds of the total property stock, while mortgages stand for the remaining third. In fact, mortgages represent almost 70 percent of the households’ total indebtedness (Lascelles, 2010). The Canadian mortgage delinquency rate has however decreased heavily since the late 1990s, in spite of the increased amount of total residential mortgages. A mortgage is defined to be in arrears after three months of default in payments. The level of arrears is generally affected by macro economic factors, such as unemployment, income growth, interest rates and house prices (Canada Mortgage and Housing Corporation, 2009).

Canadian house prices have almost been flat during the first half of the 1990s which have resulted in a very stable delinquency rate during the same period of time. The rate averaged 0.53 percent between 1992 and 1998. However, the subsequent long period of increasing house prices has resulted in a declining arrears rate which dropped from slightly above 0.60 percent in 1997 to as low as 0.25 percent in 2006 (Canada Mortgage and Housing Corporation, 2009). This bottom quotation was followed by an increase in arrears to 0.44 percent in March 2010, much due to the global economic downturn (Lascelles, 2010).

All told, Canadian mortgages have low delinquency rates in comparison with the U.S. The fraction of U.S. prime mortgages in arrears was as high as 7.01 percent during the forth quarter of 2009. This huge spread between the two countries has several reasons. First, Canada was less exposed to the subprime market and did not experience any house price crashes. Second, almost all Canadian mortgages are recourse loans and banks have incentives not to loose their mortgage customers since they usually have deposit accounts and investment products as well. So, mortgages in arrears do only turn into foreclosures when all other possible avenues have been exhausted (Lascelles, 2010).

Moreover, (Harris R. , 2010) comes to the conclusion that full recourse mortgages provide troubled borrowers incentive to extend their efforts for mortgage payments beyond their means. Mortgage lenders in Canada may chose to foreclose on a mortgage when it is more than three months in arrears. However, since the procedure is both time-consuming and expensive for the bank, and would lead to the bank losing all of the borrowers business, lenders typically do not foreclose on delinquent mortgages unless other individual arrangements have been explored (Traclet, 2006).

3.4 The insurance model

3.4.1 History

Compulsory mortgage insurance on high leverage mortgages in Canada date back to 1954, when the Bank Act was amended. Prior to that year, mortgage loans were mostly made by individuals and insurers (Harris & Ragonetti, 1998). In other words, banks were from now on permitted to make
mortgage loans as long as these were insured under the National Housing Act (NHA). All mortgage loans with a downpayment of less than 25 percent had to be insured (Martin, 2008) (Kiff, 2009).

The Canadian Mortgage and Housing Corporation (CMHC) started to provide financial guarantees to lenders in order to promote home ownership by making them more accessible to the Canadians. During 1954, The Mortgage Insurance Fund (MIF) was created as an integral part of CMHC. Their mission was to insure mortgage loans from banks and other lenders by reimbursing them in the event of default while CMHC was responsible for reviewing the mortgage applications (Martin, 2008).

The activities of MIF were initially guided through two key policies, called mandates. The first one, called the Break-even mandate, required them to be self-financing over the business cycle. The second implied that they should insure loans in all regions of Canada at the same premium rate. The latter was called the Equal-access mandate (Martin, 2008).

Further amendments in 1969 allowed banks to make non-insured mortgage loans, so called conventional mortgages. Eleven years later in 1980, the minimum term of a mortgage was reduced from 25 years to 5 years and mortgages with variable mortgage rates became eligible two years further ahead. Moreover, a six percent interest rate cap on bank loans was eliminated. These changes resulted in an increased share of the banks’ mortgage businesses which rose from being 1 percent in 1960 to 60 percent in 2010 (Martin, 2008).

In 1970 private mortgage insurer were allowed to enter the market and lenders were given the option to choose between them and the public actors. This resulted in that the Mortgage Insurance Company of Canada (MICC), which was founded in 1963, enjoyed a great growth in their business. Their fast growth led to the establishment of two additional private companies in the early 1970s. These two were however taken over by MICC a couple of years later (Martin, 2008).

In order to attract first-time buyers to enter the mortgage market, CMHC introduced interest subsidies during the 1970s. These were designed to reduce the mortgage payments of the first five years since the interest rate payments were particularly high during these years. The subsidiary program however led to a significant level of mortgage defaults which in turn resulted in great losses for CMHC. The government decided in response to refund about 800 million CAD to CMHC to cover the losses (Martin, 2008).

When the Basel Accord was implemented in Canada in 1988, the chartered banks were required to hold sufficient level of capital in relation to the riskiness of their assets. The fact that banks only were required to hold capital against privately insured mortgages and not against mortgages insured by CMHC, the latter became much cheaper for the banks to hold. This would have resulted in a distorted competition in the mortgage insurance market without any government implementations. Thus, the federal governments agreed to provide a 90 percent guarantee of MICC insured mortgages, in order to allow them to remain in the market. This guarantee was, however, not for free. In return, MICC was required to pay a fee and to build up a contingency fund against default (Martin, 2008).

A couple of year later, in the early nineties, MICC was however forced to exit the market due to losses on commercial real estate. The General Electric Capital Mortgage Insurance Corporation (which later became Genworth Financial Canada) took over the company in 1995 and started to operate two years later. In order to respond to this new and stronger competitor, the government announced the “commercialization” of the MIF in 1996 (Martin, 2008). The following key elements were included:
First, the MIF was from now on required not only to break even throughout the business cycle but to earn a reasonable rate of return. CMHC was also given the ability to respond promptly to market conditions through the MIF’s ability of modifying its programs and to introduce new mortgage insurance products without any approval from the Cabinet. Second, CMHC was authorized to set its premium rates in accordance to specific market conditions and hence, reduce the rates. In order to build up and maintain policy reserves, the MIF was finally required to pay a guarantee fee to the government (Martin, 2008).

3.4.2 Product features and credit rating methods

Residential mortgage insurances are of great importance to millions of Canadians as they open up the possibility of borrowing money in order to purchase a home. About 50 percent of all home acquisitions are financed by insured mortgaged, a number that is expected to rise in the near future. This could be compared to the U.S. where the corresponding figure is only 15-30 percent (Lascelles, 2010).

According to the federal Bank Act, every mortgage from an institution under regulation from OFSI with a down payment of less than 20 percent is required to have mortgage insurance. It was until recently possible for a mortgage insured homebuyer to borrow the full amount of the purchase price but as of 2008 the minimum downpayment was increased to 5 percent as a response to the turmoil on the American housing market. At the same time the Department of Finance also reduced the maximum amortization period to 35 years from the previous 40 years, as mentioned earlier (Lascelles, 2010).

When a lender forecloses on a mortgage that is in default and the collateral is sold for less than the debt due, the lender is protected by the mortgage loan insurance. Hence the Canadian insurance is designed to protect the lender against borrower defaults. The product covers the full amount of the loan for the full life of the mortgage and cannot be eliminated. The insurance is also transferable if the borrower chooses to switch to another lender during the amortization period (Hunter, 2010).

Today the insurance can either be provided by a government agency, i.e. CMHC, that has 100 percent of the insured mortgage amount guaranteed by the Federal government, or a private insurer approved by the OFSI, that have 90 percent guaranteed. Although the latter are private sector based companies they are eligible for the National Housing Act Mortgage-backed Securities Program (NHA MBS) as well as the Canada Mortgage Bond program (CMB). To maintain good market conditions CMHC is seeking to ensure that mortgages insured by the private actors are similar in risk compared to mortgages insured by CMHC (Lascelles, 2010) (Martin, 2008).

The private companies are not enjoying this great treatment for free though. In order to be approved to the programs they are obligated to submit sensitive information, such as policies, business plans and strategies to their largest competitor, CMHC. Moreover, the private insurers are also required to settle claims to CMHC’s standard as well (Martin, 2008).

To establish borrower’s creditworthiness, Canadian mortgage insurers apply two flow measures that must be fulfilled in order for the mortgagor to be eligible for mortgage insurance. The first flow measure is the Gross Debt Service (GDS) which equals the sum of; principal and interest payments, property taxes, heating costs, annual site lease and 50 percent of applicable condominium fee. The GDS must be equal to or less than 32 percent of gross household income. The second criterion that must be fulfilled is the Total Debt Service (TDS) ratio which must not exceed 40 percent of gross
household income. TDS includes all of the household payments for housing and all other debts (Traclet, 2006) (Lascelles, 2010).

Credit scores are sometimes also used in order to determining the customer’s creditworthiness. The most well known credit scoring system in Canada is called FICO. The model takes five main factors into consideration; past payment history, credit use, length of credit history, types of credit used and number of credit inquiries. The score can range from 300 to 800 credits, the higher the better. Canadians with a credit score below 600 may have a hard time getting an insured mortgage. Borrowers with credit scores of more than 680 have mitigated limits in terms of GDS and TDS. In such cases, both CMHC and Genworth allow no GDS limit and have a TDS rate of as high as 44 percent. However, the fact that banks tend to be protective of their customers data makes it difficult for other lenders to calculate credit scores (Lascelles, 2010) (CanEquity Mortgage and CEG Mortgages - Canada, 2010).

Mortgage applications are according to new rules as of February 2010 always to be income tested against the posted five-year rate, as published every Wednesday by the Bank of Canada, in both GDS and TDS test. So for a borrower applying for a floating rate mortgage the tests are employed as if the application is for a mortgage with the posted five-year fixed rate for the duration of the mortgage. This new policy is a tightening of previous policy that had the three-year posted rate as qualifying interest rate. The new rule effectively lifted the qualifying interest rate by 1 percentage point, at the interest levels of early 2010, constraining the size of the mortgage for which a lender can be approved for insurance. The new policy has no impact on current mortgage holders until time for renegotiation and will help to reduce the sensitivity for increasing interest rates for new mortgages (Craig, 2010).

Together with the rule regarding income testing interest rates the Finance Minister also announced two other key changes to the Canadian mortgage insurance rules. First, mortgage refinancing is now restricted to 90 percent of property value, down from previous 95 percent. Second, real estate investors will need to put down 20 percent in down-payment for their non-owner occupied dwellings. This is a significant change from the previous 5 percent limit and is aimed at keeping speculative buying of real estate in check by reducing the possibility for investors to leverage. This rule is going to affect property speculators as well as individuals looking for long term investments in rental properties (Craig, 2010) (Lascelles, 2010).

The option to refinance their mortgage was used by approximately 20 percent of the Canadian homeowners during 2009, with the most common use being to consolidate and repay other debt (Dunning, 2009). Refinanced funds may be used for any purpose except for default management. The new rules limiting refinancing to 90 percent will put a damper on homeowners’ ability to draw equity from their properties. Not until principal payments and value appraisal has the equity position exceeding 10 percent will refinancing be available, and then not to be drawn below 10 percent (Craig, 2010).

### 3.4.3 Premiums levels

The premium for the insurance is paid upfront in full. Usually the borrower pays the insurance premium to be able to take a high LTV mortgage and the lender blends the premium in to the total mortgage amount and includes these fees in the regular payments on the mortgage (Kiff, 2009). The fact that the lender adds the amount onto the overall mortgage actually reduces the size of the minimum downpayment, in percentage terms of the total loan amount (Lascelles, 2010).
The size of the premium is dependent on both the total loan amount and the LTV ratio. The premium is a percentage of the total loan amount and is increased by an increased LTV ratio and by a longer amortization period. In the extreme scenario with a downpayment of 5 percent and an amortization period of 35 years, the borrower will face a premium of as high as 3.15 percent according to CMHC standard (Lascelles, 2010).

The fact that lenders need to insure their mortgage lending in order to be able to finance them through NHA MBS, lenders sometime elect to voluntary insure mortgages even with very high down payments. In such cases, the premium rate is much lower. For a mortgage with an LTV ratio of less than 65 percent and amortization period of 25 years results in a premium of just 0.50 percent of the total loan (Lascelles, 2010).

### 3.4.4 Market competition

The Canadian Mortgage insurance market is generally viewed as an attractive and beneficial market for private sector mortgage insurer. Several companies have entered the market over the past, most of them in recent years after the government’s decision to extend the guarantee even to new mortgage insurers.

Today, about 70 percent of all insured mortgages are conducted by the CMHC (Lascelles, 2010). The remaining share is represented by three private insurers; Genworth Financial, Canada Mortgage Insurance Guaranty Company (named AIG United Guaranty Mortgage Insurance Company Canada until April 2010) and PMI Mortgage Insurance Company Canada. The market has a very high level of government involvement. Their 100 percent guarantee of CMHC insured mortgages eliminates all the required amount of capital banks otherwise would have been required to hold against mortgages (Vukanovich, 2008).

CMHC was practically holding a monopoly for the mortgage insurance market until 1995 when Genworth entered the market. In 1999, the federal government passed Bill C-66 containing amendments to the National Housing Act (NHA) in order to encourage greater competition. This was then followed by additional amendments when Bill C-13 was passed in 2006, in which the Departments of Finance extended its guarantee program to also include other private mortgage insurers, besides Genworth Financial, in order to allow them to enter the market. The government guarantees 90 percent of the private insurers’ liabilities. The private insurers must contribute to a guarantee fund and set aside money to absorb potential losses in settlement of the governmental guarantee (Vukanovich, 2008).

Although, these amendments encouraged the freedom of competition, mortgage lenders still enjoy benefits in using CMHC-insured mortgages since they are 100 percent guaranteed. The 10 percent differential in government guarantee should recognize the additional costs related to the CMHC’s mandate to serve all parts of Canada. As an example, more than one third of their business is in areas where the private companies do not serve at all, or are much less active (Kiff, 2009).

(Martin, 2008) is however arguing that the government should provide a 100 percent guarantee to private insurers too. This would, according to Martin, better balance the competitive environment and allow private insurers to compete more effectively. (Vukanovich, 2008) argues that policies from the federal government should apply equally among all market participants, CMHC included. Vukanovich also underlines the importance of that such policies ensure that the homeowners are the true beneficiaries in the event of increased competition in the market.
In order to become an OSFI-regulated institution or to participate in the Mortgage-backed Securities, private insurers must file quarterly statements including detailed information about their business to CMHC. This gives the CMHC’s executive managing access to competitors’ confidential information containing customer information and key strategies, which in turn will give them competitive edges (Martin, 2008). Moreover, since CMHC is representing approximately 70 percent (Lascelles, 2010) of the market and has established long-term business relationships with many lenders, newcomers will have to make a major effort to break into the market.

Subsequently, CMHC might have too much impact on the Canadian mortgage insurance market. CMHC’s broad scope of operations in markets such as mortgage insurance, mortgage-backed securities, valuation and housing policies, is giving them an unusual level of control which to some extent inhibits the overall competition.

(Martin, 2008) further suggests that the mortgage insurance business of CMHC should be moved to and managed by a separate crown corporation with its own management team and board of directors. Martin also argues that the government should consider its needs to be involved in the mortgage insurance business at all since it is her opinion that the private sector could manage this market without governmental involvement.
4. The Swedish market conditions

This chapter will examine the demand for an insurance product in Sweden in relation to its market characteristics and credit risk circumstances. The first section focuses on the mortgage originators source of funding and the current credit risk situation on the Swedish mortgage market. The second section will describe the new general guideline introduced by the Swedish Financial Supervisory Authority and its underlying purpose and alternative solutions.

The purpose of this section is to give the reader a better understanding of the credit risk situation on the Swedish mortgage market in order to identify the demand and prerequisites for an introduction of a mortgage insurance product. It is further the purpose to describe the new general guideline with respect to its underlying purpose and to introduce alternative solutions.

4.1 Degree of credit risk

Since the crisis in the early 1990s the Swedish property market has had a remarkably strong and stable development. Investing in real estate has been very beneficial for both consumers and the financial counterparts which have funded the acquisitions. However, at the same time homeowners have increased their indebtedness combined with higher LTV-ratios and lowered interest rates.

During the last years of economic downturn people have become more reserved about the outlook of the Swedish property market. Real estate experts have talked about property bubbles and overheated real estate markets. Such markets are typically associated with an increased credit risk for the actors involved. Both the leveraged homeowners and the mortgage originators are currently dealing with more uncertainty and subsequently higher risk of not getting their money back.

4.1.1 Mortgage originators source of funding

Mortgage credit institutions are still dominating the Swedish mortgage market. In fact, most banks have chosen to organize their mortgage lending through specific institutions. Although there are no exiting regulations requiring that mortgage corporations must handle mortgage lending, four of the major banks\(^4\) use particular mortgage companies in their mortgage lending activity (Statens Bostadskreditnämnd, 2009).

The mortgage credit institutions are either funding their lending by borrowing within the bank group or by issuing mortgage bonds and certificates of deposits (CDs). Their short-term borrowing transactions are exercised on floating rate basis and financed on the money-market trough the issuing of CDs and by loans from the parent banks. The mortgage bond market is making up for the long-term borrowing financing (Statens Bostadskreditnämnd, 2009).

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\(^4\) Handelsbanken, Swedbank, Nordea and Länsförsäkringar.
Since the beginning of the global crisis in mid 2008, it is an apparent trend that the money-market borrowing has declined. The institutions are instead turning to their parent company for financing assistance. Figure 4.1 shows the development of the distribution between the three sources of funding. The very pessimistic view among market actors, due to the crisis, resulted in almost frozen capital-markets during the last four months of 2008. Subsequently, the figure indicates that the mortgage credit institutions decreased their borrowing activity on these markets during these months. The outstanding stock of securities, bonds and CDs, was reduced by 80 billion SEK. Meanwhile, this reduction was more than offset by an increased in-house borrowing from the parent companies of the banks, which rose by about 110 billion SEK. In other words, credit institutions capital assets were increased on total, in spite of the global crises (Statens Bostadskreditnämnd, 2009).

Moreover, figure 4.1 implies that it was the outstanding amount of CDs that were reduced and not the amount of mortgage bonds. The first decreased by 90 billion SEK while the latter actually increased by 10 billion SEK during the last four months of 2008 (Statens Bostadskreditnämnd, 2009).

4.1.2 The soundness of banks lending
As a result of householders increased indebtedness and the bad macroeconomic situation, Finansinspektionen presented in February 2010 a report called “The Swedish mortgage market and banks lending” (Finansinspektionen, 2010). All the information in this section is gathered from this report. More detailed quantitative findings are to be found in Appendix.

Data was collected from seven credit agencies\(^5\) (also named companies) which together cover more than 90 percent of the total Swedish housing mortgage market. The data contained all loans that these agencies had paid out between 28\(^{th}\) and 30\(^{th}\) of September 2009 which equalled a number of 6 863 loans and a value of 11.4 billion SEK. The data sample represented approximately 0.7 percent of the total Swedish outstanding mortgage stock at that point in time.

The maximum LTV ratio applied for a residential mortgage differed among the companies, from 75 percent to 95 percent. Four agencies distinguished between first mortgage loans and second mortgage loans.

\(^5\) Länsförsäkringar Bank, Nordea, SBAB, SEB, Handelsbanken, Skandiabanken och Swedbank.
loans. The remaining three did not formerly use such terms but were however requiring longer amortization periods for the more risky part of the loan. Several companies had in recent years strengthened the amortization period requirements down to 10-15 years except for one company which still used 30 years.

Although three agencies had experienced a slight decrease in their LTV ratios in 2009, the sample data implied that the companies’ LTV ratios had increased on average during that year. The changes were in the range between -1.0 to +6.4 percentage points. When examining whether a household had the financial requirements for obtaining a mortgage or not, the same method was applied among all companies. This method estimates the customer’s disposable income after deducting several expenses, the so called “left-to-live-on” calculation.

Moreover, the customers creditworthiness was income tested against an interest rate that extensively exceeded the applied borrowing rate. The companies were, for mortgage loans, testing against a rate varying from 6.5 to 8.0 percent. In addition, the first mortgage was mostly tested against an amortization period of between 40 and 100 years, while two companies did not apply any amortization restrictions in their income tests at all. It is further notable that even if most of the loans were tested against specific amortization requirements, the absolute majority of all mortgages were pure interest only loans.

In the sample data, the average interest rates used for first mortgage loans were at 1.64 percent for small houses, at 1.63 percent for condominiums and at 1.60 percent for secondary residences. The average interest rate for secondary loans was 2.65 percent. In addition, more than 90 percent of the total households were applying floating rates, which is a historically high portion.

**Stress tests**

One of the eight companies was not included in the following stress tests since their data was unusable for such analysis. The company is however representing a small fraction of the total amount of loans why the result was not affected.

The following two figures indicate how vulnerable mortgagors are with respect to interest rate changes. Figure 4.2 shows the percentage share of households that will experience negative surplus in their “left-to-live-on” calculations when applying different interest rate levels. The interest rates differ from 6.5 percent to 13.5 percent. In spite of an increased interest rate, households’ incomes are assumed to be constant but changes in interest deduction are taken into consideration. Figure 4.2 indicates that about 8 percent of the households will experience negative surplus when the interest rate is at 7.5 percent. About one fourth will suffer from negative amounts when applying a rate of 11 percent.
The type of mortgage customer differs between the companies. Figure 4.3 shows two additional lines, the two companies with the least and most vulnerable customers on average. About one fourth of the weaker customer-company’s mortgagor will face a negative surplus already with an interest rate of 10 percent. The interest rate must however rise to 13.5 percent before the same share of the stronger customer-company’s mortgagor experience negative surplus.

The following tests are stressing the unemployment rate. It has been assumed that all individuals
below an age of 65 years possibly could become unemployed. The tests are simulating an increased level of unemployment among the households included in the sample irrespective of the total unemployment rate in Sweden as a whole. Two different scenarios have been used. In the first one, it is assumed that all unemployed are income supported through the unemployment insurance fund. In such scenario, the income is reduced to about 70-80 percent of the earlier wage, or to a maximum amount of 14 960 SEK per month. In the second scenario though, 45 percent of the unemployed individuals will not get any income support and hence be standing without any income at all. Figure 4.4 shows the distribution of the households’ disposable income with different unemployment rates, applying the first scenario approach.

![Graph showing disposable income distribution](image)

*Figure 4.4. Disposable income in case of increased unemployment rates, first scenario approach (Finansinspektionen, 2010).*

Figure 4.5 and 4.6 show the percentage share of households experience negative surplus as a function of an increased unemployment rate. Since the unemployment rate has been randomized, the outcome differs between different simulations. This is illustrated by the broken lines. Figure 4.5, which applies the first scenario approach, indicates that 11 percent of the households will experience negative surplus with an unemployment rate of 10 percent. About 18 percent of the households will experience negative surplus at an unemployment rate of 20 percent. Figure 4.6, which applies the second scenario approach, shows that about 14 percent of the households will experience negative surplus with an unemployment rate of 10 percent and about 24 percent at an unemployment rate of 20 percent.
In both scenarios, the rate of households facing negative surplus is rather small even in a very high unemployment rate environment. In fact, mortgagors seem to be more vulnerable to interest rates fluctuations than to increased unemployment rates. One reason for that is that the majority of Swedish households enjoy more than one income and the probability of both loosing their jobs at the same point in time is considered as low. However, that probability would increase in smaller towns were one or two major employers dominate the market.

Table 4.1 demonstrates how the combination of and increased unemployment rate (first scenario approach) and a decline in house prices will affect the households. The table shows the percentage amount of households that would experience both a negative surplus and a negative amount of outstanding debt. For example, a simulated unemployment rate of five percent combined with a house
price reduction of 20 percent result in that three percent of the households will face both a negative surplus and a LTV ratio of more than 100 percent.

*Table 4.1.* The percentage share of households experience both negative surplus and LTV ratios beyond 100 percent, first scenario approach (Finansinspektionen, 2010).

If we further assume that all households with negative surplus immediately must sell their houses, we are able to estimate the total (potential) credit loss the bank sector will suffer. *Table 4.2* shows the percentage relationship between the households’ negative proceeds from sale and their total indebtedness. The numbers indicate that rather extreme scenarios must come about in order to create major credit losses.

*Table 4.2.* The loss as a percentage of total debt when selling in case of negative surplus (Finansinspektionen, 2010).

Although the sample data used in this research is large, Finansinspektionen underlines that it may not serve as a representative sample for the whole population. However, Finansinspektionen makes the following three conclusions.

First, the lending agencies are generally acting in a conservative manner when estimating the creditworthiness of their customers. The less conservative company used an interest rate of 6.5 percent when testing their customers’ creditworthiness. This implies that the borrowers’ ability to repay their loans is very good, even if interest rates will be increased significantly. In fact, 92 percent of the households would still enjoy a surplus even in a scenario of an interest rate of 7.5 percent.

Second, the Swedish mortgage market does not currently pose a threat to the overall financial stability. The stress tests indicates that very high levels of interest or unemployment rates are required in a combination with a major decline in house prices, in order to create severe credit losses within the bank sector.
Finally, nothing but moderate house price decreases are however required to make a number of households to become very vulnerable by facing LTV ratios of above 100 percent. The sample indicates that 12 percent of all new mortgages had an LTV ratio of 90 percent or more, one-fifth above 85 percent while as much as one third had LTV ratios exceeding 80 percent. Some of these households are in addition very sensitive to the potential occurrence of unemployment. The survey indicates that younger mortgagors have the highest debt and LTV ratios. If one of these households simultaneously would experience unemployment, this could result in a situation in which the household needs to sell the property at a price beyond the mortgage amount.

In order to maintain a sufficient consumer protection in the credit market Finansinspektionen believes that the increasing LTV ratios are a cause for concern, particularly for younger households.

4.2 New regulation
As a result of the findings made from the previously shown report Finansinspektionen is seeing a risen demand in clarifying the requirements of the role of soundness (explained below). The current trend where lending institutions are using increasing LTV ratios for competitive advantages must be counteracted since the customer will be exposed to greater risk.

The Swedish Financial Supervisory Authority, Finansinspektionen, is a public authority that is accountable to the Ministry of Finance. Their primary role is to work for financial stability and to ensure a healthy consumer protection. Finansinspektionen was established in 1991 through the merge of the former banking and insurance supervisory bodies. All Swedish authorities have the right to issue general guidelines within their area of business, without particular empowerments.

4.2.1 General guideline
In the Banking and Financing Business Act (Lag om bank- och finansieringsrörelse, 2004), there is a general requirement implying that credit institutions should manage their business in a soundly way, called the role of soundness. This means that banking institutions must keep up a sufficient level of quality in their lending activity to maintain strong confidence in the banking market (Finansinspektionen, 2010).

On July 8 2010, Finansinspektionen decided to implement a general guideline for mortgages, collateralized by homes. The guideline took affect as of October 1, 2010 and implies that mortgage loans given by banks and other credit institutions should not exceed 85 percent of the market value of the home (Finansinspektionen, 2010).

The general guideline is adopted in order to avoid an unhealthy development of the credit market where creditors are offering higher and higher LTV ratios to attract borrowers. The main objective is to protect the consumers from unacceptable high risks and to reduce their exposure in the credit market. Highly indebted households are less capable to handle price fluctuations and consequently more exposed to risk. The situation could be very unfavourable for households, and the market as a whole, if house owners for some unforeseen reason need to sell their highly leveraged house in a property market downturn (Finansinspektionen, 2010).

Finansinspektionen has chosen to give the new regulation the form of general guidelines since their opinion is that the LTV ratio does not need to be regulated through any provisions. This gives the
companies concerned opportunities to achieve the same purpose by using alternative solutions (Finansinspektionen, 2010).

4.2.2 Implications of the regulation
The new regulation has been heavily criticized for its potential risk of excluding certain groups of people from the mortgage market. It is a common view that young, first-time buyers will experience worsening possibilities in entering the housing market.

Since the regulation implies that the value of mortgage loans must not exceed 85 percent of the property value, the remaining share of the loan may be financed through fiduciary loans. These loans do not have any formal collateral and are particularly used for financing consumption products. Banks are therefore requiring shorter amortization periods for such loans in comparisons with mortgage loans. Fiduciary loans do also have higher interest rates compared with first and secondary mortgages. Subsequently, both interest rate payments as well as amortization payments may increase for those households who need to borrow beyond the limits of the regulation.

Finansinspektionen agrees with the opinion that households without sufficient amount of initial capital and without any financial partner may have to choose a cheaper housing alternative in the future (Finansinspektionen, 2010). One group of people that is causing specially concern for Finansinspektionen is the younger first-time buyers. It is of an important matter that young people find a place to live. It is, however, in their view that the shortage of accommodation for young people in the metropolises is more of a political problem that either should or could be solved through unhealthy credit lending (Finansinspektionen, 2010).

Moreover, Finansinspektionen believes that the risk of excluding entire groups of people from the market is predominant. They argue that households who enjoy good income streams but not have sufficient amount of equity still would be offered, and be able to afford, other financing opportunities such as fiduciary loans and/or insurance products that fulfils the purpose of the regulation (Finansinspektionen, 2010).

4.2.3 Alternative solutions
Even if Finansinspektionen claims that the mortgage cap is the most appropriate alternative, they present other solutions that may as well fulfil the purpose of the regulation.

Amortization requirements
One way of obtaining the purpose of the regulation is to implement a maximal term to maturity for residential mortgages. Finansinspektionen thinks that amortizations of loans is healthy, particularly when high LTV ratios are applied, but it also believes that such solution would bring several problems (Finansinspektionen, 2010).

By introducing a requirement intended for the whole amount of the mortgage credit would not be applicable since the purpose, of only reducing loans with high LTV ratios, is not fulfilled. It is neither motivated from a stability perspective nor from a consumer perspective that a customer with a low LTV ratio should be forced to amortize. Moreover, amortization requirements of only the secondary mortgage may also counteract the purpose. If the customer has other type of credits, for example credit card indebtedness with considerably higher interest rate, it may be in both the bank’s and the
customer’s interest that such debts are given top priority. By introducing amortization requirements for mortgages, for example with LTV ratios above 80 percent, would lead to that such consumer credits would become subordinated (Finansinspektionen, 2010).

Furthermore, the fact that amortizations would result in an increased protection in the long run, but are not resistant for situations that may occur in the short run is another reason.

Finally, Finansinspektionen believes that amortization requirements would neither fulfil the purpose of the regulation nor the role of soundness (Finansinspektionen, 2010)

**Insurance products**

Finansinspektionen believes that some kind of insurance product or guarantee that fulfils the role of soundness could serve as an alternative to the regulation even when LTV ratios above 85 percent are applied. Canada and Hong Kong are two jurisdictions that apply regulated LTV ratios in a combination with mandatory mortgage insurance. It is in Finansinspektionen’s view that such combination has several advantages but they are however arguing that the introduction of such system may currently cause too big changes for the credit market (Finansinspektionen, 2010).

However, an insurance product that protects the customer from losses on mortgages above a certain LTV ratio could, according to Finansinspektionen, fulfil what is tried to be obtained and satisfy the role of soundness (Finansinspektionen, 2010).

“…One thing that we hope will be implemented is insurance products, and the ability of making them mandatory. That is, the consumer pays a premium in order to be protected against losses that occur when the proceeds from sale are less than the outstanding mortgage. This is something we welcome…” (Frisell, 2010)
5. Qualitative Analysis

In order to examine if the Canadian mortgage insurance approach would be feasible in Sweden the following method is applied. The purpose of this comparison is to examine if the new general guideline on the Swedish mortgage market could be extended through an insurance product in order to better satisfy the purpose of the regulation and enable LTV ratios above 85 percent.

The method is a qualitative step-by-step comparison in which five topics are highlighted, comparing specific market conditions. The Canadian market conditions are in each of those described and analyzed from a Swedish perspective. The method states the most basic conditions for the Canadian mortgage insurance market and analyse if the approach would be applicable in Sweden.

1. The importance of governmental control

- The Canadian mortgage insurance market is very well regulated. The Canadian Mortgage Housing Corporation (CMHC) was until as recently as 1970 the only allowed insurer and is currently representing about 70 percent of the market. In fact, the corporation has been controlling the market from the very beginning and still is to a great extent.

  In fact, the mandatory insurance system in Canada would probably not have been possible to establish without CMHCs initial monopoly position and significant market power. Since mortgage insurance products need to serve exclusively the whole country implying different levels of profit any private actors would not have been competitive. If the market would have allowed free competition from the beginning, cherry picking would have been common where only the healthy people got insured since they are the most profitable customers. In other words, mandatory insurance products need to be well regulated which requires some sort of government corporation controlling the market, initially at least.

- The Swedish mortgage market is regulated through different governmental subsidies and requirements. To establish a mandatory mortgage insurance system some huge fundamental changes would be required. First, a national housing agency needs to be instituted with the same rights and power as CMHC. Second, alternative ways of financing, such as fiduciary loan markets, need to be very well regulated.

  While Canada has used the mortgage insurance system to attract young first buyers Sweden has applied interest rate subsidiaries. The possibility to deduct interest payments is a very fundamental part of the Swedish mortgage system. The two countries have different historical structures in their mortgage systems which are difficult to change.

  Finansinspektionen also believes that the creation of such a mortgage insurance system would require too big changes in relation to the how the Swedish banks currently manage their lending business (Finansinspektionen, 2010).
2. The risk distribution among actors involved

- From a risk perspective, the Canadian insurance product is not favourable for the mortgagor. In fact, the insured customer does not enjoy any additional protection at all compared to the uninsured one since all mortgages are full recourse loans. In other words, the mortgagor is equally exposed to risk regardless of whether she has mortgage insurance or not. The consumer pays the mortgage insurer a premium for the additional risk taken by the banks offering higher LTV ratios. The banks are then consequently passing along the risk to the insurer.

- The purpose of the new regulation of Finansinspektionen is to reduce the consumer risk. It seems rather obvious that the Canadian approach does not satisfy that criteria.

3. Incentives for actors involved

- The consumer’s incentive for buying mortgage insurance is rather straightforward; in order to borrow more than 80 percent of the property value the mortgage must be insured. From one perspective, the product enables more households to enter the housing market at an earlier stage. From another, it is nothing but an additional mandatory regulation, resulting in an increased cost for the borrower, to an already very well regulated market.

The Banks have several incentives for applying the mortgage insurance product. First, since the product enables the consumer to borrow more money and the banks to lend more money, the latter will enjoy more income from interests. Second, lenders need to insure their mortgage loans in order to enable financing through NHA MBS, why lenders frequently insure mortgage with LTV ratios even below 80 percent by paying the premiums themselves. The NHA MBS Program was launched in 1987 in order to improve availability of low-cost funding. Different programs have further been introduced where the Government purchases NHA MBS to stimulate the banks lending. Third, the product enables banks to modify their capital structure since the capital risk weighting for an insured mortgage is zero percent. So, mortgage insurance is a valuable risk and capital management tool for lenders.

The insurance companies are making good profits from their mortgage insurance products and have very strong incentives to promote the product. (Taylor P., 2005) concludes that the mortgage insurance market may be too beneficial for the insurance companies, HMCH in particular. Historically, the payout ratios have been very low, especially in contrast to other insurance markets. Taylor argues that the Canadian mortgage insurance business probably is the most lucrative line of insurance in Canada. (Vukanovich, 2008) is however defending the sometimes very low payout ratios by the fact that mortgage insurance makes up for a long-tail insurance risk. The insurance companies must charge for the risk even if the probability, that the whole real estate market experiences a massive crash resulting in a worst case scenario with
extreme price decreases, is very low. The insurers must therefore build up an economic buffer in order to survive market downturns. This sort of risk does not occur to the same extent in other insurance businesses. For example, the auto insurance industry has a much higher payout ratio on average since the probability that all insured autos crash at the same point in time is more or less equal to zero.

The primary purpose of the Government is to stimulate the housing finance sector and to make it easier for the Canadians to enter the mortgage market. It is actually the Government who is the lender of the last resort since the insurance product is fully (100 percent - CMHC) or almost fully (90 percent - private insurers) guaranteed by the State.

- In order to make an insurance product attractive to the Swedish borrower the product must be beneficial in economic terms meaning that all the other possible financing alternatives must not have any advantages. For example, fiduciary loans must either be more expensive or prohibited for mortgage financing purpose. Another solution is to implement the Canadian approach and make the product mandatory for every loan exceeding an LTV ratio of 85 percent.

The Swedish banks want to lend as much money as possible in order to enjoy more income from interest, just like the Canadian banks. However, Swedish banks are financing their lending in different ways compared to Canada. The NHA MBS financing benefits do not exit in Sweden. In order to develop some sort of securitization system in Sweden, the banks need to experience some major changes in how they finance their lending and the Government will have to make guarantees for these products.

The Governmental incentive for introducing mortgage insurance is primarily to meet the purpose of the new regulation from Finansinspektionen. The product must be designed in a way that reduces the borrower’s risk exposure. As concluded above, the Canadian approach does not meet with that requirement.

4. History conditions and underlying purpose

- The Canadian mortgage insurance was introduced as early as 1954. In fact, banks were not allowed to make mortgage loans at all prior to that year. In other words, the whole Canadian mortgage market is very much based on its insurance system. Today, almost 60 years later, Canadians are very familiar with the insurance product and it is a natural element of their housing finance system.

Banks benefit from the insurance not only because of increased income from interest but also from more favourable financing. These fundamental conditions are very basic elements in the market and have been applied for a very long time.

Moreover, since mortgage interest is not tax deductible Canadians have incentives to
amortize their loans to a greater extent and put more equity into them. Since amortizing mortgage loans means that the mortgagor pays instalments every year, her exposure to risk decreases over time. Subsequently, mortgage insurance does not need to protect an amortization customers to some extent compared to an interest only paying customer.

- The Swedish mortgage market has never experienced any pure insurance products. The system has relied on a very healthy and sound credit environment in which banks have taken great responsibility. Mortgages are to a great extent interest based which has been beneficial to the customers since interests are tax deductible. The recent trends with increasing LTV ratios have resulted in general guidelines from Finansinspektionen limiting the ratio.

That being told, the purpose of introducing mortgage insurance in Sweden differs from the one in Canada. The major reason for implementing the product in Sweden is to increase the consumer credit protection. In Canada, the main reason was to stimulate the mortgage market by making it easier for borrower to enter without exposing the banks to greater risk. There are subsequently some fundamental problems that need to be solved before the Canadian approach will be applicable in Sweden. Further, it is difficult to adopt new systems into elementary markets such as the mortgage market really is.

5. *The foreclosure procedure*

- Almost all Canadian mortgage loans are full recourse loans meaning that the mortgagor is responsible for the mortgage even after a foreclosure, irrespective of whether the loan is insured or not. In other words, all other possible avenues for an insured mortgagor must really have been exhausted before the insurance coverage comes into effect. Again, this means that the Canadian mortgage insurance product only protects the lender from payment defaults and not the borrower.

(Hunter, 2010) explains that if the sale proceeds are insufficient to repay the mortgage balance and all associated costs, the lender will obtain a deficiency judgment from the courts and make a claim to the insurer. These deficiency judgments are assigned to the insurer as part of the insurance claim and evaluated based on the particular financial circumstances of the individual(s) involved. Then, a settlement is negotiated with the borrower that is fair to both the individual and other stakeholders, based on the individual's ability to pay.

However, when borrowers experience difficulties in making their mortgage payments, there are flexibilities available to approved lenders under the CMHC mortgage loan insurance program. This program helps them to assist their clients in managing mortgage payment difficulties, such as temporarily deferring mortgage payments, extending the amortization period to lower the monthly mortgage payments, or capitalizing mortgage arrears and other eligible costs.
The Swedish mortgage market has personal responsibilities for mortgage loans, just as Canada. If a house is sold for less than the outstanding loan amount, the borrower has to continue to pay off the loan. In order to establish an insurance product that meets the regulation requirements of improved consumer protection, there must be a clear difference in the foreclosure procedure between an insured loan and an un-insured loan. The borrower must somehow enjoy benefits in terms of decreased risk when buying mortgage protection. If the mortgagor does not, such product would not be sufficient from Finansinspektionen’s point of view, no matter whether the product is mandatory or not.
6. Conclusions

Increased house prices due to lowered interest rates and increased LTV-ratios over the last two decades have led to increased financial risk for Swedish homeowners. The combination of mortgages making up for more than 100 percent of private wealth and decreased savings in other assets has led to a situation where many households are extremely vulnerable for fluctuations in interest rates and property prices. Finansinspektionen has reacted to this development by introducing a cap on the amount of leverage that households are allowed to obtain using their home as collateral.

Finansinspektionen proposes that some sort of insurance product that would protect households could be used as a substitute to the LTV-ratio cap. It is important to be aware of the role of Finansinspektionen in the Swedish regulatory system when analyzing the purpose and effects of the regulation. The new regulation is implemented in accordance with their role as the responsible authority for consumer protection in terms of financial products. However, the regulation can also be seen as a contribution to financial stability of the system by decreasing the inflation and reducing an unhealthy price development in the property market, although that is neither the role of Finansinspektionen neither the purpose of the regulation. Even though this financial stability effect is not the purpose it helps other authorities in their objectives to maintain stability in the price development. That being said, in order to introduce alternative products such must fulfil these requirements and protect homeowner from a risk perspective.

Although Finansinspektionen has not specified any guidelines for an insurance product that they have presented as an alternative solution to the restricted leverage ratio some conclusions can be drawn from the material they have presented. In the decision memorandum for the regulation Finansinspektionen describes the consequences for households with LTVs exceeding 80 percent during the property crises in the 1990s. The consequences for many of these households, especially for those that had less than 10 percent of equity, was that for several years the loan on the property exceeded the market value of the property. Since the purpose of the new regulation is to protect consumers from such distressful situations one easily comes to the conclusion that an insurance would be required to financially assist these consumers and making sure that they are left at status quo after selling their property. Therefore a mortgage protection solution of the type used in Canada could not be seen as fulfilling these requirements since households could still be left with an outstanding debt after that they have sold their homes.

Neither would an insurance product based on an index completely fulfil the requirements set by Finansinspektionen. An index could never be constructed to be so accurate so to guarantee that each individual household that sell their home with a loss will be compensated for this by their insurance. However, an insurance contract that protects the specific home involves so much risk for the insurer resulting in too high premiums.

Even though the new regulation restricts to which extent a property can be used as collateral it is however still possible to fully finance a purchase using a 100 percent debt. The new regulation puts no restraints on so called fiduciary loans. Finansinspektionen concludes that these unsecured loans should command a higher interest rate. The higher interest rates required to achieve high leverage is expected to reduce the amount of households with very high debt. The higher costs will give households incentive to avoid taking on too much debt or quickly amortizes on the debt.
Applying this line of reasoning an indexed based insurance might fulfil Finansinspektionen requirement although it does not guarantee coverage. An insurance product would make it more expensive to finance high leverage mortgages hence making them less attractive. But compared to fiduciary loans an indexed based insurance product would give protection in most cases at affordable prices.
7. Bibliography


Frisell, L. (den 10 August 2010). Finansinspektionen. (TV4, Intervjuare)


Hunter, P. (den 16 September 2010). Associate, Canada Mortgage and Housing Corporation. (J. Westin, Intervjuare)


Appendix

Quantitative findings
The distribution of households’ total outstanding debt is shown in figure 1. The average outstanding debt among the households was 1.7 millions SEK.

![Figure 1. Households’ total indebtedness (Finansinspektionen, 2010).](image)

The distribution of the households’ debt ratios is shown in figure 2. The debt ratio is defined as the households’ total indebtedness in relation to the annual disposable income. About one out of every two households has an indebtedness that is a multiple of 5, of or more, of the disposable income. Further, above 10 percent of the households have a debt ratio of as much as ten or more.

![Figure 2. Distribution of households’ debt ratios (Finansinspektionen, 2010).](image)
Figure 2. Households’ debt ratios (Finansinspektionen, 2010).

The distribution of the households’ interest rate ratios for different interest rate levels is shown in figure 3 and 4. The interest rate ratio is defined as the interest charge in relation to the annual disposable income.

Figure 3. Interest rate ratios, using an interest rate of 1.63 percent (Finansinspektionen, 2010).

Figure 3 is displaying the interest rate ratio using an interest rate of 1.63 percent for all the debts of the household. This represents the average rate for condominium mortgages in the sample data, which probably underestimates the interest rates for other loans. However, mortgages represent more than 90 percent of the households’ total indebtedness which minimizes these errors. The figure implies that with such level of interest rate, more than 80 percent of the households are spending less than one-tenth of their disposable income on interests.

Figure 4. Interest rate ratios, using an interest rate of 6.5 percent (Finansinspektionen, 2010).
Figure 4 is showing the distribution of interest rate ratios using an interest rate of 6.5 percent, which was the rate the least conservative company tested against in their “left-to-live-on” calculations. The distribution changes dramatically. One third of the households would, in such interest rate environment, have interest expenses representing more than 30 percent of the disposable income. Eight percent of the households would have expenses of as much as 50 percent, or more, of their disposable income.

Figure 5 and 6 are showing the distribution of the monthly surplus for the households according to the companies’ “left-to-live-on” calculations (in which an interest rate of at least 6.5 percent is used).

![Bar chart](image)

**Figure 5.** The households’ monthly surplus (Finansinspektionen, 2010).

Figure 5 shows that more than 90 percent of the households have a monthly surplus of more than SEK 1 000, 80 percent of more than SEK 3 000 and 40 percent of the households have a monthly surplus exceeding SEK 10 000. So, households have sufficient amount of surplus even in cases of high interest rates (6.5 percent or higher).

Figure 6 is showing how the monthly surplus is distributed among different groups of ages. The smallest surpluses are to be found in the youngest and in the oldest groups of mortgagors.
Figure 6. The households’ monthly surplus distributed among different groups of ages (Finansinspektionen, 2010).