Private Mortgage Insurance in the Dutch Residential Mortgage Market

A feasibility study

Student Name: MMJ Bankers
Student Number: 307756
University: Erasmus University Rotterdam
Department: RSM Financial Management
Supervisor: Dr. P. Neuteboom
Co Reader: Dr. B. Wempe
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ACKNOWLEDGEMENT

The completion of this master thesis marks the end of my student time and the beginning of my professional career. After obtaining my bachelor degree in Maastricht and now finishing my master study in Rotterdam, I can look back on an intensive student time in which I had heaps of fun and I learned a lot, especially in my last year in Rotterdam. I am sad that I have to say goodbye to my student time, however I also welcome the new experiences that are waiting for me in my professional career. I would like to thank all the people that made my student time and my master thesis a successful and pleasant experience.

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Home-ownership stimulation is an integrated element of housing policies all over the world. However, risks and market imperfections embedded in the housing finance market cause inefficiencies that limit the realization of home-ownership. These inefficiencies can be overcome by governmental intervention. The Public Mortgage Guarantee is an example of government intervention and an instrument used to stimulate home-ownership. The Dutch program is called the National Mortgage Guarantee (NHG).

The NHG is a public program that guarantees mortgages and is therefore a credit guarantee to mortgage lenders and covers the loss incurred by a default of a mortgage borrower. However, results are lagging, criticism on the program is increasing, and market conditions have changed, encouraging the evaluation of the NHG program and the assessment of an alternative: a Private Mortgage Insurance (PMI).

The evaluation of the current NHG program and the feasibility of a PMI program are based upon the fit of the business model in the housing context. The fit will be assessed through a cross-country analysis in which by a conceptual model the Dutch and US housing markets and programs are compared. This analysis provides a rational explanation of the factors that influence the non-performance of the NHG program. Results show that the NHG program is not providing any added value mainly because a change in risk perception of Dutch mortgage lenders and development of the housing context since the inception of the program.

The feasibility of the private alternative, PMI, is also assessed by a cross-country analysis. Even though macro factors suggest that there is potential for PMI companies, the factors that also hampered the public program limit the feasibility of the PMI program in the Dutch residential mortgage market.
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<th>Description</th>
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<tr>
<td>AFM</td>
<td>Autoriteit Financiële Markten // Authority Financial Markets</td>
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<tr>
<td>BEW</td>
<td>Bevordering Eigen Woningbezit // Ownership Promotion Act</td>
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<td>DSR</td>
<td>Debt-Service-Ratio</td>
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<td>DTI</td>
<td>Debt-To-Income</td>
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<td>FANNIE MAE</td>
<td>Federal National Mortgage Association</td>
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<td>FHA</td>
<td>Federal Housing Administration (Organisation and Program)</td>
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<td>FREDDIE MAC</td>
<td>Federal Home Loan Mortgage Corporation</td>
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<td>FRM</td>
<td>Fixed Rate Mortgage</td>
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<td>GINNIE MAE</td>
<td>Government National Mortgage Association</td>
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<td>GSE</td>
<td>Government-sponsored enterprises</td>
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<td>HUD</td>
<td>Department of Housing and Urban Development</td>
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<tr>
<td>LTI</td>
<td>Loan-To-Income</td>
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<tr>
<td>LTV</td>
<td>Loan-To-Value</td>
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<tr>
<td>MBS</td>
<td>Mortgage Backed Security</td>
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<td>NHG</td>
<td>National Mortgage Guarantee</td>
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<td>PMG</td>
<td>Public Mortgage Guarantee</td>
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<td>PMI</td>
<td>Private Mortgage Insurance</td>
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<tr>
<td>WEW</td>
<td>Waarborgfonds Eigen Woningen // Home Ownership Guarantee Fund</td>
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<tr>
<td>VNG</td>
<td>Vereniging van Nederlandse Gemeente // Association of Netherlands Municipalities</td>
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<tr>
<td>VROM</td>
<td>Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer // Ministry of Housing, Spatial Planning and the Environment</td>
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INTRODUCTION

1.1 Housing Policy

1.1.1 Housing, the Economy, and Political Intervention

Government housing policies play an important role in our today’s society and increasing home-ownership among households has been a main objective in many countries. However, housing is not only a political issue illustrated by recent developments on the international credit market. These developments illustrate the fundamental relationship between the housing finance market, the economy and politics. The problems that initiated in the sub-prime market in the USA rapidly expanded to financial markets and created disturbance among international investors. The situation intensified the political discussion about the risks involved in the housing finance market and the responsibilities of the government. The time seems right to evaluate current government policies and instruments and to discuss alternatives where necessary.

The rationalization for government intervention is the market inefficiencies embedded in the housing finance market (Cao, 2005). These inefficiencies are caused by information scarcity and asymmetry resulting in ‘information costs’. The information costs lead to an increase in credit risk given that information asymmetry hinders the mortgage lender to identify and quantify all relevant factors influencing the payment probability of a borrower, for example typical borrower characteristics. The mortgage lender will use credit rationing techniques (underwriting rules, collateral requirements, etc) to minimize credit default risk which reduces the credit availability for riskier borrowers (Jaffee (1971), Jaffee and Modigliani (1971), and Stiglitz and Weiss (1981)). The government can reduce the effects of information inefficiencies and stimulate credit availability by intervention through different political tools such as mortgage guarantees (Hoek-Smit and Diamond, 2003).

The political involvement in the Dutch housing market intensified at the beginning of the 20th century with the introduction of the Housing Act. The political intervention resulted in the development of numerous government instruments which created a unique framework that includes social rent subsidies and mortgage tax relief. One of the main
objectives of this framework is to increase home-ownership, especially under low and medium income households, by stimulating the availability and affordability of mortgage credit. (WEW, 2003). In the 1930s, home-ownership was mainly limited to high income household because this group owned sufficient equity to pay the required down payment (30 to 40%) or held other collateral. Lenders refrained from providing mortgage loans to low and medium income households since the risk associated with the lending to these groups was perceived too high. The government developed an instrument that reduced the risk to mortgage lenders and therefore stimulated the supply of mortgage credit: the National Mortgage Guarantee (NHG) (WEW, 2003).

1.2 The Public Mortgage Guarantee

1.2.1 A Credit Default Guarantee

A NHG is a Public Mortgage Guarantee (PMG) that provides a credit guarantee to mortgage lenders. The PMG covers the loss incurred by a default of a borrower and can be included by a bank when a mortgage is negotiated. Even though the consumer is expected to pay back the mortgage, situations could arise (i.e. unemployment, divorce, etc) that cause the consumer to default on the mortgage loan. This will result in a deficit when the capital from a forced sale of the property is lower than the remaining debt. The PMG covers the loss towards the lender under the constraint that certain criteria are met. The credit default guarantee decreases the risk for the lender and enables the consumers to buy a house at better terms. Examples of the improved terms are a lower mortgage rate and positive physiological effects caused by decreased concerns with respect to foreclosure threats. All in all, the PMG program decreases risk to lender and stimulates home-ownership through several positive externalities.

1.2.2 PMG History in the Netherlands

The primary PMG program was initiated as a government instrument in 1956 and operated by local municipalities. However, in the beginning of the 1990s the local municipalities PMG program received increasing criticism. A research in 1992 from the policy-review committee led to the creation of the Home-ownership Guarantee Fund (WEW, Waarborgfonds Eigen Woningen) in 1995. This institution centralized the PMG program into the National Mortgage Guarantee (NHG, Nationale Hypotheek Garantie). In this thesis the terms NHG and PMG will be used interchangeable.

The success of the program in recent years is illustrated by an increase in the amount of NHG loans (figure 1) which resulted in a market share of 23% (WEW, 2006). The maximum
loan limit (€ 265,000, 2007) is pegged to the house price index to maintain current market coverage which is around 50% of the mortgage market.

1.2.3 Housing Policy Objective

The main objective of the NHG program is to stimulate home-ownership by promoting a favourable borrowing climate. The importance of home-ownership is emphasized in recent years by the adoption of the policy paper ‘What People Want, Where People Live’ in 2000 and the introduction of the ‘Promotion of Home-ownership Act’ (BEW) in 2001. The policy paper stipulates two main objectives up to the year 2010: focus on quality of housing, and freedom of choice between rental and owner occupied housing. Studies that focus on the freedom of choice demonstrate many households would like to own their own home (BEW, 2001). The government is therefore seeking to promote home-ownership, also because of the various externalities such as increased involvement with the dwelling and neighborhood. This is quantified in the goal to raise rates from 52% in 2000 to 65% in 2010. However, based upon recent rates (54%, 2006) a linearly growth projection demonstrates that this goal will not be reached (figure 2).
1.3 Changing Housing Finance Markets

1.3.1 Increasing Awareness
Since the commencement of the NHG program, the target group of the government is the low and medium income households. This financially vulnerable group is the most sensitive to credit risk since they generally take on mortgages with high Loan-to-Value (LTV) ratios and have low incomes. The primary effects of a slow down of the economy are seen in these lower income segments; the number of defaults will increase when income levels stagnate and interest rates increase. The ambition to raise home-ownership rates under these financially vulnerable groups creates contradicting forces.

The importance of the risks associated with the housing finance market and providing mortgage to these vulnerable groups is gaining awareness rapidly. On the political level the risks were already acknowledged with the introduction of the housing policy and recently underlined by the acceptance of new code of conduct by mortgage lenders. Former minister of finance, Gerrit Zalm, encouraged the mortgage sector to prevent or reduce the acceptance of ‘top-mortgages’ (loan above the execution value of the collateral). Accordingly, in January 2007, a new code of conduct was accepted by the housing finance market that discourages providing ‘top-mortgages’, with the aim to reduce the risk for the main players in the mortgage market. In addition, with the introduction of Basel II, the financial world is shifting more weight to their risk management capabilities.

The NHG is a credit guarantee to mortgage lenders and therefore important in the risk management of all market participants. Developments on political or economical level as just described affect the environment in which the NHG program operates, influencing its position and importance.

1.3.2 Conclusion
The NHG program is initiated as a government instrument to raise home-ownership rates. However, lagging home-ownership rates seem to indicate that the current NHG program is underperforming. In addition, the criticism on the program is increasing and market conditions are changing. These developments encourage the evaluation of the program and the exploration for alternatives.
2.1 Research Problem and Alternative Solution

The introduction explained the problem encountered in the Dutch housing policy; the NHG program fails to increase home-ownership rates. This thesis provides a rational explanation of this problem and evaluates the factors that cause it. In addition, the feasibility of an alternative solution for home-ownership stimulation is assessed. The solution considered is a Private Mortgage Insurance (PMI) program: a private initiative instead of a public one. The rationality for this solution is the observation that countries with high home-ownership rates, such as the United States and Canada, have a private program next to the public one (figure 3) or have merely a private initiative (e.g. United Kingdom). It raises the question if a PMI program could be a feasible solution in the Dutch Mortgage market in order to increase home-ownership rates.

Figure 3 European home-ownership rates (+ different programs)

Source: EFM, 2005
2.2 The Research Objective and Framework

2.2.1 Research Objective
In the perspective of the problem just described, the objective of this design oriented study is to analyze the functioning of the current NHG program and to assess the feasibility of a PMI program as an instrument to raise home-ownership rates in the residential mortgage market.

2.2.2 Research Framework
It is important to recognize that the business models of a public program (PMG) and of a private program (PMI) have the same value proposition. Both programs provide a credit insurance against the default of a borrower. However, the implementation of the business model differs on strategic points such as pricing and positioning. Nevertheless, the similarity in the business models illustrates the important relationship between the two research objectives that were just described; the functioning of the current NHG program provides valuable insights on the feasibility of the PMI program.

In the context of the first part of research objective, the evaluation of the current program, this thesis analyzes the functioning by focuses on factors that determine the non-performance of the NHG. Non-performance can be described as failure of the business model. The success, or failure, of a business model is determined by its practical viability potential taking into account the environment dynamics in which the model is going to be implemented (Amanor-Boadu, 2003). Therefore, the first research question is as follows;

1. What are the factors that influence the functioning of the mortgage insurance market?

Once the relevant factors are determined, the evaluation continues with an analysis of these factors in relation with the current business model and market context. The second research question therefore is,

2. How do the factors established in question 1 relate to the current PMG program and market context?

The results of this analysis will provide an explanation of the non-performance of the NHG program. Once the causes of the problem with the NHG are determined, this research
turns to a possible solution. As clarified before, the solution considered is the PMI program. Therefore, the next research question is,

3. How do the factors established in question 1 relate to the PMI program and market context?

The evaluation of the current NHG program and the answer on the third question will provide a clear understanding of the business models, the context, and the dynamics between these two. Evaluation of these results provides an answer to the last part of the research objective concerning the feasibility of the PMI program. The last research question therefore is,

4. What is the recommendation concerning the feasibility of the PMI program in the Dutch residential mortgage market?

The discussed research questions compromise the following graphical interpretation of the research framework (figure 4).

2.3 The Research Method

As described in the introduction, the mortgage market is characterized by information scarcity and asymmetry. This not only applies to data describing borrower characteristics, however, also to information of mortgages (portfolio) characteristics. The lack of public available information sets hurdles to the research feasibility and methodology.

The first research question focuses on the relevant factors that influence the mortgage insurance market. This question will be answered through a literature review. The literature
considered are theories concerning feasibility, housing finance imperfections, and credit risk. From these studies a conceptual framework is developed which will be used in the analysis of the remaining research questions.

The second question is evaluated through a cross-country comparison based upon the conceptual framework from question 1. The first section of this chapter illustrated that several countries with high home-ownership have a public (PMG) and private (PMI) program. Since this research focuses on the dynamics between the two programs (PMG and PMI) and the environment, a comparison of the dynamics within one of these countries can provide valuable insights on the dynamics within the Netherlands. The country that is selected for this cross-country comparison is the USA. The USA is chosen because it is one of the countries with both programs (PMG and PMI) and the majority of literature is written in the US context. The PMG program considered in the USA is the Federal Housing Act (FHA). The cross-country analysis provides a rational explanation on the non-performance of the NHG program and determines which factors are responsible. Next to the cross-country analysis, this research provides an overview of criticism based upon a review of academic papers and observations from the author.

The third research question covers the relation between the conceptual framework from question 1 and the PMI business model. The discussion focuses on the differences with the PMG program and the added value of the PMI model in the home-ownership problem. As in the previous question, a cross-country analysis will be used. This analysis focuses on the dynamics of the PMI model in the US market and how this relates to the Dutch context. The results will provide insight on the position of PMI within the US environment and present expectations on the feasibility of the PMI model in the Dutch residential mortgage market.

The recommendations related to the feasibility of the PMI model will be given based upon the outcomes of the analysis in question 2 and 3. A short recap of the results provides a conclusion linked to the feasibility. In addition, several developments are considered that influence the feasibility of the PMI program in the future.

The research model in figure 5 illustrates the relevant methods and the outline of this thesis.
The importance of home-ownership is well recognized in the Dutch housing policy (BEW, 2001). However, the current rates are lagging which suggests that the instrument developed to increase the rates, the NHG, is not achieving the results for which the program was created. The non-performance of the NHG program motivated this thesis because the author believes that the sources of this problem are not well understood by policy makers while a simple rational analysis provides the answers. In addition, the feasibility of a possible solution is assessed. All in all, this thesis provides an objective and rational evaluation of the NHG and PMI program for policy makers. The results provide a new point of view to the existing housing policy discussion.

In addition, the thesis presents a cross-country analysis of a conceptual framework that enhances the understanding of the dynamics in the mortgage insurance market. The focus in this conceptual model is on the operational functioning of the PMG and PMI business model and considers factors that in most academic literature are acknowledged as limitations, such as differences in law, financial structure of the capital market, and social-cultural differences (Buckley et al., 2006). In contrast, this thesis uses these factors in the cross-country analysis to explain differences and uses them to evaluate the functioning of the PMG programs and the feasibility of the PMI programs. Therefore, it provides a different view on current programs and on academic literature. These views assist policy makers in the evaluation and development of future regulation.

Furthermore, the conceptual framework can be used by PMI companies that are interested in foreign expansion. The model explores the fundamental market factors and provides a simple evaluation of market feasibility.
Chapter 3
THE THEORECTICAL FRAMEWORK

This thesis is build upon three main theories: 1. Feasibility Theory; 2. Housing Market Imperfections; 3. Credit Risk Theory related to mortgage lending. The different theories are discussed and structured into a conceptual framework which will be used in the remainder of this study.

3.1 Theoretical Framework: Feasibility Theory

3.1.1 Feasibility Theory

The previous chapter stated that the success or failure of a business model can be assessed by a feasibility study. Therefore, fundamentals from feasibility theory will be used in the evaluation of the functioning of the NHG and in the analysis of the factors that caused the non-performance of the program. This theory is also used to assess the feasibility of the PMI program.

The definitions of feasibility discussed by Castell (2000) generate a framework from which criteria can be selected for the evaluation of the feasibility. Based upon English Language Dictionaries, Castell concludes that a feasibility study takes into account the possible and practical aspects in combination of a financial analysis (2000). Furthermore, a feasibility study is performed at different levels. In line with the conclusions of Castell, Mzallasi (2005) describes that feasibility assessment is conducted at four levels; operational, economic, support and risk level (figure 6).
Within this thesis it is impossible to take into account all levels due to data availability and time constraints. Therefore, the main focus is on the fundamental level of a feasibility study: the operational level. The exclusion of the other levels does not mean that the conceptual framework that will follow from this review is useless. Quite the opposite is true: due to the fundamental aspect of the operational level it provides a quick and elementary snapshot of the feasibility. If the results on the operational level confirm that a business model is not feasible further exploration is in most cases not necessary.

Figure 6 illustrates that the operational level examines the business model and the market context. The feasibility of a business model is determined by its practical viability potential taking into account the environment dynamics in which the model is going to be implemented (Amanor-Boadu (2003)). In other words, the feasibility of a business model depends on the fit between internal factors (business model) and external factors (the market context). The distinction between the business model and market context and the dynamics between the two forms the basis of the conceptual framework.

3.1.2 Feasibility and Market Context

The performance evaluation and program feasibility will be based upon the analysis of the fit between the business models and the market context. However, the term market context is rather broad. However, David Liu (2000) from PMI Mortgage Insurance Co. describes the external factors that his company considered in a strategic planning exercise for foreign expansion. The PMG and PMI program operate in the same context and therefore the factors discussed by Liu can also be used in this thesis.

First of all, Liu explains that foreign expansion for US mortgage insurance companies is important for three main reasons. First, new mortgage markets open up new sources of premiums and therefore profit potential. Second, additional mortgage markets add geographical diversification possibilities for risk management purposes. And thirdly, PMI expands internationally in pursue of US mortgage lenders which are expected to engage in more international businesses activities because of the globalization of financial markets.

International mortgage markets differ widely in their characteristics and dynamics which make it difficult to assess different countries. To overcome this problem PMI Mortgage Insurance Co. formed a framework to capture the most important factors (figure 7).
The factors described in Figure 7 will be used to define the market context in the conceptual framework.

### 3.2 Theoretical Framework: Market Imperfections

The introduction mentioned that the rationalization for the implementation of a PMG program are the market inefficiencies embedded in the housing finance market (Cao, 2005). The business models of PMG and PMI are both based upon these market inefficiencies; the inefficiencies cause information asymmetry and hinder the mortgage lender to identify and quantify all relevant factors influencing the payment probability of a borrower and therefore increasing credit risk. The PMG and PMI business model is a credit guarantee/insurance to the mortgage lender and therefore provides added value to a mortgage lender since it reduce the credit risk exposure. This also explains how the models can raise home-ownership rates; PMG and PMI business models increase the availability and affordability of mortgage credit to riskier borrower who otherwise would be excluded by credit rationing techniques to minimize credit risk (Hoek-Smit and Diamond, 2003).

### 3.3 Theoretical Framework: Credit Risk

The theories related to market imperfections show how the PMG and PMI business model provide value to mortgage lenders. The theories also demonstrate that the main business risk in the PMG and PMI business model is credit risk.

As explained in the previous section, uncertainty about the payment probability causes credit risk. In this context, credit risk refers to the possibility that a borrower fails to repay its mortgage obligations, also called mortgage default. Mortgage default literature
concentrates on theories that model the Default Probability (PD) and expected Loss Given Default (LGD) (Merton, 1976; Simons, 1990).

The first factor, PD, explains the likelihood that a borrower is not able to repay his mortgage loan. The second factor, LGD, quantifies how severe the loss is when a borrower defaults on his loan. The history of the literature describing these two factors until the 1990s is described by Quercia and Stegman (1992).

3.3.1 Three Generations of Studies
Quercia and Stegman (1992) divide the default risk theories in three generations: first-generation studies focusing on the lender perspective, second-generation literature based upon the borrower perspective and the third-generation studies based upon the institutional perspective.

Many academics attributed to the first generation theories that originate in the beginning of the 1960 and continuing till. The focus in these theories is on default from the lender perspective. Early research attempted to explain and predict PD from the mortgage loan characteristics (Jung (1962), Page (1964), and von Furstenberg (1960)) including mortgage interest premiums and LTV ratios. Additional studies comprise borrower characteristics (von Furstenberg (1969), Herzog and Earley (1970), Sandor and Sosin (1975)) and property characteristics (van Furstenberg and Green (1974)).

Overall, the first generation studies provided the first insights on mortgage default and tried to predict default at origination. These theories therefore do not provide explanation for the reasons why a borrower would default. Second generations theories concentrated on borrower behaviour through a structured model.

The second generation theories focus on explaining default through the borrower rationalities which determine the choice to continue the mortgage payment or to stop. The main driver is maximization of utility. The payment model explains the borrower has four choices at each payment period: make the payment, delay the payment, default or prepay. The decision is based upon maximization of utility which means the borrower should act rational and choose the options that levels the highest value. Jackson and Kasserman (1980) were the first to confirm this model demonstrating that LTV ratios and mortgage default rates are positively correlated and later these findings were extended on the importance of net equity by Campbell and Dietrich (1983). An important addition to these studies came from Foster and Van Order (1984, 1985) who introduced the put option in mortgage default and constructed an option-based model. The model explains that borrowers will default on their loan when the equity level of the dwelling is lower than the outstanding loan. It explains the importance of LTV ratios since a high LTV ratio brings
a higher probability that the option will be ‘in the money’ and provoking a default. Even though this model is widely accepted by the financial world, it is a highly financial and rational model and is disputed for the lack of influence from borrower characteristics such as income and costs of moving.

The third-generation of studies concentrates on default risk from an institutional perspective. This means that default risk is assessed from a portfolio view. Evans, Maris, and Weinstein (1985) make an interesting conclusion explaining that expected mortgage loss (LGD) is more important than default rates in the portfolio context because the loss differs per loan. Therefore, factors influencing the expected loss are analysed, such as foreclosure costs (Clauretie, 1987), LTV levels and geographic diversification (Quigley and Van Order, 1991). Institutions holding high LTV mortgage and less diversified portfolio have to retain higher capital levels than lenders who have an opposite portfolio. An important addition of third generation studies is the inclusion of several costs like, transaction costs (Kau, Keenan, and Kim, 1991), moving costs, reputation costs, capital constraints (Quigley and Van Order, 1992), crisis events and moving opportunities (Giliberto and Houston, 1989).

3.3.2 Recent Theories
The three generations of mortgage studies have provided the financial world with a wide range of theories covering almost all aspects of the mortgage default decision. Contradicting opinions remain and the influence of factors that are difficult to quantify, for example the costs of default (moving, etc.), are disputed. Even though the remaining disagreements, the theories are successful to explain the role of loan characteristics and in particular LTV ratios. The role of transaction costs and borrower characteristics is less understood (Quercia and Stegman (1992)). In more recent theories, academics acknowledge the influence of both loan and borrower characteristics and try to combine the theories, e.g. Neuteboom (2002). Neuteboom explains that a mortgage is for many households by far one of the most significant financial obligations they will be ever committing to. A mortgage contract exposes the households to uncertainties with respect to their financial obligations. An unexpected decrease in income on household level caused by unemployment, divorce or any other reason, possibly in conjunction with a crisis on the housing market, can evolve in significant problems for homeowners. Neuteboom explains that modern default literature modern identifies two main risk to mortgage lending, payment risk and equity risk (figure 8).
3.3.3 Payment Risk: PD

Currently, the two main accepted theories explaining payment risk are the equity theory and the ability-to-pay theory.

The equity theory

Originated in the second generation studies, the equity theory refers to argument that ‘borrowers base their default decision on a rational comparison of the financial costs and returns involved in continuing or terminating mortgage payments’ (Jackson and Kasterman (1980), Wong et al. (2004)). The theory explains that borrowers will default on their loan when the equity level of the dwelling is lower than the outstanding loan. This theory is mainly US oriented as US borrower’s liability ends when he hands over the proprietary rights of the dwelling to the lender. However, in Europe the borrowers remain liable for any remaining debt after the arrear for a couple of years (Maulbauer, 1997; Boheim and Taylor, 2000).

The ability-to-pay theory

The ability-to-pay theory origins in social policy and is adapted to Europe as an alternative to the equity theory. The ability-to-pay theory is based upon the principle that ‘mortgagers refrain from loan default as long as income flows are sufficient to meet the periodic payment without undue financial burden’ (Jackson and Kasterman, 1980; Wong et al., 2004). This theory assumes that borrowers do not default voluntary; however, their financial situation may ‘force’ them to. This financial situation is linked to the loan-to-income (LTI) ratio and the Debt-Service-Ratio (DSR) in particular. DSR refers to the ratio of debt payments to income and is also referred to as Debt-to-Income (DTI). A balanced
level in these factors will not lead to arrears. An unbalanced (high) LTI or DSR ratio will increase the probability of foreclosure as the borrower is less able to pay the mortgage. The main difference with the equity theory is that the default decision is not a rational decision however is also based upon emotional and social costs. The equity theory assumes that the borrower can and will walk away from his mortgage obligation when the level of the mortgage debt exceeds the equity level. This is only possible in countries where regulation limits legal recourse. In these countries the borrower is not liable for any remaining debt after default and the mortgage lender can not recoup the deficit. The USA has limitations to recourse regulation which explains why this theory is applicable in this country. In contrast, the ability-to-pay considers emotional and social costs. It takes into account costs of moving and other costs related to default. This explains why the ability-to-pay theory is popular in countries where the mortgage lenders have the option of full recourse. The costs of mortgage default increases since the borrower remains fully liable. Because the increase costs the borrower will refrain from defaulting unless he is forced to. In this theory the payment probability is more important than the default probably. LTI or DSR are used as proxies for the payment probability and are therefore more important in these countries.

3.3.4 Equity Risk: LGD

The borrower can delay the effects of payment risk by delaying other costs, like maintenance costs, however this will increase the second risk: equity risk. Equity risk describes the possibility that the (forced) sale of a dwelling does not recoup enough capital to cover the outstanding loan and additional costs (tax, legal payments, etc) which results in a deficit (negative equity). Consequently, equity risk determines the LGD. The different reasons why the sale of a dwelling does not earn enough capital include a general housing market downturn (so the price of the house declined) and/or high LTV ratios at the initiation of the contract. Again, the influence of regulation is evident; in countries with full recourse the mortgage lender has the opportunity to minimize the LGD. However, in countries where full recourse is limited the LGD will be more severe. In these countries LTV will have an important role since LGD is positive related to LTV.

Nevertheless, the borrower is able to postpone the effects of equity risk as it is a ‘virtual risk’; the consequences will only emerge when the mortgage loan has to be repaid (e.g. in case of default or move to another dwelling). This theory is based upon third generation studies as the loss of the mortgage default becomes more important. Even though a borrower can postpone both payment risk and equity risk, if he is not able to turn around his financial situation these risks are inevitable in the long-term.
3.3.5 Credit risk and the Conceptual Framework

The importance of the credit risk theories is related to risk perception. The credit risk theories explain how payment behaviour and regulation influences the perception of the risks embedded in a mortgage loan.

The payment behaviour of consumers in a country is linked to the social-cultural fundamentals. Consumers that are more progressive and risk taking are more rational in their (payment)behaviour (Hofstede, 2004). The equity theory explains how rational payment behaviour is related to LTV level: a higher LTV level increase the probability of default. Therefore, when a country is characterized by risk taking consumers the importance of LTV will be higher in determining the default probability. In contrast, when a consumer is more risk adverse he will act more emotional in his behaviour (Hofstede, 2004). This relates to the ability-to-pay theory in which the consumer includes emotional and social costs in this payment decision. The theory also explains that in the countries where ability-to-pay theories prevail, LTV plays a less important role and LTI or DSR will be more significant.

The relation between regulation and risk perception is evident. In a country where regulation limits legal recourse, LTV will be more important in the risk perception of a mortgage lender since the borrower is not liable for any remaining debt after default. In countries with legal recourse the consumer remains liable and LTV will be less important in the risk perception.

Nevertheless, the question remains how risk perception plays a role in the PMG and PMI programs? Remember that the PMG and PMI is a credit guarantee/insurance to the mortgage lender. The guarantee/insurance covers the possible deficit that occurs after a borrower defaults. A deficit occurs when the remaining mortgage loan is higher than the costs than can be recouped by the sale of the collateral. The probability that this will occur increases with the LTV level. The guarantee/insurance therefore reduces the risk related to LTV. In effect, the program is most valuable in countries where LTV is the main driver of risk perception and less significant in countries where LTI is more important. Therefore, it is important to include the risk perception in the conceptual framework: is the risk perception in a country driven by LTV or LTI?
3.4 Conceptual Framework

The conceptual Framework (figure 9) is based upon the theories related to feasibility, market imperfections and credit risk.

The feasibility theory (figure 6) explains that success or failure of business proposition is assessed on different levels. This thesis focuses on the operational level and therefore the conceptual framework is based upon the fit of the business model in the market context. Within the business model the focus is on the business objective and strategy. The factors related to the market context evaluate the housing context, risk perception and regulation. The latter two follow from the information imperfection and credit theories. The conceptual framework will be used in the cross-country analysis in the next chapters.
Chapter 4

THE PMG CONTEXT

The research model explained that the functioning of the NHG is assessed by an analysis of the fit of the business model in the housing context. This fit is compared in cross-country analysis between the Netherlands (NHG) and the USA (FHA). The first step in this analysis is the exploration of the market context of both countries. The conceptual model illustrated that the relevant aspects in the market context are; 1. Housing Context, 2. Regulation and 3. Risk Perception.

4.1 The Housing Context

Figure 7 shows that the relevant aspects within the housing context are; 1. Macro-dynamic and Demographic Factors, 2. Housing Sector, and 3. Mortgage Market. In this chapter the main aspects of these factors that are important in the cross-country analysis will be provided.

4.1.1 Macro-dynamic an Demographic Factors

An increase in mortgage loans is positively correlated with an increase in the demand for mortgage insurances (David Liu, 2000). Therefore, the assessment of the mortgage guarantee/insurance context starts by assessing the macro-dynamic and demographic factors that positively influence mortgage origination: total population and age distribution, GDP, and (un)employment.

- **Total Population and Age Distribution**: The Netherlands has 16 million inhabitants which is in large contrasts with the USA which is one of the largest countries in the world with 300 million inhabitants. However, this observation changes when the total area where these people live on is taken into account; the Netherlands has a density of 395 people/km² and the US has 31 people/km². Both the Netherlands and the USA are experiencing the consequences of the baby boom that took place after the Second World War. Therefore, the amount of households within the lower age distribution (<35 Years) has been stagnating while amount of households in
the higher age classes (>35 Years) has been increasing strongly (CBS, American Housing Surveys, 2007).

- **GDP and (Un)employment:** Current GDP levels are $625.3 billion for the Netherlands and $13,632.6 billion for the USA. Again, these figures have to be placed into perspective by analysing the GDP per capita and GDP growth. GDP per capita for the Netherlands is $38,618 and $44,190 for the USA, placing both countries in the top 10 worldwide. Figure 10 illustrates that the indexed GDP per capita has been growing continuously in both countries following similar trends.

Also the (un)employment rates show similar development (figure 11).

![Figure 10: GDP per capita growth](image1.png)

![Figure 11: Unemployment rate](image2.png)
4.1.2 Housing sector

The relevant factors in the housing sector context are home-price trends, housing stock, and the housing policy.

- **Home Price Trends:** House price increased significantly in both countries with the steepest increase in the Netherlands (figure 12).

![Figure 12 House price trend](image)

- **The Housing Stock:** The housing stock has been increasing steadily over the years; however, the growth of the housing stock is slowing down.

![Figure 13 Housing Stock](image)

- **Housing Policy:** Housing plays a very important role in both countries. First, the Dutch housing policy will be considered, followed by the US policy.

The Dutch government is traditionally heavily involved in the housing market, both on the owner occupied and the rental market. The government intervention started with the
introduction of the Housing Act in the beginning of the 20th century. In this policy the government supported the development of the (social) rental sector. The government involvement has been decreasing but some centralized instruments remain, e.g. the National Mortgage Guarantee (NHG, Nationale Hypotheek Garantie). The NHG is a tool that guarantees mortgages for low and medium income borrowers and is operated from a national platform.

The current housing policy is reflected in the policy paper ‘What People Want, Where People Live’ (2001) stipulating two main goals: freedom of choice between renting and ownership, and quality of housing. To execute this plan, the housing policy includes various instruments like subsidies for low income households and rental subsidies, next to existing instruments, i.e. interest payment deductibility. The two main pillars of the housing policy, interest payment deductibility and rental subsidies receive increasing criticism from national and international platforms. Interest deductibility is a tool driven by fiscal regulation which has motivated both lenders and borrowers to borrow high level of debt. It resulted in high levels of LTV and equity withdrawal to maximize the benefit of interest deductibility. Increasing criticism focuses on these instruments since it is believed that they cause extremely high house prices. Other factors that contributed to the house price boom in the 1990s included favorable cyclical conditions, sustained period of low interest rates and low supply elasticity of new dwellings (ABN AMRO, 2006).

Policy makers are focusing on the problems caused by the pricing boom, especially for first time buyers on the housing market. However, initiatives to reduce the fiscal benefits of the interest deductibility and rental subsidies remain sensitive political issues.

The US housing policy maintained similar themes over the years with a focus on increasing home-ownership opportunities, promoting decent affordable housing, and strengthen communities. The first point, increasing home-ownership rates, is seen as the realization of the ‘American dream’ which underlines its importance. The success of the policy is illustrated by a home-ownership rate of 69% (2006) which is high in international perspective (figure 3).

Notwithstanding this market oriented policy orientation, the government involvement is high. The modern housing policy originated after the Great Depression in 1934 with the passing of the National Housing Act by the congress and by the establishment of the Federal Housing Administration (FHA). Note that in this thesis the name FHA is used for both the organisation and the PMG program. The main objective of the government was to stabilize the credit facility and encourage banks, building and loan associations, and other related institutions to invest in the housing market by providing credit to borrowers. The FHA insured loans provided by the financial institutions. The program increased the availability of mortgage credit and enabled the transfer of mortgage credit from
geographical areas with an oversupply to underserved areas. The development of the program boosted the enlargement of the primary and the secondary mortgage market. Between the end of WWII and the 1970s the primary mortgage market was dominated by depository institutions. However, the position of depository institutions was challenged by the expansion of the secondary mortgage markets which was stimulated by the government. The secondary mortgage market created a new market place for trading mortgages and provided an efficient alternative for funding through commercial deposits. The growth of the secondary market was stimulated by the creation of Government Sponsored Enterprises (GSEs). GSE’s structure and insure pools of mortgages and sell these standardized products on the capital market. In 1938, just after the depression, the government established Fannie Mae (FNMA, Federal National Mortgage Association). Fannie Mae was privatised in 1968 and the congress created Ginnie Mae (GNMA, Government National Mortgage Association) for securitization of government backed loans. In order to prevent a monopoly position for Fannie Mae the congress established a second GSE named Freddie Mac (FHLMC, Federal Home Loan Mortgage Corporation).

Nowadays, the US Housing finance system is often considered to be one of the most efficient and effective capital market structures in the world (Cao, 2005).

4.1.3 Mortgage Market

The factors assessed in mortgage market context are total mortgage debt, mortgage products, mortgage lenders, mortgage default rates, LTV levels, and mortgage funding.

- **Total Mortgage Debt:** The Dutch households have over $640 billion of mortgage debt, which is just over the level of GDP ($625 billion). The USA compromises the largest mortgage market in the world with a household debt level exceeding $8 trillion. The increase of mortgage debt has been driven by increased home-ownership rates, declining interest rates, changes in tax laws and rising house prices.

- **Mortgage Products:** The Dutch borrower can choose from a variety of products. However, the market is dominated by fixed rate mortgages (86% of outstanding mortgage debt is based on a fixed interest rate). Typical maturity is 30 years and mortgages can be refinanced at the cost of a penalty. The fiscal system had a large influence on product development, underlined by the growing popularity of interest-only mortgages. Demand for these products increased as to enjoy full interest deductibility benefits throughout the duration of the loan.
An important feature of the US mortgage market is the classification of mortgages. Certain mortgages are eligible for special treatment in the secondary market. The first classification is Government-Backed Mortgages or FHA mortgages: to promote home-ownership the government offers high LTV loans to low income households and first time borrowers. These mortgages are secured with government backing which reduces credit risk in terms of prepayment and default risk and sold on the secondary market through Ginnie Mae.

Conforming mortgages are loans qualified for purchase by Fannie Mae or Freddie Mac. The GSEs sell these loans on the secondary mortgage market. Tight underwriting rules are defined, for example loan limits and a maximum LTV ratio of 80%.

Jumbo Mortgages have a principal amount that is higher than a conforming loan and demonstrate differences in income, debt service and LTV ratios.

Sub-prime and Near-prime mortgages are issued to borrowers with a poor credit history, high LTV ratios and/or incomplete documentation.

Within these classifications, the most popular mortgage product is the traditional 30 year fixed rate mortgage (FRM). However, a whole range of products is available with different interest rate risk and amortisation schedules.

Mortgage lenders: The secondary market plays does not play an important role in the Dutch mortgage market and the primary market is dominated by depository banks, followed by insurance firms, pension’s funds and foreign banks (figure 14). The top three banks Rabobank (24%), ABN AMRO (14%), an ING (23%) hold 61% of the mortgage credit outstanding.

In contrast, the secondary mortgage market plays a very important role in the US mortgage market. Prior to the development of the secondary market, most mortgages were issued by depository institutions. Nowadays, mortgages are originated by a mix of institutions: traditional depository institutions, mortgage bankers, and mortgage brokers.
Key difference between these institutions is their way of funding: traditional depository institutions have the possibility to fund mortgage from their commercial deposits and the latter two are depending on securitisation of mortgages in the capital markets. The dependence on the secondary capital market is augmented by the fact that the US mortgage market consists of many geographical differs areas in which many small local banks are active. The secondary market enables these banks to secure their credit funding needs.

- **Mortgage default rates and LTV ratio:** Figure 15 shows the default frequencies assumed by one Ratings Agency’s mortgage risk model for a BBB rated residential mortgage backed security in different countries. The default probabilities are low in the Netherlands compared to the USA, especially when the LTV levels increases.

In addition, in the USA the amount of loans with very high LTV (>95) rates is increasing for FHA (figure 16) and conventional loans in recent years (figure 17) mainly caused by higher house prices, lower interest rates, the availability of high LTV loans, and increased effectiveness in efforts to increase home-ownership among lower income families (Mitchum, 2003).

![Figure 15 Probability Assumptions for BBB rated RMBS](source: Aalbers, 2006 & MBA, 2006)
The fiscal regime in the Netherlands has a large impact on product development and effectively on LTV levels. The Dutch system stimulates high LTV levels to maximize interest deductibility benefits. The Netherlands have therefore high LTV levels compared to other European countries and the USA (figure 18).
Next to LTV ratios Dutch mortgage lenders also apply LTI ratio requirements. The agreed upon level in the latest code of conduct is 4.5 which means that the loan limit is set on 4.5 times the gross monthly income.

The US equivalent of LTI is DTI requirements, which sets a limit on the percentage of gross monthly income that can be spend on housing debts. Current DTI level for a conventional mortgage is 28% and for a FHA loan 29%.

Mortgage Funding: Funding plays an important role in the mortgage and housing market. The Dutch mortgage market is highly dominated by commercial banks and consequently funding is mainly by retail deposits (75%, WOM, 2003). The majority of banks hold the mortgages on their balance sheets and securitization is not yet significant at 7% (WOM, 2003). Nevertheless, increased awareness of mortgage risk (introduction Basel II) advances risk management tools and secondary market activity. Mortgage funding is influenced by solvency requirements and the risk weighting of mortgages determine the risk capital. Under Basel I regulation the financial institutions have to retain 8% capital of the risk weighted assets: NHG guaranteed mortgages have a risk weight of 0%, loans with less then 75% LTV enjoy 50%, and loans exceeding 75% have a risk weighting of 100%. Funding through mortgage bonds is increasing in volume.

Nowadays, US mortgage lenders fund their mortgages with a mix of equity, debt, and most importantly, secondary market transactions of Residential Mortgage Backed Securities (RMBS). The function of the US secondary mortgage market is unique in the world and allows lenders to remove a mortgage portfolio from their balance sheet.
through securitization. Securitization is the packaging of bank loans and other assets with an appropriate level of credit enhancement into marketable securities. These securities are sold on the secondary market to investors. The credit enhancement in RMBS transaction is achieved by collateralization and insurances. The secondary market developed into the main source of mortgage credit. The involvement of the GSEs contributed to the growth of this funding source. Advanced risk management tools at banks contributed to the popularity of securitisation programmes as a tool to enhance their balance sheets. The secondary mortgage market securities can be clustered in two groups: agency mortgage-backed securities and non-agency mortgages. The agency mortgage-backed securities are mortgages guaranteed by the GSEs. Ginnie Mae mortgages are collateralized by FHA mortgages. Standard agency securities (Freddie Mac and Fannie Mae) are backed by conforming conventional mortgages and if not conforming, have to carry insurance from private insurance companies. The enclosure of mortgage insurance enhances the credit quality of the securities. This provision drives the demand for mortgage insurance products. The GSEs offer securities with relatively low risks profiles increasing the liquidity. Non-agency mortgage market comprises non-conforming mortgages typically jumbo primes, sub-primes and adjustable rates mortgages. These are securitized in the private label market and incorporate high risk profiles.

4.2 Regulation

Regulation performs an important role on in both market contexts. In the Netherlands, the most important regulation issues are the fiscal regime and recourse law. The government stipulates the fiscal regime which is used to stimulate housing availability and affordability. The law concerning recourse stipulates that financial institutions have full recourse against borrowers who fail to repay their loan. This regulation discourages defaults and the foreclosure and recovery processes are among the fastest in Europe which reduces the costs to mortgage lenders in case a default occurs (WOM, 2003).

Regulation is formally imposed by law and informally by code of conducts. An example of regulation by law is the recent introduction of the Financial Services Law (WFD, Wet Financiële Dienstverlening) which had a great impact on the mortgage market. This law ensures consumer protection by increasing the information availability. The Authority of Financial Markets (AFM) is the official law enforcement and reviews all market participant and actions. The code of conduct regarding top mortgages discussed in the introduction is an example of self-regulation of the mortgage market. The self-regulation concentrates on LTI requirements.
Most important in the US market is the regulation towards default procedures; the foreclosure law. The US foreclosure law governs the process of seizing a property that secures a loan. This law is administered on state level which in differences between states with respect to borrower protection.

In states with increased borrower protection the foreclosure procedures are lengthier and result in more costs and losses. Clauretie (1989) explains that there are three distinctive differences between states in the foreclosure law.

First of all, state laws differ on the existence of judicial foreclosure procedures. Nearly half of the US states incorporate this feature. The existence of judicial foreclosure procedures means that a foreclosure judgement has to go through court. If a financial institution wants to force a foreclosure it incurs increased costs because it has to employ lawyers, pay legal fees, etc. In addition, the process will take longer time and increases other costs like foregone interest, maintenance expenses, etc. Overall, the total costs related to foreclosure will be higher than in states were this is arranged without court involvement.

Secondly, Clauretie (1989) explains that 29 states provide a statutory right of redemption: which is a period of time wherein the borrower has the right to attempt to divert the foreclosure. This provision extent the period the financial institution can take actual possession of the collateral which is costly in terms of time, foregone interest, reduced interest of potential buyers, etc.

Thirdly, most states, except for six, allow for deficiency judgements which means that the financial institution can try to recover any remaining losses after foreclosure on the personal assets of the borrower. However, this right is generally excluded since most residential mortgages are non-recourse mortgages. In addition, legal cost and time involved in the judgement may discourage mortgage lender to actually execute this right. Nevertheless, the threat of court case persuades borrowers to make a settlement to avoid bad credit ratings. Overall, the costs for a lender in a state without this the deficiency judgement will be higher.

In addition, self-regulation of the mortgage market resulted in a LTV requirement of 80%.

### 4.3 Risk Perception

The importance of risk perception was explained in the discussion of the conceptual model. Risk perception is driven by regulation and social-cultural aspects.

**Regulation:** Risk perception is influenced by regulation through the law that governs legal recourse procedures. As explained before, in countries where regulation promotes full legal recourse LTV will be less important in the risk perception of a mortgage lender. As described in the previous section, the Dutch regulation stipulates full recourse for
mortgage lenders against borrowers. In addition, the Dutch foreclosure and recovery processes are highly efficient (WOM,203).

The USA regulation limits the possibility of recourse; most mortgages are non-recourse and legal inefficiencies increase the cost and time involved with deficiency judgements.

Social and cultural aspects: The payment behaviour of borrowers is related to the social-cultural fundamentals of country. One of the most recognized studies' regarding social and cultural differences is conducted by Hofstede. In his latest book (Cultures and Organizations, software of the mind, 2004), he describes the differences among cultures at national level in a specific framework focused on four dimensions: Power Distance, Individualism, Masculinity, Uncertainty Avoidance and Long Term Orientation. In this analysis the Dutch culture scores high on Individualism. In the Dutch context, high individualism is illustrated by the importance of privacy to Dutch people. In addition, individual pride and respect are highly valued goods and Dutch people do not like to be criticised. The moderate score of 53 (World Average: 64) on Uncertainty Avoidance indicates a culture that wants to minimize or reduce levels of uncertainty and thereby respect rules, laws, policies and regulations. Therefore, the Uncertainty Avoidance also explains the excellent payment behaviour of Dutch consumer resulting in low mortgage default frequencies. The appropriate payment risk theory is the ability-to-pay theory explaining the importance of LTI over LTV.

Also the USA is assessed by Hofstede and the USA scores high on Individualism (USA: 91, World Average: 43) and Masculinity (USA: 62, World Average: 50) which results in self-reliant behaviour and competitiveness. This attributes are demonstrated by the mindset that everything is possible for every individual and is illustrated in the ‘American Dream’. Home-ownership is part of the ‘American Dream’ and individuals are stimulated to reach this goal. The USA scores low on Long Term Orientation (USA: 29, World Average: 45) which is reflected in the high credit lending environment: spend today, pay tomorrow. Consumers are willing to take upon high level of debt and are less concerned with the (negative) long term effects. Lastly, the USA attains a low ranking of 46 (World Average: 64) resulting in an increased risk taking society. As described before, the US context converges with the equity theory, underlining the significance of LTV.

The regulation and social-cultural aspects differ widely between the Netherlands and the USA. Dutch regulation enables an efficient recourse procedure and Dutch borrowers have excellent payment behaviours explaining the importance of LTI over LTV in Dutch mortgage lending.
On the contrary, the US regulation limits full recourse and social-cultural aspects diminish the payment behaviour of borrowers. Therefore, LTV plays an important role in the risk perception of the US mortgage lenders.

4.1 The Market Context: Conclusion

The market context includes housing context, regulation and risk perception. The specific factors are summarized in figure 19 and the conclusion based upon these descriptive factors is,

- **Housing context:** The macro-dynamic and demographic factors demonstrate similar trends. There are differences in scale; however the growth indices of GDP, (un)employment, house price, and housing stock confirm that both markets have similar macro developments. Large differences are observed in the housing policy and financial structure of the capital market. Both housing policies include home-ownership stimulation however the instruments used differ based upon historical developments. The secondary capital market plays an important role in the US housing policy and mortgage market structure, influencing market players, products, and funding. In the Netherlands the fiscal system stimulated high LTV lending and traditionally the mortgage market is dominated by a small number of commercial banks.

- **Regulation:** The Dutch regulation decreases costs associated with defaults and self-regulation focuses on LTI. Foreclosure laws are inefficient and costly in the USA and self-regulation limits LTV levels.

- **Risk Perception:** Regulation and social-cultural factors influence the risk perception. In the Netherlands LTI is more important, whereas in the USA LTV plays a more significant role.

Figure 19 Summary US and NL Housing Context

<table>
<thead>
<tr>
<th>Macrodynamic &amp; Demographic</th>
<th>USA</th>
<th>NL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhabitants:</td>
<td>300 million</td>
<td>16 million</td>
</tr>
<tr>
<td>Density:</td>
<td>31/km²</td>
<td>395/km²</td>
</tr>
<tr>
<td>GDP per Capita:</td>
<td>Increasing</td>
<td>Increasing</td>
</tr>
<tr>
<td>Unemployment:</td>
<td>Increasing</td>
<td>Increasing</td>
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</tbody>
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<thead>
<tr>
<th>Housing Sector</th>
<th>USA</th>
<th>NL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household Trend:</td>
<td>Increasing</td>
<td>Increasing</td>
</tr>
<tr>
<td>Housing Policy:</td>
<td>High government involvement, focus on home-ownership, affordability, strengthening communities</td>
<td>High government involvement, focus on freedom of choice and housing quality</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Mortgage Market</th>
<th>USA</th>
<th>NL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total mortgage debt:</td>
<td>$8 trillion</td>
<td>$640 billion</td>
</tr>
<tr>
<td>Mortgage Products:</td>
<td>Different classifications and high influence secondary market activity Most popular PRM</td>
<td>High influence fiscal regime Inlaid only PRM most popular</td>
</tr>
<tr>
<td>Mortgage Lenders:</td>
<td>Traditional depository institutions, mortgage bankers and mortgage brokers</td>
<td>Dominated by depository banks</td>
</tr>
<tr>
<td>Mortgage Default rate:</td>
<td>Historical Average: 4.4%</td>
<td>Historical Average: 0.6%</td>
</tr>
<tr>
<td>Average LTV ratio:</td>
<td>73.3%</td>
<td>95.0%</td>
</tr>
<tr>
<td>Mortgage Funding:</td>
<td>Mix of equity, debt, and RMBS</td>
<td>Mostly by retail deposits</td>
</tr>
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<thead>
<tr>
<th>Regulation</th>
<th>USA</th>
<th>NL</th>
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</thead>
<tbody>
<tr>
<td>Social-Cultural:</td>
<td>Inefficient foreclosure law</td>
<td>Efficient foreclosure law</td>
</tr>
<tr>
<td>Risk perception:</td>
<td>LTV</td>
<td>LTI</td>
</tr>
</tbody>
</table>

38
The factors influencing the performance of the NHG program are analysed through a comparison of the fit of the PMG business model in the housing context. The housing contexts of the Netherlands and the USA were described in the previous chapter. The main business model stipulates that PMG is a credit guaranty for the lender against residential mortgage loans (Blood, 2001). The basic model insures an agreed upon part of the loss (coverage) and may include principal, delinquent interest, foreclosure and auction costs, and routine maintenance (Merrill and Whitely, 2003). By covering the loss that results from a (forced) sale of a dwelling, the mortgage guarantee reduces the equity risk and in effect lessens the risk to the lender. Even though the description of the main business model is similar, the actual development and implementation of the PMG programs are different. The specific historical development, objective, and strategy will be described in this chapter. The FHA program is initiated before the NHG program and therefore will be discussed before the NHG.

5.1 The History of the PMG program

5.1.1 The Federal Housing Administration (FHA)
The FHA program originates in the USA after the Great Depression. Government intervention was needed as financial Institutions were reluctant to provide mortgage loans and investors declined to participate in the housing market. Therefore, the Congress created the Federal Housing Administration (FHA) in the National Housing Act. One of the main objectives was to raise home-ownership rates by restoring the stability of the national credit facility. The availability of FHA stabilized the provision of mortgage credit in the marketplace and encouraged the accessibility of credit to households not served or underserved by the private sector, most notably first time and minority homebuyers (FHA Y2006). The FHA is integrated within the Department of Housing and Urban Development (HUD) and became one of the largest providers of funds and insurances in the world for low
income housing mortgages. Currently, the Mutual Mortgage Insurance (MMI) Fund contains more than 3.9 million basic single family households.

5.1.2 The National Mortgage Guarantee (NHG)

As stated, the NHG program was initiated as a local municipality’s instrument. However, in 1993 the Ministry of Housing, Spatial Planning and the Environment (VROM) and the Association of Netherlands Municipalities (VNG) created the Home-ownership Guarantee Fund (Waarborgfonds Eigen Woningen, WEW). The WEW established the private non-profit organization NHG in succession of the municipality guarantee (NHG, 2004). The current program is therefore relatively young and did not experience any housing downturns yet.

5.2 The PMG Objective

The historical developments of both programs are strongly linked with current objective and value proposition of both programs.

5.2.1 FHA Objective and Value Proposition

- Objective: To understand the objective of the FHA program it is important to comprehend the fundamentals of the mortgage market. As described in the introduction, the mortgage market is characterised by information asymmetry which leads to credit rationing (Jaffee, Stiglitz and Weis, 1981). Credit rationing translates in underwriting and collateral requirements for mortgage lending and potentially excludes borrowers who do not meet these requirements. Especially in unstable environments the underwriting rules are tightened to limit default risk. The US housing market collapsed during the Great Depression and the credit facility also became distorted as investor lost their confidence in the mortgage market. By guarantying mortgages the government removed any information asymmetry as investors were assured to receive their returns. In effect, the main motivation to initiate the FHA program was restoring the stability of the national credit facility.

The current objective is similar to the historical one: stabilizing the availability of mortgage credit on the supply side and promoting the provision of credit to households not served or underserved by the private sector on the demand side, most important first time and minority homebuyers (FHA, 2006). The execution of the program remained similar when the financial environment changed. Most significant, the secondary market turned into a mature and highly developed market.
• **Value Proposition:** The value proposition is captured by describing the main benefits of the PMG program. The FHA program is affecting three main players in the mortgage market: the lender, the consumer, and the capital market. The program has several benefits for all the players involved.

First of all, the main benefit for lenders is in risk management. The FHA program reduces the equity risk in mortgages and thereby the overall risk (Blood, 2001). This effect is most prevalent for high LTV mortgages because these loans are perceived riskier. Consequently, the capital requirements for financial institutions state a risk weight of 0% (Basel II) for the FHA mortgages instead of 50%. In securitization transactions they carry a risk weight of 20%. Since less capital is required, this increases profits and opens up new investment and funding opportunities for the mortgage lender.

Secondly, the gains to the consumer side include an increase of the accessibility and affordability of mortgage loans. Traditionally, American lenders require a down payment of at least 20%. Many low and medium income consumers do not have the equity to pay the down payment and are restricted from mortgage loans. However, the FHA mortgage loan enables them to take out a mortgage with a down payment as low as 5% or less. The financial institutions will deviate from normal underwriting rules as the default risk is transferred to the FHA. Thus, the reduction of the down payment amount increases the accessibility of the credit market for many (high risk) borrowers. Next to the increased accessibility, in many cases the mortgage loan also becomes more affordable. The reduction of equity risk in mortgage and the increase flow of funds to the primary mortgage markets decreased the costs of a mortgage and can result in an interest rate reduction.

Thirdly, the capital market benefits from an increased stability and trust in the primary mortgage market. The FHA contributed to the development of the secondary market and Mortgage Backed Securities (MBS) (Blood, 2001). The transfer of high LTV risk outside the banking system increases the willingness of investors to invest in these loans through MBS. Therefore, it expanded the high LTV lending market, increased efficiency and profitability of securitization and facilitated liquidity (Cao, 2005).

In addition to the pursued benefits there are various externalities in providing PMGs. It is believed and tested that home-ownership has a positive impact on citizens, their neighbourhood and human capital. For example, Green and White (1997) researched the increase in success of children and Rossi and Weber (1996) looked into a variety of family outcomes and attitudes. And last but certainly not least it stabilizes the housing
market as housing downturns will have less effect on the financial backing of the mortgage market. A stable housing market is at the heart of the housing policy.

5.2.2 NHG Objective and Value Proposition

- **Objective:** As explained, the Dutch NHG program started in 1995 and is actually a national centralizing of the local municipality guarantee programs with the aim to increase home-ownership rates. The current objective is the promotion of a permanent favourable climate for home-ownership. The focus of the program is on safe and responsible financing, improvement of the quality, and protection of home-ownership (WEW, 2006). The promotion of the permanent favourable climate has to result in a situation wherein consumers have, at all time and regardless cyclical movements of the economy, access to financial resources at the lowest possible costs. In line of this mission, their main activity is to provide the PMG to increase the accessibility of mortgage credit and to support responsible lending activities.

- **Value Proposition:** As in the situation of the FHA program, also the NHG provides benefits to three main players in the mortgage market: the lender, the consumer, and the capital markets.

The lender benefits from the NHG as it provides a credit guarantee against borrower default in the same way as in the USA. In the Netherlands the capital requirement for a NHG mortgage is 0%.

The consumer will in most cases benefit from a lower interest rate and increased security. The decrease of equity risk in addition to the zero-solvency provision for the lenders enables them to charge less for a risky mortgage without affecting returns. In addition, the NHG program provides safety in the decision to buy a house as borrowers know that when the economic climate changes they do not have to worry about debt resulting from a forced sale: this confidence will encourage them to buy a house and take upon a mortgage.

Also the benefits to the capital market are similar to the US case as the program increases stability and trust in the primary mortgage market. Note that the link with the secondary market is weak due to the fact that NHG is directed at the consumer side and the secondary market is not as well developed as in the USA.

The pursued effect on the housing policy is an increase in home-ownership rates.

Figure 20 provides an overview of the objective and benefits of the FHA and the NHG.
5.3 The PMG Strategy

As described in the conceptual model, the PMG business strategy consists of the program structure, positioning, and pricing.

5.3.1 FHA Structure, Positioning, Pricing

- **Structure**: The previous section explained that the FHA program influences three main players in the mortgage market (figure 21).

---

**Figure 20** FHA versus NHG (objective and benefits)

<table>
<thead>
<tr>
<th><strong>FHA</strong></th>
<th><strong>NHG</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective</strong></td>
<td>Stabilization of the availability of mortgage credit and promotion of the provision of credit to households not served or underserved by the private sector on the consumer side.</td>
</tr>
<tr>
<td><strong>Benefits</strong>&lt;br&gt;<strong>- Lender</strong></td>
<td>* Reduce equity risk/ zero solvency</td>
</tr>
<tr>
<td><strong>- Consumer</strong></td>
<td>* Reduce down payment&lt;br&gt;* Reduce interest rate</td>
</tr>
<tr>
<td><strong>- Capital Market</strong></td>
<td>* Increase stability&lt;br&gt;* Increase liquidity capital (geographical)&lt;br&gt;* Development secondary market</td>
</tr>
</tbody>
</table>

---

**Figure 21** PMG structure in the mortgage market
With in this structure, the FHA has strong ties with the secondary mortgage market. The structure is supported by a distinctive positioning and pricing strategy.

- **Positioning:** The positioning is assessed in terms of the target group. Within the mortgage insurance market, the target group of the FHA is defined at first time and minority households. The development of the dollar volume of insured mortgage originations shows that the FHA program is experiencing fierce competition from private initiatives (figure 22).

![Figure 22 FHA versus PMI](image)

<table>
<thead>
<tr>
<th>Year</th>
<th>FHA</th>
<th>PRIVATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>$93,660</td>
<td>$219,043</td>
</tr>
<tr>
<td>2003</td>
<td>$176,947</td>
<td>$302,203</td>
</tr>
<tr>
<td>2002</td>
<td>$145,053</td>
<td>$337,053</td>
</tr>
<tr>
<td>2001</td>
<td>$131,240</td>
<td>$282,506</td>
</tr>
</tbody>
</table>

In the fiscal year of 2006, 79.3 percent (248,953 families) of FHA-insured loans involved first-time homebuyers.

- **Pricing:** The pricing strategy of a PMG program has to fulfill two objectives: first of all, it has to cover future liabilities and provide a capital buffer for risk management purposes. Secondly, the price of the PMG product has be affordable and attractive to consumers. Currently, the costs of an FHA mortgage are an upfront fee of 1.5% of the total loan amount and in addition, an annual fee of 0.5% on the total loan amount, payable in monthly instalments (terms > 15 years, LTV > 90%). The MMI fund is a self-sustaining fund and covers its obligations with the insurance premiums and fees collected. Its capital ratio has been above two percent as required by the National Affordable Housing Act of 1990. Furthermore, the FHA program is backed by the US government and benefits from zero-solvency regulation.

### 5.3.2 NHG Structure, Positioning, Pricing NHG

- **Structure:** The NHG operates in the same structure as the FHA program (figure 21). Nonetheless, the link with the secondary market is not as prevalent as in the US since the secondary market is less developed and the primary objective, value proposition, and strategy are directed at the primary mortgage market.
• **Positioning:** The target group of the NHG is the low and middle income population which is reflected in the strict underwriting conditions and standards. These rules state that the loan-ceiling (including all transaction costs such as notary costs, commission’s fee, etc) is €265,000 (2007). This loan-ceiling is revised annually to include house price increases. Another important criterion is the borrower’s home expenses-to-income ratio which is determined by the Consumer Credit Counselling Service (NIBUD). This condition makes sure that consumer does not borrow more than they actually are able with the income they earn. The lender of the mortgage is responsibility to verify these and other underwriting conditions.

The potential market share is about 60% of the whole housing market (based upon the loan ceiling and average house prices in the market). From the potential market share 42% of all loans is actually financed with NHG (NHG, 2007).

• **Pricing:** The price of an NHG is an upfront fee of 0.4% (2007) of the total loan amount. The WEW has € 371 million in equity which insures € 90,878 million guaranteed mortgages, which implies a capital ratio of 0.41% (2006). Besides the retained equity of the WEW the program also has backing of the Dutch government. This means the WEW has access to zero-percent loans to top up the reserves if these would fall below the obligated level. Because of this backing, the NHG is viewed as a government guarantee and benefits from zero-solvency. This means that banks do not have to retain capital on their balance sheets as capital reserve for a NHG mortgage loan.

![Figure 23 FHA versus NHG characteristics](image-url)

<table>
<thead>
<tr>
<th></th>
<th>FHA</th>
<th>NHG</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>History</strong></td>
<td>Initiated in 1930s</td>
<td>Initiated in 1995 (successor Municipality Guarantee)</td>
</tr>
<tr>
<td><strong>Objective</strong></td>
<td>Credit stability and raise homeownership</td>
<td>Raise homeownership</td>
</tr>
<tr>
<td><strong>Strategy</strong></td>
<td>Positioning: Consumers/Lenders/Capital Market</td>
<td>Positioning: Consumers/Lenders/Capital Markets</td>
</tr>
<tr>
<td></td>
<td>Target Group: First time and minority households</td>
<td>Target Group: Low and middle income households</td>
</tr>
<tr>
<td></td>
<td>Pricing: 1.5% upfront fee + 0.5% annual</td>
<td>Pricing: 0.4% upfront fee</td>
</tr>
<tr>
<td></td>
<td>Zero Solvency: Yes</td>
<td>Zero Solvency: Yes</td>
</tr>
</tbody>
</table>
Chapter 6

ASSESSMENT NHG PROGRAM

The first part of the research objective of this thesis is to analyze the functioning of the NHG program. This chapter provides an explanation on the performance of the program by a cross-country analysis of the fit of the NHG business model within the Dutch mortgage market. In this analysis the fit will be compared to the US situation. The performance is considered successful when the business model characteristics contribute to the achievement of the objective to increase home-ownership. Therefore the analysis will focus on this relationship. Furthermore, this chapter ends by providing additional criticism on the functioning of the NHG program.

6.1 NHG Market Context

Chapter 4 explained that the availability of mortgages, and especially high LTV mortgages, plays an important role in the demand for the PMG product. Therefore, the analysis starts by comparing the factors in the market context that influence this relationship.

Even though there are differences in scale, the macro factors that influence the availability of mortgage are similar. Assuming that the US market is favourable for mortgage insurance/guarantee products and observing the similarity in GDP, (un)employment, home price trend, and housing stock growth suggest that there is a demand for the PMG product. Moreover, the availability of high LTV mortgages is high the Netherlands underlying the need for the product. However, current regulation and risk perception diminish the importance of LTV and possibly limit the demand for a PMG product. The analysis continues with comparing the fit of the business model in this market context.

6.2 NHG Objective and Value proposition

The analysis starts with an assessment of the program objective and explains the differences between the NHG and the FHA.
6.2.1 NHG Objective

The current objectives of both the NHG and the FHA program were discussed before; however they will be repeated here shortly. The NHG has the mission to promote a permanent favourable climate for home-ownership, with focus on safe and responsible financing, the improvement of the quality, and the protection of home-ownership (WEW, 2006). The FHA’s objective is to stabilize the availability of mortgage credit in the capital market side and to promote the provision of credit to households not served or underserved by the private sector on the consumer side, most important first time and minority homebuyers (FHA, 2006).

Both programs objective have a main focus on increasing home-ownership rates. Nevertheless, the objectives also demonstrate differences. Plainly, the FHA objective covers the demand (consumer) side and the supply (capital markets) side whereas the NHG targets the overall housing climate. The NHG mission is actually more a vision than a mission because it lacks defined action measures. Nevertheless, the difference between the two program objectives can be attributed to the dissimilarities between the historical market developments.

The NHG started as a successor of local municipality guarantees. These programs were initiated to overcome problems with down payments: many first-time buyers did not have the equity that banks required as an initial investment. The introduction of the Municipality Guarantee had to stimulate mortgage lending in the primary market however its success was hampered by local malfunctioning of the program. Its successor, the NHG, started in 1995 in a stable environment and currently does not have competition from private companies. The underwriting rules of the program were less strict in the initiation of the program however due to the changing finance context the mortgage lenders considerably loosened their underwriting rules. In addition, the NHG changed with respect to the former business model. For example, the NHG increased their target group by including loans for home-improvements. The NHG remained focused on the primary market since the secondary market did not developed until recently.

The FHA program was initiated after the Great depression in an economical unstable environment as a direct solution to the instable mortgage credit market. By stabilizing the credit facility consumers would gain access to affordable mortgages. Since the introduction of the program the mortgage market changed considerably. In recent years, the FHA received increased competition but it remained with their core motivation and target group. The development of the secondary market was included in the objective at start of the program. Nowadays, the program is still focussed at both the consumer and the capital market in order to provide stability.
The fact that the NHG objective is focussed on the consumer side of the market is caused by the historical development of the housing market and limits its value proposition to this side.

### 6.2.2 NHG Value Proposition

The objective of the program has been translated into specific value propositions. Therefore, the analysis continues with an evaluation of the program benefits in relation to the program objective.

First of all, remember that LTV is an important factor in the PMG program. All benefits are related to LTV since the program is a credit guarantee and cover losses related to the LTV level. This implies that the benefits of the program increases with higher LTV levels. As stated in the previous section, the structure of the NHG program focuses on providing benefits to the consumers and lenders in the mortgage market.

- At first glance, the NHG provides the similar advantages as the FHA; improved terms of the mortgage loan. However, an investigation of the link between the program specific benefits and the consumer side reveal that the FHA provides more direct benefits than the NHG program. The link between the benefits and the consumer market is in the USA determined by the relationship between the secondary market and underwriting rules. As described in the US market context, most mortgage funding is provided through the secondary market. In order to limit the risk in the secondary market transactions, mortgage lenders have underwriting rules that require a 20 percent down payment. However, since the FHA has underwriting rules that are less strict than conventional mortgage requirements, the same consumer can acquire a mortgage with less than 5% equity through the FHA. It is clear that the FHA loan enables consumer to enter the mortgage market earlier which has a positive effect on home-ownership rate and is in line with the program objective. In addition, the underwriting rules for FHA mortgages are more favourable for consumers with adverse characteristics. These underwriting rules further increase the benefits to consumers in order to enter the housing market.

In contrast, the NHG benefits do not have a similar direct positive link with the objective caused by the fact that the NHG pursues contradicting objectives. Next to the goal to raise home-ownership, the NHG also focuses on safe and responsible financing demonstrated by tight underwriting rules. However, the increase of home-ownership under low and medium income households requires that the underwriting rules have to be less tight than the average mortgage lender. The NHG does not provide any added value to earlier home-ownership since the underwriting rules of the program are actually...
tighter than the general market in terms of LTV levels and product restrictions (e.g. limits on interest-only part of mortgage).

This previous conclusion is caused by the risk perception of the Dutch mortgage lenders. As explained in chapter four, the risk perception of Dutch mortgage lenders is based upon LTI instead of LTV due to social-cultural factors explaining low default frequencies and regulation promoting full recourse. The direct benefits of the NHG program are related to LTV however the Dutch mortgage lender is less concerned with LTV. The more important factor is LTI which explains the willingness of Dutch lenders to provide high levels of LTV and less tight underwriting rules.

The benefits of the NHG program to the consumers and the mortgage lenders are limited due to the risk perception in the mortgage market explaining the non-performance of the program.

Nonetheless, one important direct benefit of the NHG program is the lower interest rate. The website of the NHG states an interest discount of 0.6% per year if a borrower includes the NHG. However, current interest discount in the mortgage market show that the in most extreme case the interest discount is less than 0.4% (figure 24: mortgage with NHG versus mortgage without NHG (<125%)). For the average mortgage application with LTV <90% the interest discount is less than 0.25% (figure 25: mortgage with NHG versus mortgage without NHG (<90%)).

<table>
<thead>
<tr>
<th>FIGURE 24 NHG Interest Discounts</th>
</tr>
</thead>
<tbody>
<tr>
<td>VARIABLE</td>
</tr>
<tr>
<td>1 YEAR FIXED</td>
</tr>
<tr>
<td>5 YEAR FIXED</td>
</tr>
<tr>
<td>10 YEAR FIXED</td>
</tr>
<tr>
<td>20 YEAR FIXED</td>
</tr>
</tbody>
</table>

Note: * Interest rates are average across mortgage lenders. For example, the variable interest rate with NHG is the average interest rate of all mortgage lenders offering NHG mortgage with variable interest rates.

* >125 means mortgages with maximum 125% LTV

Source: www.hypotheek-rentetarieven.nl
However, the question arises how this discount relates to the goal to raise home-ownership. For example, assuming that the target group of the NHG has a higher risk profile and following the business model, the potential borrower either has to pay a higher interest rate or has to include a NHG to be approved for a mortgage. Therefore, by including the NHG the borrower can decrease the interest rate and increase the affordability of a mortgage loan. This is in line with the objective to raise home-ownership rates. However, since the underwriting rules of banks are less tight than the ones from NHG, it remains questionable if this is the reasons why a borrower takes out a NHG mortgage. In the current market, it seems plausible that the mortgage lender would provide the mortgage at the lower rate, even without the NHG, because mortgage lender can provide mortgage products that benefit more from the fiscal regime. The question arises what the real reasons are to take out an NHG loan. A possible explanation is that the risk profile of a borrower does not change by including the NHG however the mortgage lender benefits from the zero solvency provision. The mortgage lender can include this zero solvency benefit in the price for the mortgage by an interest discount. This lowers the mortgage interest but is not in line with the objective to raise home-ownership: the borrower would have obtained the mortgage anyway.

The last benefit of the NHG program is the sense of security that the program provides to the consumer. This feeling of safety encourages borrowers to take out a mortgage since the consumers do not have to worry about the possible negative consequences. In this way the NHG does provide an indirect benefit to the consumer.
6.3 NHG Strategy

The strategy of the NHG program in relation to the main objective differs widely with its US counterpart.

6.3.1 NHG Structure

As explained in the pervious section, the NHG structure is directed at the consumer side of the mortgage market. This limits the benefits and the significance of the program. In comparison, in the US market mortgage credit availability is influenced by the strong link of the FHA program with the capital market since the secondary market is an important source for mortgage credit. In this way the FHA increases home-ownership by increasing the availability and affordability of mortgage credit.

This is in great contrast with the NHG program where the link with the secondary mortgage market is weak. As described in the housing context, mortgage funding is mainly through commercial deposits and therefore the secondary market in the Netherlands is less developed with fewer mortgages securitized. Allen (2004) explains that securitization is relatively costly for European banks and capital intensive since European regulation requires a 50% risk weight for MBS which is more than the risk weight for GSE mortgages. In addition, there are no GSEs in the Dutch capital market that stimulate the stability and liquidity of the market. State aid, like GSEs, is actually ruled out by law in order to prevent unfair competition (Articles 87 and 88, Treaty on European Union) (Allen, 2004). In addition, default probabilities in the Dutch market (figure 15) are relatively low and Dutch banks perceive Dutch mortgage a rather safe investment. Therefore, the benefits of NHG program are limited on the lender side and securitization does not play an important role in the NHG program.

6.3.2 NHG Positioning

Besides the structure of the NHG also the positioning of the program is different in comparison with the FHA. The realisation of home-ownership objective is illustrated by the proposed target groups and how these groups are reached in terms of amount loans and resulting market share.

- **Target Group:** NHG target group is based upon the freedom of choice for all households below the loan limit which is currently €265,000 including additional costs (+/- 12 %). Therefore, the maximum house price available with the NHG loan is around the average house price of €249,941 (Kadaster) which results in a target group consisting of 60% of the entire mortgage market (WEW, 2006). From the available target group, about 42%
actually takes out a mortgage with NHG. This raises the question why the other 58% of the target group does not take a NHG mortgage loan.

Comparing the target group to the main objective, the WEW initiated the NHG program targeted at low income households in line with the Local Municipality Program (WEW, 2002). An analysis of the NHG data reveals that the NHG program in its current structure actually shifted away from the initial target group. An analysis of the profile of the NHG consumer shows that around half of the loans are in the top range (€180,000) with respect to the maximum loan limit (figure 22). Continuing, 82.6% of the NHG consumers have an income above the median household income level (+/- €30,000.00 in 2005, CBS) (figure 23).

In comparison, the FHA program clearly states its target group is households not served or underserved by the private sector, most important first time and minority homebuyers. In 2006, 79.3% of FHA loans involved first-time buyers which represent 248,953 families. The focus on this target group is underlined by the underwriting rules of the program which are favourable to consumer with bad to fair credit scores, providing 97% LTV financing, discretionary DTI levels around 29% (which can be extended to 41%), and including an increasing loan limits (FHA, 2006).

Over the last years, the FHA lost borrowers to the more aggressive sub-prime lenders and the FHA was perceived as a ‘last resort’ (Gordan, 2007). In addition, the FHA has increased competition from private government sponsored entities, private mortgage insurances and structured finance techniques to provide credit enhancement. The FHA market share for home purchase mortgages in terms of numbers of mortgages declined heavily in the last ten year from 19% to 6% (GOA, 2007). Nevertheless, the FHA remained focused on those underserved and first-buyers.

- **Amount of loans and Market share**: The NHG program is gaining popularity in recent years; the last four years show an increasing trend in the amount of NHG mortgage loans (figure 1). However, a close look at the exact numbers tells that the increase in loans does
not contribute to the objective to increase home-ownership rates. The increase of NHG loans is fully attributed to the increase in loans for home improvements while loans for home purchase declined in the last three years. Furthermore, the increase of NHG loans for home improvements is linked to the development of the refinancing market (WEW, 2006). Recently, this market declined sharply due to increasing interest rates. These developments provide a pessimistic representation of the actual success of the program in terms of raising home-ownership rates.

In comparison, the FHA program is gaining ground in recent turmoil of the US housing market. The increased interest in the program is illustrated by an raise of FHA originations from 41,530 in December 2006 to 73,444 loans in June 2007 (76.8% increase) (USA Today, 2007) after several years of turn down in the amount of FHA mortgages. The increased popularity is caused by the problems in the sub-prime market. Before the turmoil, the sub-prime market was responsible for the decrease in the FHA loans together with private lenders. Sub-prime and private lenders were more innovative, efficient (approving mortgages faster and cheaper) and handled less strict underwriting rules (higher loan limits, lower down payment, credit scores). Therefore, before the sub-prime crisis a borrower could take out a mortgage easier and against better terms with sub-prime lenders. However, the problems with sub-prime mortgages caused by poor underwriting changed the market sentiment in favour of the FHA loan. Even though the program is still regarded as inefficient and bureaucratic (USA Today, 2007), the FHA loan is making its recovery.

6.3.3 NHG Pricing

The pricing of the program should reflect the objective taken into risk management requirements (capital buffer). The NHG charges a one-time upfront fee of 0.4% (2007). The FHA program costs the mortgage borrower an upfront fee of 1.5% and an annually charge of 0.5%, paid in monthly instalments (2007). The NHG and FHA both charge an upfront fee, however the FHA also collects an annual fee. The effect of receiving the annual payment is difficult to establish because it depends on other factors like risk management strategy. However the annually pricing strategy provides a continuous stream of income from past insured mortgages which offers coverage for current defaults. It adds more flexibility to liability management. Nevertheless, this flexibility comes at a price and the FHA program is more costly than the NHG program. Comparing costs is difficult since default probabilities differ widely between the USA and the Netherlands (figure 5). With current prices it seems that the NHG is able to provide a relatively cheaper product than the FHA. The lower price increase the availability of the program and enables more households the realize home-ownership.
6.4 Conclusion Cross-country Analysis

The results of the cross-country analysis show that there are several macro developments in the Dutch mortgage market (e.g. scale mortgage market, GDP development, LTV levels, etc) that stimulate market potential for the NHG product. However, the fit of the business NHG business model in the market context and especially the relationship with risk perception illustrates the limited added value of the NHG program. The analysis show that the programs contribution to the main objective to increase home-ownership is limited which explains the non-performance of the program.

The objective of the NHG program is concentrated at increasing home-ownership rates while focusing on the promotion of safe and responsible financing. The contradiction of these objectives limits the value propositions of the program. The value proposition of the program resulted in strict underwriting rules that are directed to the safe lending objective. However, to provide direct benefits to consumers and to promote home-ownership, the underwriting rules should be less strict than the average mortgage lender. Currently, this is not the case since the risk perception of the Dutch mortgage lender is focussed on LTI instead of LTV. This is underlined by the self-regulation that limits LTI instead of LTV. The benefits of the NHG program are related to the LTV levels and therefore play a less important role in the Dutch mortgage market.

In addition, the strategy of the NHG is targeted at low and medium income households however the analysis showed that currently the main target group is the high end of the medium income households. In addition, the growth of the NHG enlarges the quality of houses further diminishing the added value of the NHG as a tool to increase home-ownership.

Concluding, the analysis of the NHG program uncovers some interesting insights and raises question regarding the functioning of the NHG program. What are the reasons for borrowers to take out a NHG mortgages? Would a borrower take out the mortgage without NHG and pay a higher interest? What is the added value of the direct and indirect benefits of the NHG program in the changed housing context?

6.5 Criticism NHG program

The evaluation in the previous section reveals several concerns about the functioning of the NHG program. In addition, several studies raised doubt concerning the program
structure. First, a review of the academic literature by Buckley et all (2006) and Cao (2005) will be given, followed by an additional discussion by the author.

6.5.1 Buckley

The WEW is responsible for the NHG program in the Dutch residential mortgage market. Most recent figures show that it has €371 million in equity which insures €90,878 million guaranteed mortgages. This implies a capital ratio of 0.41% (2006). This capital ratio continues to be a point of discussion in the academic literature. The most entitled and extensive research is conducted by Buckley et all (2006) for the World Bank: Comparing Mortgage Credit Risk Policies: an Option Based Approach. In this paper, Buckley et all emphasize the advantages of the PMG program. They state that it can be a cost-effective tool for both improving housing affordability and efficiently addresses some of the credit rationing that characterizes the mortgage market. They even argue that PMG programs are more efficient way to tackle housing problems than subsidies. However, their main criticism focuses on the capital ratio. Buckley et all find that in some countries the pricing policy is not prudent. Under certain limitations they calculated for several emerging and OECD countries the implied volatility of the program based upon their equity and liability levels. This implied volatility refers to the perceived riskiness of the program. For example, the Netherlands scores an implied volatility of 1.4% inducing that with a standard deviation of the average house price of approximately 1.4% the program would survive without subsidy and at this level is financially sound. However, over the last decennium, the volatility of Dutch housing prices was around 5%. In addition, the 1.4% calculated in the Buckley research implies a volatility that is less than half of the US figure. However, the USA is a larger and more diversified country and therefore would be expected to have a lower instead of higher implied volatility. Buckley et all conclude from these results and looking at additional factors (LTV ratios and coverage) that the Dutch program has a pricing structure that implies a safer environment than seems likely or provides implicit risk exposure to the government.

The discussion of Buckley et all about the capital ratio of the NHG program is relevant, however, questions can be raised regarding some of the assumptions of this research. For example, as Buckley et all also point out, the Netherlands has a legal system that assures a higher percentage of recourse than most countries. Nevertheless, their study assumes no difference in this respect between the countries. Therefore, the assumption that in case of a default 50% of the insurance in force will be lost is highly overestimated for the Dutch situation. Nevertheless, the results of Buckley et all confirm that the capital ratio in The Netherlands is low. The discussion however should not be on how low this level is with respect to other countries. More interesting is the reason why this capital ratio is lower.
compared to other countries. The research of Buckley et al. does not provide an answer to this question as it was not the purpose of their research.

In addition, Buckley’s research does not take into account several important factors that influence the capital ratio, for example the actual observed default frequency. Numerous researchers point out that the Netherlands has relatively low default frequency throughout history. A lower default frequency justifies lower capital ratios as there is less risk of future liabilities that have to be covered.

### 6.5.2 Cao

A recent study of Cao (2005) underlines the concerns about the capital ratio. Cao provides a scenario analysis of the PMG programs. Figure 24 shows a summary of the results. The simulated mean default rate is based upon historical performance and at this rate the NHG program generates a loss of 0.22%. Furthermore, Cao performs a worst case scenario analysis for the NHG program in which the recession of 1981-1983 is simulated. Potential losses amount to € 0.21 billion. More interestingly is the projected sustainable period which measures how long the program could withstand the worst case scenario conditions. With the current loss reserves, the NHG could survive 3.5 years and the FHA could survive 22 years. The figures underline the concerns and raise questions towards the riskiness of the program.

#### Figure 24 Scenario analysis

![Table showing scenario analysis results.]

<table>
<thead>
<tr>
<th>2003 Cohort</th>
<th>FHA</th>
<th>NHG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simulated mean default rate</td>
<td>9.2%</td>
<td>1.23%</td>
</tr>
<tr>
<td>Break-even default rate</td>
<td>13.10%</td>
<td>0.70%</td>
</tr>
<tr>
<td>Multi-year Analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 year mean profitability rate (over one year's business volume)</td>
<td>7.08%</td>
<td>0.55%</td>
</tr>
<tr>
<td>10 year mean profitability rate (over one year's business volume)</td>
<td>10.06%</td>
<td>1.67%</td>
</tr>
<tr>
<td>Worst-Case Scenarios</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss reserves for its MI program as of 2003 (billion $)</td>
<td>435.70</td>
<td>22.7</td>
</tr>
<tr>
<td>Capital ratio (reserves/IIF)</td>
<td>5.21%</td>
<td>0.56%</td>
</tr>
<tr>
<td>Worst case scenario</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potential losses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implied liabilities on the backing government</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Sustainable period if the worst case situation were to persist</td>
<td>22 years</td>
<td>0.21</td>
</tr>
</tbody>
</table>

### 6.5.3 Author Observations

A thorough analysis of the capital ratio is difficult as information like portfolio characteristics and performance is to a great extent private. In addition, the methodology used by the NHG to calculate the capital ratio is also private information. However, an analysis of current public data provides several interesting insights.
Risk management theory explains that important factors in the calculation of the capital ratio are the expected and unexpected losses. The expected and unexpected losses are based upon the probability of default, the loss given default, and the exposure at default. Therefore, mortgage default seems to play an important factor in risk management. As described, most academic literature focuses LTV and LTI levels in order to predict mortgage default. In the Netherlands the LTI levels are the most important factor for predicting default, while LTV is a proxy for the loss given default. However, to predict the mortgage default rate for the NHG in this thesis is impossible due to a lack of data. Academic literature explains that a mortgage default is most likely to default in the first years of the mortgage loan (Allen and Chan). Risk management should therefore have a strong focus on the most recent loans in the mortgage portfolio. Therefore, the evaluation turns to current and historical public performance data to analyse the performance of the program.

- **Spread of risk:** First of all, by observing the spread of risk in the portfolio it is indeed easy to see that the majority of the risk is tied up in the last four years of the portfolio (65%, figure 25). The fact that the risk is concentrated in the last years underlines the importance of the performance of those years.

![Figure 25 Guarantee Equity](image)

*Table of Guarantee Equity*

<table>
<thead>
<tr>
<th>YEAR</th>
<th>GUARANTEED EQUITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>1,515,141,334</td>
</tr>
<tr>
<td>1996</td>
<td>2,348,380,748</td>
</tr>
<tr>
<td>1997</td>
<td>2,577,872,303</td>
</tr>
<tr>
<td>1998</td>
<td>3,252,949,612</td>
</tr>
<tr>
<td>1999</td>
<td>3,872,226,446</td>
</tr>
<tr>
<td>2000</td>
<td>4,386,682,196</td>
</tr>
<tr>
<td>2001</td>
<td>4,584,194,275</td>
</tr>
<tr>
<td>2002</td>
<td>4,753,016,926</td>
</tr>
<tr>
<td>2003</td>
<td>8,241,929,934</td>
</tr>
<tr>
<td>2004</td>
<td>12,609,203,871</td>
</tr>
<tr>
<td>2005</td>
<td>16,567,369,877</td>
</tr>
<tr>
<td>2006</td>
<td>19,286,124,177</td>
</tr>
<tr>
<td>2007</td>
<td>8,942,833,540</td>
</tr>
<tr>
<td>Total</td>
<td>92,919,005,343</td>
</tr>
</tbody>
</table>
• **Default:** In recent years, the performance of the portfolio is diminishing illustrated by the increase in the number of defaults (figure 26). Nonetheless, these default figures are still low compared to the USA. The increase of defaults is partly caused by the increase number of NHG mortgages; however the amount of defaults is growing more rapidly than the amount of NHG loans, illustrated by the increase of the default rate.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of NHG Loans</th>
<th>Premium</th>
<th>Number of Defaults</th>
<th>Default Rate</th>
<th>Guaranteed Capital (Million €)</th>
<th>Capital (Million €)</th>
<th>Capital Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>44,029</td>
<td>0.36%</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>2002</td>
<td>51,550</td>
<td>0.30%</td>
<td>80</td>
<td>0.16%</td>
<td>41.903</td>
<td>198</td>
<td>0.47%</td>
</tr>
<tr>
<td>2003</td>
<td>73,889</td>
<td>0.30%</td>
<td>178</td>
<td>0.24%</td>
<td>52.056</td>
<td>236</td>
<td>0.45%</td>
</tr>
<tr>
<td>2004</td>
<td>58,284</td>
<td>0.30%</td>
<td>331</td>
<td>0.34%</td>
<td>63.205</td>
<td>283</td>
<td>0.45%</td>
</tr>
<tr>
<td>2005</td>
<td>121,060</td>
<td>0.28%</td>
<td>592</td>
<td>0.49%</td>
<td>77.85</td>
<td>334</td>
<td>0.43%</td>
</tr>
<tr>
<td>2006</td>
<td>113,370</td>
<td>0.28%</td>
<td>796</td>
<td>0.70%</td>
<td>90.878</td>
<td>371</td>
<td>0.41%</td>
</tr>
<tr>
<td>2007</td>
<td>NA</td>
<td>0.40%</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

NA= Not Available

<table>
<thead>
<tr>
<th>Year</th>
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<th>Number of Defaults</th>
<th>Default Rate</th>
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<th>Capital (Million €)</th>
<th>Capital Ratio</th>
</tr>
</thead>
<tbody>
<tr>
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<td>NA</td>
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<td>NA</td>
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<td>NA</td>
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<td>80</td>
<td>0.16%</td>
<td>41.903</td>
<td>198</td>
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<tr>
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<td>NA</td>
<td>0.40%</td>
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<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

NA= Not Available

• **Pricing:** In addition, the pricing strategy of the NHG demonstrates that the NHG has lowered the premium for the insurance from 0.36% in 1995 to 0.28% in 2006. However, due to the increase in the amount of defaults, the NHG had to raise the premium to 0.4% in 2007. This seems contradicting because in the time that the housing market is slowing down and the need for insurance is increasing, the NHG had to raise the premium making the insurance more expensive and excluding new home buyers. Questions can be raised to this development as is seems that when the insurance in most needed, it actually becomes less accessible.

• **Claim amounts:** Lastly, the amount of claims illustrates another dilemma. The number of defaults that is actually covered by the NHG is decreasing. In the last three years the amount that is actually paid out to the mortgage lender decreased from 86% (2004) to 73% (2006). This means that in 2006, 27% of all defaults are not covered by the NHG. Because of the zero solvency provision, the lender did not have to retain any capital for the NHG loan. However, when the NHG does not cover the deficit (because of fraud for example) the mortgage lender still incurs losses and this undermines the zero solvency provision.

Concluding, it is important to understand that although some factors show negative developments, the magnitude of these changes is relatively low and most ratios are still on low levels. For example, the default rates are increasing however they are still low compared to other countries. However, the diminishing performance should be
monitored since the housing market is slowing down and housing downturns such as happened in the 1980s can have severe consequences. In addition, the criticism shows that there are fundamental concerns regarding the program.

6.6 Conclusiong Performance NHG

It is important to realize that market inefficiencies that justified the creation of NHG program may be very different from those that justify its continuation. The NHG program was created to increase the availability of mortgage credit to low and medium income households however the evaluation pointed out that the NHG lost its added value because the financial context in the mortgage market has changed. With respect to the availability of mortgage credit, the NHG was initiated to overcome the down payment requirement from banks. Nowadays, banks have loosened their underwriting rules and the NHG is actually stricter than a general mortgage bank. These underwriting rules limit the target group that can apply for a NHG mortgage and also limits the products availability. In addition, the risk perception of mortgage lenders changed from LTV to LTI. The NHG business model is still directed at LTV which further diminishes the significance of the program. Furthermore, the reason why a borrower includes NHG insurance remains questionable and it appears the NHG became more a subsidy to the middle income borrower. This borrower probably would also have bought their house without the NHG. The other objective of the program, promoting safe lending, is still supported however the question arises if a whole program is needed for this purpose? The introduction of the new code of conduct for mortgage lenders in 2007, shows that this purpose also can be fulfilled by policy rules. All together, the NHG lost its added value because of changes in the housing finance context. Possibly, the NHG program should refocus on the low income borrower and leave the middle and high segments of the mortgage market to another (private) initiative. The feasibility of this solution is examined by analysing the structure and benefits of PMI in this next chapter.
The non-performance of the NHG program and the growing criticism increases the possibility for a private initiative as an alternative to the NHG program. Remember that the PMI and PMG program operate in the same market context. Therefore, the assessment of the feasibility focuses on the fit of the PMI business model within the housing context described in chapter 4.

The PMI program is well recognized and described program in the United States. In this chapter, the evaluation of the feasibility will start with a description of the history of the US program and explain the differences between the public and the private business model that explain how PMI can contribute to increase home-ownership rates.

7.1 The History of the PMI program

The PMI market originates in the United States. The roots of the industry go back to the late 1800 when the first mortgage insurance companies emerged in New York. Governmental regulation started in 1904 with a legislation authorizing the insuring of mortgages. In 1911 this law was expanded to allow insurance companies to buy and sell mortgages. During the 1920s real estate prices were on the rise and most properties were sold with a profit inducing that the mortgage insurance business was a low risk industry. However, during the Great Depression real estate prices plunged and all New York mortgage insurance companies folded. The aftermath resulted in new regulations with strict capital requirements and comprehensible procedures. It paved the way for the modern PMI industry. The historical overview of the PMG program demonstrated that the US government created the FHA to restore the housing market. However, in the years after the Great Depressions the FHA program was costly and inefficiently (MICA 2006). Lenders were dissatisfied with the program and moved away from the FHA insured mortgage to conventional loans. This implicated that mortgages became more expensive and required larger down payments for borrowers; imposing problems to low income consumers who wanted to buy a house. Max Karl observed the opportunity and founded the first modern PMI company in 1957 called Mortgage Guaranty Insurance Corp (MGIC). Karl decided to challenge the monopoly position of the FHA by offering mortgage
insurance at half the cost of the FHA program and approving the application within a day or two instead of 7 or 8 weeks the FHA needed. The state enforced further regulatory requirements such as capital requirements and strong conflict of interest provisions. Since the foundation of MGIC, the PMI market expanded rapidly in the 1960s. The expansion was accelerated by the growth in secondary market activity in the 1970s which enabled lenders, government agencies and investors to buy, sell, and trade mortgages. As the demand for mortgage was growing, the government decided to created two agencies to secure the consistent availability of mortgage credit: Fannie Mae (1938) and Freddie Mac (1970). These two agencies act as an intermediary between the primary market and the secondary market by creating mortgage backed securities which are insured by either PMGs and/or PMIs. PMI companies developed themselves to provide default protection in the primary market and credit enhancement in the secondary market. The first real test for the PMI industry since the Great Depression was the 1980s. The housing market collapsed and Private Insurance companies paid out $6 billion in claims to policyholders and thereby protecting banks and other financial institutions of extensive losses. This period showed that PMI industry had learned their lessons from the Great Depression and were able to function in both good and bad economic climates (MICA, 2006).

Nowadays there are seven PMI companies active in the US market: AIG United Guaranty, Republic Mortgage Insurance Co., Genworth Mortgage Insurance Corporation, Triad Guaranty Insurance Corp., Radian Guaranty Inc., PMI Mortgage Insurance Co., and Mortgage Guaranty Insurance Corp. They are represented by the Mortgage Insurance Companies of America (MICA) since 1973. PMI companies continually expanded there market share (Figure 22) and business volumes in recent years (MICA, 2006).

7.2 Business Model PMI program

7.2.1 PMI Objective

As we have seen in the mortgage market overview, American lenders require a down payment of at least 20 percent of the mortgage loan. A borrower can overcome the large down payment by taking out insurance with the FHA. However, the borrower can also take out insurance with a private company. In many literature sources the PMI companies state therefore that their main objective is to expand home-ownership opportunities by enabling home buyers to purchase homes with a lower down payment of 3 percent or less for qualified borrowers (MICA, 2006). However, since PMI are private
companies their key objective is to generate a profit. The PMI business model is similar to the FHA however due to their private status it incorporates some differences.

First of all, the profit driven PMI companies are more focused on the development of their business models in order to overcome the fierce competition with FHA and other PMI companies. The distinctive PMI business model is represented by the value proposition, positioning, and pricing strategy.

7.2.2 PMI Value Proposition

The value proposition of the PMI program is based upon the benefits the program provides to the three main players on the mortgage market. The main business model of the PMI companies provides similar benefits as the PMG program. One of the main differences with the FHA program is that PMI programs can not offer zero-solvency benefits to the mortgage lenders. However, the PMI program also provides additional benefits to the PMG program. For example, PMI programs have an enhanced focused on risk management in corporation with the mortgage lender. The risk management activities include a delinquency management strategy which defines how the lender has to act in case of a default in an attempt to reduce any potential losses. Furthermore, it includes procedures to help borrowers in financial problems to overcome their situation. This is in mutual interest of the borrower and the PMI company as both sides lose in a foreclosure. The borrower loses his house and equity invested in it and the PMI company has to pay the claim to the lender. In addition, PMI companies claim to have a competitive advantage in risk management over financial institutions (Genworth). They increased their knowledge and developed highly sophisticated models throughout the existence of the PMI industry. With this knowledge PMI companies help financial institutions and even countries to overcome problems with a lack of experience or data. In this way the PMI companies encourages the development of a data-driven and risk-sensitive housing market.

In addition, PMI companies which are internationally active can diversify risk over large geographical and less correlated markets. This is beneficial for several transition economies as the de-concentration of credit risk out of the housing system to better diversified credit risk counterparties reduces the systemic risk imbedded in these markets. Superior risk management skills are vital in this risk driven industry as large losses can be obtained by inferior practices and threaten the existence of PMI companies.

The coverage (figure 24) determines the amount the PMI company will pay in case when a borrowers defaults and the lender forces execution. Generally, the PMI company pays 20 to 30 percent of the total claim amount. The claim amount includes principal and delinquent interest due on the loan, legal expenses incurred during foreclosure, the
expense of maintaining the home and any advances the lender made to pay taxes or insurance (MICA, 2006). Because of the partly coverage the PMI shares the risk with the borrower and the lender. This assures that all parties involved have interests in the security of the mortgage loan and since the coverage is not 100% it lowers the credit risk to the mortgage lender (and the cost associated with credit risk).

7.2.3 PMI Positioning

The target group of the PMI program is broader than the FHA program since PMI is not limited to the low and medium income households. This expands market opportunities and therefore increases the feasibility. In addition, it provides benefits in terms of risk management since the PMI are able to compensated high risk borrowers with low risk borrowers in on a broader scale. Furthermore, the PMI has international positioning possibilities that further increase the risk management benefits by risk diversification.

7.2.4 PMI Pricing

The PMI industry is profit driven and therefore the PMI pricing strategy is fundamentally different from the PMG programs. Pricing of mortgage insurances is closely connected to risk management. The price of mortgage insurances has to be able to cover future liabilities which are linked to expected and unexpected losses. Expected and unexpected losses are calculated through sophisticated models and regressions in which the default rate is an important factor. Figure 28 illustrates the difference between PMG and PMI programs in the pricing strategy and the effect on Net Present Value (NPV).
The figure illustrates a probability distribution of portfolio default rates. Point D is the mean default rate (6%) under normal economic conditions and indicates the break even point for a non-profit PMG program. The area indicated by Θ illustrated the probability that the main default will be less than the main rate.

Remember that the PMG program is a government tool that fulfills a social function. The program is less profit driven and has the government backing which results in a more risk tolerant attitude. A more risk tolerant strategy incorporates a lower pricing strategy which results in a lower capital buffer indicated at point C.

In contrast, the PMI program is less risk tolerant because it is profit driven and does not have the government backing when conditions are unfavourable. This results in a higher pricing strategy that generates a surplus which can be used as a capital buffer. This pricing strategy can withhold a market downturn until point B without incurring losses. If conditions deteriorate into including area γ, the capital buffer has to be used to pay out liabilities. If the situation worsens into area β, the private equity of the company has be used. If the situation persists, the company can become insolvent illustrated by point A.

This example explains why PMI companies in general are more expensive than PMG companies: they have no government backing and therefore they have to retain a higher capital buffer. In addition, PMI have to generate a profit increasing the price even further.
The factors that are most important in the pricing of mortgage insurance are the house price volatility, LTV ratio and coverage level. These are supplemented with related variables explained in figure 29.

These models are constantly updated to reflect the altering portfolio as the economic environment or particular terms of the mortgage contract changes. For example, in the 1980s financial institutions originated growing amounts of high LTV mortgages which increased the amount of high LTV ratio mortgage insurances.

The pricing in the USA highly depends on risk management techniques which are influenced by risk indicators. As described before, in the USA these risk indicators are LTV ratios and payment history (FICO credit scores).

**Figure 29** Risks factors in pricing

<table>
<thead>
<tr>
<th>Less Risk</th>
<th>More Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortgages Type</td>
<td>Adjustable</td>
</tr>
<tr>
<td>Owner-Occupied</td>
<td>Fixed-Rate</td>
</tr>
<tr>
<td>Employee</td>
<td>Investor</td>
</tr>
<tr>
<td>Average Size</td>
<td>Self-Employed</td>
</tr>
<tr>
<td>Single-Family</td>
<td>Jumbo</td>
</tr>
<tr>
<td>Condominium</td>
<td>Limited</td>
</tr>
<tr>
<td>Limited</td>
<td>Low</td>
</tr>
</tbody>
</table>

**Figure 30** PMI premium rates (Standard Loans)

<table>
<thead>
<tr>
<th>FICO SCORE 620+</th>
<th>STANDARD</th>
</tr>
</thead>
<tbody>
<tr>
<td>LTV LEVEL</td>
<td>COVER 50-25-YR</td>
</tr>
<tr>
<td>95.01%</td>
<td>35 0.96 0.85 1.17 1.06 0.94</td>
</tr>
<tr>
<td>and above</td>
<td>30 0.84 0.73 1.05 0.94</td>
</tr>
<tr>
<td>90.01%</td>
<td>25 0.71 0.60 0.92 0.81</td>
</tr>
<tr>
<td>20 0.59 0.48 0.80 0.69</td>
<td></td>
</tr>
<tr>
<td>18 0.55 0.44 0.76 0.65</td>
<td></td>
</tr>
<tr>
<td>12 0.49 0.38 0.70 0.59</td>
<td></td>
</tr>
<tr>
<td>95% to</td>
<td>35 0.90 0.79 1.02 0.92 1.09 0.98</td>
</tr>
<tr>
<td>90.01%</td>
<td>30 0.78 0.67 0.88 0.77 0.92 0.81</td>
</tr>
<tr>
<td>25 0.67 0.56 0.73 0.62 0.77 0.66</td>
<td></td>
</tr>
<tr>
<td>20 0.56 0.43 0.61 0.47 0.64 0.51</td>
<td></td>
</tr>
<tr>
<td>18 0.54 0.37 0.59 0.35 0.61 0.43</td>
<td></td>
</tr>
<tr>
<td>16 0.54 0.37 0.59 0.35 0.61 0.43</td>
<td></td>
</tr>
<tr>
<td>90% to</td>
<td>30 0.60 0.49 0.73 0.62 0.77 0.66</td>
</tr>
<tr>
<td>85.01%</td>
<td>25 0.52 0.41 0.61 0.50 0.65 0.54</td>
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<tr>
<td>20 0.39 0.28 0.44 0.33 0.48 0.37</td>
<td></td>
</tr>
<tr>
<td>16 0.38 0.27 0.43 0.32 0.47 0.36</td>
<td></td>
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<tr>
<td>12 0.34 0.23 0.35 0.24 0.39 0.28</td>
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<tr>
<td>85%</td>
<td>25 0.43 0.32 0.49 0.38 0.53 0.42</td>
</tr>
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<td>and under</td>
<td>17 0.37 0.26 0.38 0.27 0.42 0.31</td>
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<td>12 0.32 0.21 0.33 0.22 0.37 0.26</td>
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<tr>
<td>6 0.26 0.18 0.28 0.19 0.32 0.22</td>
<td></td>
</tr>
</tbody>
</table>
In comparison with FHA rates (1.5% upfront and 0.5% annually) the PMI is far more expensive than the PMG program.

**7.2.5 Conclusion PMI Business Model**

The business model of PMI companies demonstrates large overlap with the Public FHA program. Nevertheless, the companies have developed on several points to provide a private alternative to the PMG program. The next chapter will provide recommendation on the feasibility of the PMI program in the Dutch mortgage market.
Chapter 8

RECOMMENDATIONS PMI FEASIBILITY

The second part of the research objective of this thesis concerns the feasibility of a PMI program in The Netherlands. Supported by the conceptual model, this chapter provides recommendation based upon the evaluation of the NHG program, the current housing context in the Netherlands and fit of the PMI business model in this context.

8.1 Fit Business Model and Housing Context

8.1.1 Housing Context: Quantitative factors

The US mortgage market has proven to be a favourable market for PMI companies in recent years (Liu, MICA). The results in chapter 6 illustrated that the factors that determine the attractiveness of a country show similar trends as in the USA. In addition to the measure presented, the demand for PMI products is also influenced by supply of high LTV mortgages. In the description of the Dutch mortgage market shows that current LTV levels are high, especially in comparison with the US and other European countries (figure 11).

Concluding based upon these results, the Dutch mortgage market seems to be an attractive country for PMI companies. However besides the quantitative measures, the feasibility is influenced by qualitative measures. These qualitative measures focus on political and economic stability and the development of the mortgage finance and insurance systems (Liu, 2000). The current Dutch political situation, the economy, and the residential mortgage market are well established and mature, satisfying the requirements. However, the most important in the evaluation of the Dutch mortgage market is the actual relation of these factors in the Dutch context.

8.1.1 Housing Context: Qualitative factors

- Finance and Regulatory framework: The finance and regulatory framework appeared to provide positive and negative influence. First of all, as described in the chapter 3, the regulatory framework in the Netherlands provides full recourse for the mortgage lender towards the borrower. In addition, the legal system is very effective and relatively quick. These factors are in favour for PMI development. They lower the cost for the PMI company
and enables effective risk management techniques. However, the regulation in the Netherlands law or in mortgage codes of conduct does not incorporate any restrictions to LTV levels. This diminishes the feasibility of the PMI program since the added value of a PMI program is related to the LTV levels.

- **Risk Perception:** Related to this, risk perception in The Netherlands is not determined by LTV levels. As described before, the Dutch mortgage lenders are used to issue mortgage with high LTV levels and use LTV as a risk measure. In addition, banks keep mortgages on their balance sheet instead of securitizing them in the capital market. All in all, this has a negative impact on the feasibility because mortgage lenders and consumers are not stimulated to take out PMI loans.

### 8.2 Business Model Feasibility

- **Pricing:** Next, pricing plays a very important role; the current NHG program is low-cost compared with US PMI prices with one up-front premium of 0.4%. However, the previous section demonstrated that the current pricing strategy of the NHG is questionable and a higher price seems justified. Nonetheless, the price of the PMI product has to be attractive enough for mortgage lenders to transfer their risk exposure instead of retaining them on the balance sheet. The question arises if PMI companies are able to offer a price which is low enough to stimulate demand and high enough to make a profit.

### 8.3 Future Development Determining feasibility

The factors considered until now all related to the current characteristics of the Dutch mortgage market. However, the structure of the mortgage market is currently changing by the introduction of Basel II. The introduction of this framework could influence the feasibility of the program and therefore these developments are taken into account.

#### 8.3.1 Basel Accords

The Basel accords introduced an international framework for risk management at banks. Basel I published in 1988 a set of minimal capital requirements primarily focusing on credit risk. However, the international financial environment changed and the framework endured increased criticism focusing on the several compromises (Allen, 2004). For example, the implementation of the Basel I accords was based upon the assumption that all residential mortgage lending was low risk and did not differentiate between high or low risk mortgages which resulted in an 8% capital requirement on all originated
mortgages (Klopfer 2002). This induced capital arbitrage as banks securitised low risk mortgages, which could be sold for less than the 8% capital requirement, and retrained the riskier mortgage, that actually should carry more capital. This increased the overall risk embedded in the balance sheets of banks, which was the opposite of the objective that Basel I wanted to accomplish (Duebel, 2002). Therefore, several countries added tighter capital requirements in addition to the Basel I framework. The Dutch implementation of Basel I included a differentiation between LTV ratios and risk weights. Mortgage below 75% LTV had a risk weight of 50% and mortgages above 75% LTV were weighted 100%. In other countries, like the USA, there was also capital relief for mortgages with mortgage guarantees or insurances.

8.3.2 Introduction of Basel II
The need for realignment of the Basel I to vary capital requirements with LTV ratios is recognized in academic literature (Quigley and Van Order (1991)). Basel II accords followed by imposing capital requirements for credit risk based upon either external credit ratings (Standardized approach) or internal credit risk measurement techniques (Internal Ratings Based (IRB) approach). For banks using the Standard approach the risk weighting stayed similar however for banks using the IRB approach this means significant alterations in the risk capital requirement for mortgages. Figure 32 illustrates the differences between the Standardized approach and IRB approach and the effect of mortgage insurance.

Figure 32 Capital reliefs MI under Basel II

8.3.3 Basel II and Risk Management
The increased attention on the risk profile of mortgage also increased the attention on risk management of mortgages. As risk management become more important, so does credit enhancement products like mortgage insurance. However, in the general outline
of Basel II, the mortgage insurance is not recognized as credit risk mitigant and it looses its value to financial institutions. However, the influence of Basel II highly depends on the country specific implementation and the recognition of the mortgage insurance products.

For example, the discussion continues in the US as mortgage insurance is identifies as a tool for Credit Risk Mitigation (CRM) however the actual implications within the regulation has to be established (MICA, 2007). Academics add to this discussion with Klopfer (2002) acknowledging the value of mortgage insurance products to banks and bank regulators. Klopfer states that mortgage insurances can help the regulators because in the line of business, mortgage insurance companies demand better credit reporting and have incentives (i.e. first losses) to improve credit risk measurement and management. In addition, mortgage insurance companies transfer credit risk outside the banking systems which is in line of the Basel II objective to increase the credit worthiness of the banking system.

8.3.4 Basel II and Mortgage Insurance Business

The effect of Basel II on the mortgage insurance business remains subjected to the country regulation and implementation of the framework. However, it is clear that risk management will become more important and PMI companies have proven their expertise in this area since risk management skills define their business profitability. Again, an important factor is the price of this risk management tool. As Dutch banks prefer to take upon the risk themselves, the price of risk management will become very important.

An advantage in terms of pricing is the diversification benefits of international operating PMI companies. Through diversification, a PMI company can obtain benefits that are not obtainable for local operating financial institutions. In the USA these benefits are obtained because geographically areas are different in their characteristics and relatively uncorrelated. For example, in the recession in the 1980s, the whole economy was in a recession however delinquency rates in the energy-oriented states ware three times higher than the US average, and rates in the mountain states were half of the national average. These differences enable PMI companies to collect premiums in strong markets and support the financial institutions in weaker market (Chen, 2000). These benefits could be expanded beyond the US to Europe since the mortgage markets in Europe are significantly different from the US markets (Aalbers). Europe actually displays similar diversification opportunities that exist within the US market; despite the single currency economic region European mortgage markets show significant disparities. This diversification benefit could lower costs for international operating PMI companies in comparison with national operating financial institutions and insurance companies.
Nonetheless, while risk diversification can lower costs, the question remains if the banks are willing to transfer their risk exposures to the PMI companies.

8.4 Conclusion Feasibility Private Mortgage Insurance

Concluding, the factors determining the feasibility of the PMI program in The Netherlands provide a mixed picture. On the one side, several quantitative factors are in favour of the PMI program, like macro economic, housing, and mortgage market data. In addition, the current NHG program only covers 50% of the market, leaving the other 50% of the market as an opportunity for PMI. However, on the other side qualitative factors are limiting the possibilities for PMI companies.

In effect, the same factors that undermine the current NHG program will limit the feasibility of a PMI program. Especially the risk perception of and regulation are restraining conditions. In the lower end of the mortgage market, the NHG program has a clear competitive advantage limiting the demand for PMI. On the higher segment of the market the credit risk is relatively low and banks are willing to take upon this risk themselves. In addition, the demand is not stimulated like in the USA by self regulation and restriction on LTV levels. Again, this is caused by risk perception and the importance of LTI over LTV.

Therefore, in its current business model the PMI does not add enough value to the market participant to become a profitable business.
Chapter 9

CONCLUSION

9.1 The NHG Program Performance

The evaluation of the current NHG program in the Netherlands demonstrates fundamental concerns with the program. The NHG initiated to improve the availability of mortgage credit to low and medium households and to promote safe-lending practices. The market factors that justified the implementation of the program changed and no longer validate the continuation of the current business model.

The current underwriting rules of the NHG are stricter than the underwriting rules from general banks. This diminishes the added value of the NHG with respect to the goal to increase the availability of mortgage credit. The concerns with safe lending are currently administered by a new code of conduct which in effect replaces the need for the NHG program.

All together, the NHG lost its added value because of changes in the housing finance context. The criticism on the NHG increases the discussion on the continuation of the program and raises the question if there are any substitutions. In other international countries PMI companies act as a private alternative to the public program. The question arises if a PMI program would be feasible in the Dutch mortgage market.

9.2 The PMI Program Feasibility

The business model of the PMI program demonstrates overlap with the PMG and therefore similar factors are analysed as used in the evaluation of the PMG program.

First of all, the analysis of the PMG program demonstrates that several quantitative factors have a positive influence on the demand for PMG and PMI programs like GDP, (un)employment, housing price trends, LTV levels, etc. Nonetheless, the evaluation of the market structure reveals that several factors that negatively influenced the functioning of the PMG program also diminish the feasibility of a PMI program.

The most important factors concern risk management and risk perception. The PMG and PMI business models concentrate on LTV levels since these programs are credit guarantees/insurance for the lenders. However, due to historical and cultural
developments, the LTV ratio is less important in the risk management of Dutch mortgages and mortgage lenders focus on LTI. Therefore, the driver that should stimulate demand for the product is actually discourages its feasibility. The difference in risk perception of Dutch mortgage lenders diminishes the feasibility of the PMI program.

9.3 Possible Development

As stated, the current PMI and housing finance context diminish the feasibility of the PMI program. However, changes in the regulatory framework or extension of the current business model could change the feasibility of PMI companies and therefore this thesis ends with some suggestions.

- **Regulatory Recognition**: The recognition of PMI as a credit enhancement tool for capital relief would positively influence the feasibility. This policy change is considered in the US and in the Netherlands it would add to the current objective of the Dutch government to reduce the risk involved with high LTV lending.

- **Government Combination**: Another initiative from the government perspective could be collaboration between the government and a private company as seen in Canada. In this case, the government also provides backing to the private company and thereby increasing the credit rating of the PMI company. This decreases the cost of the PMI and increases the incentive of banks to unload their mortgage risk to the highly rated entity.

- **Pool Insurance**: The PMI business model considered in this paper focuses on the consumer side of the mortgage market. However, an extension of the business model could have market potential on the capital side instead. Currently, international PMI companies already provided the service of pool insurance. Pool insurance is a credit enhancement solution in the secondary mortgage market: it insures a pool of mortgages which in effect receives an investment grade rating. This provides advantages in mortgage financing, especially for the riskier loans (MICA, 2006). As is the case for the consumer side, the effect of Basel II on the capital side remains questionable. The new capital accords could increase the importance of credit enhancement tools. However PMI will have to compete with other tools like structured finance. Again, pricing will be fundamental and the international diversification could lower costs for the PMI companies.
Chapter 10

REFERENCE LIST