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Mortgage funds

Examining the emergence of new mortgage
finance methods in Sweden

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Bolånefonder: En undersökning av nya finansieringsmetoder för bolån

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Approved 2018-10-26	Examiner Hans Lööf	Supervisor Christian Thomann
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Abstract

Recent reports from the Swedish Financial supervisory authority and the Swedish competition agency suggest that while bank profitability is high in Sweden, the dominant position of a handful of actors have created a situation where consumers are left displeased. The mortgage market has been highlighted as one of the most concerning markets and yet, gross margins on mortgages are reaching record levels. However, as of recent, two new actors have announced their intention to challenge the incumbent banks by importing a new mortgage financing method from the Netherlands. The financing model is rooted in the creation of a *mortgage fund* and could have several particularly interesting implications for the Swedish mortgage market. Thus, the purpose of this thesis is to examine mortgage funds and its ability to change current market structures in Sweden. By examining the relationship between return on assets and cost-to-income ratios for Swedish mortgage brokers during 2011-2017, the level of competition on the Swedish mortgage market is estimated and examined in relation to the introduction of mortgage funds. It is found that the introduction of mortgage funds in Sweden have caused a structural shift of the market by altering the value-chain of Swedish mortgages. The conclusion of this study is that mortgage funds, if managed correctly, can be a helpful addition to the Swedish mortgage market by bolstering competition and diversity.

Key words: Mortgage funds, disintermediation, financial innovation, mortgage market competition



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Sammanfattning

Finansinspektionen och konkurrensverket har nyligen konstaterat en rad problematiska områden gällande den svenska bolånemarknaden. I sina rapporter konstateras det bland annat att den dominanta positionen som storbankerna håller hämmar konkursen och begränsar konsumenternas valmöjligheter. Samtidigt har storbankerna genererat rekordvinster med just bolån som kassako under det senaste året. Emellertid så har ett antal nya nisch aktörer börja dyka upp på marknaden, där vissa använder sig av alternativa finansieringsmetoder som konkurrensfördel. En sådan finansieringsform är bolånefonder där utgivandet av bolån finansieras genom en fond som riktar sig till institutionella investerare. Modellen med bolånefonder är intressant utifrån ett flertal perspektiv, inte minst för dess framgångar på den holländska marknaden där det lyckats öppna bryta upp marknaden. Syftet med denna studie är således att undersöka bolån som finansieringsmetod i Sverige samt dess möjligheter att bryta upp konkurrensen på den svenska bolånemarknaden. Genom att undersöka förhållandet mellan avkastning på eget kapital och kostnadsinkomstförhållande bland svenska bolåneaktörer under 2011–2017 uppskattas konkurrensen på den svenska bolånemarknaden i relation till bolånefonder. Resultaten indikerar att bolånefonder är ett tydligt exempel på ett skifte av värdekedjan för bolån. Vidare så visar studien att bolånefonder under rätt förhållanden kan vara ett positivt tillskott till den svenska bolånemarknaden genom att öka effektiviteten och främja konkurrensen.

Nyckelord: Bolånefonder, disintermediering, finansiell innovation, konkurrens

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List of Abbreviations

ABS - Asset backed securities

ARM - Adjustable-rate mortgages

CRN - Concertation ratio N

DTI - Debt-to-Income Ratio

FRM - Fixed-rate mortgages

FI - The Swedish financial supervisory authority

KV - The Swedish competition agency

LTV - Loan-to-Value ratio

MBS - Mortgage backed securities

NHG - The Dutch National Mortgage Guarantee

RWA - Risk weighted assets

1 Introduction

The purpose of this chapter is to provide a contextual background and problem statement for the thesis. First, a brief overview of the Swedish banking industry and mortgage markets is provided. Second, the research questions are formulated and motivated. Lastly, the expected thesis contribution and the thesis disposition is outlined.

1.1 Background

Recently, a growing concern within the Swedish Financial supervisory authority (Finansinspektionen or FI) and the Swedish competition agency (Konkurrensverket or KV) has risen with regards to the competitive situation of the Swedish banking market. Namely, two key areas of concerns have been highlighted. First, that Swedish consumers have a lack of trust and are generally displeased with their current bank. Second, that the lack of adequate competition, consumer protection and high switching cost prohibits consumer to improve their current situation (Finansinspektionen, 2017c and Konkurrensverket, 2013).

These problems are further fuelled by the dependence Swedish consumers have towards their banks. Contrary to other countries, in Sweden, a relatively high share of consumers income is devoted to financial services provided by banks which places the consumers in a misfortunate and exposed position. As is such, an intense discourse has recently sparked regarding the bank's high fees, increasing mark-ups and profitability (Riksbanken, 2011 and Konkurrensverket, 2013). Combined, the four largest Swedish banks (SEB, Swedbank, Nordea and Handelsbanken, further referenced as "the big four") earned a profit of more than SEK 100 billion last year, with mark-ups on mortgages reaching all-time highs. The big four holds around 75 % of the credit and debit market and around 80 % of all mortgage loans in Sweden (Swedish Bankers Association, 2017 and Finansinspektionen, 2018a).

The dominant position of the big four demonstrates the problematic competitive situation on the Swedish banking market and could according to the Swedish consumer agency be an explanatory factor to why consumers are left displeased. Consumer reports show that the Swedish banking and financial industry is rated amongst the top three most problematic industries with regards to trust and transparency. Consumers lack confidence and feel that there is little to no insight as to how banks set their interest rate and charge for various financial services.

The mortgage lending market is rated as one of the most problematic market segments by consumers and happens to be one of the largest and most profitable market segments for the Swedish banks (Konkurrensverket, 2013 and Swedish Bankers Association, 2017). Mortgage loans have grown from about a third of GDP to two thirds over the past decade (Finansinspektionen, 2017a). However, as of recent, a handful of new actors have announced their intention to challenge the big four on the mortgage market. Some of these entrants hope to compete by adopting a new mortgage financing method. A mortgage financing method that originated from the Netherlands and is rooted in the creation of a mortgage fund. There are several particularly interesting aspects of these announcements. First, by financing mortgages via a mortgage fund, non-banks are suddenly able to finance and/or provide mortgage loans. Given the problematic competitive situation on the Swedish banking market, mortgage funds could potentially allow for increased competition by lowering the barriers to entry. Secondly, mortgage funds allow for a relatively simple way of the lending process through disintermediation, effectively reducing overall costs of providing mortgages which in the end could result in increased

market efficiency and an improved competitive situation (De Nederlandsche Bank, 2016 and Hale, 2016)

1.2 Problematization

While bank profitability is high in Sweden, the dominant position of the big four have created a situation where consumers are left displeased. There are few options available for consumers and the banks have gradually built a “*universal banking*” system where consumers are prompted to gather all their financial services with one bank. This has left many consumers concerned and stuck as switching costs are high (Konkurrensverket, 2013 and Carlsson Hauff, 2018). Given the concerning remarks around the problematic mortgage market in Sweden, the question as to whether new actors can increase the competition arises. What makes the examining of the Swedish mortgage market even more motivating is the similarities it shares with the Dutch mortgage market. Both countries have around 70 % of private owned real estates, both countries have low default rates on mortgage loans, both countries have relatively high loan-to-value ratios (LTV) and both countries mortgage markets are dominated by a hand full of big actors with large market shares (Finansinspektionen, 2017b). In the Netherlands non-bank lending partially via mortgage funds started to gain traction in the aftermath of the 2008/2009 financial crisis. De Nederlandsche Bank (DNB), have acknowledged several benefits including increased competition as a result of the rise in non-bank lending and reports that more than 20 % of new loans are funded through non-banks. Furthermore, DNB have reported several benefits in the arise of new non-bank players on the market, such as lowering overall risks in the financial system, boost of diversity and increased financial stability (De Nederlandsche Bank, 2016).

As presented above, it is evident that Sweden have a problematic competitive situation on the mortgage market while sharing several characteristics with the Dutch mortgage market. Furthermore, the Dutch mortgage market has seen several improvements such as increased competition since the introduction of non-bank lending partially through mortgage funds. Given the similarities between the Swedish and Dutch mortgage market, and the recent improvement the Dutch market has seen in the emergence of non-bank lending. The question as to what potential gains the Swedish mortgage market can benefit from by importing mortgage funds becomes an interesting topic to investigate.

1.3 Purpose

It is thus my intention to examine mortgage funds as a way of financing mortgages and its ability to change current market structures in Sweden. I will examine mortgage funds in relation to conventional financing methods to gain an understanding of what potential influence it can have on the Swedish mortgage market. The aim is to provide a thorough analysis of the Swedish mortgage market and its outlook. This thesis should be of interest to anyone who wish to gain a deeper understanding of mortgage funds, the competition on the Swedish mortgage market and how the two interacts. This thesis can serve as a foundation in decision making for any stakeholders that are active on the Swedish mortgage market. Banks may see this investigation beneficial as to how they could navigate on the mortgage market, authorities may see this thesis as a basis for policy making and both consumers and investors may see this thesis as a mean to understand mortgage funds and how they could impact their current situation.

1.4 Research questions

To examine mortgage funds as means of financing mortgages and their potential impact on the Swedish mortgage market the following research questions were defined:

1. Can mortgage funds increase the competition on the Swedish mortgage market?
2. What implications does the usage of mortgage funds have on the Swedish mortgage market?

1.5 Expected contribution

At the start of this thesis there was to my knowledge no previous research on the emergence of mortgage funds on the Swedish mortgage market. However mid-way through this thesis, the economist Tomas Pousette published an investigation of mortgage funds and their potential impact on the Swedish mortgage market in cooperation with the Swedish competition agency. That investigation was conducted during the winter of 2017, before any actual usage of mortgage funds in Sweden. This thesis is thus unique in the sense that mortgage funds will be examined in their presence on the Swedish mortgage market. While Pousette (2018) examined bank specific performance indicators to induce the potential impact of mortgage funds on the competition, this thesis will examine measurements of banking competitive to induce the potential impact of mortgage funds on competition. The expected contribution can thus, partially be viewed as a follow-up to Pousette (2018), and partially as an academic approach to understanding mortgage funds and the competitive situation on the Swedish mortgage market.

1.6 Disposition

The rest of the thesis is structured as follows; section 2 sets up the theoretical framework of the thesis, section 3 explores the relevant literature for the topic. Section 4 will cover the methodological approach, data and research design of the thesis, section 5 provides the institutional setting and background of the development of the Swedish mortgage market. In section 6 the results are presented, and a discussion is held based on the gathered empirical data and theoretical framework. Lastly, in section 7 the research questions are answered and some interesting topics for future research are highlighted.

2 Theoretical Framework

This section covers the theoretical framework upon which the arguments in this thesis are built on, as well as some key concept that are necessary for understanding mortgage funds and financial markets. The section is divided into two main parts, where the first part is devoted to theories of partial equilibrium and the second part covers the technicalities of mortgage financing.

2.1 Structure of a monopolistic competitive market

To understand the dynamics of competition and how firms interact one can use economic theories and models. One such theory that is relevant for most countries mortgage markets and the Swedish market in particular is the theory of imperfect competition. The theory of imperfect competition tries to explain the market structure whenever a market, hypothetical or real, violates the abstract tenets of neoclassical pure or perfect competition. Since all real markets exist outside of the plane of the perfect competition model, each can be classified as imperfect (Leece, 2008). Market structures such as monopoly, oligopoly and monopolistic competition are all included under the theories of imperfect competition. However, as most other markets, the Swedish mortgage market most resembles a monopolistic competition (Karlsson et al., 2007)

A monopolistic competitive market is distinguished by relatively large group of firms that sell differentiated products, that buyers view as close though not perfect substitutes for one another. Each firm therefore enjoys a limited degree of market power in the market for its own particular product variant. Firms provide products with similar technology and market entry occurs when a new firm introduces a previously non-existent variant of the product. In such a market the demand for any given product X will depend on its own price and the price of all other variants. Each firm produce according to when the marginal cost is equal to marginal revenue but since all actors have some degree of monopolistic power, prices are above marginal costs. The monopolistic competitive market has two equilibria, a long-run and short run-equilibrium. The short-run equilibrium occurs when a fixed finite number of active firms choose price to maximize profits, given the prices chosen by the other firms. While in the long-run equilibrium entry and exit occurs so that profits on the market will eventually reach zero. Figure 1 illustrates the short and long run equilibrium on a monopolistic competitive market (Jehle & Reny, 2001).

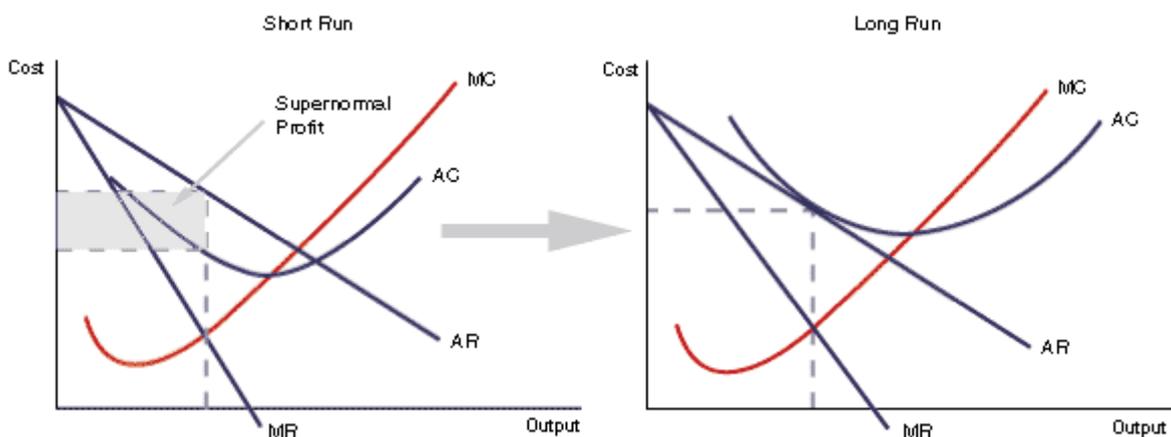


Figure 1. Short-run and long-run equilibrium in monopolistic competition *Source: Jehle & Reny (2001).*

Some key characteristics of monopolistic competitive markets are that each firm makes independent decisions about price and output, based on its product, its market, and its costs of production. However, the variation in cost of production is usually low as knowledge is widely spread between firms. Furthermore, the entrepreneur has a more imperative role on a monopolistic competitive market compared to a perfectly competitive markets because of the increased risks/rewards associated with decision making. Another key characteristic of monopolistic competition is that products are differentiated, usually we can distinguish between differentiation through production, marketing, human capital and distribution (Jehle & Reny 2001).

2.2.1 Mortgage finance methods: Covered bonds

As previously noted, actors on a monopolistic competitive market compete via differentiation. As mortgages is a relatively homogenous product, production differentiation in mortgages are mainly done through their financing methods (Leece, 2008). It is therefore relevant to cover the theoretical framework of the traditional mortgage financing methods in contrast to mortgage funds. As mortgages traditionally have been provided by banks, they have thus been financed through banking operation tools. At its most fundamental level, the traditional bank finance loans (credit) with savings (deposits). However, contrary to international banking tradition, the typical Swedish bank runs on a deposit deficit (i.e. they are lending out more than they are receiving from deposits). The deposit deficit has emerged over time alongside the development of the Swedish financial system, partially due to Swedish consumers reluctance to hold cash in regular savings account. Instead Swedish consumers seek out investment opportunities in exchange markets, which implies that banks must find finance elsewhere (Finansinspektionen, 2013).

Specifying and calculating the exact costs and sources of finance for mortgage is difficult and requires a lot of insight in the banks' balance-sheet. However, the Swedish financial supervisory authority (FI) has developed a general framework in which they try to estimate the general costs of mortgages for the typical Swedish bank. By making some assumptions and analysing the liabilities of the banks' balance sheets, FI can estimate the size of various financing sources. In their framework, they identify and divide the financing sources into two main categories, *covered bonds* and *other financing sources*. Where other financing sources are such things as non-covered bonds, market loans and deposits (Finansinspektionen, 2013).

Covered bonds are however the most important source of finance for Swedish mortgages. Approximately 75 % of Swedish mortgages are financed through covered bonds (Finansinspektionen, 2017b). The main feature that distinguish a covered bond from a regular bond is that it is guaranteed in the underlying security, usually the property of the mortgage in concern¹. This gives covered bonds an additional level of security since if the bond issuer or the mortgage holder for some reason are unable to deliver its payments, the bond holder has a priority right to the underlying security or assets that is covered in the bond. The investor is thus protected against the credit risk of the issuing company and the default risk of the mortgage holder, effectively making covered bonds less risky than conventional bonds. Figure 2 depicts a simple case of bank funding through covered bonds.

¹ The degree of which the bond has to be filled with mortgages may vary depending on country legislation.

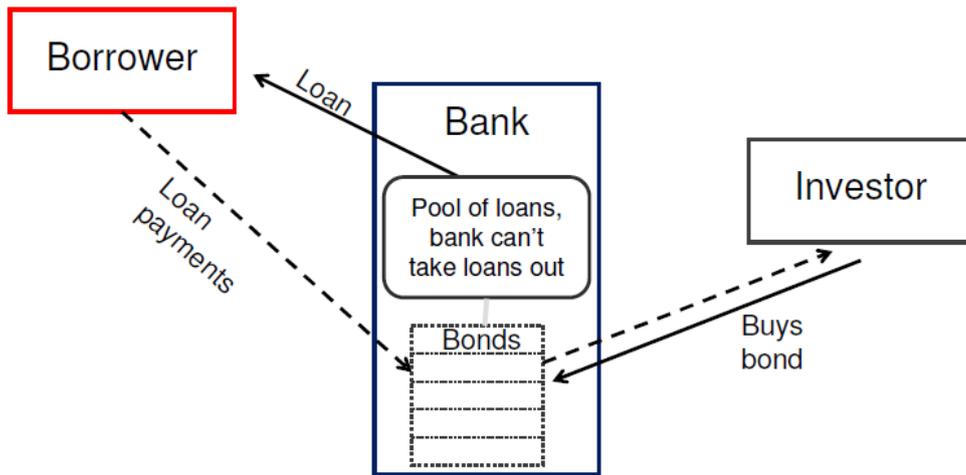


Figure 2. Illustration of Covered bond funding steps. *Source:* Carbo-Valverde et al., 2013

In this simple version of covered bonds, the bank originates a mortgage and designates the mortgage as a part of a pool in the bond and the mortgages remain on the bank's balance sheet. The face value of mortgages in the pool must be at least as large as the face value of the covered bonds, although the value of mortgages usually is adjusted so that they exceed the value of the bonds (overcollateralization). One important feature of covered bonds is that if a mortgage in the bond pool defaults or is repaid early, the bank replaces the loan with a new mortgage. This keeps the size of the pool predictable (Carbo-Valverde et al. 2017).

2.2.2 Mortgage finance methods: Mortgage funds

The pivotal focus of this thesis are mortgage funds. A mortgage fund is an investment fund in which the underlying asset predominantly consists of mortgages (mortgage receivables or cash) instead of securities such as stocks and bonds. Mortgage funds can be structured in a variety of ways, however, in its simplest form an originator sets up an investment fund in order to raise funds for mortgages. After the mortgages are provided to consumers, the interest from the mortgages are then distributed to the investor except for some administrative fee. In this simple case, any investor regardless of tick size can participate by buying a fraction of the interest payments that are provided from the assets in the fund and gains exposure to the entire pool of mortgages. The second form is a mortgage fund that allows investors to participate by buying the interest rate from a segregated part of the assets in the fund. This allows the investor to target some specific type of mortgage loans so that the risk/return rate can be matched to the investor profile. However, since the pool of underlying mortgages are separated, a larger tick size is usually required to gain the same amount of diversification as in the simple case (Bosman, 2017). Figure 3 depicts the simple flow-chart of a mortgage fund.

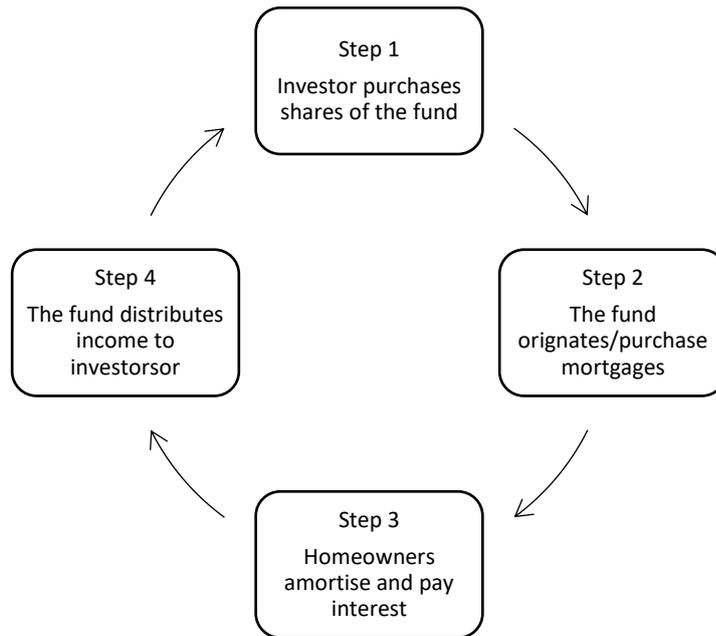


Figure 3. Flowchart of the essential mortgage fund steps.

Mortgage funds are typically targeted at larger investment institutions such as pension funds and insurance companies that wish to diversify their portfolio and spread their risk by gaining exposure towards the mortgage market. Since investors can invest directly in the mortgages through the fund, the need for an intermediary (bank), becomes obsolete and allows for non-banks to tap in to the mortgage market. Consequently, non-banks can fund and provide mortgages without the typical costs that are associated with banking operations. The reduced cost of raising funds for mortgages via a fund implies that the originator has a competitive advantage compared to regular banks (De Nederlandsche Bank, 2016).

2.2.3 Mortgage finance methods: Comparative analysis of mortgage funds and covered bonds

The difference between covered bonds and mortgage funds are interesting for several reasons. First, depending on the differences one could reach a conclusion as to which situation each method could be used. Secondly, since they are structured in different ways, they affect different parties in the value-chain differently. In this section, the differences will be mapped out from aspects such as profitability, balance-sheet, management and agency problems.

From an investor's perspective, the main difference between covered bonds and mortgage funds is the fact that the investor is exposed to the originator's credit risk in the case of mortgage funds, while having a guarantee in the security that mitigates the credit risk with covered bonds. Since covered bonds require the originator to hold on to the mortgage that is representative of the bond, the investor can claim a receivable from the bank on the actual underlying security in the case of default. While investors of a mortgage fund have no legal claim on the actual mortgage, the investor is left in a principal-agent situation in which the contractual features of the mortgages become of great importance. Since the contractual features of the mortgages such as LTV-ratios, DTI-ratios and credit scoring constitutes the overall risk of the assets in the fund it translates to end risk for the investor. Given that the investor wants to find an investment that matches their risk assessment, the investor needs to make sure that the portfolio matches that assessment (Pousette, 2018).

Another difference between mortgage funds and covered bond is their respective liquidity and transferability features. From the investor's perspective liquidity and transferability matters in the investment decision, and from the originators perspective both are important in order to cope with refinancing. Covered bonds are generally both more liquid and more transferable than mortgage funds. Partially because covered bonds aid banks liquidity and balance-sheet management since they are usually issued on a shorter term to maturity (2-5 years). While participation in a mortgage fund is usually considered a long-run (5-10+ years) investment. Take for instance the simple case of a mortgage fund in which the investor doesn't have full control of the underlying mortgage loan receivables. In the simple case, for an investor to successfully exit the fund, there must be enough liquidity within the fund to redeem the participation of the investor or the investor needs to find a third party that is willing to buy the participation. In the case of a mortgage fund that allows for exposure to segregated parts of the underlying assets, the transferability is enhanced since the investor can customize the portfolio to match the investors requirements and then take control of the underlying mortgage loan receivable. Either through a special holding company or directly on the investors balance-sheet. The investor can then sell its participation as the complete portfolio or parts of it via securitization (Bosman, 2017).

From a management perspective, the mortgage fund stands out in its ability to be operated with less man-power than covered bonds. Through disintermediation, the mortgage fund provides a relatively simpler way of the lending process in the sense that the number of actors in the value-chain can be reduced by allowing direct investments in mortgages. The reduction in the value-chain implies the possibility of a more cost-effective business model. In combination with new technological capabilities such as digitalization tools, the mortgage finance and origination procedure can be rationalized. The gains from the reduction of costs can be distributed however the originator of the fund seems fitting. For example, the originator can provide a more attractive investment opportunity by offering a higher yield than covered bonds, or they can offer a more attractive offer to customers by lowering interest rates (De Nederlandsche Bank, 2016).

Financial institutions and banks are required to hold a certain capital base of their assets. This is referred to as capital requirements and are supposed to work as a security and buffer to hedge against risks in the organization. The capital requirements vary in size and shape depending on the risk and type of organization. For example, the capital requirements for banks are not the same as for pension funds and insurance companies. Since pension funds and insurance companies are the main investor in mortgage funds, capital requirements are another dividing line between covered bonds and mortgage fund. Pension funds and insurance companies typically have lighter restrictions on the capital requirements than banks. In Sweden, pension funds and insurance companies mainly follow Solvency 2 while banks must obey Basel 3. The capital requirements for mortgages with lower LTV-ratios are typically lower under Solvency 3 than with Basel 3. This gives mortgage funds an advantage in the sense that investors in the fund are not required to hold as much assets in their capital base (Pousette, 2018).

From a competitive perspective, mortgage fund differs from covered bonds since they allow for new actors to enter the market by lowering the barriers to entry. Since mortgage funds allows for disintermediation, the typical requirements that are associated with banking operations are mitigated and new actors can transcend and enter the market. Table 1 shows a synopsis of the different features of covered bonds and mortgage funds

Covered bonds**Mortgage funds**

General structure		
What are the underlying assets?	Mortgages loans and other credits such as government receivables, as well as receivables from other finance houses. The pool of assets is dynamic in the sense that it can be changed	Primarily in mortgages and liquidity in government treasury bills with AAA-rating and max 1y term. The pool of assets is dynamic in the sense that it can be changed
What are the Security requirements of the underlying assets?	The pool of underlying assets must be at least 80 % mortgages according to Swedish law	No regulated requirements. However, each issuer will usually present a target balance of assets in the portfolio
What are the maturity rates?	2-5 years	At least 5-10 years with recommendation of 15+ years
Investor		
What is the potential yield for the investor?	Agreed coupon rate, usually based of STIBOR and some additional mark-up	Interest rate from mortgages within the portfolio minus administrative fees from the issuer
What is the assigned security rating?	May vary but usually AAA by Moody's and S&P in Sweden	For the time being, two use cases in Sweden are rated AAA by Moody's and S&P
What are the investors opt-out options?	Sold on a secondary market that allows for easy transformation between investors	Available only if the fund has enough liquidity or if there is another investor willing to participate
What risks does the investor face?	Mainly the risk of default from underlying mortgages	Risk of default from underlying mortgages as well as credit risk of the issuer
Issuer		
What risks does the issuer face?	Credit risk from mortgages kept on the balance-sheet of originator	Credit risk from mortgage kept on the balance-sheet of originator
What are the costs of issuance?	Internal banking rate (STIBOR) plus an additional margin for interest swaps and other administrative costs and profit	Administrative and management costs of setting up and maintaining the fund

Table 1. Comparison of covered bonds and mortgage funds

3 Literature review

The purpose of the literature review is to provide contextual background of the relevant literature. To understand the dynamics of banking competition and how the introduction of mortgage funds could impact the Swedish mortgage market, a review of banking competition, mortgage pricing and some other economical competes that are imperative in the setting of mortgage funds are reviewed.

3.1 Banking competition

The level of competition in the banking sectors is likely to have far-reaching implications for economic growth, productivity consumer welfare and financial stability (Sinn, 2013). As is such, theoretical and empirical research that can assess the extent of competition in banking markets therefore has imperative implication for policy makers and stakeholders. Most of the literature consists of banking competition in its relation to economic growth and financial stability. While it has been established that a connection between the three variables exists, there is some ambiguity as to how they are connected and to what extent they impact each other (Jayakumar et al., 2018).

Usually, a decent level of competition in any market is associated with positive externalities such as increased innovation, product quality and efficiency. Financial markets are not an exception to this rule, however, as for the relationship between banking competition and financial stability, the empirical evidence is scattered (See for example; Andrievskaya & Semenova, 2016, Kasman & Kasman, 2015; Tabak et al., 2012). The literature of banking competition and financial stability can be divided into two attitudes. The traditional “competition-fragility” view, where more bank competition erodes market power, decreases profit margins, and results in reduced franchise value that encourages banks risk taking. The alternative “competition-stability” view which states that more market power in the loan market may result in increased bank risk as the higher interest rates charged to customers make it harder to repay loans and exacerbate moral hazard and adverse selection problems (Berger et al., 2009). Furthermore Schaeck et al., (2009) suggested that competition and concentration capture different characteristics of banking systems, where concentration was an inappropriate proxy for competition. Their findings suggest that policies promoting competition among banks, if well executed could have the potential to improve systemic stability if designed properly.

As for the relationship between banking competition and economic growth, the general idea is that banking competition promote financial markets and thus increase economic growth. However, as with the relationship between banking competition and financial stability the empirical evidence is fragmented (see for example; Fernandez et al., 2016; Coccoresse, 2008; Bolbol, Fatheldin, & Omran, 2005). The literature of banking competition and economic growth can be divided into three theoretical lines of reasoning.

(1) The Supply-leading hypothesis of banking competition (SLH), which argues that banking competition contributes to economic growth through two main channels; first, bank competition plays a substantial role in economic growth by facilitating credit access to new firms which leads to economic growth; and second, markets that rely on external finance has slower economic growth, thus an increase in market power amongst banks brings faster growth in firms and economic growth in general. A selection of studies supporting this hypothesis are, Coccoresse (2008), Carbo et al. (2009), Caggiano and Calice (2016), and Mitchener and Wheelock (2013).

(2) The Demand-following hypothesis of banking competition (DHF) which states that as the economy expands, the demand for banking competition increases, leading to the growth of the banking sector.

These studies argue that the macroeconomic variables such as GDP per capita and the natural rate of unemployment strongly influence banking competition. Thus, countries who tend to set policies to promote competition in the banking sector may create spill-over effects on macroeconomic variables and thus, on economic growth. Some studies that support this hypothesis are Coccoresse (2004, 2008)

(3) The Feedback hypothesis of banking competition and economic growth (FBH) which states that banking competition and economic growth reinforce each other. Banking market power has its highest growth effect at its intermediate values (i.e., neither perfect competition nor monopoly). There is thus an inverted-U-shaped effect of banking competition on economic growth. A selection of studies supporting this hypothesis are De Guevara and Maudos (2011).

3.2 Measurements of banking competition

Since the level of banking competition is not a directly observable feature, the literature of banking competition has provided some measurements and estimation techniques for banking competition. The following is a review of some the most commonly used measurements that will be used throughout this thesis;

The Boone indicator is a measurement of the degree of competition, calculated as the elasticity of profits to marginal costs. The indicator is based on the efficient structure hypothesis that associates performance with differences in efficiency. Under this hypothesis, it's expected that more efficient banks, (i.e. banks with lower marginal costs) achieve superior performance in the sense of higher profits at the expense of their less efficient counterparts. This effect is monotonically increasing in the degree of competition when firms interact more aggressively and when entry barriers decline. Following Boone et al (2008), we can estimate the competitiveness of the banking industry by setting up a general demand function where each bank i produces one product q_i :

$$P(q_i; q_j) = a - bq_i - d \sum_{i \neq j} q_j \quad (3.1)$$

As usual any given bank will maximize profits by producing optimal level q^* , where marginal cost is equal to marginal revenue ($\pi = (p - mc)q$). If $a > mc$ and $0 < d < b$ the first order condition for a cournot-nash equilibrium is:

$$a - 2bq_i - d \sum_{i \neq j} q_j - MC_i = 0 \quad (3.2)$$

When N banks produce positive levels of output levels we can solve for profit maximizing level of q_i :

$$q_i(c_i) = \frac{\left[\left(\frac{2b}{a} - 1 \right) a - \left(\frac{2b}{a} + N - 1 \right) MC_i + \sum_j MC_j \right]}{\left[2b + d(n-1) \left(\frac{2b}{a} - 1 \right) \right]} \quad (3.3)$$

We know that in a monopolistic competitive market, entry will only occur if profits exceed entry costs. Thus, the equation **provides a relationship between output and marginal cost**. From equation $q_i(c_i)$, the Boone formula suggest that a market may become more competitive in two ways. First, when the produced services of the various banks become closer substitutes, that is d increases. Second, when entry costs (e) decline. From equation (3.3) the Boone indicator estimates the level of competition by calculating the elasticity of a firm's performance in terms of its performance or market share, with respect to its marginal costs, as follows:

$$\ln(MS_{it}) = \alpha + \beta \ln(MC_{it}) \quad (3.4)$$

Where MS_{it} denotes the market share (or profits) of the loans or total assets of bank i at time t ; and MC_{it} is the marginal cost for bank i at time t . The market shares of banks with lower marginal costs are

expected to increase, so that β or the Boone indicator is negative. The stronger competition is, the stronger this effect will be, and the larger, in absolute terms, this (negative) value of β (Boone, 2008). Some drawbacks of the Boone indicator are that it assumes that firm's efficiency gains are passed on to consumers which might not be the case. Furthermore, it ignores differences in bank product quality and design, as well as the attractiveness of innovation (Van Leuvensteijn, 2011).

The Lerner index – measures banking competition through market power and is defined as: the difference between marginal price and marginal cost divided by the marginal price or:

$$Lerner\ index_{it} = \frac{P_{it} - MC_{it}}{P_{it}} \quad (3.5)$$

Where P_{it} is the proxied ratio of total revenues to total assets for a given bank i at time t and MC_{it} is the marginal cost to total assets for bank i at time t . The Lerner index derives from the monopolist's profit maximisation condition and thus, the Lerner index varies at the bank level rather than with aggregated country concentration level. The index ranges from a high of 1 which indicates a monopoly to a low of 0 which indicates a perfectly competitive market. One drawback of the Lerner index is that it does not capture the risk premia in the prices of banks' products and services. Thus, it has a very simple and straight forward interpretation. Though the Lerner index is widely used by economists since the mid-1930s, its use in banking literature is comparatively new due to the difficulty of measuring marginal costs of banks (Van Leuvensteijn, 2011 and Jayakumar et al., 2018).

The H-statistic – was presented by Panzar and Rosse (1987) and is another alternative tool for capturing the degree of competition in the banking industry. It measures the elasticity of banks revenues relative to input prices from a given firms revenue function. Claessens and Laeven (2004) argue that the H-Statistic is a more appropriate measure for the degree of competition than other proxies for competitive conduct because it is derived from profit-maximizing equilibrium condition. The H-static is based on a general banking market model which determines equilibrium output and the number of institutions by maximizing profits at both the firm and the industry level. Any given bank on the market maximizes profit when marginal revenue costs is equal to marginal revenue. That is:

$$R'_i(x_i, n, z_i) - C'_i(x_i, w_i, t_i) = 0 \quad (3.6)$$

In the profit maximization formula R denotes revenues, C refers to cots, output is denoted by x_i and n is the number of banks. The term w_i is the vector of m input prices for bank i and z_i and t_i are vectors of exogenous variables that shift the revenue and cost functions respectively. Given a market in equilibrium the H-statistic measure market power by the extent to which changes in factor prices, translates into equilibrium revenues and is computed as:

$$H = \sum_{k=1}^m \frac{\partial R'_i}{\partial w_{ki}} \frac{w_{ki}}{R'_i} \quad (3.7)$$

Whereby R'_i denotes revenues, and the term W_{ki} is the vector of m input prices for bank i . In a perfectly competitive market, an increase in input prices raises both marginal costs and total revenues by the same amount, and hence the H-statistic equals 1. Under a monopoly, an increase in input prices results in a rise in marginal costs, a fall in output, and a decline in revenues, leading to an H-statistic less than or equal to 0. The H-statistic generally varies between 0.60 and 0.80, which indicates that monopolistic competition is the best description of the degree of competition for most banking markets (Claessens and Laeven, 2004).

The market concentration ratio – Is defined as the sum of market shares of the N largest bank although there is no rule for the determination of the number N .

$$CRn = \sum_{i=1}^N \text{Market share}_i \quad (3.8)$$

CR5 and CR3 are the most frequently used indicators to represent the volume of banking competition. The higher the value, the greater the market concentration, and vice versa. The major advantage of concentration measures is the low data requirement. A major limitation with this approach is the omission of non-regulatory barriers and sunk costs that play a significant role in the banking industry (Jayakumar et al., 2018).

Herfindahl-Hirschman index (HHI) – Similar to the concentration ratio, the HHI measures competition via the size of firms in relation to the industry. It is defined as the sum of squares of the market shares of the firms within the industry, where the market shares are computed as fractions and is computed as:

$$HHI = \sum_{i=1}^N S_i^2 \quad (3.9)$$

The difference between HHI and the concentration ratio is that HHI gives more weight to larger firms than the concentration ratio (Van Leuvensteijn, 2011).

3.3 Pricing of mortgages

Pricing levels, strategies and practices will often have some effect to the level of competition on any given market (see for example Van Leuvensteijn, 2011 and Jayakumar et al., 2018). High prices are associated with high market power and low concentration ratios and vice versa. Thus, a review of the determinants of mortgage pricing is of interest as it will provide us with an understanding of what tools are available in mortgage pricing that potentially could affect and indicate the level of competition.

The foremost price of a mortgage is the interest rate. The level of interest rate set by banks or mortgage originators and is not merely a function of the central bank's interest rate. It is thus important to explore the determinants of banks interest rates since banks pricing models are dynamic it is also important for governments to understand how the interest rate is set in order to design effective policy measurements that have real effects on the economy. Thus, a body of research that tries to map what factors banks are considering when determining their interest rates. This is also true for mortgage pricing, where researches have looked at factors such as prepayment risks, default risk, pricing discrimination by race (Chinloy and Megbolugbe, 1994), consumer credit worthiness (Zhang, 2013), market conditions (Kau and Peters, 2005), anti-predatory regulations (Ho and Pennington-cross, 2006), differences between conventional loans and other loans, mortgage underwriting and combinations of all these factors (Courchane 2007 and Zhang, 2013).

Mortgage pricing beyond the central banks interest rate is at its most fundamental level based on the credit risk. Due to the lack of loan level information the empirical evidence on the specific determinants of mortgage prices is fairly limited. Consequently, researchers are constrained to the observable features such as aggregate data at local, regional and national levels. Chinloy and Megbolugbe (1994) used derivatives from securities markets to observe mortgage yields in a hedonic mortgage market and concluded that low-income and minority borrowers were significantly discriminated against since they were forced to purchase prepayment insurance for which they may have limited demand because of low mobility and illiquidity in paying the transaction costs of refinancing. Similarly, Kau and Peters (2005) examined the relationship between residential mortgage yield spread and market conditions. They found that mortgage yield spread increased as the market volatility increased as well as macroeconomic measures and regulatory factors were important explanatory variables in the determining of mortgage pricing. Ho and Pennington-Cross (2006) examine the impact of anti-predatory lending laws on mortgage prices through the variation in 24 US states. They found that for the same metropolitan area,

mortgage prices were higher in the states with stronger anti-predatory laws. Their findings suggested that some measure of anti-predatory framework should be included when examining the determinants of mortgage financing. Courchane (2007) examined mortgage pricing and the borrowers' option to take out a regular prime loan or a sub-prime loan. She found that aggregate differences in annual percentage rate (APR) paid by minority and nonminority borrowers are both due to different treatments but rather due to difference in market condition and underwriting. Zhang (2013) use APR and national bank data to estimate the price of mortgage and found that the underwriting decision can also influence mortgage pricing.

Regarding the Swedish mortgage market, Karlson et al (2009) examined the balance sheet and public records of Swedish banks. By applying the monopolistic competitive pricing method, they distinguished the following determinants for pricing models of Swedish mortgage interest rates: (1) Internal interest rate (STIBOR) (2) Cost of product (3) estimated credit loss (or risk-premium) (4) capital requirement price and (5) mark-up. By disassembling the different components, they were able to show that the internal structure of Swedish banks has a significant effect on how the banks choose to price their mortgages. The key distinction was made between banks that track its deposits to finance lending and banks that treats deposits and lending as two separate operative functions. In the latter case the financing method of loans will have a greater impact on the mortgage price.

3.4 Mortgage markets economics

To understand mortgage funds, we must understand mortgage markets. One way of doing so is via mortgage market economics. Mortgage market economics is the application of economic techniques to mortgage markets (Leece, 2008a). It tries to explain the supply and demand of mortgage loans as well as the variation in contractual features and its overall impact on economies. As countries mortgage market develops, the importance of specific mortgage market features becomes more important for the overall economy. At its core, mortgage market economics relies on the importance of mortgage finance in economies where homeownership is promoted. Thus, it is due to the homebuyer/consumer's dependence on mortgage finance that the question of how mortgage contracts and markets should be designed in order to maximize efficiency for all parties. Mortgage market economics is especially important from the consumers perspective, as mortgage loan often tend to dominate the household's balance-sheet. Due to their prevalent role on the household balance sheet the specific features of the mortgage contract design affect both the consumer choice of goods and the demand for mortgage finance. Consequently, the research revolving mortgage market economics has been growing substantially over the past fifty years (Leece, 2008). The essence of this thesis is built upon theories of mortgage market economics, such as mortgage pricing, mortgage product differentiation and mortgage competition. These theories and concepts are applied to the Swedish and Dutch mortgage market to gain an understanding of what features are currently driving the respective marker forward.

3.5 Financial intermediation and disintermediation

Mortgage funds is an example of financial disintermediation. The opposite of financial *disintermediation* is *intermediation* and is a field of economics that has been extensively researched in recent years (Gorton & Winton, 2003). Historically, scholars claimed that the amount of intermediation could serve as a proxy for the overall efficiency in a housing finance system (Berger et al., 2000). Financial intermediation is a universal feature of most economies. The definition of a financial intermediary can vary, but at its core a financial intermediary is an entity that acts as the middleman between two parties in a financial transaction. The most notable intermediary are banks and bank-like intermediaries which are firms that primarily (1) borrow from one group of agents and lend to another

group of agents, (2) borrowing and lending to sufficiently large groups so that they can diversify on each side of the balance sheet and (3) have different claims on lenders and borrowers. While some have argued that the role of financial intermediaries is less significant since they in theory have no real effect in the economy (Berger et al., 2001). Gorton & Winton (2003) provided a different view where they argued that financial intermediaries are necessary for the understanding of the savings-investment process, workings of capital markets, corporate finance decision and consumer portfolio choices. In their workings they argue that financial intermediaries are the root institution in the saving-investment process and that financial intermediation is closely linked to economic history. According to Gorton & Winton (2003), it is impossible to understand the level of intermediation within an economy without understanding the surrounding environment, laws, and regulations that came before. Gorton & Winton (2003) conclude that the main task for financial intermediaries are the production of services that are not easy replicated in capital markets and that their emergence can be explained through their monitoring capabilities and information production capabilities.

Financial intermediaries as monitors was first explained by Dimond (1984), in which financial intermediaries was considered as the best cost solution for monitoring borrowers. Since monitoring is required due to asymmetric information between borrowers and lenders it makes sense to provide the monitoring task to a specialized agent. The notion of financial intermediaries as information producers stems of the *reliability problem*². Leland & Pyle (1977) were first to suggest that intermediaries could overcome the reliability problem. Since intermediaries can credibly produce information by investing its wealth in assets about which it claims to have produced valuable information. Both the explanation of financial intermediaries as monitors and information providers have been extensively researched and further developed (Fang et al., 2015). However, the role of intermediaries is in a constant fluctuation that makes it hard to determine the exact features and impact of intermediaries across time

Since mortgage funds is an example of financial disintermediation, it becomes even more interesting to discuss mortgage funds in its relation to the wider economy. Serena Garralda (2014) proposed that the process of financial integration reached a turning point after the global financial crisis. He found that heightened activity in capital markets combined with shrinking of cross-border banking activity was sign of a change of trend towards financial disintermediation. The phenomenon of financial disintermediation is a relatively new trend and not as extensively researched. Thus, it becomes important to closely monitor disintermediation initiatives such as mortgage funds and its implications on the economy.

3.6 Financial innovation

Mortgage funds is an example of new capabilities and techniques acquired from process innovation and new technology. This is often referred to as *financial innovation*. The concept of financial innovation refers to the act of creating and popularizing financial instruments as well as new financial technologies, institutions and markets. Usually the distinction is made between product and process innovation. The literature of financial innovation addresses several questions such as; how financial innovations are brought up, their impact on economies and who are most likely to innovate (Tufano, 2003).

Most authors refer to financial innovation as the response to various biases and imperfections such as incomplete markets, risk shifting and asymmetric information. Notably, the most common argument is that financial innovation mainly arises due to some type of market failure. In an economy free of all “imperfections” there would be no need for financial innovation (Tufano, 2003). Following the

² The reliability problem states that; it may be impossible for the information producer to credibly ensure that he/she has in fact, produced valuable information

argument of financial innovation as a response to market failure, Merton (1993, 1995) presented six main areas for why financial innovations exist that capture and summarize most of the core validations for financial innovation. The 6 reasons include; (1) the moving of funds across time and space (2) the pooling of funds (3) the managing of risk (4) the extraction of information to support decision making (5) the addressing of moral hazard and asymmetric information problems and (6) the facilitation of sale or purchase of goods and services through a payment system.

However, empirical evidence suggests that most innovations do not occur due to one particular reason but rather as a response to multiple problems and complex situations. Similarly, most innovations are not a single breakthrough of a new process or product but rather the development and improvement of existing products and processes (Tufano, 2003). The emergence of mortgage funds illustrates this since it originated as a response to increased regulation, was rooted in improved technology and allowed for the facilitation of goods and services (mortgages) through new payment systems.

3.7 Securitization

Somewhere in-between the landscape of funding mortgages through a fund and conventional covered bonds lies mortgage backed securities (MBS). MBS are essentially the application of securitization on the mortgage market. Securitization is more common in the U.S. where it has a significant role and has become a widespread phenomenon over the past thirty to fifty years (Gorton & Metrick, 2013). *Securitization* is the act of selling securities whose principal payments are exclusively linked to a pool of legally segregated, specified, cash flows owned by a special purpose vehicle (SPV)³. By doing so, loan originators remove the loans from their balance-sheet to another entity. The process of securitization has fundamentally changed the working of capital markets, financial intermediaries and challenges many of the theories revolving the role of financial intermediaries. Since the loan is lifted off the balance sheet of the originator, there is no incentive for the originator to screen or monitor borrower's behaviour and characteristics (Gorton & Metrick, 2013). Due to this fact, securitization is often associated with moral hazard problems which was one of the contributors to the financial crisis of 2008.

³ A special purpose vehicle is a subsidiary created for a specific task to mitigate risk or simplify business operation

4 Methodology and Data

The purpose of this section is to cover the methodological approach of the thesis. The research methods and data used to examine mortgage funds will be described, motivated and critically evaluated.

4.1 Scientific approach

The process of building and reaching valid inferences is a fundamental key aspect of the scientific approach. Thus, as scientists, we must always be able to account for our choice of methods when conducting scientific research. Any reader should clearly be able to follow the research methodologies and understand why certain methodological choices are made. This is especially important within social sciences where problems of construct validity can diminish the overall validity of the research. To combat such issues and demonstrate that our capabilities of reaching valid inferences within social sciences, research should be designed properly and conducted in such a way that it is rigorous, reflective, credible and triangulate (Kitto et al. 2008).

The baseline of this thesis follows the approach of a case study research project. Case studies are well suited for exploratory research of new phenomena where current knowledge is lacking or non-existing. Case study research also enables the examination of phenomenon's as a longitudinal (Farquhar, 2012). This is essential as we must understand the historical build-up that eventually led up to the emergence of mortgage funds if we wish to understand mortgage funds in its contemporary state. Consequently, I will provide for a historical background and highlight key events that drove the development we've seen on the Dutch and Swedish mortgage market. Furthermore, mortgage funds in its contemporary setting will be examined with the competitive situation of the Swedish mortgage market as the objective.

Most case study-based research follows the inductive approach, and this is true for this study. An inductive case study-based research project strives to generate theory from the data, by looking for patterns in the data (Maylor & Blackmon, 2005). Projections and generalisations about mortgage funds in Sweden will be made from empirical data that consist of literature, statistics and interviews to seek out an understanding of this recent phenomenon. Due to the lack of recent literature revolving mortgage funds, it is my intention to explain, describe, illustrate and enlighten on how and why mortgage funds emerged by gaining an in-depth understanding from empirical data. In the end I wish to provide a multidimensional holistic picture of mortgage funds in Sweden.

4.2 Research design

The research for this thesis was structured according to these five steps;

1. Pre-study/ Literature review
2. Comparative analysis of finance methods
3. Comparative analysis of Swedish and Dutch mortgage market
4. Interviews
5. Empirical regression analysis

The research project was initiated with a pre-study in which I had the intention to map out the literature that existed on the Swedish mortgage market, mortgage funds and conventional mortgage financing methods. I used search engines and citation databases such as, Scopus and Web of Science to find relevant articles based on some key phrases. The articles provided a foundation of how to navigate and investigate the Swedish mortgage market and the different practices of financing mortgages.

Following the pre-study, I sought to examine the differences between financing mortgages through a fund and conventional methods. The purpose of the comparative analysis was to gain an understanding of the advantages and disadvantages of financing mortgages through a fund and if it could be considered a complement, substitute or plainly as a separate method of financing mortgages. The source material in the comparative analysis consisted of official documentation from banks, statistics from national statistic services, documentation from trade associations and scientific articles.

Following the comparative analysis of mortgage finance methods, I examined the similarities and differences of the Swedish and Dutch mortgage market. In order to gain an understanding of mortgage funds in their applicable context, the Dutch mortgage market provided a great researchable point. The purpose of the comparison between the Swedish and Dutch mortgage market was to understand what features allowed for the emergence of mortgage funds in the Netherlands, and to find out if similar features are present on the Swedish mortgage market. To ensure an objective stand point in the comparative analysis I choose to follow the comparative mortgage market efficiency framework of Dimond & Lea (1992). Their framework provides a model to compare mortgage market and housing finance systems in qualitative and quantitative manner. Following their categories, a comparative analysis of various features from both markets will be benchmarked against each other. The data upon which the comparative analysis was based on consisted of governmental reports such as market analyses, statistical reports from national statistic services and scientific articles. The results from the comparative analysis of Swedish and Dutch mortgage markets are presented in section 5.4.

To further strengthen the thesis applicable insight, I conducted semi-structured interviews with two persons that are active in the centre of the development of mortgage funds in Sweden⁴. The first interview was done with a representative from Avanza Bank AB. Avanza Bank AB in association with Stabelo Group AB were the first actors in Sweden to provide mortgages that are financed via mortgage funds. The second interview was done with Tomas Pousette, an economist whom recently got assigned to investigate if mortgage funds could increase the competition on the Swedish mortgage market by the Swedish competition agency. These two interviews were conducted with the purpose of reinforcing the research project connection with the actuality current market structures and gain expertise opinions on the future of mortgage funds in Sweden.

The empirical analysis and discussion were conducted to process the source material and answer the research question. The analysis and discussion link the theoretical framework and the empirical data to build a holistic picture of mortgage funds and their implications on the Swedish mortgage market. The empirical analysis consists of a regression analysis whereby the competitive situation of the Swedish mortgage is estimated via the Boone indicator. Based on the results from the regression analysis, the discussion is continued by exploring the dynamics of competition and what potential implication mortgage funds can have for the Swedish mortgage market. This is partially done by investigating two cases of mortgage funds adaptation in Sweden.

4.3 Data

I estimated the Boone indicator by using a panel data set of bankscope data that was gathered from Orbis. Orbis is produced *Bureau van Dijk Electronic Pub* which is a business information publishers of international private company data. The bankscope data from Orbis consists of key financial information based of annual reports from banks around the globe. To find the relevant companies for the thesis I filtered the search on country and industry *US sic code core code 616* (mortgage bankers and brokers). Then I matched the listed companies with the Swedish bankers' associations list of active mortgage

⁴ See appendix 1 for interview guide

brokers in Sweden. The end resulted was a panel data set with the 7 largest mortgage brokers in Sweden (Länsförsäkirgnar, Skandiabanken, Nordea, SBAB, SEB, Stadshypotek/Handelsbanken and Swedank hypotek), whom together make out approximately 95 % of the Swedish mortgage market (Swedish bankers association, 2106). Since Swedish banks have separate organizational entities for their mortgage operations the data effectively isolates the Swedish mortgage market and allows for a precise analysis of the mortgage market. However, since SEB originates their mortgages directly from their parenting company (no special entity), the data from SEB was inseparable from its other business areas. To balance the data set two mortgage brokers were dropped. First Danske bank was excluded from the set due to lack of exclusive data for their Swedish filial and then Landshypotek were excluded due to lack of data from recent years. The sampling of observations was done in accordance to the available data, which resulted in full observations of all variables for the years 2011-2017 (See table 2 for descriptive statistics).

Variable	Count	Mean	Variance	Standard deviation	Min	Max	sum
<i>ID</i>	49	4	4.083	2.020	1	7	196
<i>YEAR</i>	49	2014	4.083	2.020	2011	2017	98686
<i>CIR</i>	49	31.698	714.853	26.736	.0261	92.086	1553.248
<i>ROA</i>	49	.4855	.071	.268	-.004	1.021	23.791
<i>logROA</i>	49	-.8913	.481	.694	-2.864	.020	-42.783
<i>logCIR</i>	49	2.9421	1.832	1.353	-3.645	4.522	144.163

Table 2. Descriptive statistics of data used for computation of Boone indicator for Swedish mortgage brokers.
Source: Orbis, 2018

The variables from table 2 are defined as follows; *ID* are specific indicator for each mortgage broker. *Year* are time indicator for each mortgage brokers. *Cost to income ratio in % (CIR)* are overheads (all ongoing business expenses not including or related to direct labour or direct materials used in creating a product or service) divided by net interest income + other operating income. *Return on assets using net income in % (ROA)* are P/L (profit loss ratio or net income) /total assets. *LogROA* and *LogCIR* are logged values of ROA and CIR.

With regards to the correlation between the variables, there's a negative correlation (-0.4206) between *CIR* and *ROA* which is also what we expect from general business theory and the estimation of the Boone indicator (Boone et al., 2008). Furthermore, *YEAR* are negatively (-0.1165) correlated with *CIR* and positively (0.3179) correlated with *ROA*. This suggest that the banks in the sample increased their overall efficiency during the sample period which corresponds with previous notions made about the increasing profitability on the Swedish mortgage market (Finansinspektionen, 2017a).

4.4 Estimating the Boone indicator for Swedish mortgage brokers

To obtain the elasticity (Boone indicator), the log of profits (measured by *return on assets using net income or ROA*) is regressed on the log of marginal costs. Since the marginal costs of any firm is not a directly observable feature, Boone et al (2008) first approximated the elasticity by using the ratio of average variable cost and revenue as substitute. Similarly, I used the *average costs as share of income (CIR)*. The method in which I computed the Boone indicator is based of Schaeck & Cihák (2010) who estimated the Boone indicator by using average cost of bank *i* as a share of total income and ROA as dependent variable. It is, however, noteworthy that recent studies have attempted to improve the estimates of the Boone indicator by estimating firms actual trans log marginal costs. This is done by

setting up a total cost function for a generic bank when computing the Boone indicator and requires a more extensive dataset (see for example van Leuvensteijn et al., 2011). By doing so the authors improve the estimated model by aligning itself more closely with theory, however, due to limited access to data, this was not possible in this thesis.

I estimate the relation between profitability, measured by ROA, and average cost as share of income CIR using a fixed effect, Two-Stage least squares (2SLS) and GMM-style estimator, whereby I used one-year lagged values of the explanatory variable as instrument. Thus, the following model was estimated:

$$\ln(\pi_{it}) = \alpha + \beta_1 \ln(C_{it}) + \beta_2 \gamma_t + \varepsilon_{it} \quad (4.1)$$

Where π_{it} is ROA for bank i at time t , (C_{it}) is the cost to income ratio for bank I at time t , γ_t are year dummies and ε_{it} is the error term. By estimating the Boone indicator via a fixed effect-, 2SLS- and GMM-estimator I can address and examine problems of endogeneity and heteroskedasticity. As bank performance and cost are most likely jointly determined it could potentially lead to biased estimates due to simultaneity. Furthermore, the cause and effect relationship of performance and costs are generally changing over time making the panel dataset dynamic which GMM-estimators are suited for (Ullah et al., 2018).

While the 2SLS estimator is suitable for isolating the effect of independent variable to address simultaneity problems, the GMM estimator offer efficiency gain from being more suitable for dynamic panel datasets. Furthermore, the GMM estimator controls for the three major sources of endogeneity: (i) unobserved heterogeneity; (ii) simultaneity; (iii) dynamic endogeneity and it is more efficient than the simple 2SLS estimator whereas if heteroskedasticity is present, whereas if heteroskedasticity is not present, the GMM estimator is no worse asymptotically than the 2SLS estimator (Baum et al., 2002).

The fixed effect estimator is used to explore bank-specific fixed effects in the model by including a set of firm-specific indicator variables into the regression. The fixed effects estimator helps in controlling unobserved heterogeneity, which is ‘constant’ over time and is also correlated with the explanatory variables. It allows for the elimination of unobserved time-invariant bank specific effects such as managerial capabilities and firm-level institutional quality which cannot be captured in the econometric specification. However, the fixed effects estimator is more suitable for static panel data sets, therefore, the GMM estimator should be the more reliable estimate. This is also reflected upon in the literature where previous studies have used the GMM- estimator when computing the Boone indicator (see for example Schaeck & Cihák, 2010 and Van Leuvensteijn et al., 2011).

4.5 Critical evaluation and discussion of methods

One essential characteristic of case study research is the use of several different sources of data material (Yin, 2009). By using several different sources of data collection, the research findings are strengthened as the evidence for the explanatory argument is triangulated. Triangulation is important since it allows for different perspectives which can reinforce any inference from the analysis. Furthermore, it strengthens the ability to provide robust arguments. In this thesis, a combination of literature, statistical reports, interviews and empirical analyses have been used to triangulate the understanding of mortgage funds and the dynamics of competition.

When considering and evaluating the data used for this report, a distinction between primary and secondary sources should be examined in order to elucidate how solid the source material for the arguments are. Most of the arguments presented in this thesis is based on primary sources such as

interviews, governmental reports and statistics. However, in the pre-study, some secondary data such as literature summaries and news articles were also used.

Reliability refers to the repeatability of findings, the first three stages of this thesis, the pre-study and the two comparative analyses should be considered as repeatable since all the sources material used were public (Gustavsson, 2004). The pre-study was a matter of searching, finding, gathering and sorting information based upon topics such as ‘mortgage funds’ and ‘the Swedish mortgage market’ and ‘Dutch mortgage market’. Given the same accessibility to the source material, a repeatable pre-study to gain knowledge and a repeatable comparative analysis to benchmark finance methods and markets should be achievable. While the filtering and sorting of information can be subject to interpretation and subjective elements, it should not tamper the reliability. Furthermore, the comparative analysis was based of factual differences and in accordance with a pre-existing framework to minimize subjective interpretation. In terms of the interviews, reliability depends on several aspects. However, it is mainly dependent on the degree to which the interview is structured in accordance to a premade template. A more structured interview with a clear deliberate schedule can be repeated easier than an open-ended interview. The two interviews in this study were semi-structured to compromise between gaining structured answers and exploring topics to find new insights. As for the empirical analysis the regressions were conducted based of public data records. Given the same access to data any statistical tool should be able to repeat the study and find the same results.

Validity refers to the credibility or relevance of the gathered data. Validity can be composed into internal and external validity. Internal validity is the degree to which a test measures what it is supposed to measure, and external validity is the degree to which generalizations can be made from the data (Gustavsson, 2004). The validity of the thesis has partially been assured by identifying and following previous literature in acclaimed academic journals. However, as competition, and the structure of markets are an inherently complex issues, generalizing with regards to the future of markets will by nature be a speculative matter. Thus, the ambition is not to give a predetermined answer to the research question. But rather to provide a rationale way of reason to build a theoretical framework around mortgage funds and their role on the Swedish mortgage market that can provide useful for all stakeholders.

5 Institutional Setting

This section provides a background and institutional setting of the Swedish mortgage market. The section begins with a walkthrough of the Swedish housing market and continues to cover some key issues of the market. Lastly, it explores the development of the regulatory environment on the market and its relation to mortgage funds.

5.1 Households of the Swedish mortgage market

The Swedish households has experienced a steady increase in debt over the majority of the 21st century, today Swedish households hold liabilities of approximately SEK 3 500 billion, roughly 80 % of which are mortgage loans. Mortgage loans has grown from about a third of GDP to two thirds during that same period. The increase in household's debt in Sweden has predominately been driven by increasing housing prices across the country and has been further reinforced by historically low interest rates (Finansinspektionen, 2017a). The increased debt among Swedish households implies a greater risk in the overall economy as consumer become more susceptible to economic fluctuations since a large portion of their incomes are tied up to debt and interest payments. Consequently, several new measures to hedge against these risks have been implemented, including new amortization rules, maximum LTV-ratios and stricter capital requirements. The newly implemented measure seems to be affective as amortization-rates has increased and the total DTI-ratios amongst households with new mortgage loans is decreasing (Finansinspektionen, 2017b).

Despite increasing house prices, the demand for mortgage loans in Sweden has been on a steady rise due to a combination of low interest rates, increasing household incomes and a large portion of the residential stock changing format from rental to owner-occupied. Generally, Swedish mortgage brokers provide contracts at a 3-month, 6-month, 1-year, 2-year, 3-year,5-year and 10-year term. The vast majority of the mortgage contracts demanded in Sweden are adjustable rate mortgages (ARM) which is the 3-month contract. Approximately 70 % of all mortgages in 2017 were ARM's and 27 % had a term between 1-5 years (Pousette, 2018). This is most likely driven by the recent trends in declining interest rates over the last decade. Consequently, over the last 5 years or so, ARM's has also been the cheaper option. Furthermore, the fee for prepayment of mortgage contracts has driven more people to choose ARM's as it becomes easier to move between different lenders. The high share of ARM's in Sweden implies that households are more vulnerable to changes in interest rates which put the Swedish economy at greater risks. However, most mortgage lenders allow customers to split mortgage loans in to several portions that can be fixed with different interest rates and terms. This allows the customer to hedge against potential interest rate increases while still partially benefitting from decreasing interest rates (Konkurrensverket, 2013).

The practice of splitting up mortgage at different terms may be convenient, however it is not unproblematic. As the fixed rate mortgages (FRM) contract are associated with an interest rate compensation for prepayments of the mortgage loan or if the borrower wishes to switch to a different lender. The interest rate compensation is based upon a flat rate calculation provided by FI and is supposed to cover any credit losses the mortgage provider suffers from the prepayment (Finansinspektionen, 2013). Since Swedish borrowers by law, always have the right to prepay their debts the interest rate compensation has two major effects. (1) It protects credit institutions and mortgage providers against prepayment risk and (2) it creates a lock-in effect for borrowers which reduce the mobility of consumers and thus inhibiting competition.

5.2 Problems of the Swedish mortgage market: The competitive situation, the big four and their business models

As previously stated the Swedish mortgage market is dominated by “the big four” (Swedbank, Handelsbanken, Nordea and SEB), together they hold around 75 % of the mortgage market. However, during the last 10-15 years the big four has lost around 10 % of their market shares to smaller players such as niche banks and incumbent regional banks. Despite that, the competition on the Swedish mortgage market is still being highlighted as one of the top 3 most problematic industries in Sweden by the Swedish competition agency (Konkurrensverket, 2013). To put the competitive situation of the Swedish banking market in perspective we can examine some of the competitive measurements of banking competition.

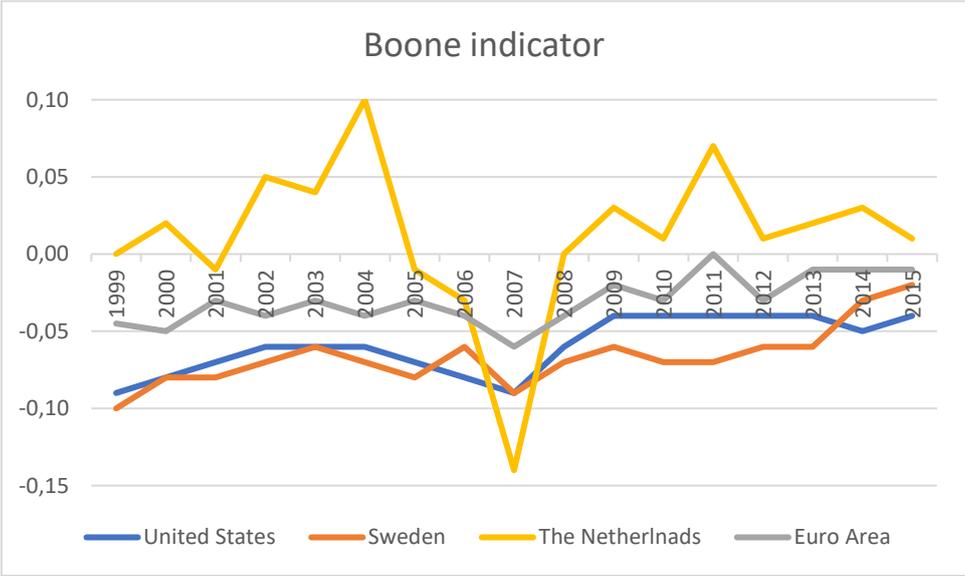


Figure 4. Development of Boone indicator of selected banking markets during 1999-2015 *Source: FRED*

Recent studies have argued that the Boone indicator is preferable to market concentration ratios and other measurements when examining banking competition since it rooted from banks balance sheets (Van Leuvensteijn, 2011). A higher value of the Boone indicator suggests a lower competitive level for the given. Figure 4 shows that as of 2015, Sweden had a more competitive market than the EU average as well as the Netherlands while the US market just recently became more competitive than the Swedish. All markets except the Dutch are within the range of a monopolistic competitive market. A clear downwards trend can be observed on the Dutch mortgage market for the past 10 years which has gone from significantly higher indicator to a level similar of the others. This trend could potentially partially be explained by increases in competition and quality from the rise of non-bank lenders on the mortgage market (De Nederlandsche Bank N.V, 2016). However, a drawback of the Boone indicator is that it assumes that banks generally pass on at least part of their efficiency gains to their clients which is generally not true in both Sweden and the Netherlands. Figure 5 displays FI’s quarterly publishing of the estimated mark-ups on mortgages for Swedish banks which illustrates this.



Figure 5. Estimated mark-ups on mortgages provided by Swedish banks. *Source: FI*

Consequently, while the Boone indicator might suggest that the market is relatively competitive in terms of bank efficiency, we can see that those efficiency gains are collected as profit margins and not necessarily distributed to the consumers in the mortgage case.

Turning to another measurement of competition, the H-statistic is another tool for capturing the degree of competition by examining the revenue function of the active firms on the banking market. The H-statistic generally varies between 0.60 and 0.80, which indicates that monopolistic competition is the best description of the degree of competition for most banking markets (Claessens and Laeven, 2004). Figure 6 depicts the H-statistic for the selected markets.

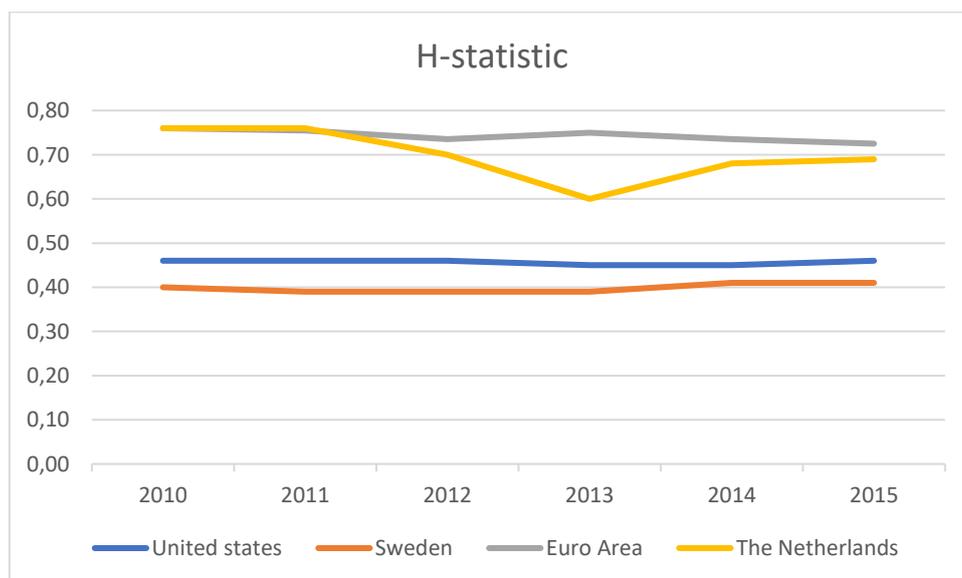


Figure 6. Development of H-statistic of selected markets during 2010-2015 *Source: FRED*

In a perfectly competitive market, an increase in input prices raises both marginal costs and total revenues by the same amount, and hence the H-statistic equals 1. Thus, a lower value indicated a less competitive market. Figure 6 shows that Sweden has had the lowest value of H-statistic among the

selected countries with a value of 0.40 throughout the observed period. This implies that changes in the Swedish banks production costs will have relatively large impact on price and quantity, since the markets demand elasticity is relatively high. Consequently, decreasing production costs might not be enough to fuel competition amongst Swedish banks.

Finally, we can examine the Lerner index which captures the degree of market power in banking markets. Figure 7 depicts the Lerner index for the selected markets.

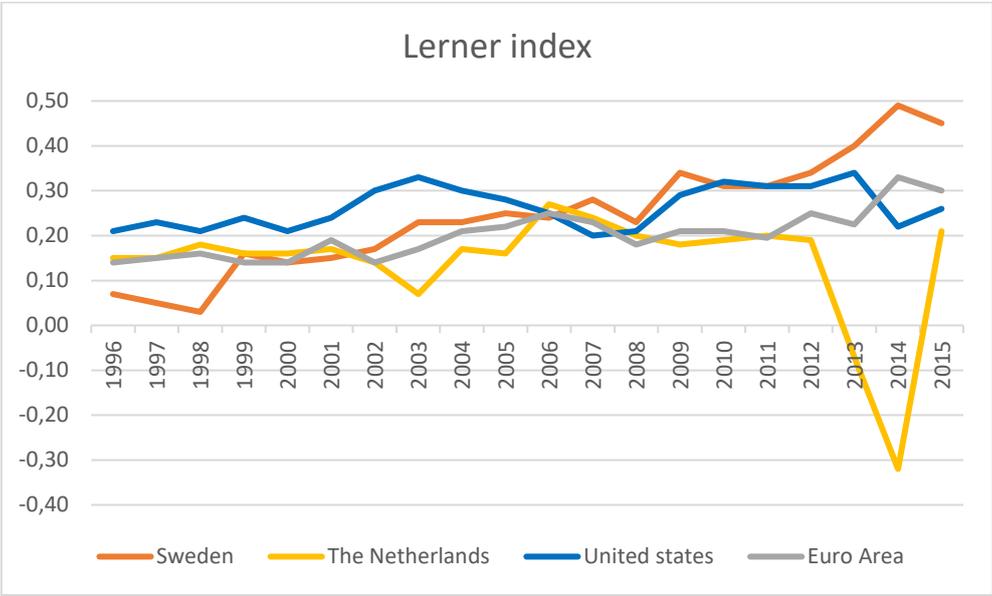


Figure 7. Development of Lerner index for selected markets during 1996-2015. *Source:* FRED

The Lerner index ranges from a high of 1 to a low of 0, with higher values indicating less bank competition since firms have more market power. Figure 7 shows that Sweden has had the least competitive market in terms of market power amongst the selected countries with a Lerner index of 0.45 at 2015. This corresponds with the rise in gross margins and profitability as well as demonstrates the increased market power Swedish banks have experienced over the last decade (Swedish Bankers Association, 2017).

The historically high mark-ups on mortgages provides an interesting notion about the profitability on the Swedish mortgage market. To continue the analysis, we can examine alternatives key figures such as the return on equity to gain insight of the profitability on the market. In general, the profitability seems to be quite high as Pousette (2018) presented the big fours return on equity to be at levels around 20 % for 2017. Given the relatively low risk of Swedish mortgages a peculiar investment situation has occurred with high yields on low risk products. As the Swedish mortgage market has sustained several crises over the last 20-30 years while credit losses have remained relatively low the interest of investing in Swedish mortgages have increases. Thus, it is not strange that the Swedish mortgage market has seen an increase in the numbers of actors on the market over the last 10 years. Figure 8 depicts the market share of the big four and four challengers on the mortgage market⁵.

⁵ The challengers are SBAB, Länsförsäkringar, Danske bank and Skandiabanken

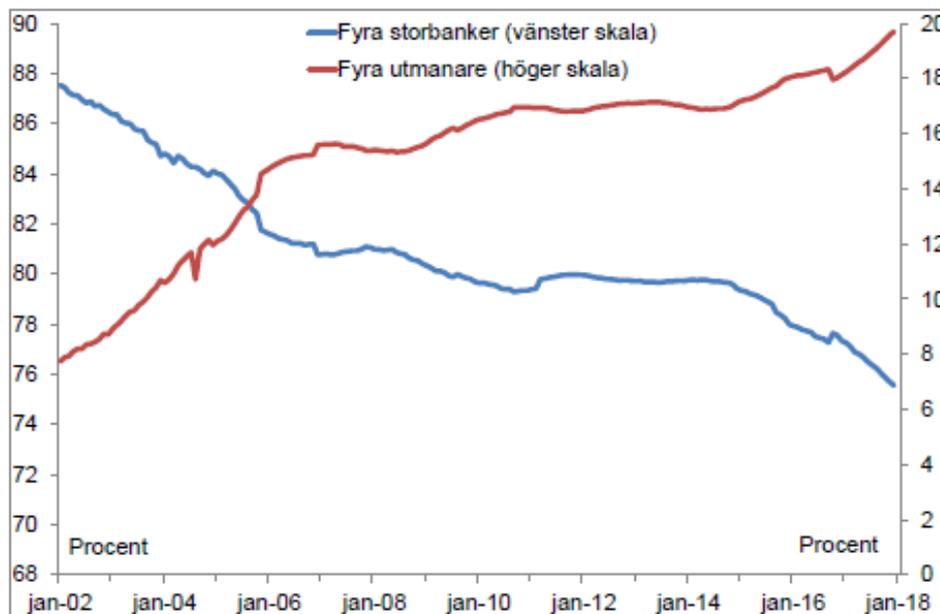


Figure 8. Change in market shares big four (blue) vs challengers (red). *Source:* Pousette (2018)

As figure 8 shows the market shares for the challengers are rising while the big four are decreasing. However, as the big four have solidified their role on the market, they still hold around 75 % the mortgage market which the Swedish competition agency (2018) described as a slight improvement of the competitive situation but the big four still holds a very strong position that reduces customer mobility and prevent competition.

All together these measurements of banking competition depict a vivid picture of relatively low but slightly increasing competitive situation on the Swedish banking market. However, high profit margins in combination with the banks business models on the mortgage market has left the majority of consumers in displeas. Through survey analysis it has been found that consumers feel locked-in as mortgage lenders often make it difficult for consumers to switch between banks. This is partially done by offering consumers loans in bundles together with other financial goods and services. Another troublesome aspect of the market is the fact that consumers are highly uniformed about the structure of mortgage contracts and prices (Konkurrensverket, 2013 & Finansinspektionen, 2017a).

Both consumers and Swedish authorities considered the pricing of mortgage loans as a key area of concern on the Swedish mortgage market (Konkurrensverket, 2013). Before 2015, mortgage issuer was only obligated to publish listing interest rates (menu prices) which were seldom close to the actual interest rate consumers faced. Furthermore, consumers are often given a bargaining opportunity in which the mortgage issuer and borrower are supposed to reach a mutual decision on a specific interest rate for a given customer (individual pricing). Since the public information on actual interest rates and knowledge about the costs of providing mortgage is lacking amongst the public, a situation of asymmetric information occurred which resulted in most of the bargaining power being distributed to the lender who can take out higher interest rate and extract more consumer surplus. Consequently, the big four has enjoyed historically high profits and gross margins from mortgage loans (Finansinspektionen 2018a).

In the typical bargaining situation, the interest rate is decided upon factors such as the underlying security, risk profile of the customer and the potential total business of that customer. Customers can usually attain a more generous deals as they chose to commit other products provided by that bank (bundling). Generally, a customer that chooses to commit with all her financial inquiries tend to get the

most beneficial interest rate, and as the potential revenue from the bank perspective increases so does the discount. Not all banks price their mortgage loans through this method, some banks have a more centralized way of pricing, however, it is still the most common practice (Finansinspektionen, 2013).

The financial supervisory authority observed this problematic information asymmetry of mortgages and implemented the requirement for mortgage brokers to publish the actual average interest rate paid by customer in 2015. This was done to offset the shadow pricing and asymmetric information that was held up by the system of individual interest rates. The bargaining system with individual interest rates has remained but the new requirements have proven effective by lowering the spread of actual paid interest rates (Finansinspektionen, 2017a).

5.3 Recent regulatory trends on the Swedish mortgage market: Post crisis environment

Ho and Pennington-Cross (2006) examined the impact of anti-predatory lending laws on mortgage prices and suggested that the regulatory framework should be included when examining the determinants of mortgage pricing and competition. Thus, in order to grasp the context of which mortgage funds started to appear in, it's important to understand some key historical events that eventually led to the environment that came to see mortgage funds as a means to compete on the mortgage market. In this section a timeline following some pivotal developments of the regulatory setting will be provided with the starting point of 2006 when the law of covered bonds was first instituted.

2006 – The law of covered bonds

The law that allowed for issuance of covered bonds was decided upon in 2004 and instituted in 2006. By then, the European market already had a well-established system of covered bonds in place. By instituting the law of covered bonds, the Swedish government (Swedish social democratic party) sought out to lower the costs of housing finance for consumers. The intention was to achieve this by increasing the competitiveness of Swedish banks and financial institutes on the international market. The proposed argument was that if they could improve the competitiveness amongst Swedish banks that would lead to more efficient capital markets that decreased the costs of raising funds which would then reflect upon lower costs for Swedish homeowners. The strategy proved to work as covered bonds are the most common means for financing mortgages today. There are currently eight institutes in Sweden that are all allowed to issue covered bonds and the market cap amounted to 2 158 billion Swedish crowns in 2017 (SFS 2003:1223 and Finansinspektionen, 2017b).

2007 – Introduction of the law of capital requirements

The law of capital requirements was instituted on February 1, 2007. Following the EU directive (2006/49/EG), the law was constructed as an initial framework to guide banks and financial institutions in their calculation of the different capital requirements depending on exposure towards credit risk, market risk and operational risk (SFS 2006:1371).

2008 – Basel 2

Basel 2 was published in June 2004 and fully implemented in the beginning of 2008. The Basel frameworks are issued by the Basel committee and are recommendations on banking laws and regulation. The Basel 2 framework aimed to amend international banking standards on capital requirements of banks and financial institutions. The goal was to make capital requirements more progressive so that the requirements were in proportion to the exposed risk of the firm. i.e. the more significant the risk a bank is exposed to, the greater the amount of capital the bank needs to hold to safeguard its solvency and overall economic stability (ENISA, 2018).

2008 – The global financial crisis 07/08 housing collapse

One of the most severe financial crises in history. Started in the U.S housing market with extensive subprime lending and a housing bubble and eventually caused an international banking crisis after the collapse of Lehman brothers. Quasi-governmental housing financial institutions such as Fannie Mae and Freddie Mac played a significant role in their securitization and creation of MBS that were subject to moral hazard issues (Gorton & Metrick, 2012).

2009 – European debt crisis

Following the global financial crisis, troublesome domestic house markets around the Eurozone eventually caused the EU fall into a debt crisis. Several Eurozone member states were unable to repay their government debt and bail-out collapsing banks in the aftermath of the financial crisis. Several Eurozone countries suffered from massive layoffs and a series of financial support measures were taken (Sin, 2013).

2010 – FI: LTV-ratios limited to 85 %

Due to a continuing rise in household debts and especially mortgage debt, the Swedish financial supervisory authority decided to publish administrative guidance for limiting LTV-ratios on mortgages to 85 %. By limiting the LTV-ratios, FI tried to offset banks whom were competing based of LTV-ratios and lower the incentives for households to take on too much debt (FFFS 2010:2).

2011 – Basel 3

After the global financial crisis, the Basel framework was once again updated. Basel 3 was fully implemented by the first quarter of 2018 and aimed to strengthen the capital requirements from Basel 2 as well as introducing requirements on liquid assets holdings and funding stability (EBA, 2018).

2014 – Reinforced capital requirements

The law of capital requirements was further reinforced in 2014 with the introduction of different kinds of capital buffers and a stricter supervision of banks and financial institutions. The aim was to strengthen the resistance of banks and financial institutions during economic downturns (Prop. 2013/14:228).

2013 – EU Capital requirements Regulation/ directive (CRD/CRV)

While the Basel framework are recommendations and guidelines, the EU capital requirement regulations aimed at implementing part of the Basel framework into Regulation. CRD establish a detailed rulebook on capital, liquidity adequacy and other key areas in order to prevent feature crisis.

2013 – FI: Risk weight floor on mortgage set to 15 %

In 2013 FI decided to impose a minimum floor of how low the requirement of risk weighted assets⁶ (RWA) for mortgages. The Basel 3 framework allowed banks to use internal models (IRK-model) to calculate the risk weighted assets which lead to a decrease in the amount of risk weighted assets that Swedish banks held. The average amount of RWA fell from around 50 % under Basel 1 to 5 % after Basel 2. To counterbalance this effect FI imposed a minimum requirement of 15 % in RWA for mortgage loans (FI Dnr 12-11920).

⁶ Risk-weighted assets are used to determine the minimum amount of capital that must be held by banks and financial institutions to reduce the risk of insolvency

2014 – FI: Law of capital buffer expanded to include countercyclical buffer

According to the law of capital buffer, FI should on a quarterly notice announce a countercyclical capital buffer that banks must hold. The law is implemented so that banks save and build up a buffer during period of economic growth that can be used during economic downturns. Thereby, increasing the banks resistance and preventing future financial crisis (FFFS 2014:33)

2015 – FI: Average interest on mortgages rates made public

Fi announced that all providers of mortgages must publish their average interest rate for every maturity contract as well as statistics of the interest rates for the past 12 months. Furthermore, they were required to inform on what aspects are taken into account when setting the interest rate. The aim was to provide more information to customers so that they could make an educated decision (FFFS 2015:1).

2016 – FI Amortization rules

In order to dampen household debt and increase financial stability, FI announced a amortization requirement on households. New mortgages with LTV-ratios above 70 % must be amortized with 2 % of the original loan value and loans with LTV-ratios below 70 % must be amortized with at least 1 % per year until the LTV-ratio reaches 50 % (FFFS 2016:16).

2017 – The law of operation with mortgages

As a response to the rise in new non-bank firms that originated or mediated mortgages, the law of operation with mortgages was instituted. The aim was to increase the stability on the mortgage market by requiring license, increasing the supervision and setting knowledge requirements for all firm that are in the mortgage business (SFS 2017:1343).

2017 – Strengthening amortization rules for households with high DTI-ratios

To further limit the rise in household debts, FI announced stricter rules of amortization for households with DTI-ratios above 450 %. The new rules forced households to amortize one additional percent above the pre-existing amortization requirement (FFFS 2017:23).

2018 – Stabelo and Hypoteket

The introduction of the first two mortgage originators in Sweden that are funded through a mortgage fund.

Throughout the timeline there are two key trends that should be highlighted. First, two crises occurred within a relatively short time-frame that demonstrated how fragile financial markets and the world economy is. Especially how fragile banking operation is if left unregulated and unmonitored. Second, how authorities responded after the crisis by gradually increasing banking regulation. These regulations were implanted to increase the resilience in the finance system and deflect future crisis. However, by doing so they have also limited banks' ability to navigate on the market. Throughout the tightening of the regulatory environment, a window of opportunity has emerged for new actors that aren't bound by the majority of these regulations. These new actors are organized in alternative ways such that they don't need to comply to the same capital requirements and regulations as traditional banks sine their business models are not based of the traditional banking model. Consequently, non-banks have gained a competitive advantage on the mortgage market. Furthermore, the relatively stable performance of

Swedish banks during these times have raised a growing trust amongst investor that has sparked an interest in the Swedish mortgage market. The growing trust amongst investors in pair with the low interest environment have created a “window of opportunity” where new actors can capitalize by packaging mortgages and selling them to investors with better yields than government bonds. Figure 9 depicts the yield of covered mortgage bonds issued by the biggest mortgage originator Stadshypotekets and government bonds (treasury notes).

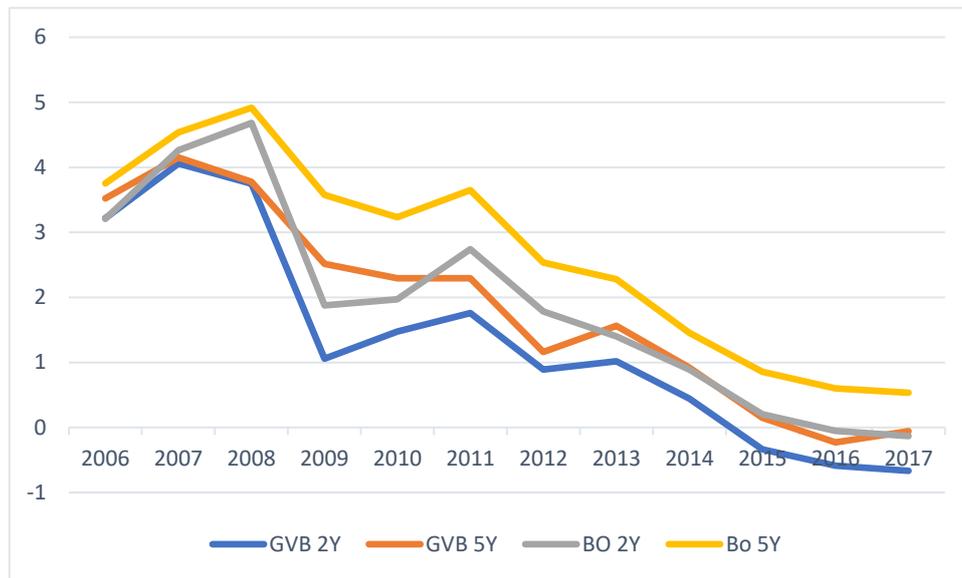


Figure 9. Graph of coupon rate (%) for the average covered mortgage bond (BO) and governmental bond (GVB) in 2006-2018. *Source: Riksbanken*

As investors are seeking out new opportunities due to the falling yield from government and covered bonds, the window of opportunity was seized by financial innovators who realized that mortgage funds could provide an attractive investment opportunity. In Sweden that window of opportunity has thus far been seized by two actors Stabelo AB and Hypoteket. Both actors are new to the mortgage market and are currently providing mortgages that are financed through mortgage funds. Similar to the Dutch mortgage market where non-bank lending and the usage of mortgage funds is more common (De Nederlandsche Bank N.V, 2016).

5.4 Similarities and differences with the Dutch mortgage market

Since the development of mortgage funds has gone further on the Dutch mortgage market and given the similarities it holds with the Swedish mortgage market it becomes relevant to examine the two markets and distinguish between factors that might disable/enable mortgage funds in Sweden. Thus, a comparative analysis based on the framework of Dimond & Lea (1992) will be presented. The framework consists of four categories that are used when comparing the efficiency of housing finance systems. For each category in the framework there’s an indicator or feature of the mortgage markets that can be compared to reach a conclusion for that category. By the end we can examine all indicators to provide an overall score for the relative differences in housing finance efficiency.

(1) Funding markets - Funds for mortgages are raised in different ways across different mortgage finance systems. As previously noted, covered bonds are widely used in Sweden, as is the case in the Netherlands. However, the Dutch market stands out from the Swedish in the increase in mortgage finance through institutional investors such as pension funds and insurance companies. There’s a

fundamental differences of financing mortgages via banks and institutional investors. For instance, institutional investors tend to invest in mortgages that are considered safer such as mortgages that are covered by guarantee schemes and place their investments on longer terms. Up until recently, the Dutch mortgage market was almost fully in the hands of banks. However, over the past 10-years the Dutch mortgage market has seen an increase in mortgage debt financed by insurance companies and pension funds. The mortgage loan portfolio of Dutch banks (excluding banks subsidiaries of insurance groups) has declined, both in an absolute and in a relative sense. Insurers and pension funds are currently funding 20 % of new mortgage production (De Nederlandsche Bank, 2016).

This is Noteworthy from an international perspective since the Dutch insurers and pension funds are currently primarily investing in non-securitised mortgages⁷. While institutional investors often play an important role on the mortgage lending market, they usually invest in covered bonds or in (government-guaranteed) other MBS's. The Netherlands is unique in the swift rise of non-securitised mortgage investments by institutional investors.

(2) Credit risks -The LTV ratio is calculated as the share of the mortgage loan over the appraised value of the property. The LTV ratio is used in the approval procedure by mortgage originators and as a market analytics tool for approximating the credit risk on the housing market. Typically, high LTV ratios are associated with greater risk exposure since the chance of default for a given loan increases due to a lack of, or no equity build up within the property. In the event of a foreclosure, high LTV ratios may put the mortgage originator in a situation where the selling of the underlying property does not cover the full value of the initial loan, effectively exposing the lender to greater credit risk. Consequently, mortgage originators usually assign higher interest rates to borrowers that wish to apply for mortgages with high LTV ratios. Furthermore, high LTV ratios are often associated with insurances against potential losses in the case of a default which further add to the cost of the loan (Finansinspektionen, 2017a).

Historically, both The Netherlands and Sweden have had relatively high LTV ratios compared to other European countries where the Netherlands stands out with remarkably high ratios. The average LTV ratio in the Netherlands was 80 % at the end of 2015, while Sweden had an average LTV ratio of 65 % at that same time. However, there are certain things one should consider when comparing LTV ratios in between different countries. First, the mean LTV ratio does not necessary paint an accurate picture of the structure of the mortgage market as the LTV ratio can be decomposed differently between subcategories. Secondly, the LTV ratio can also be calculated differently, for instance, the standard way of calculating the LTV ratio ignores the fact that in the Netherlands, many households have savings accounts pledged to their mortgages (DNB, 2015 and Finansinspektionen, 2017a).

In a macroeconomic sense, the LTV ratios is used as a measurement of the household's vulnerability. For any scenario in which a given economy only consists of mortgages with relatively high LTV ratios. In the event of market turbulence or economic downturn, a decrease in house prices would cause the LTV ratios to increase. For any given loan where the LTV ratio increased above some critical level, households might switch their consumption towards amortization. If several consumers were to act in a similar fashion at the same time, the aggregate effect may cause greater macroeconomic fluctuations (Finansinspektionen, 2017a). Most governments try to prevent this by imposing limits on LTV ratios for mortgages. This is true for both Dutch and Swedish mortgage market. In Sweden, the LTV limit for mortgages was set to 85 % by FI as of 2010 (FFFS 2010:2). In the Netherlands the maximum LTV was set to 104 % as of 2014 with the intention of lowering it by one percentage point each year so it hits 100

⁷ Mortgages that has not been subject to securitization i.e. not MBS

% by 2018. Furthermore, DNB has per request of the Financial Stability Committee (FSC) investigated what a further reduction of the limit to 80 % would imply (Dutch Banking Association, 2014).

Similar to the LTV ratio, the debt-to-income ratio (DTI) is a financial measurement that captures credit risks and is used to determine a given borrower's ability to repay their debts. Usually, it is calculated as the ratio between the overall sum of the household's debts over the overall sum of household's disposable income. Generally, a lower value is preferred as it indicated a stronger ability to repay current debts and a good balance between income and debts (Finansinspektionen, 2017a).

Several important financial institutions such as IMF and OECD have signalled their concerns about countries with high DTI-ratios, especially of those countries with DTI-ratios that predominantly consist of mortgages (Van Rixtel & Gasperini, 2013). Both Sweden and the Netherlands are positioned well above the average DTI level in Europe. By the end of 2016 Sweden had a DTI-ratio of 180 % where 80 % of those debts originated from mortgages. While the Netherlands had a DTI-ratio of 212,9 %, for reference the entire euro area had an average DTI-ratio of 93,29 %. However, While Sweden's DTI-ratio is lower than the Dutch, the overall trend shows that the DTI-ratio is rising in Sweden while it has been decreasing for the last three years in the Netherlands (Finansinspektionen 2017a and Dutch Banking Association, 2016)

(3) Interest rate risk - Because markets interest rates are uncertain in the future, some party in a long-term investment or lending transaction may be subject to interest rate risk. Interest rate risk directly affect the values of fixed income securities such as bonds through the inverse relationship between interest rates and bond prices. However, with mortgage loan and covered bonds part of the risks can be mitigated through a fixed interest contract and interest rate swaps.

The ratio of FRM and ARM differs substantially between the Dutch and the Swedish mortgage market. In the Netherlands only, a quarter of new mortgages loan contracts were ARM's, while in Sweden that same rate was 70 %. The larger share of ARM in Sweden reflects a higher sensitivity for interest rates fluctuations and thus greater interest rate risks.

(4) Subsidies – The role of the government is one that cuts across all areas discussed above. Governments intervene in the means they see best fitting to sustain a healthy mortgage market. In the Netherlands there are two important governmental schemes that lack a counterpart on the Swedish mortgage market. It is The Dutch National Mortgage Guarantee (NHG) and their tax deductibility scheme.

The Dutch National Mortgage Guarantee (NHG) is a public mortgage loan insurance scheme for consumers that incentivize and support homeownership with affordable and responsible mortgages. It was first introduced in 1956 and was originally aimed at providing first time buyers and low-income households access to the housing market. The NHG model in its present form is based upon the non-profit private funding organisation Waarborgfonds Eigen Woningen (WEW) that provide the guarantees with a limited government fall-back facility. This organisation allows the scheme to be under budgetary control and financed by the consumers while keeping the government role to a minimum (Primeus, 2012).

In order to be applicable for the scheme consumer must meet some criteria set by the National institute for family finance in the Netherlands (NIBUD). By only allowing mortgages that are up to pair with some these criteria homeowners that are granted NHG knows that their mortgage loan is within the boundaries of their financial capabilities. The core feature of the NHG scheme is to provide a safety net for granted mortgages by paying the borrowers residual debit if the borrower for some reason suddenly becomes incapable of doing so by own means. The NHG provides cover for instances such as; loss of

job, terminated relationships, disability from work, or loss of parents. Furthermore, a secondary feature of the scheme is that it provides discount on the mortgage interest rate as the lender runs a lower risk compared to a non-NHG mortgage. Banks benefit from this scheme by being able to claim a significant share of the potential loss on the mortgage. Customers benefit by receiving lower interest rate (NHG, 2018).

Approximately half of all new mortgages are accommodated by the NHG and empirical evidence suggest that NHG had a significant market stabilizing effect on the housing market as a (1) safety net for financial risk of homeowners and (2) through preserving continuity of the housing and mortgage market in uncarvable cyclical time (Primeus, 2012). As previously stated, the Swedish mortgage market lack such a wide spread program of mortgages guarantees which could offset the attractiveness of investing in Swedish mortgages compared to Dutch.

To further promote homeownership, governments can use tax deductibility of interest paid on mortgages loans. Tax deductibility allows a homeowner with a mortgage loan to deduct the interest paid on the outstanding amount of money from his/hers pre-taxed income (Rouwendal, 2007). Despite the benefits of tax deductibility, it is often a subject for debate. As is the case in both The Netherlands and Sweden. Critics have raised concerns of the crowding out effect of tax deductibility through the rise in price that has been proven to arise from tax deductibility (Gervais, 2002). However, both Sweden and the Netherlands still have some form of tax deductibility on their mortgage interest rates, with Netherlands providing the more generous offer. The Netherland have a relatively generous tax regime consisting of some significant possibilities of tax deduction. One of which is the mortgage interest rate deductibility option which allows full deductibility from pre-tax income for a maximum period of 30 years. On average, the typical Dutch household receives approximately 40 % of their income back through tax deductibility. Consequently, The Netherlands managed to increase homeownership with 8 % from 48 % in 1993, to 56 % in 2013 (Dutch Banking Association, 2014). Tax incentives and other policy measures of the past decades have led to soaring pension savings and home equity on the one hand and mortgage debt of Dutch households on the other (Sahin, 2016).

In summary the comparative analysis highlights some key differences that potentially could offset a development in Sweden of increased non-bank lending like we've seen on the Dutch mortgage market. The lack of a guarantee scheme on the Swedish mortgage market might decrease the attractiveness of investing in Swedish mortgages and the high frequency of ARM might impose constraints in constructing attractive mortgage funds for investors. However, these effects could just as well be put off by the low credit risks and stable performance of Swedish mortgages. These highlights will be further elaborated on in section 6.

6 Results and Discussion

This section covers the results and discussion of the gathered empirical material. The section provides insights to mortgage funds in Sweden by linking empirical data and theoretical concepts. The initial parts of this section consist of the results from the empirical analysis and explores how mortgage funds could impact competition. The second part covers the constitutional conditions of the Swedish mortgage market and explores the outlook and implications of mortgage funds usage in Sweden.

6.1 The competitive situation on the Swedish mortgage market and how to increase competition on a monopolistic competitive market

To answer the question of mortgage funds ability to increase competition on the Swedish mortgage market, we must first determine the current level of competition so that we can explore the prerequisites of the market. I've done this by examining and applying the measurements of banking competition on the Swedish mortgage market. Table 3 depicts the results from the estimated Boone indicator (equation 4.1). The coefficient for CIR is the elasticity of costs to income or the Boone indicator and it is negative and significant with the GMM and 2SLS estimator. The interpretation of the coefficient suggests that the more negative the Boone indicator, the higher the degree of competition on a given market. The results are seemingly in line with previous computations which suggest that the Swedish banking industry has had a negative Boone indicator for the past decade (World Bank, 2018). The estimated Boone indicator is representative for the full sample-period by one single parameter as in equation (4.1), instead of estimating the elasticity for each year. Thus, the full sample period estimates can be interpreted as an average of the year-to-year estimates over the entire sample-period (2011-2017), weighted by the number of observations in each year.

	(I) GMM	(II) 2SLS	(III) FE
CIR	-0.349** (-3.16)	-0.376*** (-3.53)	-0.0159 (-0.32)
_cons	0.232 (0.80)	0.438 (1.23)	-1.290*** (-10.37)
R2	-	0.2221	0.1544
N	41	41	48

Table 3. Estimations of Boone indicator for Swedish mortgage brokers: I report the estimates of the Boone indicator based on average costs as share of total income (CIR) with ROA as dependent variable, adjusted for heteroskedasticity. The estimates are obtained using a two-step GMM, 2SLS and Fixed effects estimator with one-year lagged values of the explanatory variable as instrument based on equation 2.1. T-statistics in parentheses. See appendix 2 for full table of regressions. * p < 0.05, ** p < 0.01, *** p < 0.001

As of writing this, the results are unique in the sense that the Boone indicator is computed solely for mortgage brokers in Sweden for the first time. The magnitude of the coefficient suggest that the mortgage market has a higher degree of competition than the overall banking market in Sweden which for the period 2011-2015 had an averaged indicator of around -0.05 (World Bank, 2018). However, any interpretation of the estimated coefficient should be conducted with caution. As the available dataset for the estimations resulted in less than 50 observations, the robustness of the estimates is threatened. Furthermore, it is also most likely a contributing factor to the discrepancy of the Durbin Wu-Hausman test which was only significant at 0.05 level. While this would still suggest that we should be inclined to continue to treat the instrument as endogenous the magnitude of the estimated coefficient should be

treated carefully. The variance in number of observations in the regressions reflect the omitted time indicator variables, where one is dropped in the one-staged estimators and two are dropped in the two-staged estimators. The elasticity coefficient in the one-staged fixed-effect estimator was not significant which could indicate that the model was insufficient in isolating the effect of CIR to ROA. This hypothesis is further strengthened as the two two-staged estimators were significant. Since the FE-estimator was insignificant, I could not isolate and exclude any time-invariant bank specific effects from the model. Therefore, an extended model with the FE-estimator could serve as a potential area for further research.

The estimated coefficients are further intriguing in the context of mortgage market dynamics and the rationale behind the Boone indicator. As noted, the Boone indicator suggest that it's expected that more efficient banks achieve superior performance at the expense of their less efficient counterparts and that the effect is monotonically increasing as the degree of competition increases when firms interact more aggressively and when entry barriers decline. This implies that the effect could potentially be fuelled by the introduction of mortgage funds. Given that, mortgage funds can reduce the marginal cost of providing mortgages, the **Boone indicator** suggest that new entrants should decrease any given firms market share and as more competitive firms are rewarded in greater extent than less efficient firms the introduction of mortgage funds will reflect in decreased profits, decreased market shares and increased competition (Van Leuvensteijn, 2011). As previously noted, equation $q_i(c_i)$, of the Boone formula suggest that a market may become more competitive in two ways. First, when the produced services of the various banks become closer substitutes, that is d increases. Second, when entry costs e decline. Provided that mortgage funds can reduce entry costs by lowering barriers to entry, the competition on the mortgage market should be expected to increase. The dynamics of how mortgage funds can decrease entry cost on the mortgage market is one key aspect which will be further explored upon in the next section (6.2.1).

Following the theories of partial equilibrium, entry and exit on a monopolistic competitive market occurs in the long-run when induced by profits from current firms. In the entry decision, entrepreneurs play a central role as innovators to create new ways of competing by differentiating. This rationale corresponds to the situation of the Swedish mortgage market, where incumbent banks are profitable and new actors are entering the mortgage market by production differentiation via mortgage funds. The direct effect of an increased number of actors on the market is an increase in the concentration ratio for any given CR_n. According to partial equilibrium theories market, that implies that the marginal costs are reduced as they are spread out across a greater number of actors, the price decrease, and quantity supplied increase (Jehle & Reny 2001). Which is precisely what has been observed on the Swedish mortgage market with the introduction of new actors that provide mortgages funded via mortgage funds. The mark-up on mortgages have recently stagnated after a 10-year period of increase which could reflect incumbent actors trying to match the new offerings (Finansinspektionen, 2018). However, to merely state that the stagnation in mark-ups and an increase in the concentration ratio are signs of increased of competition does not proved a satisfactory explanation to the full dynamics of competition on the mortgage market. To extend the analysis we can explore the previously mentioned indices that can serve as tools for proxying the level of competition and rationales for reasoning around the development of competition dynamics and mortgage funds.

First, **the Lerner index** which measure competition through market power of firms states that as the relative between the mark-up and marginal revenue increases, the market power of that firm increases (Jayakumar et al., 2018). It's a relatively simple interpretation since it does not take into account the distribution and reallocation of surplus as well as risk premia in the prices of banks' products and services. While market power for any given firm can increase with the competitive advantage that comes

alongside mortgage funds which in theory should lower marginal cost for actors and decrease competition. The Lerner index will change according to the elasticity of demand on the mortgage market, for instance, we know that firms will never profit maximize if they produce a quantity q where elasticity of demand is completely inelastic. Thus, if consumers are highly price sensitive, that is the demand is relatively elastic, a decrease in marginal cost deduced from mortgage funds should increase competition. The elasticity of demand, the price sensitivity and the mobility of the Swedish mortgage market will be further explored in section 6.2.2.

Second, **The H-statistic** measures market power by the extent to which changes in factor input prices translate into equilibrium revenues earned by a given bank (Claessens and Laeven, 2004). Considering that the Swedish banking market has a H-statistic of 0,4 which is indicative of a monopolistic competitive market, revenues will increase relatively little compared to a change in input prices. Provided that mortgage funds can lower the input prices of mortgages by disintermediation, the extent to which these changes translate into changes in revenue on the market will determine the level of competition. Following this reasoning of the H-statistic, the level of competition on the market will increase more if the difference in revenues and marginal profits between incumbent actors and new entrants is greater. While incumbent banks historically have earned relatively high profits on the Swedish mortgage market, the revenue stream of all actors is an interesting point to follow up to estimate any potential change in the level of competition.

6.2.1 Mortgage funds and competition: Lowering the barriers to entry and product differentiation

To estimate mortgage funds potential impact on competition in the Swedish mortgage market is naturally a complex and speculative evaluation. However, by examining the empirical material, some interesting notions can be emphasised. From a producer standpoint, mortgage funds can increase competition by lowering the barriers to entry on the Swedish mortgage market. Since mortgage funds allows for non-banks and other financial institutions to access the mortgage market and directly invest in mortgages without intermediaries the threshold to entering the market is reduced. The threshold has been reduced in the sense that through the reduction of actors in the value-chain the overall costs of providing mortgages are reduced. A single mortgage originator can rely of funding through a mortgage fund without the typical costs that are associated with traditional banking, such as branch network costs and administrative costs (DNB, 2016).

By the above, relatively small actors can enter the market as long as they gain a sufficient amount of funds through investors. This is precisely what the Swedish mortgage market have experienced recently. During the past 6 months Stabelo (in association with Avanza bank AB) and Hypoteket (Backed by Schibsted media group) have announced their intention to compete on the Swedish mortgage market. Both firms are substantially smaller in terms of turnover rate, numbers of employees and customer base than the big four. These two actors are trying to gain market shares by product differentiation, mainly through digitalization, abandonment of the bundling system and aggressive pricing (lower interest rates). While mortgage loans can be considered as a relatively homogeneous product category, the two actors are trying to differentiate themselves to appeal to the consumers.

The product differentiation through aggressive pricing can be achieved since their operational costs are relatively low compared to traditional banks. As of writing this both Stabelo and Hypoteket interest rates are around 0.20-0.25 percentage points lower than the big four. However, it's important to note that both Stabelo and Hypotekets offers are limited in LTV-ratios (60 and 65 %). This makes it somewhat troublesome to compare their menu offerings with the traditional banks that offer mortgages with LTV-

ratios up to 85 %. Since any comparison of interest rates is done according to average interest rates of the entire mortgage portfolio, it favours actors who don't serve customers with higher LTV-ratios. As customers with high LTV-ratios will most likely get higher interest rates since they impose a greater risk to the mortgage provider, consequently, driving up the average interest rate for the entire mortgage portfolio (Stabelo, 2018 and Hypoteket, 2018).

The extent to which the mortgage originator would like to differentiate by lowering interest rates will depend on how the distribution of the savings gained from mortgage funds are distributed across stakeholders. The mortgage originator could either lower interest rates to attract more customers and solidify a customer base or offer higher yields to the funds investors. As of writing this Stabelos mortgage fund has served its investor with net income yield before management fees of 1,03 % for the first quarter of 2018, compared to the negative coupon rate on 2y covered bonds provided by Stadshypoteket.

Both actors are also differentiating themselves by offering a simple and digital application procedure with robot interactions. By exploring the business plans of both actor's, two phrases stand out "online based" and "digital channels" are highlighted as their respective ways of adding value. Contrary to the big four whom often prefer to schedule physical meetings with their customers, in which an offer is presented and bargained over. However, the business model of both Stabelo and Hypoteket is based on creating an online system that will save them the costs typically associated with administrative offices. While an online application system will exclude some part of the consumer base that lack the technological skills to proceed with such an offering, the savings earned are most likely more valuable for these actors and should increase as digitalization become more widespread.

Finally, both actors are offering mortgages as an exclusively single and finished product. Contrary to the traditional banks where consumers gain from gathering all their financial interest at one bank to get the best prices. Furthermore, both Stabelo and Hypoteket stands out in that their offer is not based upon individual pricing but rather a *one-size fits all* approach where the offer is up for any consumer that meets the credit rating.

How Stabelo and Hypoteket are trying to differentiate themselves is indicative for what is going on in the Swedish financial industry at large, where more niche start-ups are emerging. Alike many other recent start-ups over the last year in Sweden (Tink, izettle, dreams, swish etc), new technical capabilities in combination with financial innovators are changing the market structures by offering more efficient and targeted solutions.

"The universal banking system may slowly erode as financial innovations create niche solutions" –
Representative from Avanza

In its current form, mortgage funds as a means of financing mortgages for new actors have some interesting implications for the *universal banking* system. The actors that provide mortgages via mortgage funds are targeting one of the core business for traditional banks. This could imply a greater threat to the universal banking system. As more actors are starting niche initiatives that target specific segments of the banking industry, the universal banking system may slowly dissemble. These initiatives could be considered as positive development from a competitive perspective since it could increase the diversity in the financial sector.

6.2.2 Mortgage funds and competition: Consumer mobility and the importance of trust

Consumer mobility is another key factor for the competitiveness of markets. From a consumer perspective, the emergence of attractive alternative options is not merely enough to increase

competition. For a consumer to switch or complement with another bank, the effort and cost of the switch must be worthwhile. In the consumer decision, consideration is not limited to direct costs such as which actor provide the best interest rate, but also implicit costs such the time and effort it takes to switch. A complex product system where many financial initiatives are linked to each other in order to function properly creates a moat where consumers are forced to gather all financial initiatives with one actor. In such a case, the switching cost might be too high and consumer mobility is reduced. Sweden has traditionally had relatively low consumer mobility on financial markets and especially on mortgage markets. However, the mobility of consumers on the Swedish mortgage market has been increasing over the years and is explained by changed attitudes amongst customers and increased digitalization (Carlsson Hauff, 2018). Mortgage funds is an initiative that follows this trend as it lower switching costs for consumers by its simple application. However, as originators backed by mortgages funds is a new phenomenon they lack one key feature that is imperative for consumer mobility, the confidence and trust that traditional banks have.

Among the most important forces that keep consumers from switching bank in Sweden is the degree of which a financial institution is considered stable and trustworthy. Consumers are reluctant to switch to new actors that lack a credible reputation or a solid customer base (Carlsson Hauff, 2018). This is one of the challenges that the new mortgage originator will face and must overcome if they are to compete on the Swedish mortgage market.

“If mortgage funds are to succeed, no actor can mismanage, especially not in this initial phase -
Pousette, 2018

Trust is usually embedded in a bilateral relationship between the producer and the consumer. However, since both Stabelo and Hypoteket are presenting similar offers, the new mortgage originators face a situation where they are jointly building confidence amongst consumers. Since both investors and consumers will face similar offerings that are rooted in the competitive advantages of mortgage funds, if one of the actors were to disrupt the trust of the market, it could reflect on the reputation of the other actors. In that aspect the new actors are entering the market together and are also building their reputation together. Furthermore, as mortgage loans are a long-run business, the new actors must convince the consumers that they mean to compete even on the long run.

In Netherland, trust has been embedded amongst consumer and investors over the past 8 years, so that mortgage funds have ended up becoming an established part of the Dutch mortgage market. At its current state there are originators of mortgage funds that have expanded their horizon to target international investors as well (De Nederlandsche Bank, 2016).

6.3 Mortgage funds from a constitutional perspective

Throughout this thesis, the regulatory environment has been highlighted as one of the drivers for the emergence of mortgage funds. In this section, I will discuss mortgage funds from a constitutional perspective. Since the regulatory development on the market can decide the outlook for mortgage funds, its relevant to discuss how the mortgage fund relates to current legislative branches. The two main governmental branches that are concerned with mortgage funds are Riksbanken and FI. Based on their mission, I will discuss how the branches may reason around the development of mortgage funds usage in Sweden. Since they are responsible for the financial stability, consumer protection and the overall economy, the emergence of mortgage funds may have some policy implications or other effect on their missions.

FI are responsible for contributing to a stable financial system that is characterized by confidence, well-functioning markets that fulfil the financial need of customer and firm’s while maintaining strong

consumer protection. Their mission can be simplified and broken down to two main areas; consumer protection and financial stability (Finansinspektionen, 2017c).

From a consumer protection perspective, the development of mortgage fund can be argued as beneficial since it increases the available options for consumers. As stated throughout this study, mortgage funds lower barriers to entry which allow for new actors that can increase competition and bolster the option available for the consumer. Increased competition thrives better offers for consumers as mortgage originators compete by improving or differentiating their products. Furthermore, the improved efficiency and reduced cost of providing mortgages can bring lower mortgage cost for consumers. However, bolstering of competition and the emergence of new actors are not necessarily exclusively beneficial, as if for instance unserious actors may be able to enter the market. Consumers can be lured and end up in unexpected situation when dealing with actors whom set up fraudulent deals or lack the proper experience.

Which has also been the case with the recent emergence of new actors on the Swedish mortgage market. While not specifically related to the mortgage fund, some new actors have been highlighted as potential “scams”. These actors have provided mortgage contracts with attractively low interest rates but shorter maturities than traditional mortgage loans which could be considered as a mean of deceiving consumer. Thus, the consumer must renegotiate for a new mortgage loan and may not be the same or even a new deal.

To increase the consumer protection FI responded to the development of new mortgages originator by increasing the coverage of existing regulation to include all parties and legal entities that originates or mediated mortgages loans. Furthermore, FI has launched an innovation centre for financial innovators that is aimed at supporting new actors with any regulatory support. As FI noted, Sweden carries a strong innovative capacity, but many companies often face unnecessary regulatory difficulties and knowledge gaps. Financial innovation can increase the efficiency and competition on financial markets however innovation should not occur on the expense of financial stability, it is thus in their best interest to make sure that innovators are properly supported in terms of regulatory counselling when necessary (Finansinspektionen, 2017d).

From a financial stability perspective Mortgage funds can lower the risks in the financial system. In the traditional banking system with covered bonds and wholesale funding, maturity transformation is a common phenomenon where intermediaries are borrowing money on a shorter notice than they are lending. While this is good since it creates liquidity in the financial system by fuelling investments, and the system with covered bonds has provided to be effective during the financial crisis in Sweden (Finansinspektionen, 2013). However, maturity transformation in a too large extent is a risk if the short-term funding costs rise much faster than they can recoup through lending. With this regard mortgage fund can help lowering the risk in the financial system. Since mortgage funds allow pension funds and investors to place their investments over a longer maturity rate which also matches their assets. Thus, dampening of the maturity rate in the financial system since the system is less vulnerable to market fluctuations.

Riksbanken, which is the second legislative branch that are concerned with mortgage funds are responsible for sustaining a healthy level of inflation through momentary policy as well as maintain the stability in the wider payment system (RIX). Their mission can be broken down into two main areas financial stability (inflation) and the payment system (RIX) (Riksbanken, 2018).

RIX is the central payment system were all the transactions between large financial institutions occur. That includes all large banks, clearing houses, Riksgälden and Riksbanken. Since pension funds and

insurance companies are excluded from RIX, an increased usage of mortgage fund could relieve RIX from transactions that typically would have been directed through banks and other financial institutions. Transactions made in and out of mortgage funds can be channelled directly from insurance companies to mortgage originators which implies that monitoring abilities of Riksbanken might decrease as fewer transactions are under their supervision. Furthermore, mortgage funds may reduce the effectiveness of macroprudential and monetary instruments. Since many of the macroprudential and monetary instruments are exclusively focused on banks (such as the inter-bank interest rate STIBOR, capital requirements etc), they may become less effective as non-bank lending through mortgage funds increases. On the contrary, pension funds and insurance companies who are the primary investors in mortgage funds are not subject to potential bank-runs which implies that capital and lending markets become less sensitive to market fluctuations and pro-cyclical lending can be facilitated. As Merton (1993, 1995) argued financial innovation are often a response to various market failures and mortgage funds illustrates this notion by stimulating the moving of funds across time and space as well as facilitating a smoother payment system for mortgages.

From a constitutional perspective the overall assessment should probably be a reserved positive attitude towards mortgage funds since it thrives competition on a relatively rigid market. However, depending on the magnitude of the development, policy implications may become necessary. As of now, the scale of which mortgage funds originators are conducting their business is too small to have any real effect on the economy and impose any threat towards consumers, however FI has announced that they are monitoring the development of mortgage fund usage. This is imperative, since if mortgage funds can increase competition, it will most likely have some implications for the financial stability on the mortgage market.

6.4 Exploring the potential risks associated with an increased usage of mortgage funds?

Following the development on the Swedish mortgage market, an increase in usage of mortgage funds that fundamentally changes the value-chain has some implications for the risk profile in the financial system. An increased usage of mortgage funds could potentially reduce the typical risks that are associated with the traditional finance system such as liquidity risks, concentration risks etc since mortgages are spread out across more actors. However, it will also shift and introduce new actors to risks in the financial system. It is therefore imperative to closely monitor the development so that risks can be identified, and interventions can be implemented when necessary. Some of the new risks has already been highlighted throughout this thesis, such as reducing the effects of macroprudential policy measure or that inexperienced actors end up with excessive risks. To expand this discussion, I will highlight some other potential risks associated with mortgage funds.

Mortgage funds, depending on how they are structured may to varying degrees be susceptible to some liquidity constraints. This may impose borrowers to a refinance risk, if the fund does not contain enough liquidity for borrowers whom for example wish to increase their loan. Refinance risk increases with stricter credit rating of borrowers since originators of mortgage funds are exposing their investors to the credit risk of their mortgage portfolio, mortgage fund originators are likely to try to match the risk in their mortgage portfolio to the risk profile of investors. Evidently, credit rationing amongst the new actors have initially tended to be relatively strict, both Stebeols and Hypotekets offers are relatively modest in their offerings with limited LTV-ratios and no consideration of alternative income streams. The relatively strict credit rating of these actors in combination with the limited LTV-ratios further increases the refinance risk for consumers compared to the traditional banks.

Conversely, the argument of refinance risk can be reversed to the investor's perspective whom may see mortgage funds as susceptible to prepayment risk. Prepayment risk is the risk involved with the

premature return of principal on a fixed-income security. When principal is returned early, future interest payments will not be paid on that part of the principal, meaning that investors who participate in fixed-income securities such as mortgage funds will not receive interest paid on the principal. This could be offset by replacing the prepaid mortgage with a new mortgage, however, the new actors may not have the ability to replace mortgages in the same extent as the established actors due to their limited customer base.

Unlike investors whom invest in covered bonds, institutional investors that participate in mortgage funds are exposed to the credit risks of the originator. This implies that investors should be aware of the credit risk of Swedish mortgages. To widen the perspective of what that credit risk consists of, investors can compare the Dutch and Swedish mortgage market. With regards to the risk profile, there are some features that stands out on the Dutch mortgage. While Dutch borrowers tend to borrow to higher LTV-ratios, the Dutch mortgage market has the national guarantee scheme (NHG) which institutional investors prefer since they tend to invest in mortgages that are covered by the program. Sweden lack a corresponding counterpart which could offset the attractiveness of investing in Swedish mortgages. However, traditionally, the Swedish mortgage market has enjoyed relatively low credit risks and credit losses, even during times of crisis (Pousette, 2018). Secondly, unlike Sweden where the majority of mortgages are ARM, most Dutch mortgages have a long fixed-term rate, which matches the liabilities of pension funds and insurance companies. This could further offset the attractiveness of investing in Swedish mortgages relative to Dutch.

The increased role that pension funds and insurance companies' plays on the mortgage market through mortgage funds may also impose some risks to incumbent banks. As pension funds and insurance companies are prone to limit their risk assessment to the premium of their assets, they tend to invest in relatively safe mortgages. Consequently, as the mortgage funds portfolio develops and increase it may affect and change the banks mortgage portfolio that is left with a larger share of risky mortgages. Banks need to account for this when constructing their business plans and model for the future. Conversely, investors in mortgage funds need to examine their investments options and rigorously explore the different risks of investing in mortgage funds contrary to covered bonds.

Another aspect of risks revolving mortgage funds is the potential lack of crisis response or management tools. The system with covered bonds has been developed for more than a decade and proven to function through economic downturns by providing liquidity to banks when necessary (Finansinspektionen, 2013). While mortgage funds are a new phenomenon we have yet to see how the system would work in times of crisis, are there any necessary restriction that are needed to be put in place to not disembrace the financial system?

6.5 Future outlook of mortgage funds in Sweden: The role of incumbent intermediaries and structural changes

To explore how the incumbent actors on the Swedish mortgage market may respond the new actors we can turn to SBAB. SBAB is owned by the Swedish government and started out as an initiative to finance government mortgages. Initially, SBAB were financed through treasury accounts but over the years their special role has decreased and while Swedish government is the majority owner today, they act as an independent bank and compete on the same terms as other actors, with the key focus on transparency towards it's costumers. Today they mainly focus on mortgages and have the vision of providing Sweden's best mortgages. SBAB, like most actors on the Swedish mortgage market finance their mortgages through covered bonds issued by their holding company SCBC. SBAB currently hold around 7 % of the Swedish mortgage market. However, open market mortgages only became their priority in 2014. Since then they have strived to provide cheap and competitive mortgages to their customers.

SBAB share several characteristics with Stabelo and Hypoteket in that they don't have any physical offices, they are not selling mortgages in bundles, they focus on transparency and want to provide a competitive offering. Pousette (2018) conducted a comparison of the offerings provided by Stabelo and SBAB for mortgages with an LTV-ratio up to 60 %. He found that for an ARM contract (3-month contract) Stabelo had the better offer for mortgages under SEK 3 million while SBAB had the better offer for mortgages from SEK 3-8 million. However, for any FRM contract (1,3,5,10 years) Stabelo consistently had better deals. If we turn to today's figures the same is true, as of writing this, for any mortgage under SEK 3 million and an LTV-ratio of 60 % Stabelo provides a better ARM contract. Furthermore, Stabelo still provides better FRM contract for any given loan level, but, for any mortgage above SEK 3 million SBAB has the better ARM contract (SBAB, 2018 and Stabelo, 2018).

As the majority of mortgage contract on the Swedish mortgage market are ARM, the degree of attractiveness for Stabelo's offer could be questioned. However, as interest rates are expected to eventually increase again Stabelo's offer might become even more attractive to its counterparts. Since Stabelo are funded through mortgage funds which are long-run investments it makes sense for them to try and match their portfolio of mortgages with investors deposits. In the long run, this could potentially drive the mortgage market to an increase usage of FRM contracts since Stabelo can offer better FRM. When more mortgages are converted to fixed rate contracts, fluctuations in interest rates will have less effect on household consumption and thus increase financial stability. This raises the question as to whether mortgage funds are a long-term structural change within the mortgage market.

Fi defines a structural financial change as *“Changes that are rooted in new techniques, products and establishment of new actors in markets where the value-chain are in transformation”* (Finansinspektionen, 2017b). In that sense mortgage funds can already be considered as a structural change since it meets all the criteria of that definition. Mortgage funds are rooted in new techniques, it has already established new actors and transformed the value-chain. This could potentially indicate that mortgage funds are not a temporary phenomenon. Furthermore, from the interviews conducted, some interesting reflection were brought up as to whether the rise of mortgage funds is a temporary or structural change.

“Since mortgage funds in the Netherlands were a fundamental change, there is no reason to believe that it wouldn't be the same case for Sweden” – Pousette, 2018

If mortgage funds were to be a structural change on the Swedish mortgage market, all stakeholder within the market must or at least should adjust accordingly. Investors, consumer and especially banks need to develop strategies to cope with these changes. Banks will most likely not be replaced anytime soon as they are much more than providers of mortgages and have a solid role in the economy. However as more and more of their business are targeted by niche actors, one can question how their role might change over the course of time. Theories suggest that intermediaries act as information providers and monitors amongst other things, the disintermediation process would then imply that those roles would have to fall on someone else (Serena Garralda, 2014). Another possibility is that intermediaries pick up mortgage funds as finance method. In a scenario where mortgage funds become sufficiently attractive, there is no saying that banks themselves might pick up the habit.

“Mortgage funds could be the start of the development of more asset backed securities, there's no saying that other assets can be the basis of other funds in order to provide other kinds of loans” –
Representative from Avanza

Expanding on the note of mortgage fund as structural change, the concept of using investments funds to provide other types of loans. In theory, any originator can set up similar funds with other underlying

securities to provide different kinds of loan. That would imply an increase in securitization and the result would probably be something alike the many variates of asset backed securities that currently exist on global capital markets.

7 Conclusion

This thesis has provided a review of mortgage funds, the Swedish mortgage market and how the two interact. The conclusive answer to the research question is that, mortgage fund can and already have opened for more competition on the Swedish mortgage market. The investigation suggest that mortgage fund have caused a structural shift of the market by significantly changing the value-chain of mortgages. The magnitude of this shift is yet to be decided, as it depends on the future development and response from stakeholder on the mortgage market. Factors such as trust, confidence, the regulatory environment will determine the future outlook of mortgage funds in Sweden. The findings in this thesis are aligned with the previous findings on the topic which suggest that Sweden has had a negative Boone indicator over the past decade. Furthermore, this investigation like previous studies suggest that increase usage of mortgage funds thus far is a positive addition for both competition and mortgage markets (Pousette, 2018 and De Nederlandsche Bank, 2016).

This thesis could be viewed as an initial step to the contribution of a deeper understanding of mortgage funds and how they relate to the Swedish mortgage market. However, at the completion of this thesis its evident that (1) the development of mortgage market is at change and should thus be followed up continuously in research to provide an holistic picture and (2) the degree to which mortgage funds can increase competition and drive markets forward could be further explored and operationalized by other means to gain a more precis indication of changes in the level of competition.

Financial innovation, disintermediation and digitalization are all current trends within financial sectors all over the globe and mortgage funds are yet another symptom of these phenomena. Mortgage funds allow for disintermediation and while intermediation has been studied extensively, disintermediation has not. Future research on the origin, implication and policy implication of various types of disintermediation initiatives would serve of great interest. Furthermore, given the positive reaction of the mortgage funds, research of how governments and other stakeholders can facilitate more initiatives alike mortgage funds could serve as an interesting topic of research.

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Appendix:

Appendix 1 - Interview Guide:

1. What do you think is the background to the development of the Swedish and Dutch mortgage market?
2. Are there any special forces at works, why is this happening now?
3. How much of the market do you think actors with mortgage fund can attain?
4. Do you see any potential risks with mortgage funds?
5. What do you think will happened to the universal banking system in the future?
6. How do you think the stakeholders will respond? (government, incumbent banks and consumers)
7. You collaborated with some representatives from FI and the Swedish banking Association in your report, did you get any particular insight as to their standings of the development?
8. How do you think Riksbanken are relating to mortgage funds?
9. How do you think investors are viewing mortgage funds?
10. Do you believe mortgage funds are here to stay? Temporary or structural?

Appendix 2 – Full table of regression results

	(I) GMM	(II) 2SLS	(III) FE
CIR	-0.349** (-3.16)	-0.376*** (-3.53)	-0.0159 (-0.32)
YD2		-0.333 (-1.20)	0.287* (3.26)
YD3		-0.148 (-0.46)	0.425* (2.68)
YD4		-0.0499 (-0.16)	0.563* (3.14)
YD5		0.0911 (0.28)	0.742** (4.09)
YD6		-0.288 (-0.84)	0.392 (1.11)
YD7		- -	0.747** (4.35)
_cons	0.232 (0.80)	0.438 (1.23)	-1.290*** (-10.37)
R2	-	0.2221	0.1544
N	41	41	48

Table 4. Full table of estimations of Boone indicator for Swedish mortgage brokers: I report the estimates of the Boone indicator based on average costs as share of total income (CIR) with ROA as dependent variable, adjusted for heteroskedasticity. The estimates are obtained using a two-step GMM, 2SLS and Fixed effects estimator with one-year lagged values of the explanatory variable as instrument based on equation 2.1. T-statistics in parentheses. * p < 0.05, ** p < 0.01, *** p < 0.001