

# The Rise of Non-Bank Financial Institutions in the Dutch Mortgage Market

An analysis of the effect of Basel III on the market shares of Non-Bank Financial Institutions (NBFIs) in the Dutch mortgage market

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Bachelor thesis

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13-06-2016

## Abstract

*This research covers the rising trend of Non-Bank Financial Institutions (NBFIs) in the Dutch mortgage market. Due to stricter capital requirements that are part of Basel III, banks face higher costs, and consequently, their lending behaviour is altered. This creates opportunities for NBFIs in the Dutch mortgage market to compete with banks and increase their market shares. This research examines the effect of Basel III on the mortgage market shares of NBFIs in the Netherlands. Mixed methods are applied to enhance the overall reliability of the research. By use of multiple linear regression analysis, the effect of Basel III (as dummy variable) and macro-variables (GDP Growth, HPI, Yield on 10 Year Dutch Government Bonds) on aggregated market shares of NBFIs in the Dutch mortgage market is analysed. In addition, interviews are conducted with 4 NBFIs<sup>1</sup> that operate in the Dutch mortgage market. The regression analysis finds no significant relation between Basel III and NBFIs' market shares. It is reasonable to assume that limitations of the data and the model affected the outcome of the quantitative analysis. The interviews, however, suggest a positive effect of Basel III on the market shares of NBFIs. Basel III makes holding mortgages on the balance sheet less attractive for banks, which causes them to be more restrictive in their mortgage lending behaviour by decreasing their mortgage lending activities and increasing the interest rate charged on mortgages. Besides the withholding attitude from banks, NBFIs have proactively seized opportunities that arose, and increased their market shares. The low risk and high return profile of Dutch mortgages, as well as low entry barriers to the market are important motives for NBFIs to enter the market. Since the quantitative component of this study does not find a significant effect whereas the interviews do suggest effect of Basel III, future studies on this topic are recommended to include different methodology, such as event study.*

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<sup>1</sup> I would like to thank the following companies for helping out with interviews: De Hypotheekshop, MUNT Hypotheken, Syntrus Achmea, and Venn Hypotheken.

## Abbreviations

ACF	Autocorrelation Test
ACM	Authority for Consumers and Markets
ADF	Augmented Dickey-Fuller Unit Root Test
BCBS	Basel Committee on Banking Supervision
CBS	Statistics Netherlands (Centraal Bureau Statistiek)
DNB	Dutch National Bank
EC	European Commission
ECB	European Central Bank
HPI	House Price Index
NBFI	Non-Bank Financial Institution
SIFI	Systemically Important Financial Institution

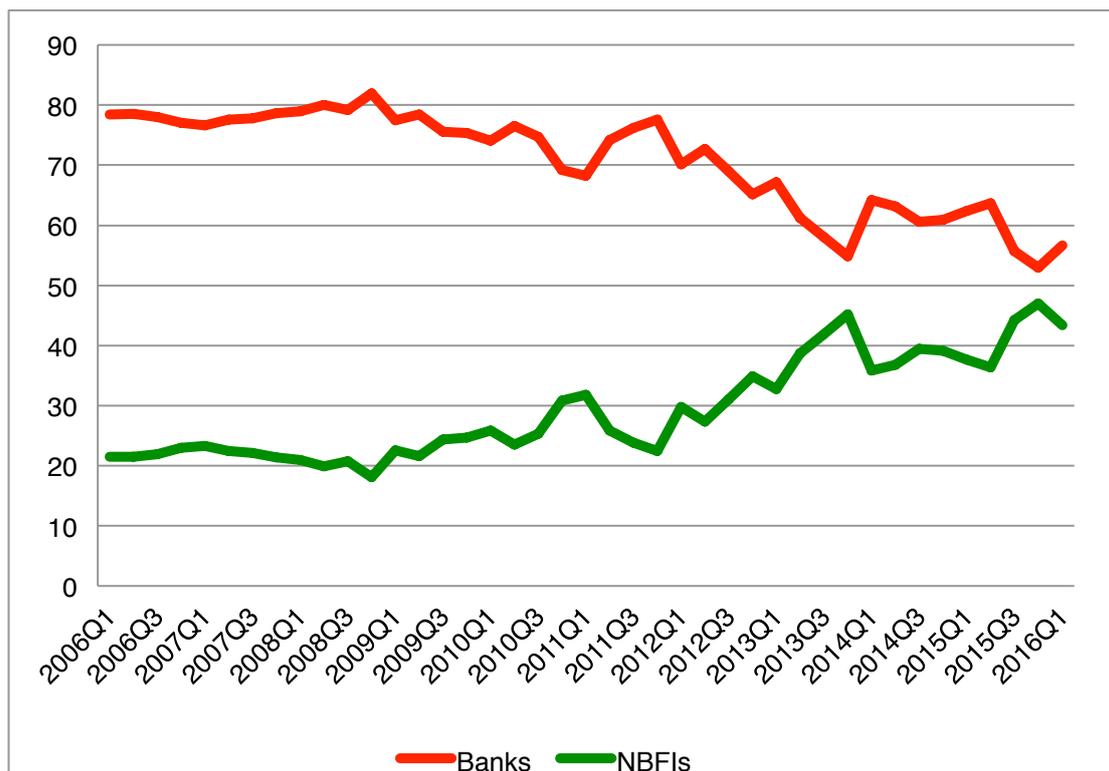
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## Introduction

This research draws attention to the rising trend of Non-Bank Financial Institutions (NBFIs) in the Dutch mortgage market. This market has been dominated by banks, which have always held almost all the market shares. Now, the long-maintained dominance of banks seems to decrease as NBFIs are increasing their market shares (see figure 1). An article in the [Financial Times \(2016\)](#) outlined this trend by stating that Dutch banks are losing market shares to NBFIs in the Dutch mortgage market, and pointed to Basel III (a recently enacted set of regulations) as main cause. Yet, academic literature lacks research on this topic. This paper asks the question what caused this sudden shift, and examines whether this is a consequence of Basel III.

Figure 1: Market shares of banks and NBFIs in the Dutch mortgage market (in %) (source: IG&H, self edited)



On 12 September 2010, the Basel Committee on Banking Supervision (BCBS) announced the agreement on a package of regulatory reforms, named Basel III (BCBS, 2010a). This set of regulations builds on earlier agreements of Basel I (1988) and II (2004) and aims to improve the stability of the banking sector by implementing

stricter capital requirements and countercyclical buffers. The effect of Basel III on banks' lending activities has been covered in academic literature. Studies by [Slovik & Cournède's \(2011\)](#); [Roger & Vittek \(2012\)](#) examined the effect of stricter capital requirements imposed by Basel III on banks in general, whereas [ACM \(2013\)](#); [Thibeault & Wambeke \(2014\)](#) also focussed on Dutch banks. However, no research has been conducted to the effect of Basel III on NBFIs. They do not have to comply with stricter capital requirements, which can open opportunities for NBFIs to increase their market shares.

Multiple researchers and institutions studied the Dutch mortgage market in specific. [The Netherlands Competition Authority \(NMa\) \(2011\)](#); [the Dutch Banking Association \(NVB, 2014\)](#); [Treur & Boonstra \(2014\)](#) did research to the structure of the market. These studies included topics as concentration and entry barriers, but have not specifically addressed the role of NBFIs in the Dutch mortgage market.

This research aims to fill the gap in academic literature on the effect of Basel III on NBFIs in the Dutch mortgage market. Since the Dutch mortgage market comprises approximately a third of total lending in the Netherlands, it is a market that is not only relevant to many lenders but also critical to the financial system. More knowledge on the effect of regulation on these NBFIs in the Dutch mortgage market can assist regulators and policymakers in enhancing financial stability.

The main question this research seeks to answer is phrased in the following way:

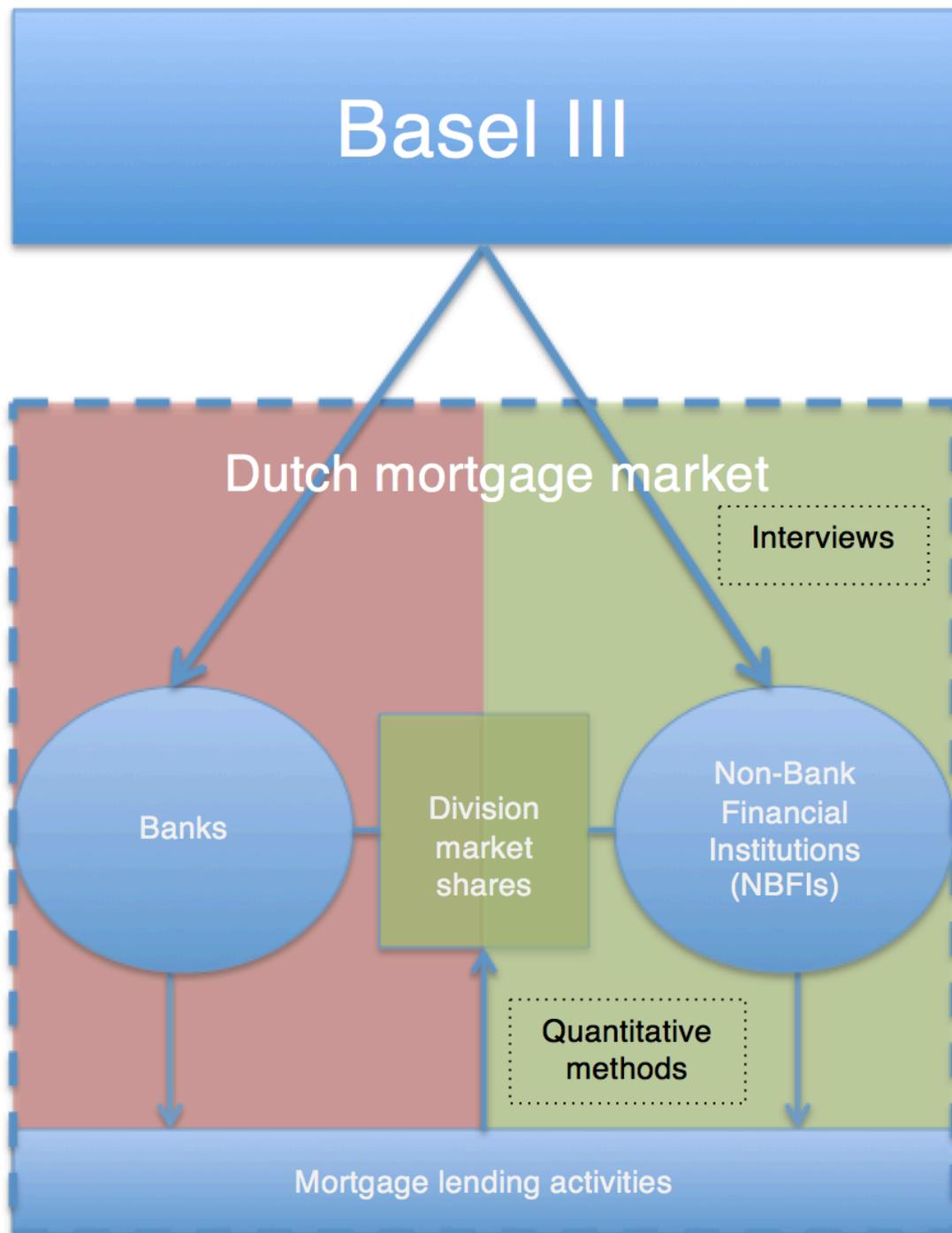
*What is the effect of Basel III on the market shares of Non-Bank Financial Institutions (NBFIs) in the Dutch mortgage market?*

The following secondary questions provide structure to this research:

- 1. What are the main differences between banks and NBFIs?*
- 2. How are mortgage lending activities of banks affected by Basel III?*
- 3. What motives do NBFIs have to operate in the Dutch mortgage market?*

In figure 2 a conceptual model of the research is displayed. It shows the area that is already covered by academic literature, and the gap this research aims to fill.

Figure 2: Conceptual model of the research



# 1. Theoretical framework

## 1.1 Banks and Non-Bank Financial Institutions

Vittas (1998) defines a Non-Bank Financial Institution (NBFI) as an institution that facilitates the financing of different activities and mobilizes savings, but does not accept deposits from the public. Since a NBFI does not have a full banking license, it is by law not allowed to take deposits. Various types of institutions can be regarded as NBFIs. Vittas (1998) argues that pension funds and insurance companies are the most important ones, since they are accumulators of long-term financial resources and are actually able to transform capital markets in structure and function. Other types of NBFIs include financial service providers, asset managers, mutual funds, private equity firms, hedge funds, and central clearing counterparties (Carmichael & Pomerleano, 2002; European Commission (EC), 2012). Banks and NBFIs are both financial intermediaries, basically fulfilling the same function within the financial system: channelling resources of groups having surpluses of funds to those groups that have deficits (with the exception of financial service providers, that charge fees for advisory services)(Carmichael & Pomerleano, 2002). Figure 3 provides an overview of core financial services and different types of financial institutions that provide them.

Figure 3: Institutional Groups and Core Financial Services (source: Carmichael & Pomerleano, 2002)

<b>Core financial services</b>	Deposit takers (banks)	Risk poolers	Contractual savers	Market makers	Sectoral financiers	Service providers
Payments	✓					
Liquidity	✓		✓	✓	✓	
Divisibility	✓	✓	✓		✓	
Store of value	✓	✓	✓			
Information	✓	✓	✓	✓	✓	✓
Risk pooling	✓	✓				

Although both banks and NBFIs intermediate between supply and demand of funds, they do so in different ways. Allen et al. (2005) and Ayyagari et al. (2007) draw attention to distinguishing the banking from the non-banking sector. The distinction

between the two types of institutions is important, since they differ in how they fulfil their roles in financial markets. First, the nature of a bank's balance sheet is different from a NBFIs' (Carmichael & Pomerleano, 2002). Banks accept short-term liabilities from depositors and provide longer-term credit to individual borrowers. As such, liquidity transformation (from relatively liquid and short term liabilities to illiquid and longer-term assets) plays a key role in the classic banking model. For a NBFIs, this is not necessarily the case (Carmichael & Pomerleano, 2002). Pension funds for example, have longer-term liabilities on the balance sheet: the pensions of the public also remain on the balance sheet for a longer period of time. Mismatches on the balance sheets are for this reason a more important issue for banks than for NBFIs. A second difference between banks and NBFIs is the nature of the assets they hold. Banks' assets consist mainly of debt issued to borrowers, whereas NBFIs mainly invest in assets that include equity, contingent and derivative promises (Carmichael & Pomerleano, 2002). Traditionally, NBFIs do not engage in direct lending to the same extent as banks do.

Various researchers and institutions argue that NBFIs are necessary components for enhancement of our financial systems. First, Carmichael & Pomerleano (2002); Vitas (1998); Fadzlan (2006) all argue that NBFIs complement banks by providing services that are better suited for them than for banks. For example, NBFIs provide a broader range of risk that investors can choose from, which improves the efficiency of savings and investment (Carmichael & Pomerleano, 2002). Fadzlan (2006) adds that banks have limits of the type and range of assets they can hold to their balance sheet.

Second, NBFIs compete with banks in offering financial services, forcing banks to operate more efficiently (Carmichael & Pomerleano, 2002). Traditionally, banks offer many different financial services to customers (see figure 3), whereas NBFIs can specialize in specific sectors or focus on single types of services. Because of this specialization characteristic, NBFIs experience informational advantages. Thus, when NBFIs focus on specific sectors (in this research this point is reflected in companies that specialize in mortgage related activities), they can compete with banks by offering competitive rates or attractive conditions. Bakker & Gross (2004) argue that as a result of increased competition between banks and NBFIs, firms and individuals experience improved accessibility and affordability of finance.

The third argument concerns the resilience of the financial system. According to [Carmichael & Pomerleano \(2002\)](#); [CPB \(2015\)](#), the existence of NBFIs enhances the resilience of the financial system, making them more robust to economic shocks. According to a policy paper by the Netherlands Bureau for Economic Policy Analysis ([CPB, 2015](#)), an economy that has more diverse financial intermediation (and therefore is less reliant on banks for the provision of financing), is more resilient to shocks in the financial system.

In conclusion, banks and NBFIs both fulfil the same general role in the financial system (channelling resources from surpluses to deficits of funds), but do so in different ways. The most important difference is that NBFIs are not allowed to take deposits from the public. NBFIs are necessary components of the financial system as they complement banks in providing services, provide competition for banks, and make the financial system more resilient to shocks.

## 1.2 Financial Regulation: Special Focus on Basel III

Since the world financial crisis, shortcomings in regulation have been important points of discussion. Basel II (the financial regulation for banks and the predecessor of Basel III) lacked on various points. The main issue with Basel II was that the capital buffers of banks were insufficient. Especially a number of systemically important financial institutions (SIFIs) were not able to absorb significant losses, as was experienced from the world financial crisis (King & Tarbert, 2011). Among others, Carvajal et al. (2009); Claessens et al. (2010); De Nicolò et al. (2012); IMF (2009) discuss the key areas in regulation that required improvement.

First, the regulatory “perimeter” (the scope of regulation) is discussed. Carvajal et al. (2009) back measures that increase the scope of regulation of institutions, products and markets. Regulation before and during the crisis failed to address risk that emerged from interactions between banks and NBFIs. Solely tightening the regulation of banks is insufficient to prevent excessive build-up of systemic risk, because this will only cause risky activities to move to the unregulated institutions (NBFIs)(Carvajal et al., 2009). Instead, regulation should cover a broader range of institutions, products and markets.

Second, improvements in micro-prudential regulation are part of the discussion. Micro-prudential regulation focuses on enhancing financial stability of individual firms (De Nicolò et al., 2012). Claessens et al. (2010); De Nicolò et al. (2012) stress the importance of preventing financial institutions from incurring systemic risks, which are risks that involve the entire financial system rather than only the individual firm. They argue for stricter capital requirements, but especially improvements of these requirements that take into account aspects as interconnectedness and complexity of these institutions, so that systemic risk is better integrated in the micro-prudential regulation.

Third, macro-prudential regulation (a type of regulation that covers a relatively new policy area) is focussed on limiting systemic risk of financial distress for the financial system as a whole, instead of focussing on the risk of individual institutions (see figure 4) (Borio, 2011). Systemic risk consists of two dimensions: the time dimension and the cross-sectional dimension (Borio, 2011; Frait & Komárková, 2011). The time

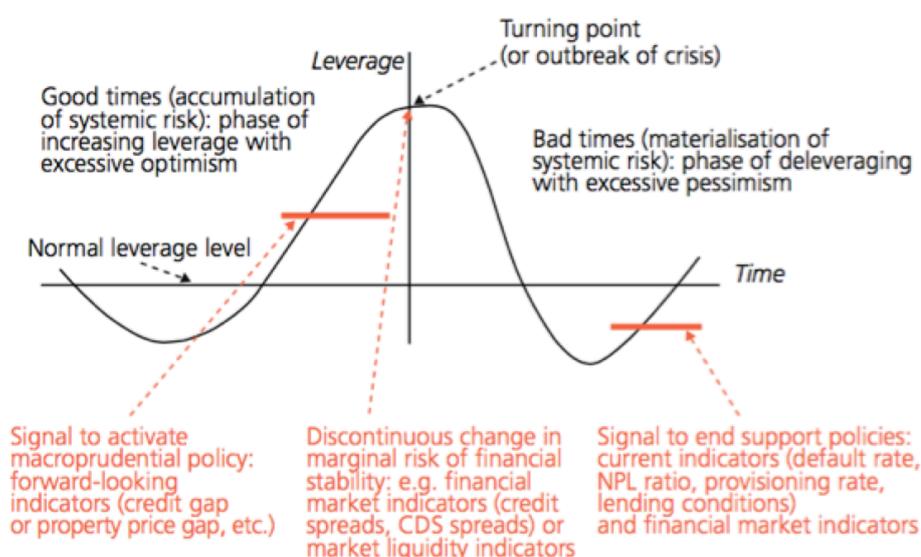


dimension covers the build-up of systemic risk over time. The pro-cyclical behaviour of financial institutions can lead to greater risk of the financial system. In good times of economic growth, financial institutions have the tendency to take on bigger risks due to multiple factors, such as increased competition and lower cost of external financing. This upward going spiral leads to build-up of systemic risk and makes the probability and impact of financial crises bigger (see figure 5) (Frait & Komárková, 2011). The cross-sectional dimension covers the relation between risk of an individual institution and the financial network as a whole (Frait & Komárková, 2011).

Figure 4: Comparison between macro-prudential and micro-prudential policy (source: Borio, 2003)

	<b>Macroprudential</b>	<b>Microprudential</b>
<b>Proximate objective</b>	Limit financial system-wide distress	Limit distress of individual institutions
<b>Ultimate objective</b>	Avoid GDP costs	Consumer protection
<b>Characterisation of risk</b>	Dependent on collective behaviour	Independent of individual agents' behaviour
<b>Correlations/exposures across institutions</b>	Important	Irrelevant
<b>Calibration of prudential controls</b>	System-wide risk; top-down	Risk of individual institution; bottom-up

Figure 5: The Financial Cycle and Systemic Risk (source: Frait & Komárková, 2011)



Debates on new regulatory requirements for the financial system eventually resulted in reforms of the regulatory framework. On 12 September 2010, the Basel Committee on Banking Supervision (BCBS) announced Basel III: a package of regulatory reforms aimed at enhancing stability in the banking sector (BCBS, 2010a). The main objective of Basel III is to improve the ability of the banking sector to absorb shocks coming from financial markets to eventually reduce the risk that these shocks spill over to the real economy (BCBS, 2010b). The BCBS implemented a number of fundamental reforms that both focus on micro-prudential regulation (improving resilience of individual banks) and macro-prudential policies (focused on mitigating systemic risk) (BCBS, 2010b). A number of measures were taken with the implementation of Basel III. One measure aims to strengthen the capital base of banks by imposing higher capital requirements than Basel II (BCBS, 2010a). This ensures that a bank does not expose itself excessively to risky lending practices (Kroot & Giouvris, 2016). The capital requirements are often referred to as the most important aspect of Basel III. Later on, various studies are discussed that focus on the effect of increasing capital requirements for banks. Other measures include the implementation of a countercyclical buffer and a leverage ratio. The countercyclical buffer reduces availability of bank lending in economic upswings (King & Tarbert (2011).

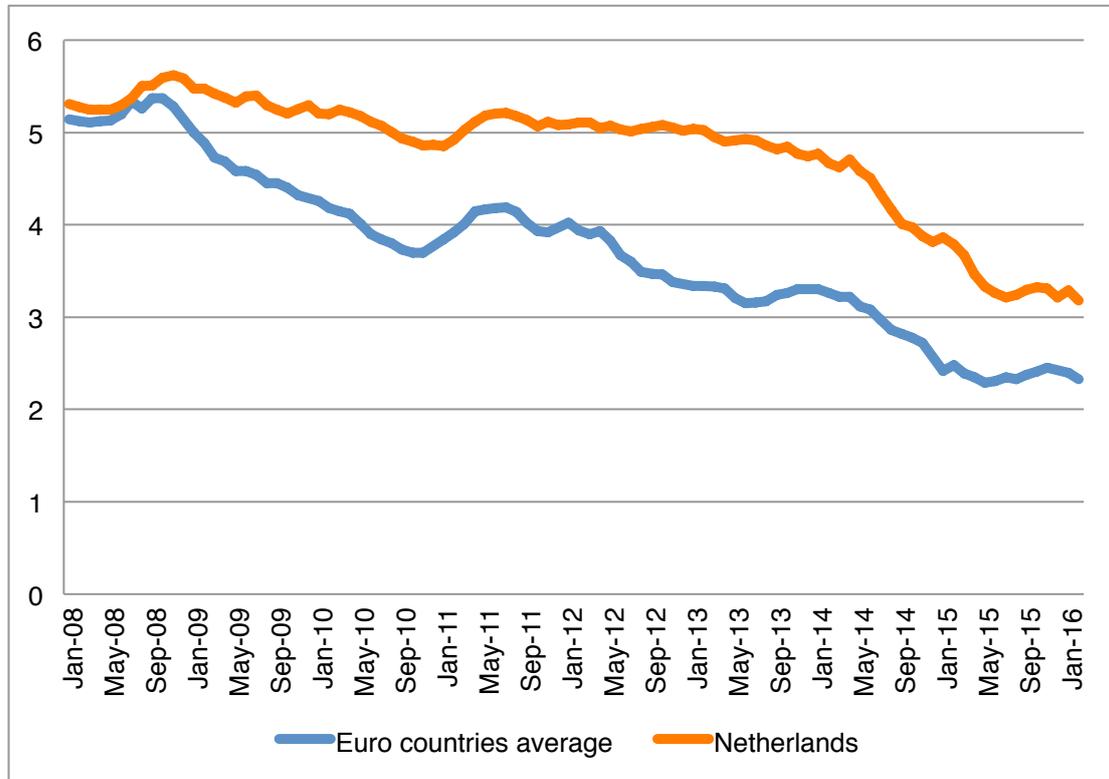
Various researchers focused on the effect of Basel III regulation on banks and their lending activities. Slovik & Cournède's (2011) research, which was conducted closely after the official announcement by the Basel Committee on Banking Supervision (BCBS), emphasized the trend of increasing lending spreads of banks (difference in interest rates between borrowing and lending). In their research they argue that higher capital requirements create costs for banks, which they tend to pass on to their customers by setting higher interest rates for lending. Roger & Vittek (2012) came to the same conclusion. Thibeault & Wambeke's (2014) research included interviews with Dutch banks. They all revealed that they were restrictive in their behaviour by allocating less funds to finance mortgages and increasing the interest rates on mortgages since Basel III came into play<sup>2</sup>. The Authority for Consumers &

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<sup>2</sup> Thibeault & Wambeke's (2014) research also compared the effects of Basel III to the effects of a similar regulation for insurance companies (called Solvency II) on the lending behavior of respectively banks and insurance companies. They found that compared to banks, insurance companies are less influenced by the capital requirements, which makes them more competitive. Specifically, they found that insurers had an advantage over banks in the

Markets (ACM, 2013) found similar results. Figure 6 illustrates the development of the interest rates since 2008.

Figure 6: Comparison between interest rates on mortgages in the Netherlands and the Euro countries average (%) (Sources: ECB, DNB)



However, the increase in interest rates on mortgages set by Dutch banks is not merely the result of the stricter capital requirements of Basel III. Various researchers that focussed on the Dutch mortgage market found other factors that contributed to this rise in mortgage rates. According to Treur & Boonstra (2014) the relatively higher levels of interest rates on mortgages that Dutch banks have set since the onset of the financial crisis in 2008 are also due to higher dependency of Dutch banks on capital markets. Because Dutch banks are relatively more reliant on (the since the financial crisis deteriorating) capital markets for funding, they started competing heavily by increasing the interest rates on deposits, in order to attract savings. To offset this increase in costs, banks started charging higher interest rates on mortgages (see figure 6). Other studies suggest that high levels of concentration and weak

mortgage market, where capital charges are lower for Solvency II than for Basel III (see appendix 2 for comparison). Banks that were interviewed for this research admitted that insurance companies face better prospects in mortgage markets, which could lead to an increase in market shares for insurance companies. Especially Dutch banks noted that the mortgage market in the Netherlands is attractive for insurers.

competition in the Dutch mortgage market were other contributing factors for rising mortgage rates (Mulder, 2014; NMa, 2011). Research by Mulder (2014) finds that the market became highly concentrated since the financial crisis, which resulted into a lower level of competition, measured by the Lerner Index. Mulder (2014) points to pricing constraints that were imposed by the European Commission (EC) on some of the big Dutch financial institutions (ABN Amro and ING among others) as one explanation. The restrictions were imposed because the Dutch government gave state aid to get these banks out of dire financial positions. This regulatory measure by the EC aimed to prevent these banks from using the state aid to compete in an unfair way with other institutions that were not given aid. Therefore, due to these pricing restrictions interest rates on mortgages remained high after the crisis, especially compared to other Eurozone countries (Mulder, 2014). The Netherlands Competition Authority (NMa, 2011) also studied the structure of the Dutch mortgage market and the pricing behaviour of mortgage lenders. They developed an econometric model that explains the interest rates setting, and found that significant factors that explained rise in interest rates include the imposed price restrictions, concentration of the market (measured by HHI, C4 and C5) and cost of financing.

In conclusion, the global financial crisis opened debates on regulatory reforms, which in 2010 resulted in Basel III. Various studies differ on the size of the impact of Basel III on the behaviour of banks, but there is a general consensus that this regulation has affected banks' lending behaviour. Especially in the Netherlands, it is clear that due to stricter capital requirements, interest rates on mortgages increased significantly and banks decreased allocation of funds to mortgages. Other factors amplified this rise in interest rates in the Dutch mortgage market, such as competitive behaviour to attract savings (due to worsening conditions on capital markets), high concentration and pricing constraints for some Dutch banks.

### **1.3 Motives for NBFIs to operate in the Dutch mortgage market**

Mortgage markets differ among countries. Mulder (2014) for example, argues that because of differences in legal frameworks and requirements for mortgages between countries, mortgage markets differ substantially, even given their geographic proximity. A paper by the European Central Bank (ECB) (2009) on housing finance

also points out differences among mortgage markets, such as interest rates, competition, legal frameworks and the role of banks. Characteristics of mortgage markets can influence companies' decisions on whether or not to entry or exit the market or increase its activities. A number of characteristics of the mortgage market in the Netherlands provide insight into the motives for NBFIs to operate in this market.

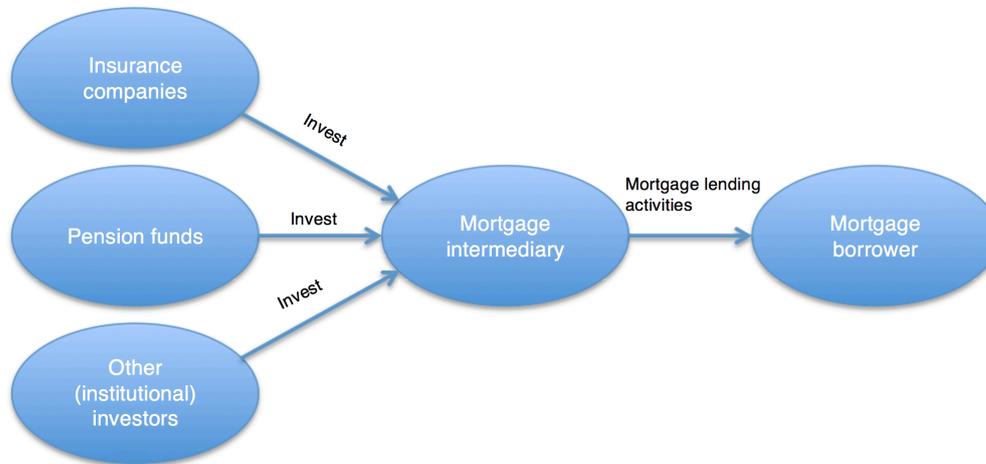
First, [Treur & Boonstra \(2014\)](#) characterize the Dutch mortgage market as a market with low entry barriers. Companies can enter and exit the market easily and rapidly, making it an attractive market to operate in. Two reasons for these low entry barriers are highlighted in this article. Most importantly, the existence of a substantial amount of mortgage intermediaries<sup>3</sup> in the Dutch mortgage market facilitates companies in accessing the market ([Treur & Boonstra, 2014](#)). These intermediaries accumulate capital from institutional investors such as pension funds, or other types of firms or individuals that seek access to the mortgage market, and channel them through by lending mortgages (see figure 7 for illustration). [Treur & Boonstra \(2014\)](#) argue that costs of institutions or individuals that seek access are reduced, since they do not have to establish new offices or allocate money for marketing: they just invest, while the mortgage intermediary does the rest<sup>4</sup>.

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<sup>3</sup> In the Netherlands this type of intermediary is better known for the more specific term “regiepartij”. Whenever in this research is referred to a “regiepartij”, the term mortgage intermediary is used.

<sup>4</sup> Academic literature lacks research on mortgage intermediaries in the Dutch Mortgage market. However, a recent report by consultancy firm [IG&H \(2015\)](#) on the Dutch mortgage market and an article in the [Financial Times \(2015\)](#) emphasize the increasing importance of these intermediaries. Recently, pension funds are making more frequently use of mortgage intermediaries when they seek to invest in Dutch mortgages.

Figure 7: conceptual model of a mortgage intermediary (“regiepartij”)



A second aspect of low entry barriers is the comprehensive use of National Mortgage Guarantee (Treur & Boonstra, 2014), which insures a mortgage lender against default of the borrower (in cases of divorce and unemployment) (DNB, 2015). This type of mortgage is considered as a more standardized product due to stricter requirements for borrowers. The standardization of this type of mortgage product makes it more liquid, rendering it attractive for companies to invest in mortgages with National Mortgage Guarantee. This aspect lowers the threshold for companies to operate in the Dutch mortgage market (Treur & Boonstra, 2014).

Another characteristic that can be an important motive for NBFIs is the relatively low risk of Dutch mortgages. In determining the riskiness of the mortgage market, two ratios are commonly used, i.e. the Loan-to-Value ratio (LTV) and the Debt-to-Income (DTI) ratio<sup>5</sup>. Various researchers, including Lawrence & Smith (1992); Ingram & Frazier (1982) performed research on the relation between these ratios and the probability of default on mortgage loans. They concluded that riskiness of mortgage loans is determined by higher LTV and DTI ratios. Both of these ratios are high in the Dutch mortgage market (see figure 8 and 9) compared to other countries, which suggests a market of higher risk.

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<sup>5</sup> Loan-To-Value (LTV) ratio is the amount that can be borrowed relative to the value of the property; Debt-To-Income (DTI) ratio refers to the individual's amount of debt relative to his or her income.

Figure 8: LTV ratios in the Netherlands in 2013 (Source: NVB, 2014)

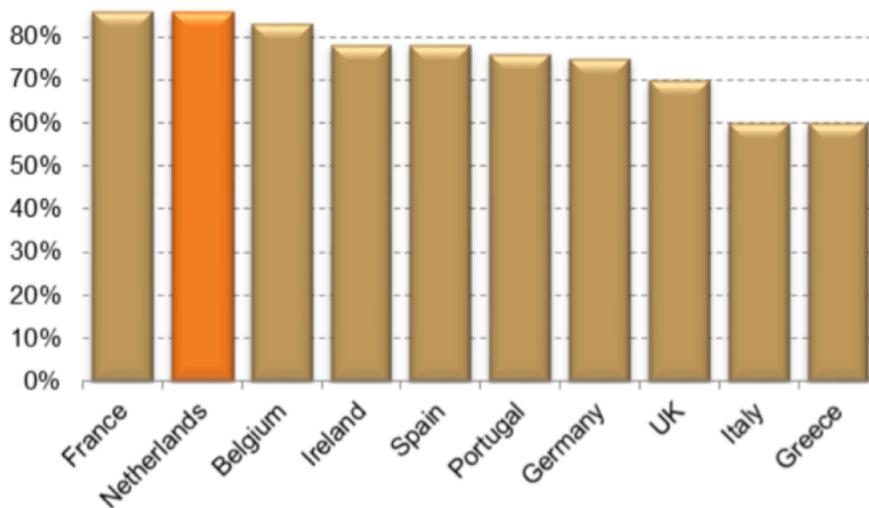
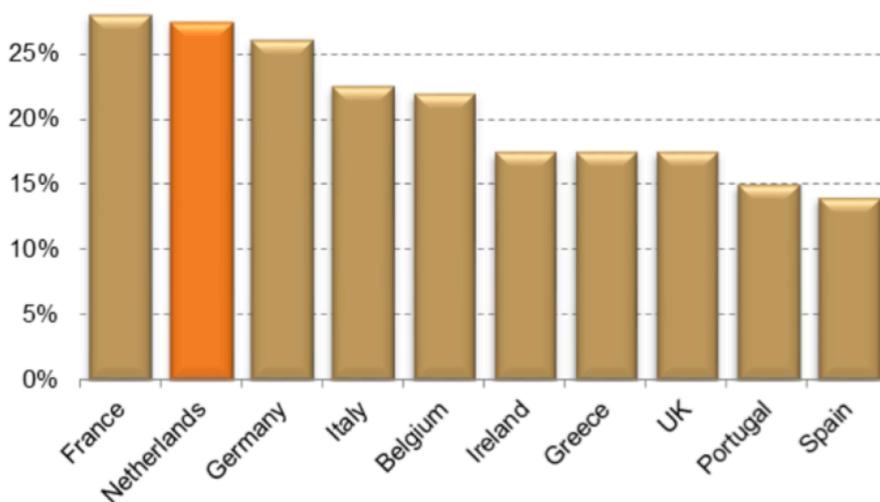


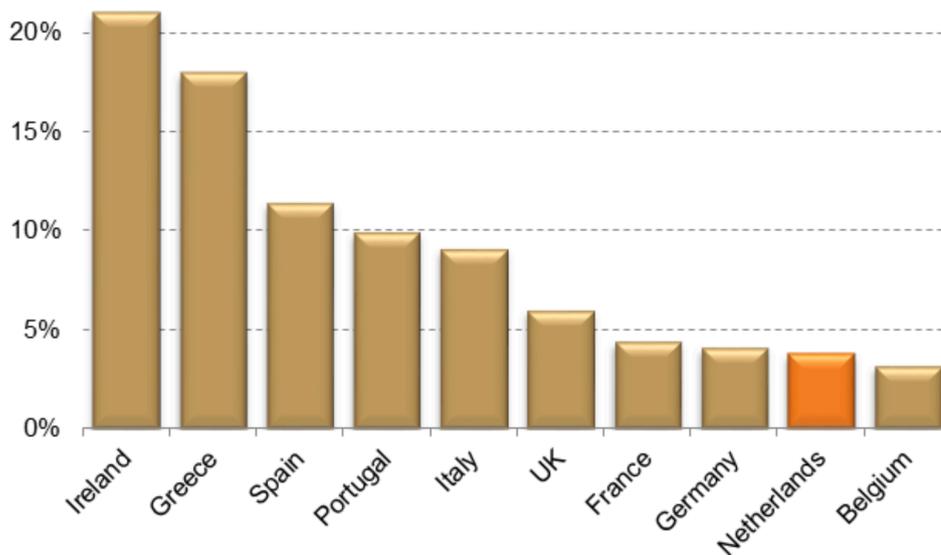
Figure 9: DTI ratios in the Netherlands in 2013 (Source: NVB, 2014)



However, factors that display the expected default rates on mortgages suggest otherwise. There are several other factors that determine the riskiness of a mortgage market. [Burkhard & De Giorgi \(2004\)](#) find that macro-economic performance of a country (GDP, House Price Index, unemployment rate) influences the probability of default on mortgage. In general the Dutch mortgage market is regarded as relatively safe. Even though the market is characterized by high LTV- and DTI ratios, Dutch borrowers have low expected default rates (see figure 10). [The Dutch Banking Association NVB \(2014\)](#) explicitly refers to this as a paradoxical situation. [Fitch's](#)

(2016) outlook of the Dutch mortgage market is a stable and positive market, as they point out that arrears are low in absolute terms and compared to other countries.

Figure 10: Expected default rates on mortgages in various European countries in 2013 (Source: NVB, 2014)



Besides the low riskiness of Dutch mortgages, the yield of investing in these mortgages is relatively high. This is reflected by high interest rates on mortgages compared to other European countries (see figure 11). With higher interest rates, the yields on these mortgages are higher, which is more attractive for investors. Also, there is room for firms to offer competitive prices and increase their market share. Compared to other “safe” investments such as government bonds, the yield on Dutch mortgages can be attractive to investors. Consultancy firm IG&H (2015) interviewed various mortgage intermediaries that are active in the Dutch mortgage market and manage the funds of institutional (and individual) investors. They found that the main reason investors seek to invest in the Dutch mortgage market is the low risk and high return environment. Compared to other investments that are regarded as safe, such as government bonds, the yields on mortgages are higher (see figure 12).

Figure 11: Mortgage lending rates of several European countries (%) (source: ECB, 2015)

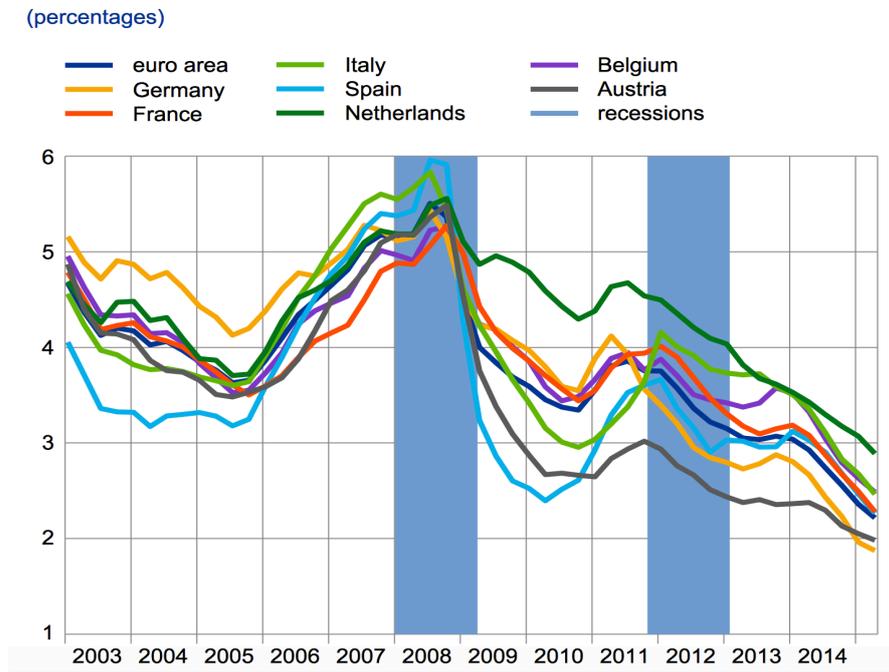
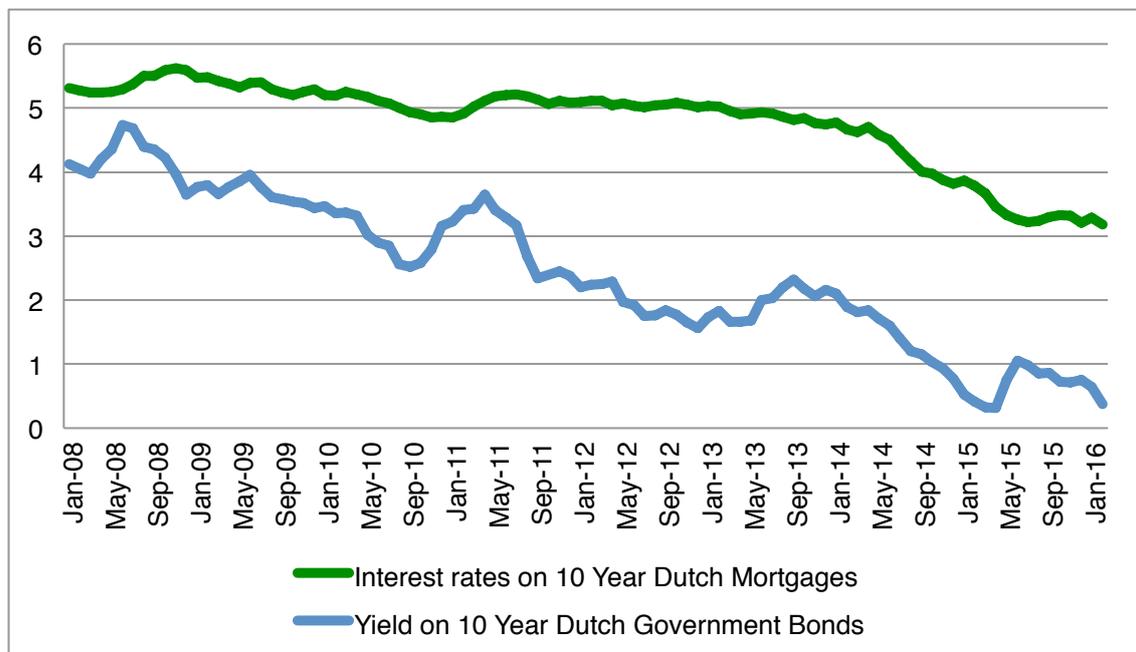


Figure 12: Comparison between interest rates on Dutch mortgages and Yield on Dutch Government Bonds (%) (Source: DNB)



In conclusion, a number of motives for NBFIs can explain why they tend to move into the Dutch mortgage market or increase their activities and market shares. Entry barriers are low due to the existence of mortgage intermediaries and the use of National Mortgage Guarantee schemes, the performance of borrowers in the Netherlands implies a relatively sound mortgage market with low expected default rates, and yields on investments in Dutch mortgages that are relatively high (compared to investing in other countries' mortgages, but also to other low-risk investments such as government bonds).

## 2. Methodology

First, statistical analysis is used to examine the effect of Basel III (and macro-variables) on market shares of NBFIs in the Dutch mortgage market. Then, interviews with NBFIs are conducted to obtain more in-depth and tacit information that cannot be derived by the analysis of quantitative data. Information obtained from interviews includes more qualitative data, such as underlying motives for NBFIs, how NBFIs experience competition, and the future expectations of NBFIs. By adopting mixed methods, the research will provide a more complete view of the effect of Basel III on Non-Bank Financial Institutions.

### 2.1 Quantitative methods

To address the research question, a multiple linear regression is conducted. The dependent (ratio) variable is the aggregated market shares of NBFIs in the Dutch mortgage market. Independent variables include a dummy variable that represents Basel III, and macro-variables such as GDP Growth Rate, House Price Index (HPI), and the Yield on 10 Year Dutch Government Bonds.

Time series are used for the quantitative analysis. Quarterly data from 2006 to 2016 is obtained from datasets of DNB, Statistics Netherlands (CBS), European Central Bank (ECB) and consultancy firm IG&H. This data is considered reliable since these institutions are well-established and have a reputation - grown on the basis of a long and closely scrutinised track-record, for collecting data in a responsible and honest manner. Monthly data is transformed into quarterly data, by taking the average of periods of three months.

Because we are dealing with time-series data, the variables have to be stationary. Stationarity refers to the absence of trends in a time series. In other words, a variable can be correlated with itself over time. To prevent this, all variables have to be tested for non-stationarity. When these tests reveal a trend (and a variable is therefore non-stationary), the variable has to be transformed. Usually, this transformation takes place by taking the first differences of the variable. The value of the period before ( $t$ -

1) is subtracted from the value of point t in time. If a variable is still not stationary after taking the first difference, it is excluded from the model (with the exception of the dependent variable, which will then be transformed again by using the second difference). To test for non-stationary variables, the Autocorrelation Test (ACF test) in SPSS and the Augmented Dickey-Fuller Unit Root Test (ADF test) are conducted.

The Autocorrelation Test (ACF) in SPSS is used to test for non-stationarity. The null hypothesis (H0) of this test is no autocorrelation in the time series and alternative hypothesis (H1) is autocorrelation in the time series. Therefore, p-values < .05 reject the H0, and indicate autocorrelation and ultimately require transformation of the variable using first differences.

The Augmented Dickey-Fuller Unit Root Test (ADF) in STATA is also used to test for non-stationarity. The null hypothesis (H0) of this test is that the time series is non-stationary (displays a trend), and the alternative hypothesis (H1) is a stationary time series. The MacKinnon approximate p-value is used for testing the H0. If this p-value < .05, the H0 of non-stationarity can be rejected, and the variable is stationary. Therefore, if the p-value > .05, it has to be transformed using first differences.

The dependent variable in the regression is the aggregated market share of NBFIs in the Dutch mortgage market. Due to a lack of availability of individual market shares, aggregated data is used. Data on aggregated market shares is provided by consultancy firm IG&H. Chapter 4 (Results) discusses limitations on the model.

Various independent variables are included. First, Basel III is included as a dummy variable. The official announcement of the Basel III regulation on 12 September 2010 is assumed to be the moment in time that companies started to respond. All quarters after the announcement (starting 2010-Q4) are given the value “1”, and everything before “0”. Besides the dummy variable, macro-variables are included. The GDP Growth Rate, obtained from Euro Area Statistics (data website of the ECB) is an indicator of the economy of the Netherlands. Changes in GDP growth can have influence on companies’ decisions to enter or leave the market. For example, if GDP Growth declines it can cause companies to retract from the market, which in turn can leave mortgage lending to a larger extent to the banks, that traditionally fulfil the role of mortgage lending in the Netherlands. Also, the House Price Index (HPI), obtained

from Statistics Netherlands (CBS), is included as independent variable. This is used as an indicator for the health of the Dutch housing market. It may, just like GDP Growth, attract or discourage alternative providers of mortgages (which include many NBFIs) to operate in the Dutch mortgage market. This indicator is more specific than GDP Growth because it is directly related to the housing market, whereas GDP Growth is related to the economy in general. Also, the Yield on 10 Year Dutch Government Bonds, obtained from DNB, is included as independent variable. This is used as an indicator of investors' appetite for investing in safe assets. When these yields are low, investors have the tendency to seek higher returns by investing in assets that are considered safe, such as Dutch mortgages. Investors would make these investments largely through NBFIs. Therefore a negative relation is expected between the yields on government bonds and market shares of NBFIs.

The null hypothesis (H0) of this regression can be phrased as: there is no linear relation between the market shares of Non-Bank Financial Institutions in the Dutch mortgage market on the one hand, and the independent variables Basel III (dummy), Yield on NL 10 Year Government Bonds, GDP Growth and House Price Index. The alternative hypothesis (H1) says there is a linear relation. Also, the regression will be conducted with just the dummy variable (Basel III) and market shares to see how the p-value changes.

## 2.2 Qualitative methods

The aim of using qualitative methods is to obtain more in-depth and tacit information in order to meaningfully address the main research question. This information is obtained by conducting interviews with 4 NBFIs that are operating in the Dutch mortgage market.

It is difficult to study the effect of Basel III on market shares of NBFIs in the Dutch mortgage market by merely using quantitative methods. The model that results from a regression can have its limitations, if only because of the lack of available data, and can therefore not always provide reliable results (see chapter 3.1). Through interviews with key personnel from NBFIs, information can be obtained on the motives of these institutions for operating in the Dutch mortgage market, how they experience Basel III regulation and competition in the market, and how they expect market conditions to change in the future. This kind of information cannot be obtained effectively and accurately through quantitative research. Correspondingly, [Thibeault & Wambeke \(2014\)](#) conducted interviews with banks to find out how they experience Basel III, how it affected their lending activities and their appetite for investing in certain asset classes.

In addition, the information from interviews can complement the information that is obtained from data-analysis. For example, if the regression shows a significant relation between the independent variables and market shares of NBFIs, information extracted from interviews can confirm this and make the research more robust. Or, if no significant result is found whereas based on the interviews it can be concluded that Basel III has effect on the market shares of NBFIs, this can suggest errors of the model or the data used.

The selection of companies for interviews goes according to various steps. First, all mortgage lending companies that are registered at the Dutch National Bank (DNB) as a deposit-taking institution (i.e. banks), are filtered out. Then, the companies are selected by random sample. This is done to prevent bias in the selection and make the outcomes of the qualitative part more reliable. The companies are contacted by e-mail. In the event that a company from the random sample does not respond within five working days, that company is contacted by phone. Eventually, if the company

does not respond to both communication attempts over e-mail and phone, or declines the suggested interview, the next company on the list of random samples is contacted. In this way, selection of companies follows an unbiased procedure. Companies that are contacted will always be provided with the following information: name of the University, outline of the research, aim of the interview, and the topics covered in the interview. Only in this way, the companies know what to expect, so that they can provide the right person for the interview: someone that understands the company's business structure, activities, and most importantly their mortgage related business. These steps are all carefully executed to make sure the outcomes are reliable and therefore the research more robust.

Ethical considerations are important to take into account. [Lichtman \(2012\)](#) mentions two levels of privacy and anonymity: the individual and the company. The interviewee or the NBF he or she represents may want to remain anonymous. Also, permission to record the interview should be granted by the interviewee. The interviewee is explained explicitly that they can refuse the recording or leave certain aspects (such as quotes, sensitive or strategic information, names of firms etc.) out of the transcript. Before the interview these issues are discussed. After the interview, the respondent is asked whether he or she is interested in having the results of the research, so that reciprocity ([Patton, 1990](#)) is also taken into account. Also, the reliability of information is considered. Firms may have the tendency to exaggerate their successes. Therefore, in the analysis the focus will be on general trends that are experienced by the interviewed NBFs, and less on unique aspects of these firms individually.

The interviews are analysed by first coding the transcripts. Various codes (motives, competition, effect Basel III on banks, effect Basel III on NBFs, future) are used to extract important information out of the interview transcripts. Then, the coded parts are compared to gain insight in general findings. In order to gain overview of the results, the relations between the coded parts are visualised in a conceptual model. For further analysis, links between results and literature from the theoretical framework are made.

## 3 Results

### 3.1 Quantitative methods

After conducting ACF tests and ADF tests, it appeared that all variables were significantly non-stationary (figure 13 displays the results of the ADF tests). Transformation by the use of first difference is therefore conducted. After testing these first differences, all variables turned out to be stationary, except for the first difference of House Price Index (HPI) (see figure 13). Therefore, HPI is removed from the regression to prevent inaccurate results. The first difference of GDP Growth was only slightly insignificantly stationary, so it is assumed to be stationary and included in the model.

Figure 13: Results of the ADF Tests

<b>ADF Tests</b>		
Variable	MacKinnon approximate p- value	Stationary (on a 5% level)
MS NBFIs	0.7774	No
Yield Gov Bond	0.6936	No
HPI	0.2654	No
GDP Growth	0.2675	No
1 <sup>st</sup> dif MS NBFIs	0.0306	Yes
1 <sup>st</sup> dif Yield Gov Bond	0.0125	Yes
1 <sup>st</sup> dif HPI	0.7013	No
1 <sup>st</sup> dif GDP Growth	0.0720	No*

\* Not statistically stationary on a 5% level, but the slight insignificance is ignored here and the variable is included in the regression.

The multiple linear regression model finds no significant relation between the shares of Non-Bank Financial Institutions (NBFIs) in the Dutch mortgage market on the one hand, and the independent variables Basel III (dummy), the first difference of the Yield on NL 10 Year Government Bonds and the first difference of GDP Growth on the other hand. The p value of the model is  $.463 > .05$ , which makes it highly insignificant (see appendix 2). Therefore, the null hypothesis of no linear relation cannot be rejected.

Figure 14: Results of multiple linear regression

Descriptive Statistics			
	Mean	Std. Deviation	N
DIFF(MS_NBFIs,1)	.37	2.773	47
DIFF(Yield_Gov_Bond,1)	-.071219858156028	.277645129187119	47
DIFF(GDP_Growth,1)	.000386017637317	1.046983248374410	47
Basel_III	.45	.503	47

Correlations					
		DIFF(MS_NBFIs,1)	DIFF(Yield_Gov_Bond,1)	DIFF(GDP_Growth,1)	Basel_III
Pearson Correlation	DIFF(MS_NBFIs,1)	1.000	.124	-.020	.191
	DIFF(Yield_Gov_Bond,1)	.124	1.000	.179	-.065
	DIFF(GDP_Growth,1)	-.020	.179	1.000	-.006
	Basel_III	.191	-.065	-.006	1.000
Sig. (1-tailed)	DIFF(MS_NBFIs,1)	.	.203	.446	.099
	DIFF(Yield_Gov_Bond,1)	.203	.	.115	.332
	DIFF(GDP_Growth,1)	.446	.115	.	.484
	Basel_III	.099	.332	.484	.
N	DIFF(MS_NBFIs,1)	47	47	47	47
	DIFF(Yield_Gov_Bond,1)	47	47	47	47
	DIFF(GDP_Growth,1)	47	47	47	47
	Basel_III	47	47	47	47

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20.286	3	6.762	.872	.463 <sup>b</sup>
	Residual	333.557	43	7.757		
	Total	353.842	46			

a. Dependent Variable: DIFF(MS\_NBFIs,1)

b. Predictors: (Constant), Basel\_III, DIFF(GDP\_Growth,1), DIFF(Yield\_Gov\_Bond,1)

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.023	.553		-.042	.967
	DIFF(Yield_Gov_Bond,1)	1.451	1.506	.145	.963	.341
	DIFF(GDP_Growth,1)	-.119	.399	-.045	-.299	.766
	Basel_III	1.107	.819	.201	1.352	.184

a. Dependent Variable: DIFF(MS\_NBFIs,1)



The coefficients of the regression are displayed in figure 14. None of the coefficients show significant p-values. Therefore, the interpretation of these coefficients is not useful. The least insignificant p-value is the variable Basel III. For interpretation, it has to be taken into account that it is a dummy, with 1 meaning *after* Basel III and 0 *before*. We have to take into account that we transformed the variable to the first difference because of its non-stationary character. The B value can be interpreted as follows: compared to before the Basel III announcement, the growth of market shares of Non-Bank Financial Institutions in the Dutch mortgage market after the Basel III announcement is on average 1.107% higher (holding all other factors constant). Still, this coefficient is insignificant as well, so interpretation is not useful. By excluding the macro-variables from the regression and merely using the dummy variable (before or after Basel III), the model remains insignificant. However, the p-value decreases to .198, which means that the macro-variables that are added decrease the quality of the model.

The insignificance of this multiple linear regression does not necessarily exclude the possibility that there is a relation. Limitations on the model can make outcomes less reliable. First of all, the use of data in this research is not optimal. Due to a lack of available data, aggregated data of the market shares for all NBFIs (the dependent variable) is used. With the use of data of individual firms, the analysis can be done more accurately with more cases. Also, other types of analyses, such as event study methodology, can be conducted with data of individual firms. This will be discussed in the conclusion and discussion. Another point in which the data lacks is frequency. The data on market shares is obtained per quarter. However, if this data could be obtained in a higher frequency, for example monthly or weekly, it would make the analysis more accurate.

A second argument that can cause distortion to the analysis is the dummy variable Basel III. The aim is to investigate what the effect of Basel III regulation is on the market shares of NBFIs. However, it is difficult to determine when this regulation actually starts to have an impact. It is assumed in this research that the quarter following the announcement on 12 September 2010 (2010-Q4) is the point that the effect is expected start taking place. To simplify the research, it does not take into account any response time. It is likely that NBFIs and banks start to react to Basel III much later than assumed. Basel III is increasing capital requirements gradually to

prevent sudden effects resulting from implementing requirements all at one point in time (DNB, 2014). For this reason it is difficult to include a valid timeframe for the effect of Basel III. This research goes with the assumption that banks and NBFIs start to react to Basel III directly after the official announcement. Another point of distortion regarding the timeframe is that Basel III covers a long period of over five years. Influence from other events that have happened during this period, such as implementation of other policies and regulation are ignored in this research.

Finally, the use of macro(economic)-variables has its limitations. Due to a lack of time and expertise in conducting regression analyses with macro variables, the variables included in the analysis may not reflect the best available indicators. Therefore, it is suggested that further research on this topic focuses on the inclusion of other macro-variables (or different statistical analyses).

## 3.2 Qualitative methods

The interviews that are conducted with 4 NBFIs operating in the Dutch mortgage market provide this research with insight in the effect of Basel III on NBFIs and their market shares. In this chapter the results of these interviews are discussed and analysed.

The respondents explained various motives for being active in the Dutch mortgage market. The most important motive for NBFIs is the attractiveness of mortgages for investors. This motive is repeated frequently and emphasized by all respondents. The appetite for mortgages is especially high among pension funds, but also among insurance companies and other investment firms. The main reason for this is the combination of low risk and high returns (relative to other European countries) on Dutch mortgages. This characteristic of Dutch mortgages is emphasized in literature, where for example [ACM \(2013\)](#); [Mulder \(2014\)](#); [Thibeault & Wambeke \(2014\)](#); [Treur & Boonstra \(2014\)](#) suggest that interest rates on Dutch mortgages are high compared to other countries. Besides, even with high LTV and DTI ratios, Dutch borrowers have low expected default rates and low arrears ([Fitch, 2016](#)). Some NBFIs specifically pointed to the difference in yield between investing in Dutch mortgages and government bonds, which shows that investing in mortgages is more attractive (as a “safe” investment), which was found by [IG&H \(2015\)](#) as well. Another firm highlighted the relatively low amount of cross-selling (offering other products to existing customers at a discount) that takes place in the mortgage market in the Netherlands. The underlying argument is that cross-selling eventually reduces the yield. An important motive for NBFIs that entered the Dutch mortgage market after the official announcement of Basel III is the opportunities they saw due to restrictive mortgage lending behaviour of banks. Other motives that are named less frequently or emphasized to a lesser extent include low entry barriers, improving housing market conditions (e.g. increasing HPI, consumer confidence), and the high quality of organisational factors in the Dutch mortgage market. Low entry barriers are discussed in [Treur & Boonstra’s \(2014\)](#) work, which points to two reasons: widespread use of mortgage intermediaries and the use of National Mortgage Guarantee schemes. In the interviews, mortgage intermediaries are more often referred to as reason for low entry barriers, whereas the comprehensive use of

National Mortgage Guarantee schemes are only named once. The motive improving housing conditions does not come forward in literature directly. Only with the research of [Burkhard & De Giorgi \(2004\)](#) an indirect link can be made, as they find macro-economic performance of a country as a determining factor for the probability of default on a mortgage, which in turn points to the riskiness of the mortgage and therefore the attractiveness for investors.

All the interviewed NBFIs revealed that they do not experience high levels of competition. The main reason is that the market is sufficiently large for all parties to satisfy their investors' preferred amount of mortgages that are lent. Studies by [Mulder \(2014\)](#) and [NMa \(2011\)](#) emphasized low levels of competition in the Dutch mortgage market since the onset of the global financial crisis. According to the interviewees, competition has increased modestly, mainly due to improving conditions in the Dutch housing market (around 2013), which caused more firms to enter the market. One firm pointed to the "extremely unhealthy situation" of the market before 2013, where a number of banks dominated the market and mortgage rates remained at high levels. Though, NBFIs do not (yet) experience this competition on high levels, only on higher levels compared to a few years earlier. This does not correspond perfectly with the literature, where [Carmichael & Pomerleano \(2002\)](#); [Bakker & Gross \(2004\)](#) argue that NBFIs provide banks with competition, so that increasing involvement of NBFIs would cause heavier competition. It is possible that this increased competition is yet to come, when more NBFIs enter the market.

All respondents argued that due to Basel III, mortgages are less attractive for banks. Banks reduced their mortgage lending activities, and their market shares decreased. This is in line with many other studies that all suggest banks to react with restrictive behaviour of mortgage lending (see for example [Roger & Vittek \(2012\)](#); [Slovik & Cournède \(2011\)](#); [Thibeault & Wambeke \(2014\)](#)). Some firms pointed out that especially mortgages with a fixed interest rate of 10 years or longer are less attractive. These mortgages are a better fit for pension funds, since the longer maturity of the mortgages matches the longer term funding of pension funds (whereas banks have short-term deposits as funding, which matches less with longer term mortgages). Some interviewees explicitly mentioned that general development in laws in regulation caused banks to be more restrictive in their lending behaviour. Discussions on leverage, stricter supervision and future regulation for example, can

cause banks to be extra restrictive in their behaviour. This is not discussed in the theoretical framework since it mainly covers effects of Basel III. Nevertheless it is an interesting finding, pointing to other factors (that have less influence than Basel III according to the interviewees) that caused banks to be more restrictive and contributed to the increase in market shares of NBFIs in the Dutch mortgage market.

All interviewed NBFIs eventually concluded that Basel III has a positive effect on their market shares. They argued that this effect is mainly due to the restrictive behaviour of banks towards mortgage lending, as discussed before, but also because of the opportunities the NBFIs took. The decreasing dominance of banks in the Dutch mortgage market opens opportunities that NBFIs can take advantage of. However, some firms make the argument that it is difficult to conclude that the increase in market shares of NBFIs is only the result of Basel III. Other factors can also contribute to changes in market shares. Nevertheless, they conclude that Basel III is the most important cause driving this trend. The following quotes (that are translated from Dutch to English) from the respondents provide insight in the effect of Basel III on the market shares of NBFIs in the Dutch mortgage market:

*“The market shares [of NBFIs] have increased. This is not necessarily because of the strength of non-banks, but mainly because of the weaknesses of banks. They had to do something with their balance sheets.”* – respondent Syntrus Achmea

*“These possibilities indeed have something to do with Basel III, in the sense that banks become less competitive in the mortgage market; this opens opportunities which we can take advantage of. In this way, non-banks expand their market share.”*  
– respondent Venn Hypotheken

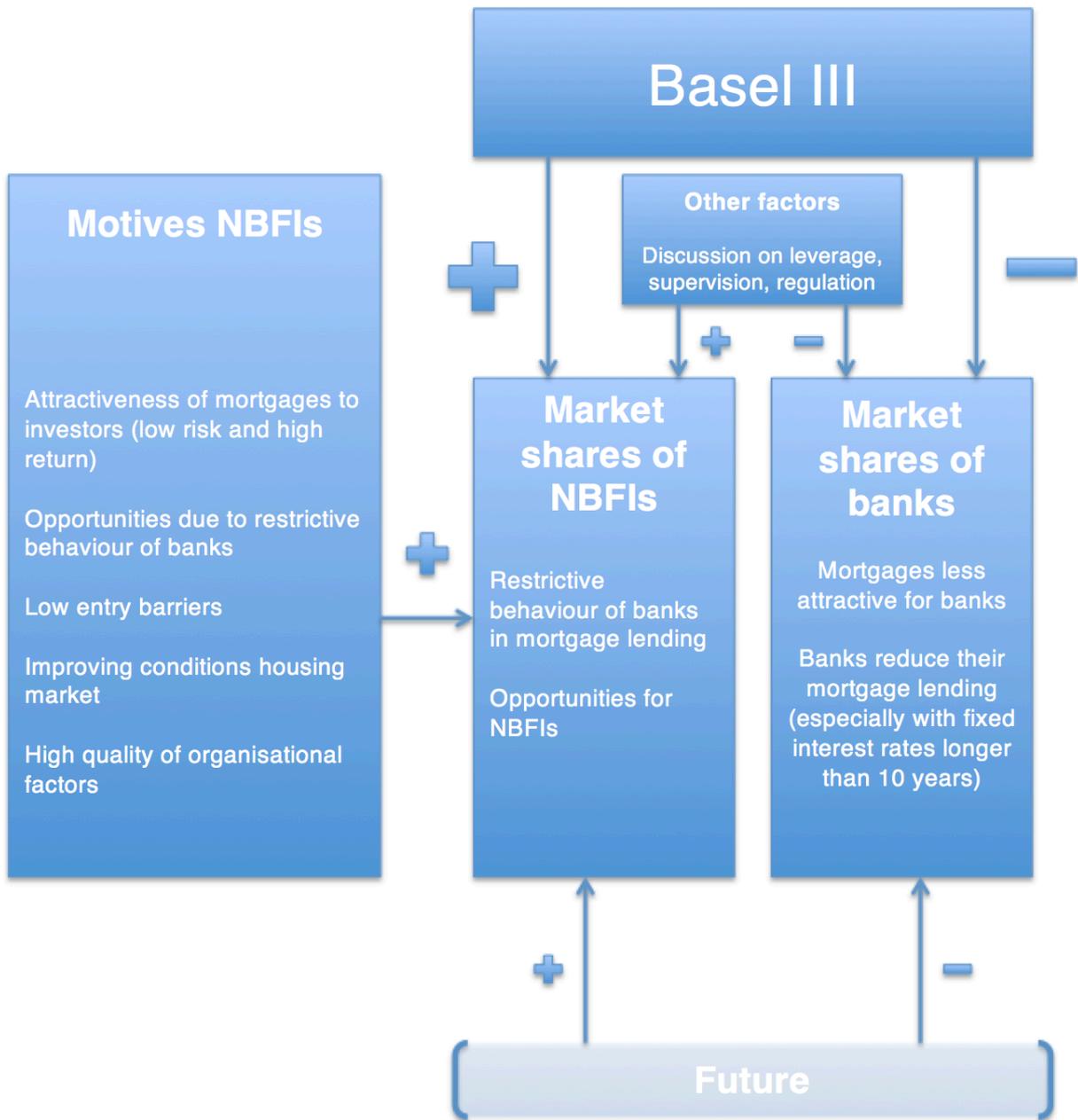
*“It is exaggerated to blame it all on Basel III. However, because of Basel III, banks have experienced tougher times. Lending mortgages is simply more expensive for banks. Maybe it is too expensive, which causes banks to be restrictive in mortgage lending, especially with long periods of fixed interest rates. This definitely has impact on their market shares.”* – respondent MUNT Hypotheken

*“What is happening now is that traditional banks are retracting, and non-banks are jumping into that space.”* – respondent De Hypotheekshop

All respondents expect the near future to be positive in terms of business for NBFIs, and see more opportunities than challenges. As long as institutional investors remain their appetite for Dutch mortgages, NBFIs can grow and become even more integrated in the mortgage market. However, most of the interviewed firms stated that the market shares of NBFIs are normalizing now, and that it will not increase more than approximately 10%. One of the challenges NBFIs face is possible stricter regulation on NBFIs.

The results of the qualitative analysis are visualized in a scheme (see figure 15)

Figure 15: Visualisation of the results of the qualitative analysis



## 4. Conclusion and discussion

### 4.1 Conclusion

This research finds a positive effect of Basel III on the market shares of Non-Bank Financial Institutions (NBFIs) in the Dutch mortgage market. Interviews conducted with 4 NBFIs reveal that Basel III negatively influences banks' behaviour in such a way that they substantially decrease their mortgage lending activities, and NBFIs seize opportunities to increase their market shares. Literature covered the effect of Basel III on banks in general and on Dutch banks in particular, all concluding to restrictive behaviour by decreasing lending and increasing interest rates. Literature suggested apart from Basel III several other factors that contributed to the rise in interest rates on mortgages in the Netherlands, such as competitive behaviour to attract savings, high concentration, and pricing constraints imposed on some Dutch banks. Interviews support literature in suggesting that the combination of relatively higher interest rates and low risk included in Dutch mortgages, is one of the most important motive for NBFIs to be active in the Dutch mortgage market. Other motives include low entry barriers (mainly due to comprehensive use of mortgage intermediaries), improving conditions on the housing market, and high standards of organisational factors. All interviewed NBFIs that entered the Dutch mortgage market after the announcement of Basel III also stressed the opportunities that occurred due to restrictive behaviour by banks as an important motive to enter the market.

The regression that included Basel III as a dummy variable and macro-variables (yield on government bonds and GDP growth) failed to find a significant effect on the market shares of NBFIs. The insignificance of the regression is expected to be the caused by limitations on the model, such as data availability, variables included, and difficulties with implementing the effect of Basel III in quantitative methods. Even though the quantitative part fails to find a significant effect, this thesis still concludes that Basel III has a positive effect on the market shares of NBFIs.

## 4.2 Discussion

This research can be used for further studies on the role of NBFIs in the Dutch mortgage market. The contradicting results of the two types of analyses make it interesting to improve the quantitative method to find significant effects, since the qualitative method showed an effect was experienced whereas the quantitative analysis failed to find a significant effect. Academic literature still needs to address this topic to gain better understanding of this trend. [Financial Times \(2016\)](#) referred to the rising trend of NBFIs in the Dutch mortgage market as a “striking embodiment of a global trend”, so research on other mortgage markets can also be conducted to examine effects of Basel III on market shares of NBFIs. Qualitative research, as conducted in this study, can be used for this. For quantitative analyses in future studies it is suggested to look at individual data on NBFIs, instead of aggregated market shares. In this way, other quantitative methodology can be applied, such as event study, which is often used to measure effects of regulation on companies. Future research can also use earlier works on the Dutch mortgage market. For example, the study conducted by [NMa \(2011\)](#) shows how indicators such as HHI and C4 can be included to study the concentration of lenders in the market.

The scope of the topic of NBFIs in the Dutch mortgage market can also be placed on the consequences of NBFIs being increasingly active in the Dutch mortgage market. As this study suggests, NBFIs are becoming more integrated in the mortgage market in the Netherlands. The decreasing dominance of banks can have profound consequences for the market, which is vital for policymakers and regulators. Regulators for example, can use such studies to further enhance the stability of the financial system, whereas policymakers can use this to come up with better policies for the mortgage market that match current trends.

## References

- ACM. (2013). *Concurrentie op de hypotheekmarkt. Een update van de margeontwikkelingen sinds begin 2011.*
- Allen F., Qian J. & Qian M. (2005). *Law, Finance and Economic Growth in China.* J Financ Econ 77.
- Ayyagari, M., Demirgüç-Kunt, A. & Maksimovic, V. (2007). *Formal versus Informal Finance: Evidence from China.* World Bank Policy Research Working Paper.
- Bakker, M. & Gross, A. (2004). *Development of Non-bank Financial Institutions and Capital Markets in European Union Accession Countries.* World Bank Working Paper No. 28. Washington, D.C.: The World Bank.
- Basel Committee on Banking Supervision (BCBS), BIS. (2010a). *Press release. Basel: Bank for International Settlements (BIS).*
- Basel Committee on Banking Supervision (BCBS), BIS. (2010b). *Consultative Document: Strengthening the resilience of the banking sector.* Basel: Bank for International Settlements (BIS).
- Borio, C. (2003). *Towards a macroprudential framework for financial supervision and regulation?* CESifo Economic Studies, vol 49, no 2/2003, p181–216.
- Borio, C. (2011). *Rediscovering the macroeconomic roots of financial stability policy: journey, challenges and a way forward.* BIS Working Papers No 354, September.
- Burkhard, J. & De Giorgi. (2004). *Intensity Based Non-Parametric Default Model for Residential Mortgage Portfolios.*
- Carmichael, J. & Pomerleano, M. (2002). *The Development and Regulation of Non-Bank Financial Institutions.* Washington, D.C.: World Bank.

- Carvajal, A., Dodd, R., Moore, M., Nier, E., Tower, I. & Zanforlin, L. (2009). *The Perimeter of Financial Regulation*. International Monetary Fund.
- Claessens, S., Dell'Ariccia, G., Igan, D. & Laeven, L. (2010). *Lessons and Policy Implications from the Global Financial Crisis*. International Monetary Fund.
- CPB. (2015). *Een wereld zonder banken? Marktfinanciering en bankfinanciering in perspectief*. CPB Policy Brief 2015/14.
- De Nicolò, G., Favara, G., & Ratnovski, L. (2012). *Externalities and macroprudential policy*, IMF Staff Discussion Note 12/05.
- Dutch National Bank (DNB). (2014). *Dutch Banks are keeping up with increasingly stringent Basel III requirements*. DNBulletin 14/12.
- Dutch National Bank (DNB). (2015). *Dutch mortgages in the DNB loan level data*. Occasional Studies Vol. 13-4.
- European Central Bank (ECB). (2009). *Housing Finance in the Euro Area*. Occasional Paper Series No 101, 09/03.
- European Central Bank (ECB). (2015). *The state of the house price cycle in the euro area*. ECB Economic Bulletin, Issue 6 / 2015.
- European Commission (EC). (2012). *Non-bank financial institutions: Assessment of their impact on the stability of the financial system*. Economic Papers 472, 12/11.
- Fadzlan, S. (2006). *The Efficiency of Non-Bank Financial Institutions: Empirical Evidence from Malaysia*. International Research Journal of Finance & Economics; 2006 Issue 6, p49-65.
- Financial Times. (2015). *Dutch pension funds turn mortgage lenders*. Article accessed on 8-2-2016 via [www.ft.com](http://www.ft.com)

- Financial Times. (2016). *Dutch lenders lose ground in battle for new mortgage market*. Article accessed on 8-2-2016 via [www.ft.com](http://www.ft.com).
- Fitch. (2016). *Global Housing and Mortgage Outlook – 2016*. Accessed on 10-5-2016 via [www.themreport.com](http://www.themreport.com)
- Frait, J. & Komárková, Z. (2011). *Financial stability, systemic risk and macroprudential policy*. Czech National Bank, Financial Stability Report 2010/2011.
- IG&H. (2015). *Hypotheekupdate Q2 2015: Regiepartijen hebben 10% van hypotheekomzet in handen*. Accessed on 20-3-2016 via [www.igh.nl](http://www.igh.nl)
- IMF. (2009). *Lessons of the Financial Crisis for Future Regulation of Financial Institutions and Markets and for Liquidity Management*.
- Ingram, F. J. & Frazier, E. L. (1982). *Alternative Multivariate Tests in Limited Dependent Variable Models: An Empirical Assessment*. The Journal of Financial and Quantitative Analysis, Vol. 17, No. 2 (Jun., 1982), pp. 227-240.
- King, P. & Tarbert, H. (2011). *Basel III: An Overview*. Banking & Financial Services, Policy Report Volume 30, No 5. Wolters Kluwer.
- Kroot, J. & Giouvriss, E. (2016). *Dutch mortgages: Impact of the crisis on probability of default*. Finance Research Letters, <http://dx.doi.org/10.1016/j.frl.2016.04.018>.
- Lawrence, E.C. & Smith, L. D. (1992). *An analysis of default risk in mobile home credit*. Journal of Banking and Finance 16 (1992) 299-312. North-Holland: Elsevier Science Publishers B.V.
- Lichtman, M. V. (2012). *Qualitative Research in Education*. 3<sup>rd</sup> edition. Sage Publications Inc.
- Mulder, M. (2014). *The impact of concentration and regulation on competition in the Dutch mortgage market*. Journal of Competition Law & Economics, 10(4), 795-817. Oxford University Press.

NMa. (2011). *Sectorstudie Hypotheekmarkt: een onderzoek naar de concurrentieomstandigheden op de Nederlandse hypotheekmarkt.*

NVB. (2014). *The Dutch Mortgage Market.* Accessed on 17-3-2016 via [www.nvb.nl](http://www.nvb.nl).

Patton, M. Q. (1990). *Qualitative Evaluation and Research Methods.* Accessed on 20-5-2016 via <http://www.uwex.edu/ces/tobaccoeval/pdf/EthicsInt.pdf>.

Roger, S. & Vittek, F. (2012). *The Global Macroeconomic Costs of Raising Bank Capital Adequacy Requirements.* IMF Working Paper 12/44.

Slovik, P. & Cournede, B. (2011). *Macroeconomic Impact of Basel III.* OECD Economics Department Working Papers, No. 844, OECD Publishing.

Thibeault, A. & Wambeke, M. (2014). *Regulatory Impact on Banks' and Insurers' investments.* Ghent: Vlerick Business School.

Treur, L. & Boonstra, W. (2014). *Competition in the Dutch Mortgage Market: Notes on Concentration, Entry, Funding and Margins.* Journal of Competition Law & Economics, 10(4), 819-841.

Vittas, D. (1998). *The Role of Non-Bank Financial Intermediaries (with Particular Reference to Egypt).* Policy Research Working Paper. The World Bank.

# Appendices

## Appendix 1: Interview topics and questions

### *Topic 1: Introduction*

- What activities does this company engage in?
- For how long has this company been active in the Dutch mortgage market?

### *Topic 2: Motives for being active in the Dutch mortgage market*

- For what motives did the company enter the Dutch mortgage market?
  - o Discuss the motives from literature

### *Topic 3: Competition in the Dutch mortgage market*

- How do you experience competition in the Dutch mortgage market?
- What type of firm(s) do you consider as the most important competitor for this firm?

### *Topic 4: Effect Basel III*

- What do you consider as the most important effect of Basel III regulations on Dutch banks?
- What do you consider as the most important effect of Basel III regulations on NBFIs?
  - o Discuss the effect on this firm (also market shares)

### *Topic 5: Future*

- What opportunities will NBFIs have in the Dutch mortgage market in the coming years?
  - o Discuss whether this is related to Basel III
- What challenges will NBFIs face in the Dutch mortgage market in the coming years?
  - o Discuss whether this is related to Basel III
- How do you see the division of mortgage market shares between banks and NBFIs in a few years?

## Appendix 2: Comparison between capital charges for Solvency II (regulation for insurance companies) and Basel III

(source: Thibeault & Wambeke (2014), self edited)

<b>Asset class – rating – duration</b>	Solvency II	Basel III
Government bond AA 10 years	0%	0%
Residential mortgage loan A 15 years, 80% LTV	0%	3.68%
Type 1 securitisation A 3 years	22.20%	5.25%