

COMPETITION IN THE SWEDISH BANKING SECTOR

Swedish Bankers' Association
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Preface

In Sweden, a possible lack of competitive pressure in the banking sector has been debated in recent years; various stakeholders point to rising prices, increasing interest margins and a low level of consumer mobility. These developments are supposedly driven by a high concentration of market shares due to considerable economies of scale and substantial barriers to entry.

In particular, the question has been raised whether Swedish banks use new regulatory requirements as a pretext to increase margins higher than what can be justified from a cost perspective.

Against this background, the Swedish Bankers' Association has asked Copenhagen Economics to:

- Provide facts on the actual standing of financial services in Sweden
- Analyse the competition in the Swedish banking sector
- Decompose the increase in the mortgage margin since the financial crisis

Executive summary: No evidence of lack of competition in Swedish banking

In evaluating competition in Swedish banking, we have primarily analysed:

- Stylized facts on banking services in comparison to other EU countries, to see if there is any evidence of an insufficient competitive pressure in Swedish banking.
- If prices in Swedish banking appear to be cost-driven, in particular for the mortgage market.
- Barriers for Swedish banking customers to switch bank.

OUR GENERAL ASSESSMENT

Using these measures, we see no evidence of a lack of competition in the Swedish banking sector:

- The net interest margin (looking across the entire banking sector) is among the lowest in Europe, some 1/2 percentage below the average in the EU.
- The concentration of the banking sector in Sweden is average among comparable countries (note, however, that concentration is ill-suited as a measure of competition in banking due to substantial economies of scale).
- Operational costs for Swedish banks are among the lowest in the EU, indicating a sufficient competitive pressure, pushing out inefficient banks.
- Price changes in the Swedish banking market appear to be cost-driven; the banks that have experienced the biggest declines in operational costs in the past six years have also given the biggest price reductions to their customers.

The profitability (return on equity) of Swedish banks is among the highest in Europe. Sector-wide

sustained high returns are sometimes put forward as an indicator of insufficient competitive pressure.

However, we primarily attribute the – in a European context – high profitability of the Swedish banking sector to a high level of non-performing loans in many southern European countries. In addition, the profitability of the Swedish banks has, since the financial crisis, been upheld by the booming housing markets.

A DYNAMIC CREDIT MARKET

The Swedish credit market appears dynamic, with different players assuming the role of market leader in different years. While four large players are dominating the credit market, smaller banks are currently gaining market shares.

The dynamism of the Swedish credit market is supported by low lock-in effects for Swedish banking customers:

- In contrast to many other countries, switching costs are low.
- The high degree of digitalisation of the banking sector has eased the administrative hassle of switching bank, and online comparison sites have made it easier for retail customers to find the most competitive banking offers.
- Most of the information needed to conduct credit assessments is publicly available, hence reducing uncertainty for banks when onboarding new customers.

Our assessment that the credit market is dynamic is underscored by an estimation of the Swedish

banking customers' response to price changes; between 2011-2017, we find that the banks that decreased prices the most also realised the biggest gain in market share.

DIGITALISATION IS INTENSIFYING COMPETITION

Customer mobility has been growing significantly the past ten years, a development we primarily attribute to the growing digitalisation of the sector.

In addition, digitalisation has made it easier for customers to be serviced by several banks. In the coming years, a new regulatory measure, called PSD2, will further accelerate that development as third-party operators (such as for example Tink) will have the right to access bank accounts and initiate payments on behalf of customers. Going forward, we see that digitalisation will increasingly allow customers to pick the best offers from different banks, intensifying competition.

For a number of reasons we see that the Swedish banking sector has considerable potential for exploiting the opportunities, for example due to 1) the strong cost efficiency of Swedish banks making them internationally competitive, and 2) the strong tech environment in Sweden.

Executive summary: The mortgage market is the battleground for retail customers

Mortgages are a flagship product for many banks, and the mortgage market is a battleground where different banks seek to win over new retail customers. The potential gain is considerable as around a quarter of all mortgages have been issued within the past year.

Customer choice is made easy as the various mortgage institutes essentially offer the same product, only at different interest rates, i.e. the market is transparent.

As is the case in the general credit market, different banks appear to lead the market in different years. For example, SEB succeeded in attaining a large share of the credit growth realised between 2010 and 2014 through an aggressive pricing strategy. In other years, other banks gained more market share.

INCREASE IN MORTGAGE MARGIN IS PRIMARILY DUE TO INCREASING CAPITAL REQUIREMENTS

A particular discussed topic in Sweden is an increase in the interest margin on mortgage loans since the financial crisis. Here, we find that:

- Looking across the entire credit portfolio of mortgage institutes, the mortgage margin has increased some 0.7 percentage points since the financial crisis.
- Before the financial crisis, the mortgage margin *decreased* almost correspondingly; the mortgage margin has merely climbed back to pre-crisis levels.
- In decomposing the mortgage margin, we find

that around two-thirds of the increase since the financial crisis can be attributed to changing capital requirements.

- Similar, we find that around half of the decrease before the crisis, can be attributed to decreasing capital requirements.

Thus, our analysis indicates that the increase in the mortgage margin since the financial crisis is primarily a 'cost-driven' return to pre-crisis level.

Overall, we find that stronger financial regulation has increased the mortgage rate by some 0.5 percentage points since the financial crisis, corresponding to some SEK 5,000 for the average Swedish homeowner.

The Swedish FSA has presented an alternative way of calculating the mortgage margin. The FSA looks specifically at the mortgage margin on a *floating* rate mortgage for *retail* customers – where we look across the entire mortgage portfolio, for both retail and corporate customers, including both floating and fixed-rate mortgages.

In decomposing the mortgage margin of the FSA, we still contribute most of the increase to external factors; however, slightly more of the increase remains unexplained.

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1 MARKET AND BUSINESS SITUATION

Outlining the facts

In order to properly assess competition in Swedish banking, it is important to establish a common baseline. Therefore, in this chapter, we describe the Swedish banking market and provide facts on its functioning, size and structure.

First, we outline the basic functioning of banking; the services provided by Swedish banks, and the costs entailed by providing them.

Second, we describe the Swedish banking market; which players are on the market and how the market shares have developed the past six years. Here, we also look at sector concentration, which is a simple measure of competition (which is further discussed in the competition analysis in chapter 2).

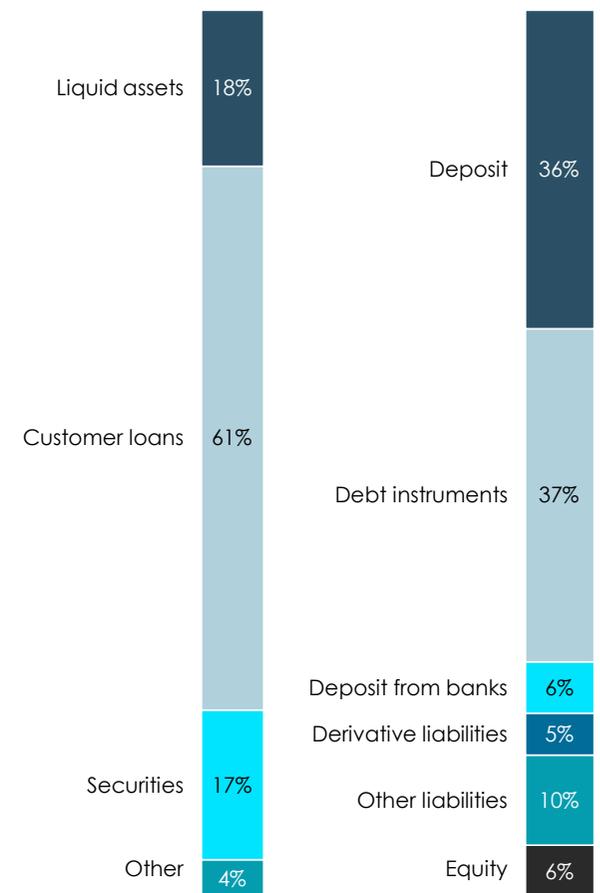
Finally, we compare the quality and prices of Swedish banking products to European peers.

SCOPE OF ANALYSIS

Throughout the report, "Swedish banks" refer to institutions providing financial services to Swedish banking customers. This includes both retail and corporate lending, both regular credit and mortgage lending. The Swedish banking sector is dominated by four large banks, which all have activities outside Sweden. When assessing the credit market, only domestic activities are included in the figures. However, due to data restriction, for other types of activity (e.g. asset management) foreign activities are included in the figures reported. When comparing banking sectors in different countries, only banks with total REA (Risk Exposure Amount) above EUR 100 million and total capital above EUR 1 million are included in the analysis, implying that the analysis includes some 2,500 banks in Europe.

Balance sheet of Swedish banks in 2017

% of total assets



Note: Based on data for the four largest banks. Liquid assets include holdings at central banks. Source: SNL database

Credit transmission is at the core of banking

At its core, banking consists of receiving debt from the public – often in form of deposits and bonds – and transmitting it to customers in need of funding, in the form of credit. The credit transmitted to the public are assets for the bank, and the debt received are liabilities for the bank. The most common form of credit received from the public is either deposits, which are widespread among retail customers, or debt instruments, e.g. bonds, which are more common among institutional investors, *cf. balance sheet figure on the previous page*. In transmitting the credit, the bank pays interest to debt holders and receives interest from borrowers.

The process of transmitting credit to borrowers entails certain costs for the banks. To cover these costs, the interest received from borrowers is higher than the interest paid to debt holders. This difference between the interest income and expenditures is the lending margin (or net interest margin).

Credit transmission makes up most of the revenue of the Swedish banks; net interest, which stems from the lending margin, amounted to around half of the Swedish banks' total revenue in 2017, *cf. top figure*. In addition, around 1/4 of banking fees are directly related to credit transmission (see figure on the next page), which means that revenue from credit transmission accounts for 54% of total revenue.

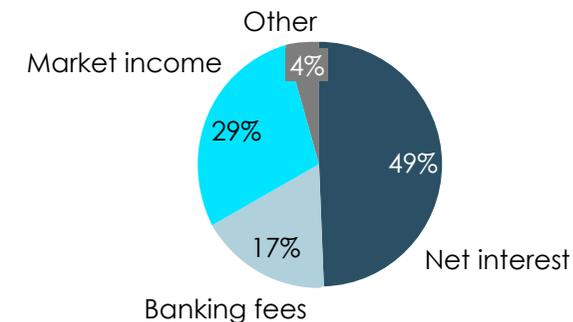
The credit transmission of Swedish banks services the entire economy, *cf. bottom figure*. Household loans, primarily mortgages, account for around 40% of the Swedish banks' credit portfolio. Corporates received around one-third of the total credit,

whereas Small and Medium-sized Enterprises (SMEs) received around 20% of the total credit.

The credit transmission of banks is a twofold service: in addition to financing the economy, the fund-taking from the public is an independent service provided by banks. Deposits are used by households and companies to safely store surplus savings and liquidity to earn a return.

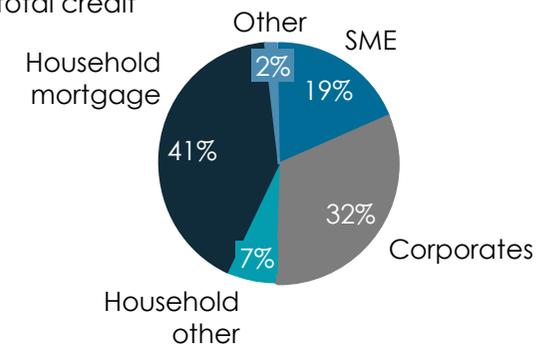
Decomposition of operating income in 2017

% of total revenue



Decomposition of credit portfolio for Swedish banks in 2017

% of total credit



Note: Based on data for the four largest banks. Fees are included as a gross measure. Central banks, financial institutions and public loans are excluded. From the bottom figure. Source: SNL database and EBA transparency exercise

Swedish banks provide a variety of services besides credit transmission

In addition to credit transmission, Swedish banks offer a variety of other services:

PAYMENTS AND CURRENCY EXCHANGE

Banks issue credit cards (enabling electronic payments) and exchange currency for both businesses and retail customers. This is an area, however, which is currently seeing strong competition from third-party operators, e.g. Klarna and iZettle.

Credit card fees equated to around one-third of total banking fees for Swedish banks in 2017, *cf. top figure*, corresponding to around 5% of total revenue for the Swedish banks.

MARKET SERVICES

Financial market services consist of investment banking and asset management, and made up just below one-third of the Swedish banks' total revenue in 2017, *cf. bottom figure*.

Investment banking is used by larger corporates to:

- Underwrite new debt and equity
- Buy derivatives, e.g. to hedge against currency fluctuations
- Facilitate mergers and acquisitions

Investment banking is also called sell-side, which refers to the fact that the banks sell capital and debt on behalf of companies. Investment banking, through net trading income and fees corresponded to

around 40% of the Swedish banks' market revenue or to around 12% of their total revenue.

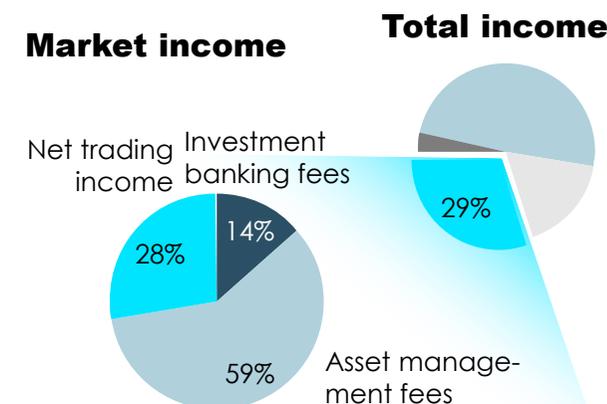
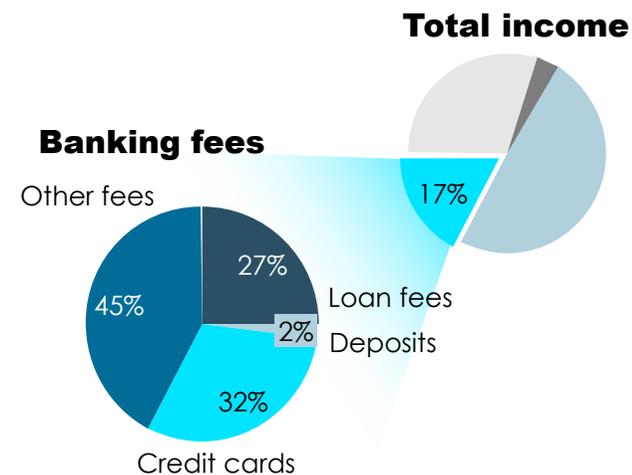
Asset management

As mentioned above, bank debt can be used to store savings. However, if investors or retail customers are willing to take on risks, the banks also provide asset management services, helping investors to invest their savings in order to achieve a higher return. Asset management is also called buy-side, referring to the fact that the banks buy debt and equity, often from investment banks. A typical example of asset management is pension funds that help households to save up for retirement.

Asset management took up around 60% of the Swedish banks' total market revenue in 2017, corresponding to 17% of the Swedish banks' total revenue

OTHER SERVICES

Several financial institutes provide insurance services, through subsidiaries. Net insurance income corresponded to just below 3% of the Swedish banks' total revenue in 2017.



Note: Based on data for the four largest banks from 2017. A few figures are missing for some of the banks. To correct for this, the distribution of income from the other banks is used.
Source: SNL database

Banking entails costs, which are covered by lending margins

As mentioned above, the costs of banking are covered through lending margins and fee charges, which combined can be called “the effective lending margin”. If the costs of banking increase, the (effective) lending margin will also increase in order to cover the increased costs.

Below we go through how the revenue of the banks are divided between their different costs.

COST OF EQUITY

Some of the revenue is channelled to return on equity. Banks are required by laws and regulations to finance some of their loans by equity, which requires a return (similar to interest expenditures for debt financing). As seen in the balance sheet figure on page 8, equity currently amounts to 6% of total liabilities. Equity is a more expensive source of finance for banks, and if the required equity ratio increases, i.e. if capital requirements increase, the effective lending margin will also increase to cover the increased costs. See appendix, p. 59 for a thorough treatment of this topic.

In 2017, the return on equity (or profit) amounted to around 38% of total costs (where return on equity is included total costs), *cf. figure*.

TAX

Banks pay corporate tax on taxable profits. This is one of the factors behind equity being more expensive than debt financing.

OPERATIONAL COSTS

The operational costs covered by the lending margin include:

- Staff costs
- Rent
- IT equipment
- Software development

Which in turn arise from tasks such as:

- Risk and credit assessment
- Complying with regulatory requirements
- Advising and servicing customers
- Asset and liability management

Operational costs is the biggest cost driver for the Swedish banks, corresponding to around half of total costs in 2017, *cf. figure*.

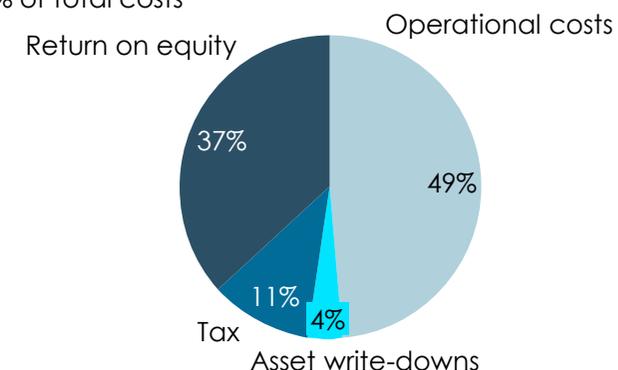
OTHER COSTS

In addition, banks need to cover costs related to:

- Liquidity requirements; banks are obliged to keep a liquidity reserve (see appendix, p. 58).
- Expected losses; some borrowers default on their loans, e.g. due to unemployment. This is a cost to the banks, which is covered through the lending margin. In 2017, this amounted to just about 4% of total costs.
- Finally, banks pay a resolution fee, which can be viewed as a tax on financial liabilities (see appendix p. 58).

Decomposition of costs for Swedish banks in 2017

% of total costs



*Note: Return on equity is in this figure included in total costs.
Based on data for the four largest banks.
Source: SNL database*

Small banks are gaining market shares in Sweden

The Swedish credit market is dominated by four big banks: Handelsbanken, Nordea, SEB and Swedbank. Together, they make up just below 70% of the Swedish credit market (based on data from SCB), cf. figure.

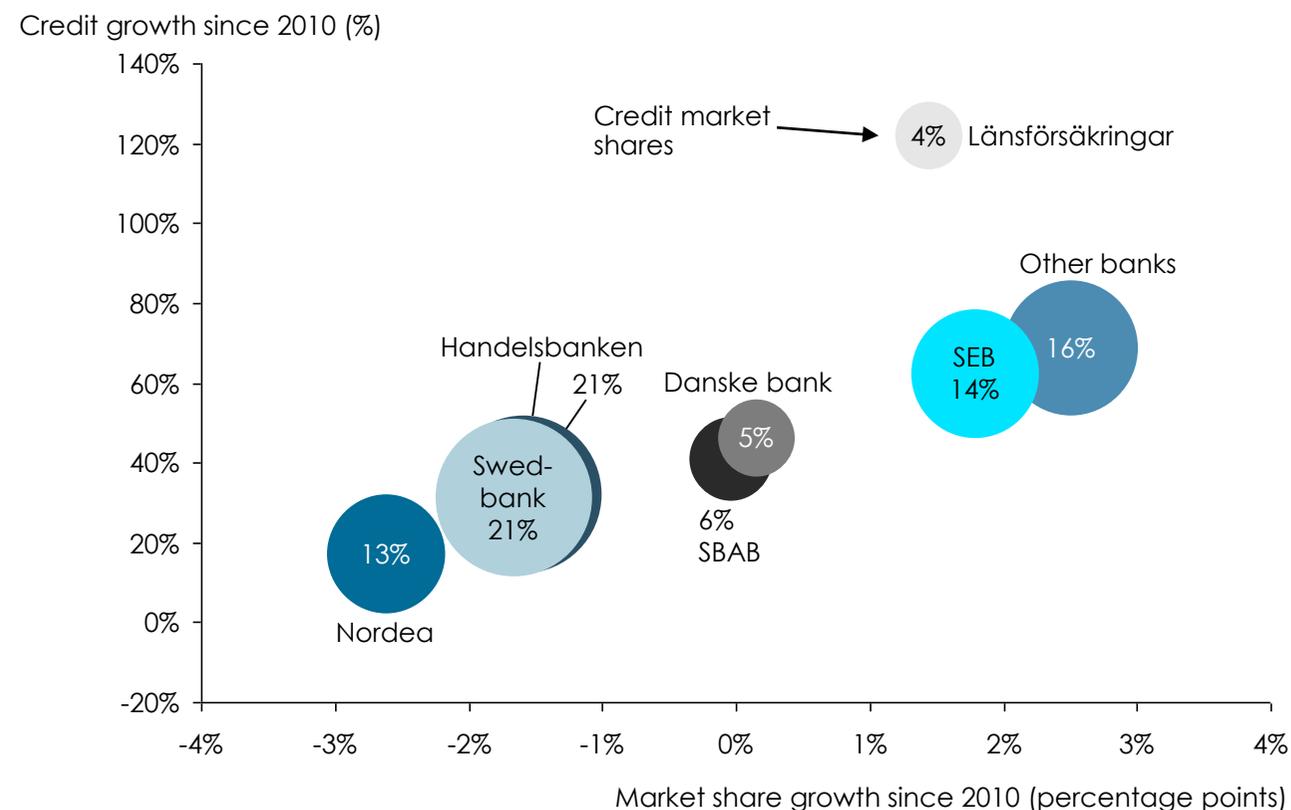
Nordea is the largest of the four banks with a strong presence in Denmark, Norway and Finland. However, on the Swedish market, Nordea is the smallest of the four big banks with a market share of around 13%. Swedbank and Handelsbanken are the two largest banks in Sweden with some 21% of the total credit market.

Since 2010, three out of the four largest banks have lost market shares, with Nordea experiencing the biggest decline, losing around 3 percentage points. SEB is the only one of the four largest banks to have increased its market share.

Small banks in Sweden have collectively gained market shares since 2010 through strong growth in lending. For example, Länsförsäkringar Bank has more than doubled its credit portfolio since 2010. Other medium-sized banks such as Sparbanken Skåne, have also seen strong growth in lending. This category also includes many non-listed cooperative banks. Many consumer credit banks have also been growing rapidly in this period, including e.g. Ikano Bank.

In total, Swedish banks have increased their credit volume by some 42% since 2010, corresponding to average annual credit growth of some 5%.

Shares of the total credit market (including mortgages, corporate loans etc.) in 2017



Note: The size of the circle indicates the market share in 2017. For example; Handelsbanken had a market share of 21% in 2017. This market share is down around 2 percentage points since 2010, despite a credit growth 32%. In order to have had unchanged market share, Handelsbanken would have needed growth of around 42%.
Source: SCB

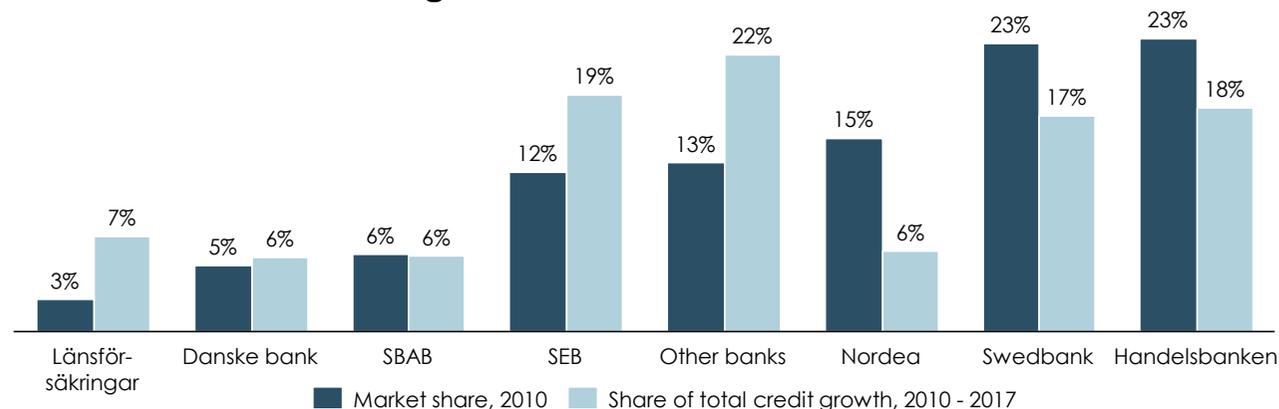
Small banks are gaining market shares in Sweden – continued

The fact that small banks have gained market share in Sweden since 2010 is confirmed by the *top figure*; small banks (outside the top seven biggest banks) realised 22% of total credit growth from 2010 to 2017, despite having a market share of around 13% in 2010. Also Länsförsäkringars bank accounted for around 7% of the credit growth from 2010 to 2017 despite having a market share of 3% in 2010.

At the other end of the scale Nordea accounted for only around 6% of the credit growth in the period.

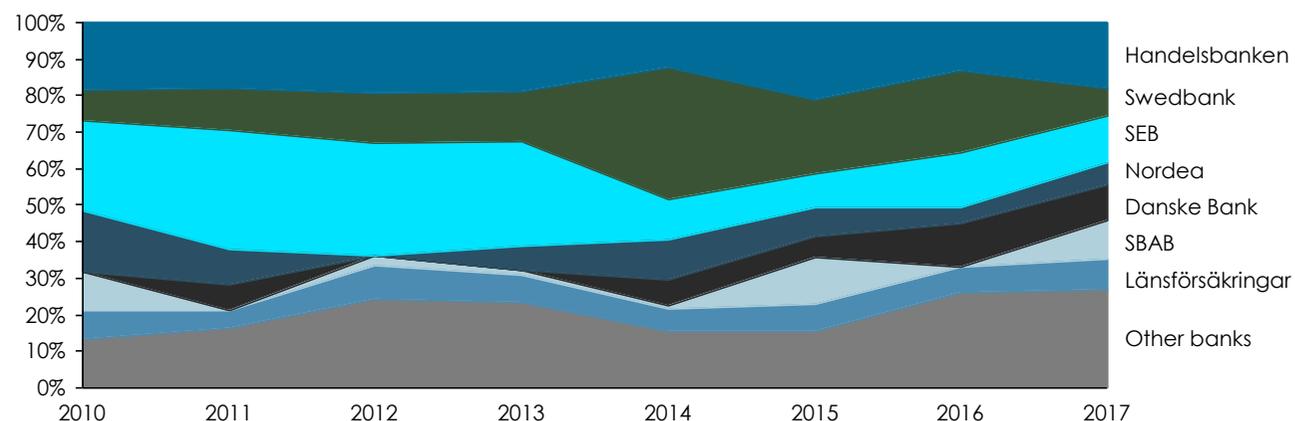
There are variations on who drives the credit growth within each year, *cf. the bottom figure*; The large credit growth of SEB primarily took place in 2010 to 2013, after which Swedbank got the biggest share of the credit growth. Since 2014, the four big banks have got around 50% of the net credit growth (compared to their market share of 70%), thus losing market shares.

Share of total net credit growth 2010-2017



Note: The figure is based on data from SCB of "credit to households and non-financial businesses. These figures differ from the SNL database used in the rest of the report, which are based on income statements. In 2016, Sparbanken Öresund changed from cooperating with SBAB to Swedbank. This meant that a stock mortgages of SEK 20.5 bn moved from SBAB to Swedbank. The numbers in the figures are adjusted for this. Without that adjustment the SBAB's share of the net increase would be 5% instead of 6% and Swedbank's 18% instead of 17%.
Source: SCB

Share of credit growth each year



Note: The figure shows each bank's share of the credit growth each year. Banks with negative credit growth in a given year have been excluded from the figure (in that year).
Source: SCB

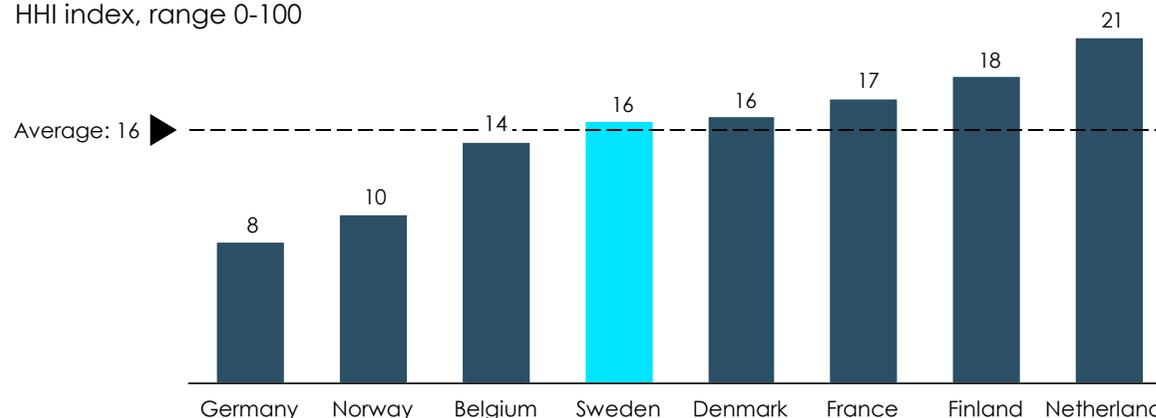
Swedish banking sector concentration is average among comparable countries

The HHI index is often used as an indicator of competition. A high value of HHI implies a high market concentration, *cf. appendix p. 46*. If a sector is very concentrated, market participants have strong market power, which could give rise to insufficient competition. However, in banking, low concentration could also be a sign of low competition as discussed in the box.

The Swedish banking sector ranks average in Europe. On the face of it, the concentration index thus does not indicate insufficient competition in Sweden. Note that, large countries tend to have less concentrated banking sectors simply due to the fact that their banking markets are bigger and thus allows room for more banks.¹ The banking sector concentration in Germany, Denmark and Norway is pulled down by a large number of smaller savings banks.

Banking sector concentration in 2017 in different countries

HHI index, range 0-100



Note: See appendix, p. 46 for calculation method. Spain and Italy are not included due to data restrictions.
Source: SNL database

CONCENTRATION INDEX – AN AMBIGUOUS MEASURE IN BANKING

Concentration indices are standard measures of competition. High concentration is normally a sign of little competition in the banking sector. For example, if one bank had a monopoly, it could set the price high, without losing too many customers, as there would still be a need for finance. In contrast, if there are many banks, customers can more easily switch to other banks, meaning that each bank has

less market power, i.e. prices are given.

However, because of considerable economies of scale, a banking market with many small banks and low concentration could be a sign of insufficient competitive pressure; in a more competitive market, the small banks would be pushed out of the market by larger banks better able to exploit the economies of scale.² Consequently, ECB calls the HHI index in banking an “ambiguous measure” of competition.³

Thus, the “optimal” concentration in a banking

sector is a balance between having large banks that can exploit economies of scale and, on the other hand, having enough banks for each individual bank not to have too much market power.

Finally, it should be noted that small banks often service non-urban areas that would otherwise have more difficult access to finance. Thus, having some small banks, or at least banks with a local focus (even though they are less cost-effective), is important for the economy.

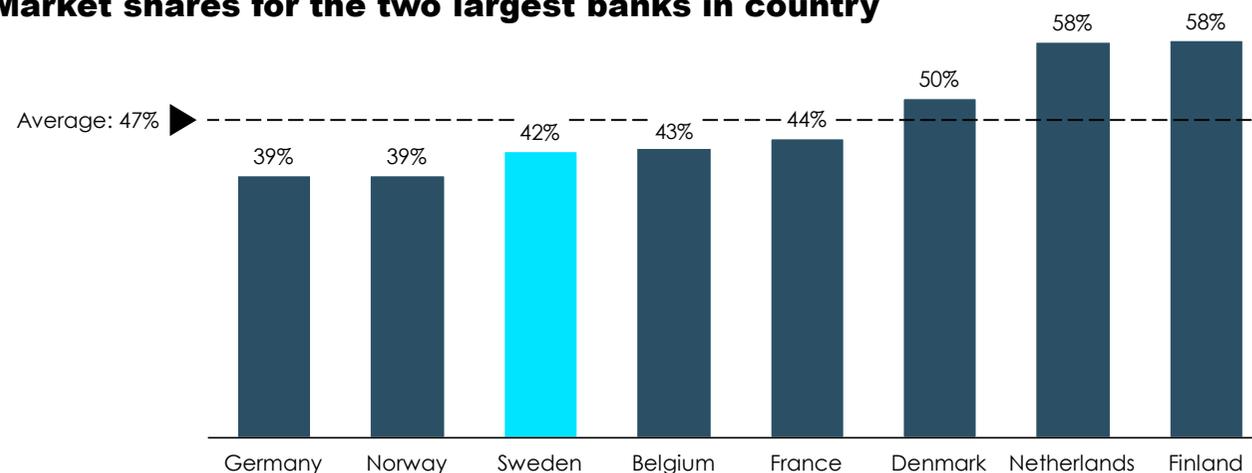
1) ECB (2008), p. 6 / 2) Claessens and Laeven (2004) found that bank concentration and competition were positively correlated. / 3) ECB (2007) p. 7

Swedish banking sector concentration is average among comparable countries - continued

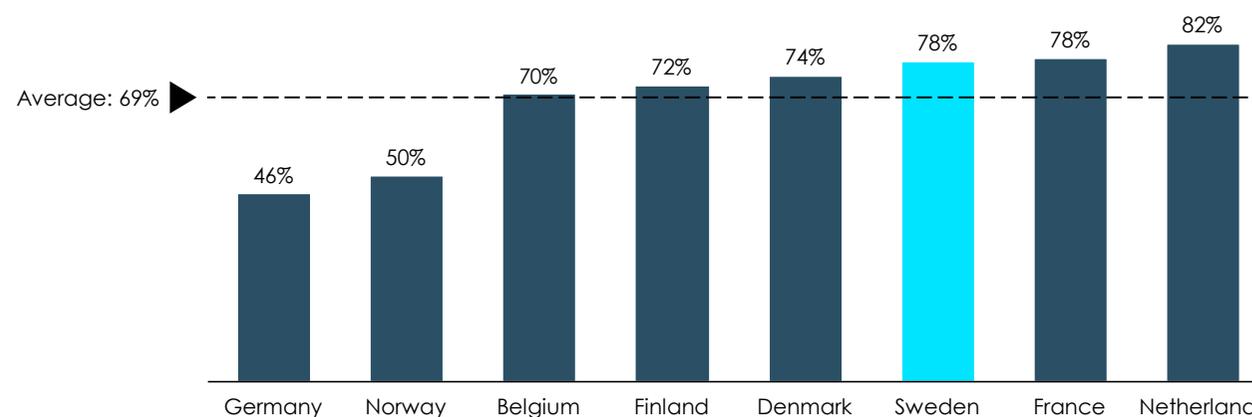
Using other concentration index, Sweden again appear to be among average of comparable countries:

- Looking at the market shares of the two largest banks, Sweden is below average, *cf. top figure*.
- Looking at market shares among the four largest banks, Sweden is in the high end. However, the figures show, that there is nothing unusual about having the four largest banks in a country dominating the banking market, *cf. bottom figure*.

Market shares for the two largest banks in country



Market shares for the four largest banks in country



Note: Note that the figures are based on the SNL database and thus differ from the credit growth figures on p. 11-12, which are based on data from SCB. See appendix p. 45 for banks included in the analysis
Source: SNL database

Swedish banking customers are offered high-quality and low-priced financial services

SWEDISH BANKS DELIVER A SATISFACTORY SERVICE COMPARED TO OTHER COUNTRIES

In an international perspective, Swedish banking customers are satisfied. In a survey from 2016, 61% responded that they were satisfied with their bank, which is above the average of the benchmark countries of 57%. Such surveys should naturally be interpreted cautiously as many factors other than the actual quality of the financial services can impact results, e.g. public debate, general financial conditions etc.

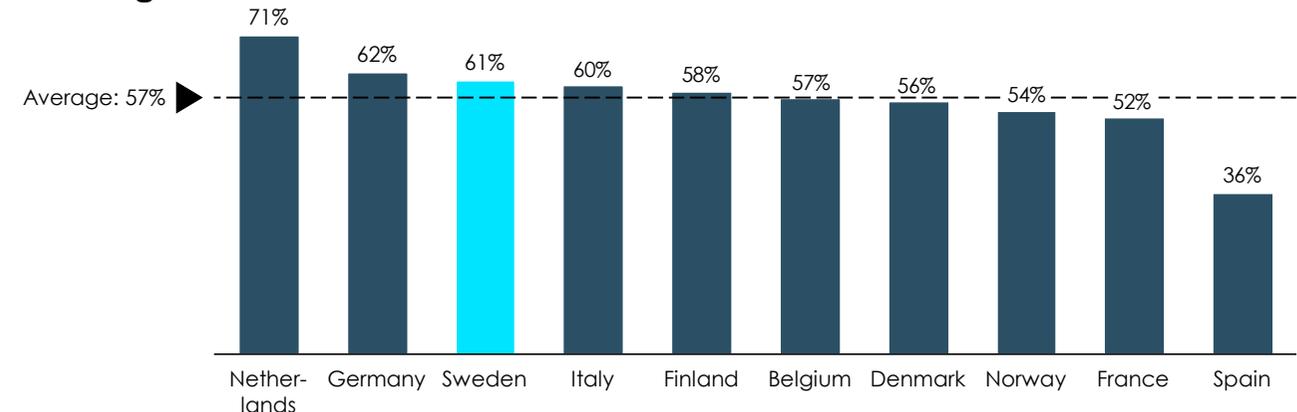
SWEDISH BANKS HAVE LOW PRICES INTERNATIONALLY

Swedish banking customers are currently offered the lowest interest rates in EU (as an average for all types of loan, based on data from 2016 from the SNL database), cf. bottom figure. Both looking across the entire loan portfolio and looking specifically at SMEs, which are crucial for job creation and growth.¹

Several factors influence interest rates, such as money market rates and the nature of the credit provided, and cannot be used as a stand-alone measure of banking sector efficiency.

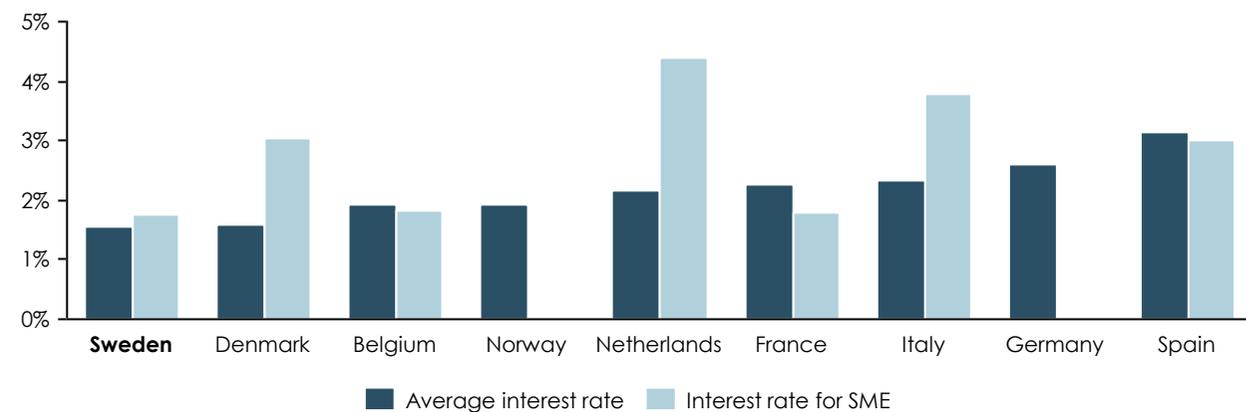
However, the low Swedish interest rates are partly due to low funding costs for the Swedish banks, which is a reflection of a high level of trust in the Swedish banks and due to an efficient banking system with low cost margins, as will be outlined in the next chapter.

Share of banking customers with positive customer experience in banking in 2016



Note: The average presented is of the countries in the figure.
Source: Capgemini and EFMA: World Retail Banking Report 2016

Average interest rates



Note: The average interest rates are from 2016, the SME interest rates are from 2015. The countries in the figure are sorted according to the average interest rate. SME interest rates for Germany and Norway were not available.
Source: SNL and OECD: "Financing SMEs and Entrepreneurs"

1) For example, a study from the EU Commission showed that SME accounted some 85% of the job creation in EU from 2002 to 2010, see: http://europa.eu/rapid/press-release_IP-12-20_en.htm

2

**COMPETITION IN THE SWEDISH BANKING
MARKET**

General characteristics of competition in the banking sector

Competition in banking is paramount for the functioning of the economy as it pushes down funding rates for households and companies.¹ However, there are certain distinct features of the competitive dynamics in banking in general, which is discussed on this page.

As we will discuss on p. 27, it is normal to be serviced by several banks in Sweden. However, this is not the norm in most countries, where customer often choose a single provider for their financial services. Thus, in general, the competition in banking is primarily on the choice of provider and not on individual products.

In addition, we have noted at least four other aspects that characterize competition in banking²:

1) Considerable barriers to entry

There are several requirements to be met by new banks, which generally leads to substantial barriers to entry³:

- Strong requirements for regulatory compliance.
- Establishment of IT systems that can deliver banking services to customers.
- Payment schemes that allow customers to send and receive payments.
- Risk management scheme that can accurately determine the risk profiles of potential customers.
- Establishing sources of funds to service consumer demand.

2) Large economies of scale

Similarly, the factors listed above are associated with many one-off costs⁴, not least when it comes to

complying with regulatory requirements as costs tend to go down with increasing scale.

Furthermore, large “IRB-approved” institutes are allowed to use their own risk models to determine their capital requirements. Developing these risk models involves large one-off costs, but then in return leads to lower capital requirements. On the other hand, it should be noted that big banks get an add-on to capital requirements in the form of the systemic risk buffer, i.e. at a certain point the economies of scale effects start to diminish.

3) Large switching costs

Choosing your provider of financial services is more comprehensive compared to buying other type of products. Every banking customer’s financial situation is different, and it takes time to figure out which bank has the best products for the customer’s specific situation. For example, a bank might offer cheaper products in the short run, but higher ongoing costs. Finally, in most countries, switching banks involves actual costs, for example refinancing costs on mortgages etc., although this is not the case in Sweden, as will be discussed on page 27.⁵

4) Historically, limited international competition

The EU has for decades attempted to establish a single market for financial services. However, in Europe there is still little international competition in banking, e.g. in Sweden the banking market is dominated by Swedish banks (although technological advances might be about to change this, as described in the end of chapter 2.

ARE BANKING PRODUCTS HOMOGENOUS?

At first glance, banking products may appear quite homogenous; when financing a house, it matters little which bank funds it. However, it is generally important for banking customers that they trust their bank, and for many customers personal relations are an important parameter.

This inhomogeneity of banking products could give some market power to individual banks – the extent of this in Swedish banking is explored on p. 27.

1) Cetorelli (2001) discusses the importance of competition in banking. / 2) See also Copenhagen Economics (2009) on how competition in banking differs from other sectors. / 3) See e.g. FSA and BoE (2013). / 4) See ECB (2007 and 2008) for discussion on the scale effects in banking. / 5) Egariusa (2016) finds a positive relation between switching costs and market power for banks.

An international benchmark analysis

Due to the characteristics of the banking sector outlined on the previous page, banking does easily be compared to other sectors when analysing competition. In this chapter, we therefore compare the competition indicators to those of other relevant European banking sectors, such as:

- Norway
- Denmark
- The Netherlands
- Belgium
- Finland

We see them as benchmark countries because they are geographically close to Sweden, and their banking markets are quite similarly structured and sized. These countries are thus the most obvious to use for comparing to the Swedish banking market. In addition, we have included:

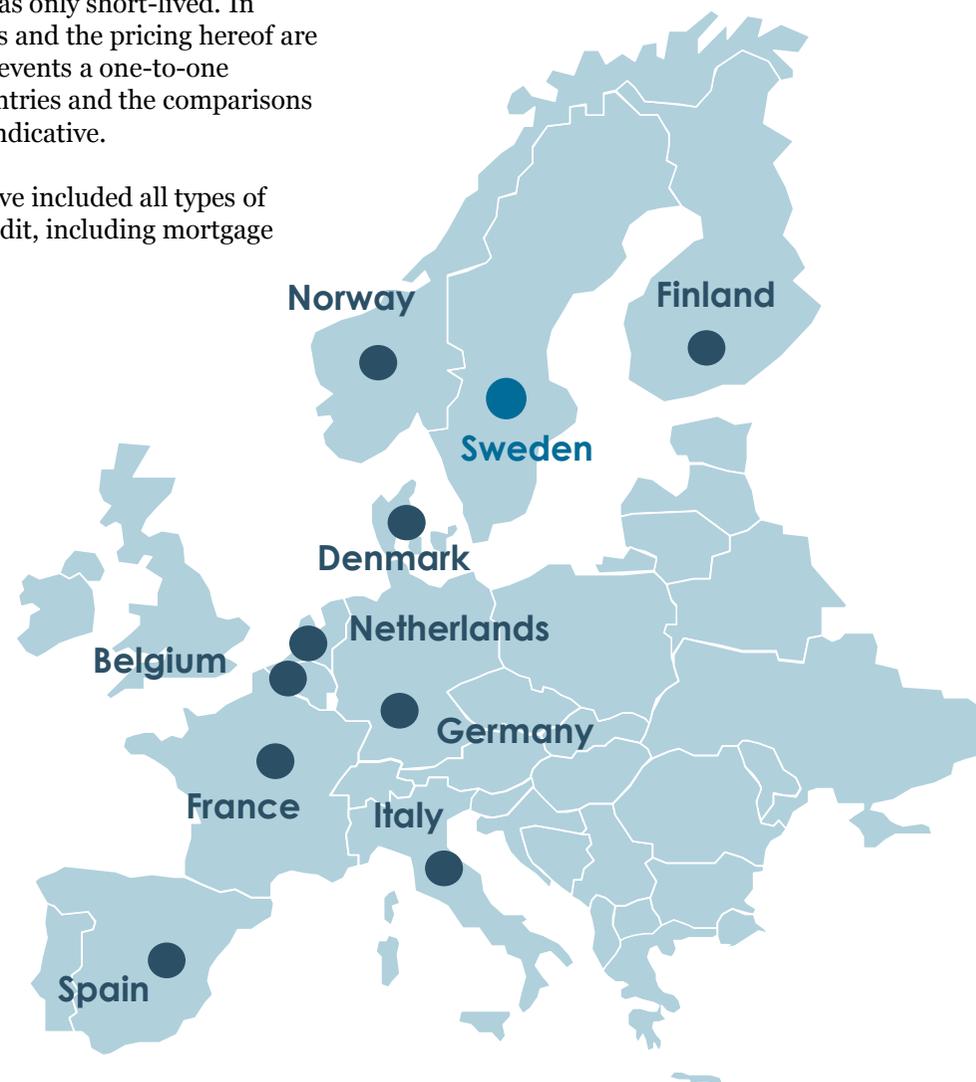
- France
- Spain
- Italy
- Germany

to include some larger countries as a way of giving some perspective on the performance of the relatively small Swedish banking market. These countries will in the rest of the report be denoted “benchmark countries”.

Thus, the benchmarking technique provides an analysis of competition in Swedish banking in comparison to similar countries. It should be noted that the method is also not without its flaws. The European banking sector is quite diverse, and especially southern European banks are still

struggling with high credit losses, whereas the crisis in Sweden and Norway was only short-lived. In general, banking products and the pricing hereof are highly complex, which prevents a one-to-one comparison between countries and the comparisons presented are therefore indicative.

In the comparison, we have included all types of institutions providing credit, including mortgage institutes, *cf. box on p. 7*.



How we measure competition: Three channels where lack of competition can be observed

To analyse competition in the Swedish banking sector, we have identified three indicators of lack of competition in banking¹:

1) HIGH OPERATIONAL COSTS

Lack of competitive pressure could mean that many inefficient banks will remain on the banking market, leading to higher costs at banks. With sufficient competition, inefficient banks will be pushed out of the market by banks with lower operational costs. As such, high operational costs can be a sign of insufficient competition.²

2) LOW COST PASS-THROUGH

If banks have substantial market power, they may be less likely to pass on low costs to banking customers, resulting in higher end-user prices. On the other hand, if prices are cost-driven, it is a sign of strong

competition, where each individual bank has little market power.³

3) LOW CUSTOMER MOBILITY AND PRICE SENSITIVITY

If customer mobility is low, or customers are not responsive to price changes, each bank will have more market power, meaning that they can increase prices with lower risk of losing customers. Thus, low customer mobility and price sensitivity are signs of weak competition.³

In the rest of this chapter, we will analyse each of these three factors in the Swedish banking market answering the questions:

1. Are operational costs for Swedish banks higher than in other countries?

2. Are Swedish banks charging prices higher than what can be justified by costs?
3. Do Swedish customers appear to be static and not very responsive to changing prices?

In answering these questions, we will draw on our market description presented in the previous chapter.

HOW WE MEASURE COMPETITION:



1) The literature review in ECB (2007) provides an elaborate overview of different ways of measuring competition in banking, which we use extensively on this page. / 2) See ECB (2008), p. 6 / 3) This is also called the degree of "conjectural variation". See e.g. Bikker and Haaf (2000), Panzar and Rosse (1987) / 4) See Dick (2003). In addition, Konkursverket (2013) also discusses the importance of customer mobility

Swedish banks are cost-efficient

The first measure of competition we look at is the cost-efficiency of Swedish banking.

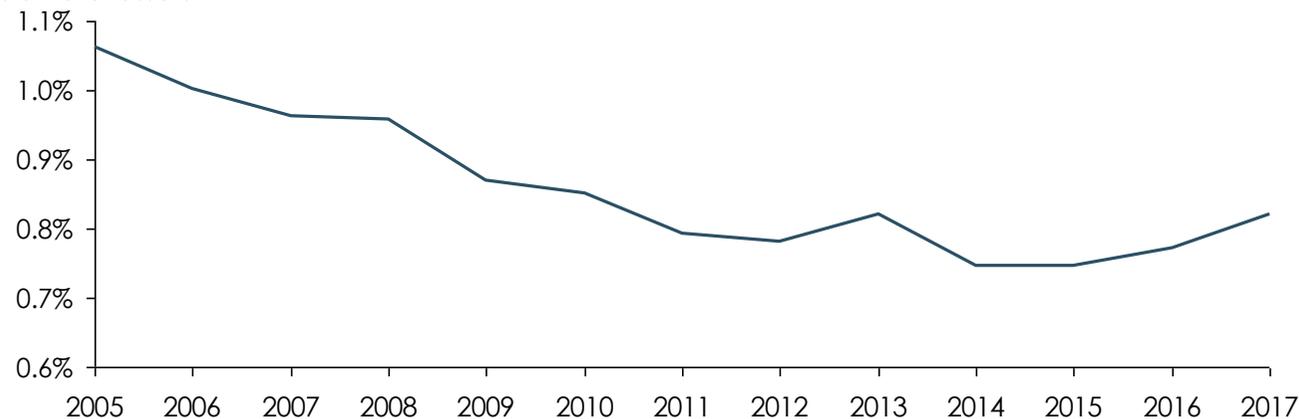
Overall, the Swedish financial sector appears to be efficient, and in this regard there are no indications that low competitive pressure makes room for inefficient banks. In 2016, operational costs as a share of total assets were among the lowest in Europe and some 0.4 percentage points below the average of the benchmark countries, *cf. bottom figure*.

The low costs in Sweden are partly the result of a rationalisation process in the past ten years, where operational costs have declined, *cf. top figure*. This is the result of an ongoing process where banking customers are moving from physical interactions with banking staff to operating on digital platforms, see also page 28.

Note that the largest country in the sample, Germany, had the lowest banking sector concentration and also the highest operational costs as a share of assets. This could indicate that the low concentration is a result of many relatively small banks, which are not very cost-efficient.

Operational costs in Swedish banks

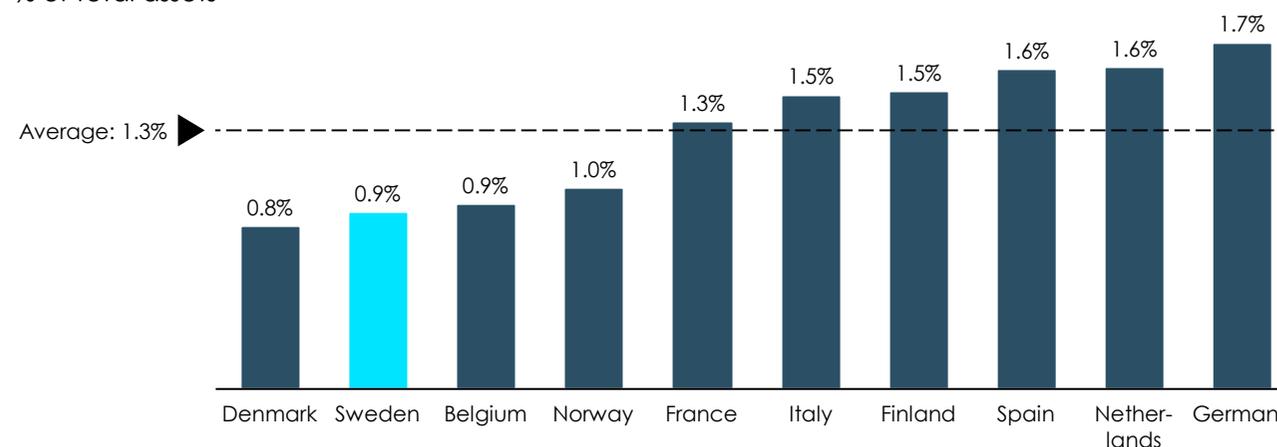
% of total assets



Note: Based on the four largest banks.
Source: SNL database

Operational costs in Sweden are some of the lowest (2016)

% of total assets



Source: SNL database

Swedish banks are cost-efficient – continued

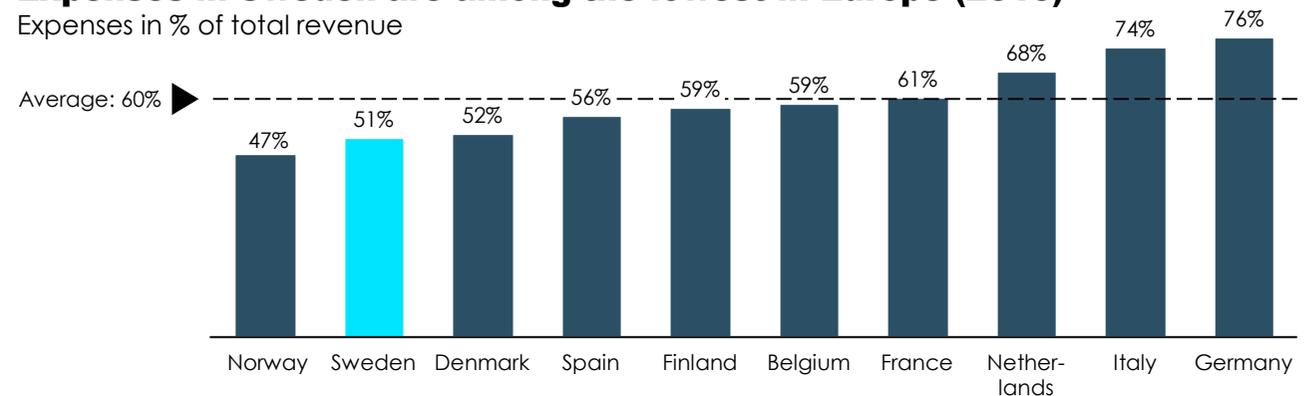
It should be mentioned that operational costs vary for different types of assets. For example, a loan to a start-up company requires more risk assessments than a standard mortgage. As such, variations in operational costs are affected by the differences in asset composition in different countries.

An often used alternative measure is operational costs as a share of total revenue, also called “efficiency ratio”. This should to some extent adjust for the different asset compositions in different countries. For example, a high risk asset requiring substantial risk assessment will also yield a higher interest rate.

Looking at this measure, the picture is unchanged; Sweden is one of the most cost-efficient countries in Europe, 9 percentage points below the average of the benchmark countries, *cf. figure*.

Expenses in Sweden are among the lowest in Europe (2016)

Expenses in % of total revenue



Note: The efficiency ratio is calculated as non-interest expense before foreclosed property expense, amortisation of intangibles, and goodwill impairments as a percentage of net interest income and non-interest revenues, excluding only gains from securities transactions and non-recurring items.
Source: SNL database

Swedish banks pass on their low costs to customers

PASS-THROUGH OF COSTS IS A MEASURE OF COMPETITION

We now turn our attention to the pass-through of costs, analysing whether the low costs in Swedish banking are the passed on to customers. If banks in the market have substantial market power, they may be less likely to pass on low costs to banking customers, resulting in higher end-user prices. On the other hand, if prices are cost-driven, it is a sign of strong competition, where each individual bank has little market power. In chapter 3, we will analyse competition on the mortgage market by evaluating whether the increase in the mortgage rate is cost-driven.

Overall, there is evidence that Swedish banks pass on the low costs to Swedish banking customers. Sweden had the lowest average interest rate of all EU countries in 2016, as described on p. 15.

LOW INTEREST RATE MARGIN IN SWEDEN

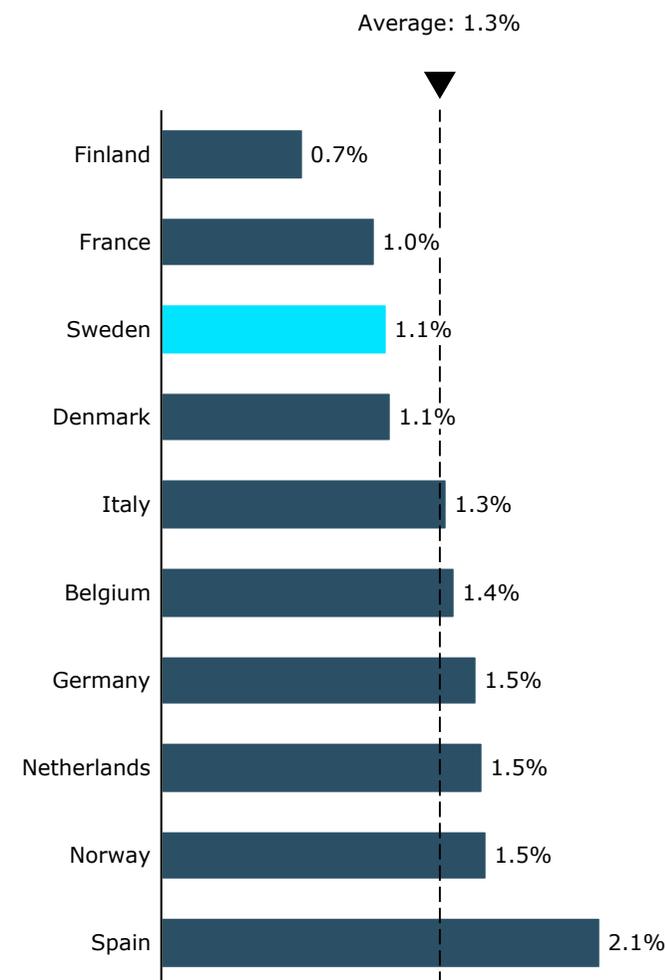
The low interest rate is partly explained by low funding costs of Swedish banks. Money market rates in Sweden are some 0.2 percentage points lower than in the Eurozone (although there is not full pass-through from money market rates to lending rates, as discussed in appendix, p. 55-57). In addition, Swedish banks have a history of low default rates and generally an efficient funding structure, leading to low funding costs.

To adjust for this, one can look at the spread (which is the spread between the interest rate and funding costs).

Based on this measure, the lending margin of Swedish banks are still among the lowest in EU, 0.2 percentage points below the average of the benchmark countries (and around half a percentage point below the European average). The measure is again impacted by other factors such as variations in the credit portfolio between countries and average operational costs. Nevertheless, as a simple measure, it points towards a generally efficient Swedish banking sector that provides efficient funding to the Swedish economy.

Net interest margin (2016)

% of total credit



Source: SNL database

The profitability of Swedish banking assets is on European average

As mentioned above, the low lending margin is due partly to the low operational costs in the Swedish banking sector. Alternatively, one can look at the operational profit (before impairments) as a share of assets. This measure reflects the margin between the revenue and the average costs of banks. Moreover, the measure provides a more broad measure of the cost pass-through in the banking sector since it includes all types of business and not just credit transmission.

Using this measure, Sweden comes out just above average among the benchmark countries, *cf. figure*. Given that the Swedish lending margin was one of the lowest in Europe, this could indicate that Swedish banks generate somewhat higher earnings on operations that do not relate to credit transmission.

Lerner index in banking

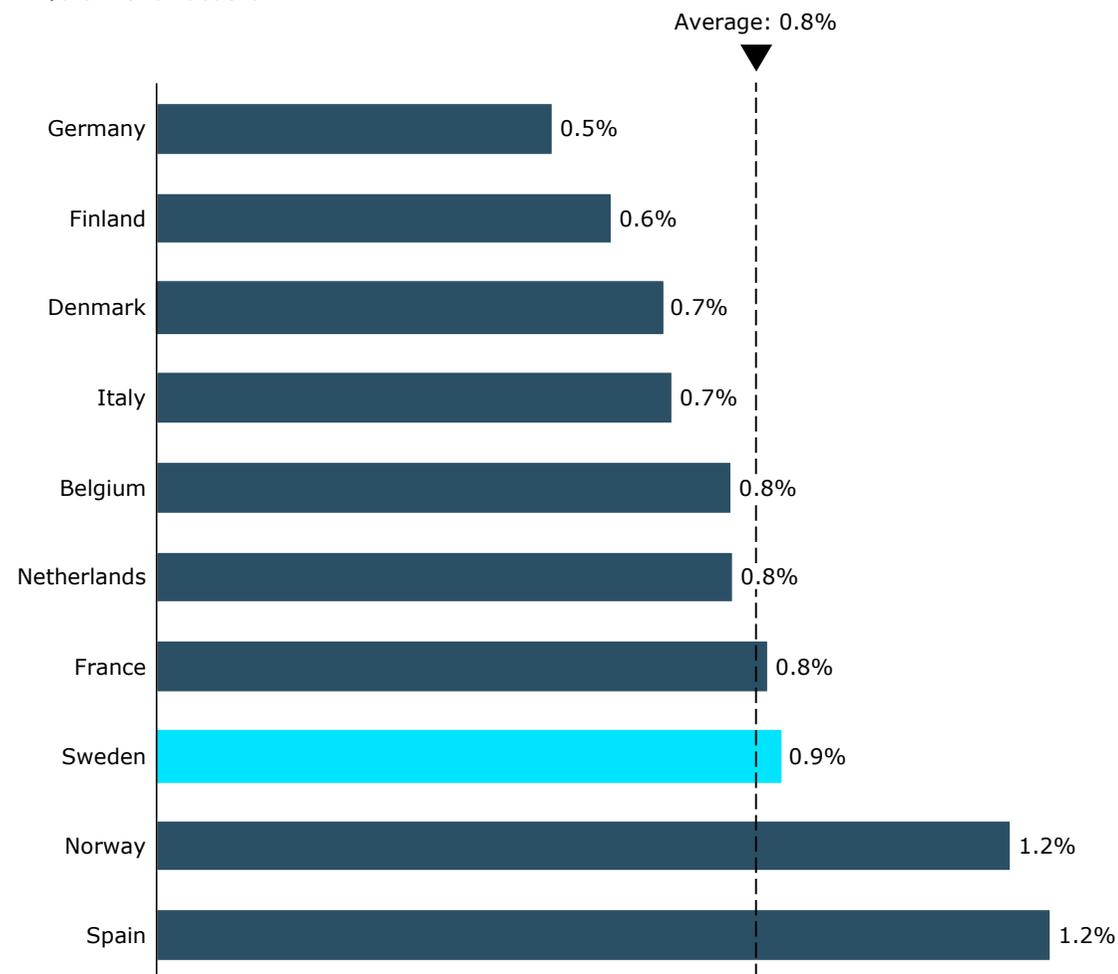
A standard measure in competition analysis is the so-called Lerner index, which is the difference between prices and marginal costs. The idea is that tough competition should force market participants to offer prices close to marginal costs.

In banking, however, marginal costs are not observable, and estimating them is not straightforward.

A simple approach is instead to look at the difference between revenue and average costs. This will then be coinciding with operational profit as a share of assets, as depicted on the figure.

Operational profit (2016)

% of total assets



Source: SNL Database

Development in lending margin is cost-driven

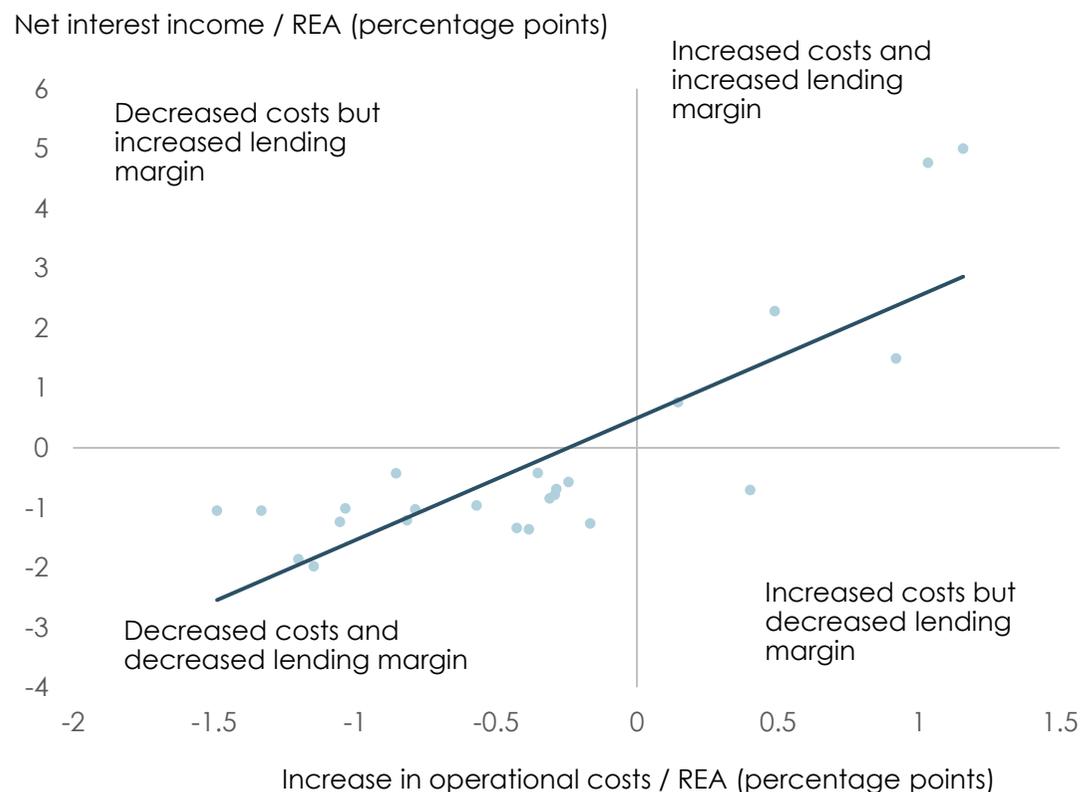
Another indicator of cost pass-through is – looking at banks individually – to measure if costs and prices are correlated, e.g. if banks with decreasing costs pass it on to their customers in the form of lower prices.

Looking at data for Swedish banks, we see indications that the development in the interest margin of Swedish banks in the past six years is cost-driven. In general, most have experienced a decline in operating costs in the past six years and have also lowered their prices, *cf. figure*. In contrast, no bank with decreasing costs increased their prices.

Five banks increased their interest margin between 2011 and 2017, and these banks also experienced an increase in their operational costs.

Finally, five banks decreased their prices despite having increasing costs. However, these banks did not decrease prices as much as those banks, that also experienced a decline in costs.

Correlation between increase in operational costs and lending margins for Swedish banks, 2011-2017



Note: Figures are calculated as a share of REA. We have also estimated the correlation with net interest as a share of total loans – this provided a similar picture with a positive correlation. The figure only includes traditional banks, with a strong focus on credit transmission. See selection criteria in appendix, p. 45. The net interest margin includes all financial assets. Source: SNL database

Return on equity is high in Sweden compared to the rest of Europe

As a last measure of cost pass-through, we look at return on equity. In 2013, the Swedish competition authority suggested that the high return on equity was an indication of insufficient competition in the banking market. Indeed, a prolonged period of unusually high profits can be a sign of weak competition.

Between 2014 and 2016, the Swedish banks realised a return for their investors of around 12%, which together with Norway is the highest in Europe, *cf. figure*.

However, international comparisons of profitability

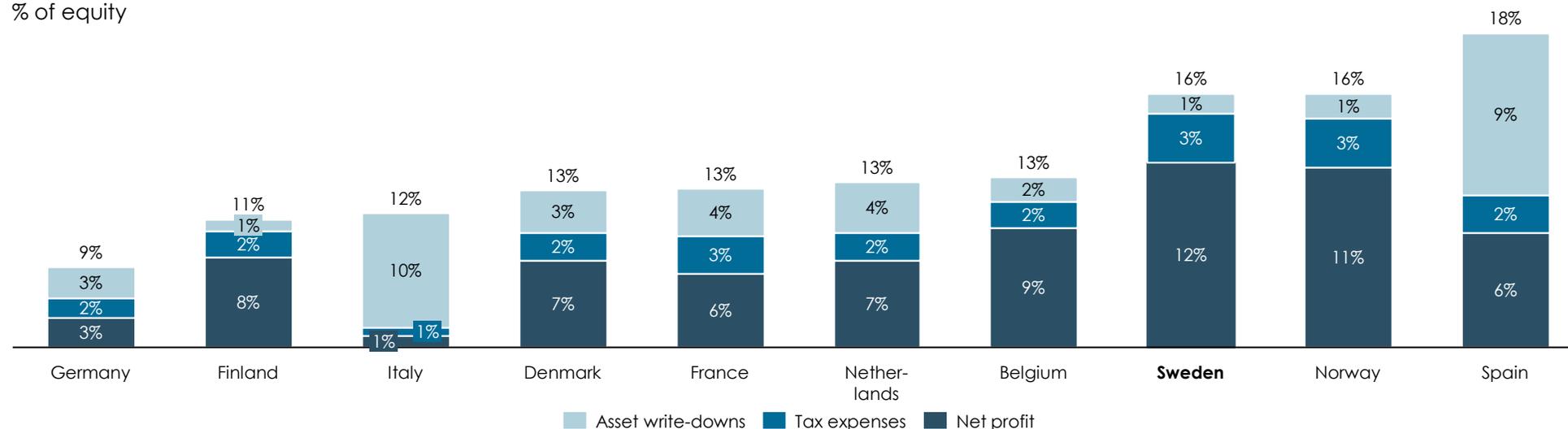
are currently much affected by differences in business cycle situations in Europe:

- Norway and Sweden are arguably at the top of the cycle, with strong housing markets.
- Banks in southern Europe are still struggling with non-performing loans and belated efforts to recapitalise and consolidate the banking sector. Average impairments in 2014-2016 amounted to 10% of equity in Italy and 9% in Spain, *cf. figure*. Naturally, this leaves little room for a satisfying return on equity.
- France and the Netherlands have also seen elevated impairment levels in the period, drying up return for equity holders.

In the appendix on p. 62, we estimate the required return on equity for Swedish banks to be around 8%. In 2016, the return on equity for Swedish banks was just below 12% (after tax). However, this current “surplus of return” could very well be explained by a booming economy in Sweden. As such, the return on equity for Swedish bank is on line with other sectors in Sweden. See appendix p. 59 for a discussion of this.

Pre-impairment income, average of 2014-2016

% of equity



Source: SNL database

Customer mobility is on EU level and growing

Finally, we turn over attention to the price sensitivity and mobility of Swedish banking customers.

Low customer mobility *could* be a sign of insufficient competition; each bank will have more market power, meaning that they can increase prices with lower risk of losing customers.

Customer mobility on the Swedish banking market has previously been questioned by the Swedish competition authority: *“it is still uncommon to move an existing commitment to another bank or fund company. This means customer mobility is relatively low”*. Which they state can be problematic for banking competition as: *“A prerequisite for effective competition is consumers’ willingness and ability to change service supplier”*. Finally, they state that: *“major banks have been able to use their market power.”*¹

It should be noted that low customer mobility could also simply be a sign that banking customers are satisfied with their banking products and believe that they will derive little gain from switching banks. In terms of competition, what is most important is that:

- There are no strong barriers for customers to switch banks. As described on the next page, this seems to be the case in Sweden.
- Customers respond *if* the banking services of one or several banks are uncompetitive, e.g. banking customers change banks if the prices they are paying are higher than the prices charged by competing banks – as described below, this seems to be the case in Sweden.

In general, there are quite limited data on customer mobility in Swedish banking. The most recent international comparison shows that around 4% of Swedish retail banking customers switched bank in 2010-2012, which was around the average of EU countries.² A more recent survey study shows that around 10% of Swedish retail banking customers have switched bank from 2014-2016.³ Finally, a recent study by Konkurrensverket (2018:2) finds that 20% of all bank customers have switched their entire or part of their banking activities the past three years.

Thus customer mobility in Sweden appears to be growing⁴ as also Konkurrensverket (2018:2) finds: *“comparing the present study with the previous ones it becomes obvious that the number of customers having added or switched banks has markedly increased”*.

As we argue on the next page, the increased customer mobility should be seen in the context of the growing digitalisation of banking services.

SWEDISH BANKING CUSTOMERS RESPOND TO CHANGING PRICES

Price sensitivity is crucial for sufficient competition; If customers do not respond to changing prices, this gives each individual bank strong market power as they can increase prices without losing market shares.

In an estimation of the price sensitivity of Swedish banking customers (including mortgages, corporate loans etc.), we find that the banks that lowered their

prices the most from 2010 to 2017 on average also saw the largest increase in market shares. Specifically, we find that the average bank’s market share increases some 1.5%-2% in a given year if it decreases its lending margin by 0.1 percentage point (relative to the average market rate).⁵

Estimations of this kind are always subject to uncertainty, which is described in the appendix, p. 47, together with the details of the estimations. As a result, the estimation of price sensitivity should merely be seen as an indication of a dynamic credit market, in line with the other indications presented in this chapter.

1) Konkurrensverket (2013) / 2) TNS(2012), p. 28 / 3) Ipsos (2016) / 4) Although the survey method differ between the two reports / 5) The methodology is inspired by Dick(2008), that uses a similar approach to estimating price sensitivity on the deposit market.

Low switching costs on the Swedish banking market

NO MONETARY SWITCHING COSTS FOR MOST SWEDISH BANKING CUSTOMERS

In most countries, switching costs on the banking market is a significant factor that gives rise to less intensive competitive pressure, *see example in the box*. Often banks charge one-off fees both when customers leave a certain bank and when acquiring a new banking product. These fees cover the costs to the banks of making the switch. In addition, there can be costs associated with redeeming loans on fixed-term mortgages.

In Sweden, no monetary switching costs are normally charged, which allows price differences between banks to have a much bigger impact. There are still some costs in redeeming fixed-term mortgages, which however a minority of the Swedish mortgage customers have.

“SOFT” COSTS OF SWITCHING BANK

In addition to the monetary switching costs, banking customers generally face some “soft” costs when switching banks. In banking, trust and personal relations play a major role, and Sweden is no different. For retail customers, banks are involved in the biggest financial decisions households make, such as saving for pensions and buying a house. Similarly, for corporate customers, financial advisers at banks advise on major commercial decisions, e.g. debt composition, the value of potential acquisitions etc. When switching banks, this trust has to be built up again.

In other respects, “soft” switching costs in Sweden are quite low:

Several banks: It is normal for Swedish banking to be customers at several banks. For example, half of all Swedish households are registered as customers with Swedbank, despite the bank only having around 23% of the credit market. Generalising on that example, this could – as a rough indication – mean that the average household is serviced by two banks.

Vast public information about banking customers:

Lack of sufficient information about the credit worthiness of customers is normally a major obstacle to competition in banking (so-called “imperfect information on the banking market”). When banking customers want to switch banks, the new bank has less information about the customer than the previous bank had. This means that new customers are more risky than customers who have been with the bank for many years. As banks are risk-averse, they will tend to factor this higher risk into the prices offered to new customers. As such, customers need to pay a risk premium when switching banks, which hampers mobility. However, in Sweden, the information which banks need to make credit assessments is to a large degree publicly available, including history of default, income, loan requests etc. Thus, lack of information about customers switching banks is only a minor obstacle to customer mobility in Sweden.

Time spent researching where to get the best products (costs of obtaining information): In Sweden, mortgages are easily comparable standard products, as discussed on the next page.

Administrative burden of switching banks

There is some administrative work involved in switching banks, but digitalisation of the Swedish banking sector and the “one-form principle” have substantially reduced this. One possible improvement would be to digitalise the mortgaging of properties. In addition, regulation sometimes create soft switching costs, as for example the amortization requirements introduced in June 2016. The requirement only affects new loans, and in order to not lock-in customer, banks are given the possibility to let a borrower keep the original conditions of the loan when switching to a new bank. Still, this introduces additional work for both borrowers and banks, which could hamper switching.

Example: High switching costs hamper competition

High switching costs is a problem for competition as it makes banking customers less responsive to price differences between banks. To see this, consider the following example: a banking customer pays for highly priced financial services at her bank, and she could save EUR 50 a year by switching bank. However, switching bank would involve a one-off costs of EUR 500, meaning that it would take ten years to recoup the one-off costs, making a switch unfavourable. As such, the banking customer is not responsive to price differences between banks, and her existing bank has more market power, i.e. less incentive to be price-competitive.

A dynamic Swedish mortgage market

Mortgages in Sweden are a flagship product and often a decisive parameter for customers in their choice of bank. As a result, winning over a mortgage customer usually brings opportunities for cross-selling of e.g. insurance, other retail loans, etc.

And the potential for winning new customer is large; despite the fact that Swedish mortgages de facto do not expire, around a quarter of all loans have been granted within the past year.¹

Looking at the various mortgage institutions' share of credit growth each year also indicates a dynamic mortgage market; different mortgage institutes capture market shares in different years, cf. bottom figure.

For example, SEB accounted for a large share of the credit growth realised between 2010 and 2014, achieved through an aggressive market strategy.² Looking at 2017, SBAB, Danske Bank and Länsförsäkringar Bank got a large share of the credit growth, cf. top figure. In addition, a number of non-banks has recently entered the market, for example Stabelo, Hypoteket and Enkla. Their business model is set up in such a way that they are not affected by the capital requirements for banks.

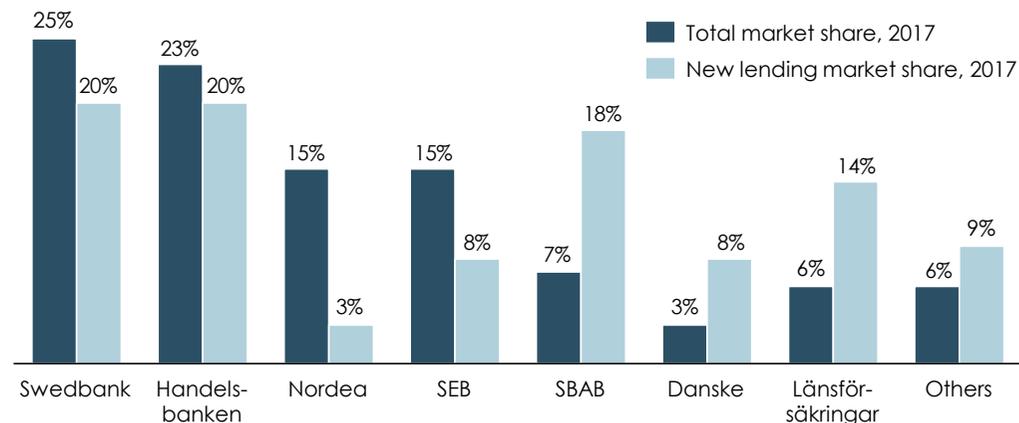
Two factors contribute to intensify competition on the mortgage market:

1. Swedish mortgages are basically the same product, i.e. vanilla products. This makes it easy for Swedish banking customers to compare prices; they compare apples to apples.
2. In recent years, price comparison internet sites have made it easy for customers to find the cheapest mortgage institute.

In Sweden, there is a tradition for negotiating interest rates on mortgages, and in practice banking customers often obtain interest rates below the listed prices. This factor could be a problem for the comparability of prices on the mortgage market. On the other hand, it allows customers with a strong solvency to obtain reductions as they represent lower capital and credit risk costs to the bank (due to lower LTV, LTI etc.).

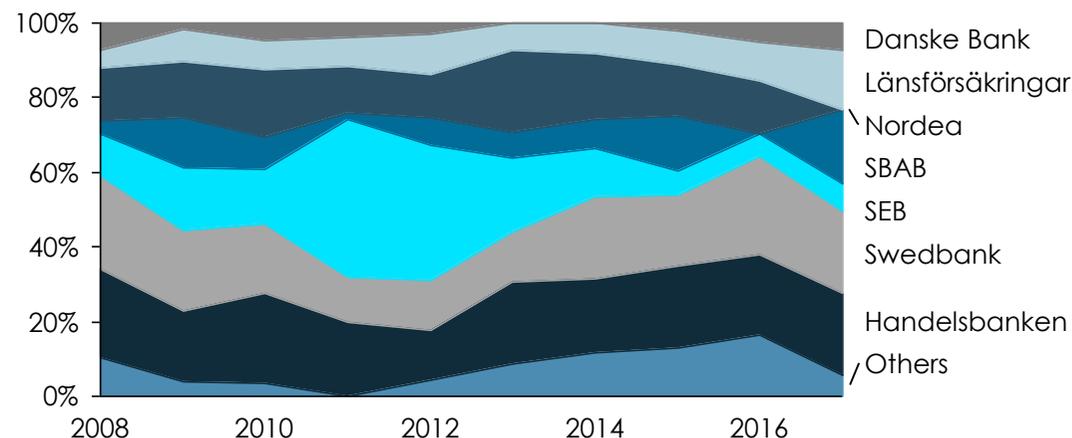
Mortgage market shares

Share of total mortgages



Source: SEB, Equity Research, Swedish banks, p. 5.

Share of credit growth each year on the mortgage market for different banks



Source: SNL

1) Based on numbers from SCB, the average amount of loans granted within one year is 23% on average from 2002 to 2016. / 2) SEB lowered its (risk-adjusted) average interest rate from just below the market average in 2010 to around 1 percentage point below the market average in 2014. The average risk-adjusted interest rate is calculated as total interest income divided by risk-weighted assets.

Digitalisation is intensifying competition

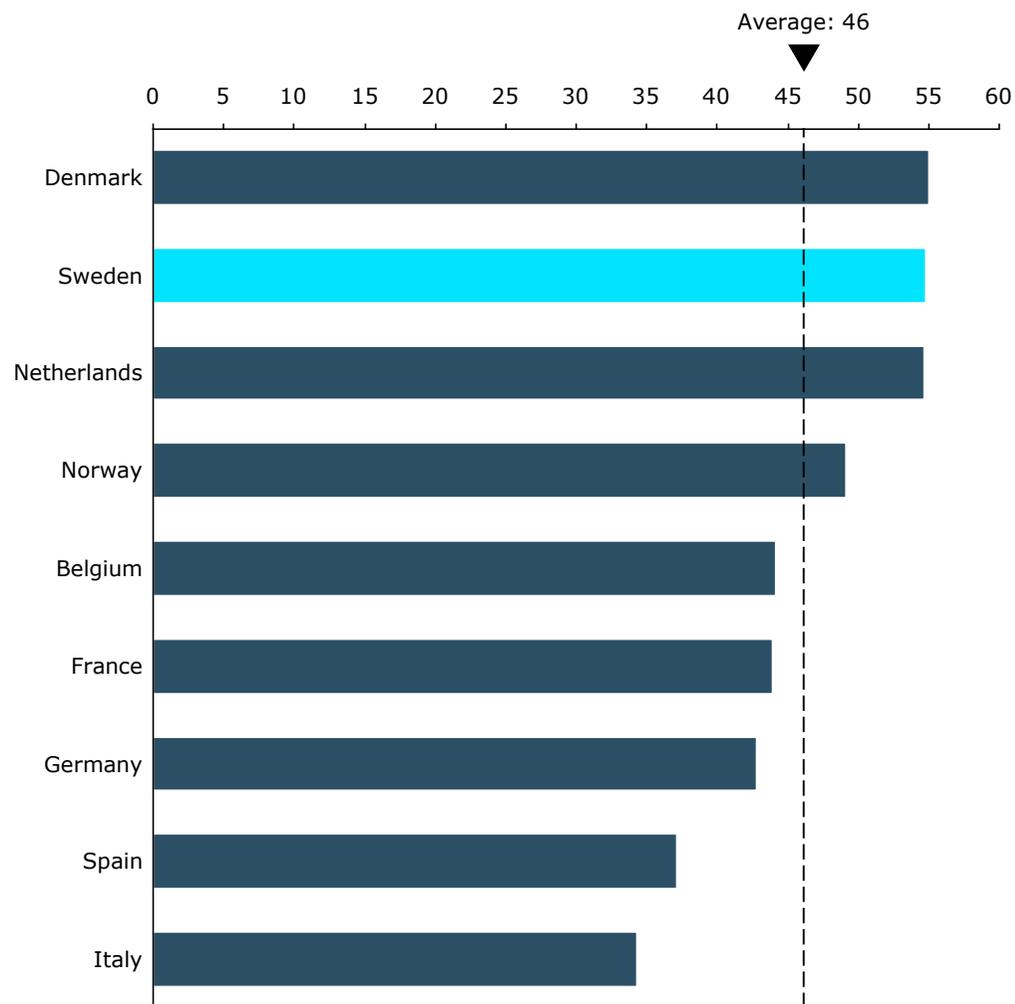
The Swedish banking sector is one of the most digitalised in Europe, *cf. figure*. The digitalisation has in a number of ways reduced the operational costs of Swedish banks, paving the way for cheaper financing for Swedish banking customers, e.g.:

- Closing of branches and digitalisation of information
- More self-service through internet-based platforms
- Digital payments have reduced the need for cash handling
- Automatisation of manual processes in back-office operations

As described, digitalisation has eased switching costs and made it easy for Swedish customers to have several banks. Going forward, we see that this process will accelerate; the Swedish banking market is starting to see so-called “customer platforms” (or demand aggregators), which collect different accounts in one interface for example as “Tink”. This allows customers to pick the best offers from different banks, intensifying competition. Banks can as well take on the role of a “customer platform”.

Thus the digitalisation process might be about to impact the value chain in financial services. This process is denoted “open banking” and have the potential to significantly impact the competitive dynamics. A new regulatory measure, called PSD2, will accelerate this development, as described on the next page, see also Copenhagen Economics (2018): *“Impact of open banking in Scandinavia”*.

Digital banking readiness index (2016)



Source: A.T. Kearney and EFMA global retail banking study, 2016

New regulation will change and increase competitive dynamics

During 2018, a new EU regulatory measure called PSD2 will be implemented in Sweden, which will intensify competition in banking (together with a new data protection regulation called GDPR)¹.

The two most noteworthy direct consequences are outlined below (see also *figure*):

1: THIRD PARTIES CAN MAKE TRANSACTIONS ON BEHALF OF THE CUSTOMER (PISP)

PSD2 will make it possible for third-party operators to make account-to-account transactions on behalf of the customer.

Consequently, PSD2 will blow the competition on payment services wide open and greatly diminish transaction costs on payments.

In Sweden, payment solutions are already a domain which is highly challenged, with many payment solutions such as Klarna, iZettle etc. As such, we assess that the direct impact on fees earnings from payments in Swedish banks will be limited.

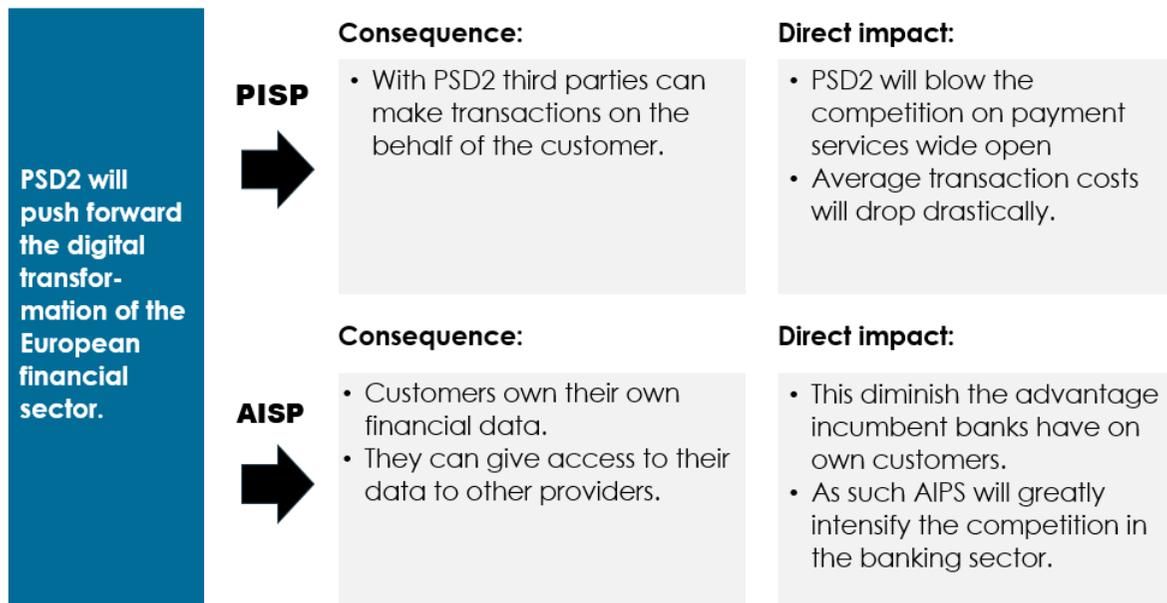
2: CUSTOMERS OWN THEIR OWN FINANCIAL DATA AND CAN GIVE ACCESS TO THIS TO WHOM THEY CHOOSE (AISP)

As mentioned, Swedish customers with several

banks can be collect all their services in one interface, called a “customer platform”.

Under current legislation, different banks need to cooperate actively with this “third-party operator” to provide an overview of the banking customer’s various accounts. With PSD2 (and GDPR), the banks will – by law – have to give this information to third-party operators if approved by the customer.

Consequently, PSD2 will most likely work as a catalyst for third party access to account information in a wider context through an “open banking” regime.



1) See Datastax (2016).

The digital transformation is a great opportunity for the Swedish banking sector

We see the Swedish banking market as being very well-positioned when it comes to meeting the increased international competition caused by the digital transformation for at least four reasons:

- 1. DIGITALISED:** The Swedish banking market is one of the most digitalised banking markets in Europe, which will ease the switch to open-banking platforms for Swedish banks.
- 2. STRONG TECH SECTOR:** Stockholm has already become a centre for new innovation in FinTech.¹ This constitutes a great opportunity for Swedish banks to team up with FinTech players to improve customer experience.
- 3. FREE FLOW OF INFORMATION:** One of the challenges that open banking poses to the incumbent sector is, that a freer flow of information removes the advantage of providing loans to customers already on the banking book. Swedish banks are already prepared for this as most relevant information for credit assessments is publicly available today.
- 4. COST-EFFICIENT:** As described, the Swedish banking sector is one of the most cost-efficient in Europe in terms of operational costs. Furthermore, and maybe more interestingly, the strong market trust in Swedish banks means very low funding costs, which will be a big advantage in providing loans through customer platforms. This trust has been built up over many years and is not easily copied; for an

innovative new player, it is possible to compete with the digital infrastructure of the Swedish banks, but e.g. Handelsbanken's 145 years of non-default history cannot easily be copied by new entrants, be they FinTechs or Big Techs.

Overall, the digitalisation of the banking sector in general and open banking in particular constitute both a threat to the existing business model of Swedish banks and an opportunity to expand for those who seek.

Given Sweden's strong initial position when it comes to both digitalisation and core banking, we primarily see the transformation as a great window of opportunity for Swedish banks and expect the sector to generally stand to benefit from a greater internationalisation of the banking markets.

Thus, we see the efficient and robust Swedish banking system as a great export potential for Sweden, especially in areas of finance, which have so far had little exposure to international competition, such as SME and retail finance.

1) See Copenhagen Economics (2016)

3

DRIVERS OF MORTGAGE MARGIN IN THE PAST DECADE

A Swedish debate on mortgage margins

In Sweden, as in many other countries, the lending margin on mortgages has increased since the financial crisis, *cf. figure*. This has sparked a debate on whether the increase in lending margins can be justified from a cost perspective, or whether it might reflect weak competition on the mortgage market.

In this chapter, we analyse the mortgage market in Sweden. *First*, we present our preferred method for calculating the mortgage margin and explain the development in mortgage margins in the past decade. *Second*, we analyse the development in the mortgage margin for floating rate mortgages calculated by the Swedish FSA (Finansinspektionen). *Finally*, we conduct an international comparison of mortgages.

Development in average mortgage margin

Mortgage margin



Note: Mortgage margin as reported in the financial statements of the mortgage institutes, see also appendix, part 1.
Source: SNL database and annual reports

The mortgage margin has increased since the financial crisis

The mortgage margin (“bolånemarginalen”) can be observed in the mortgage institutes’ financial statements, where interest income and expenditures are reported. This mortgage margin will be an average for the entire stock of loans with different maturities and of both retail and business customers.

MORTGAGE MARGIN HAS INCREASED SINCE THE FINANCIAL CRISIS

In 2004, the average mortgage margin was around

1.1% but declined to 0.6% in 2008. From 2008 to 2017, the mortgage margin then increased again by some 0.7 percentage points, to close to the level in 2004, *cf. figure*.

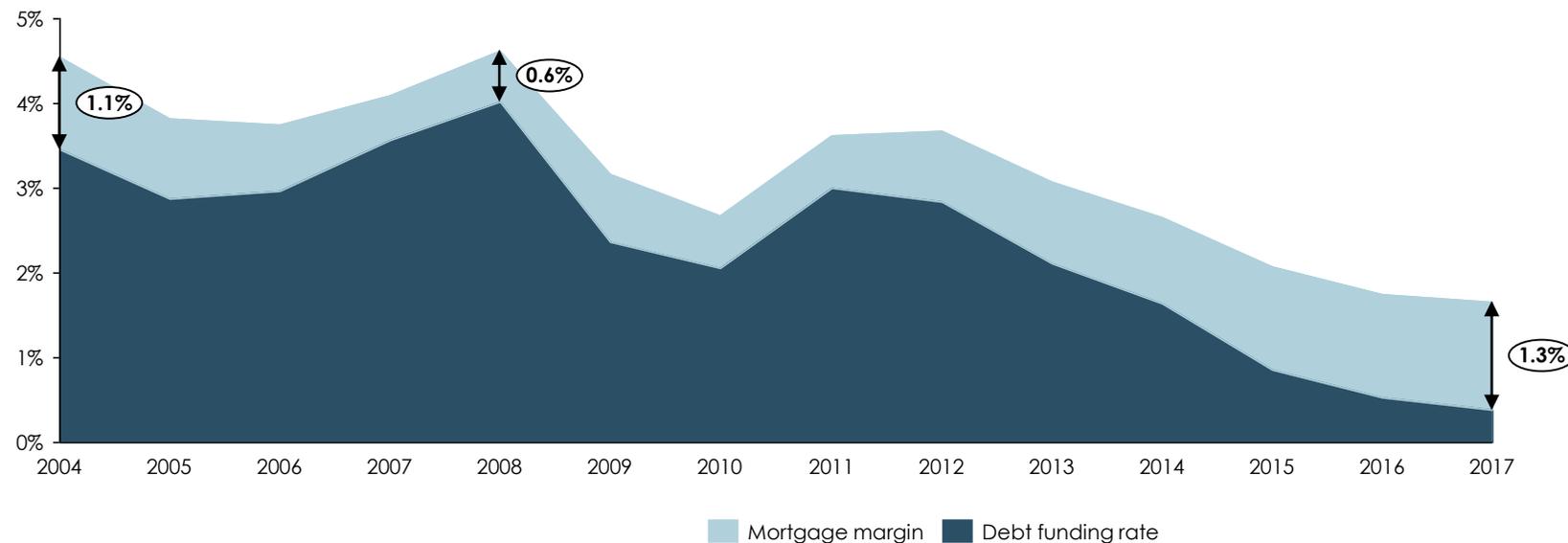
Although the mortgage margin has increased since the financial crisis, the average mortgage rate (mortgage margin + debt funding rate) has declined, due to lower overall funding costs, *cf. figure*.

The debt funding costs of Swedish mortgage

institutes have not declined to the same extent as money market interest rates, which are currently negative. Several factors indicate that debt funding costs do not fully follow market rates; for example, some bonds were issued by the mortgage institutes when interest rates were positive, pulling up the average funding costs. See appendix to chapter 3 for a thorough discussion of this.

Development in the average mortgage rate since the financial crisis

Average mortgage rate



Note: The figure shows the average mortgage margin and funding rate, which together make up the mortgage rate. The measures are averages over different maturities and for both retail and business customers. Figures are rounded.
Source: SNL database

Fluctuations in the mortgage margin can largely be explained by changing financial regulation

We find that the decrease in the mortgage margin from 2004-2008 and the increase from 2008-2017 can largely be explained by changing capital requirements, *cf. left figure*. On the next page, we outline how the capital requirements have impacted the mortgage margin. In appendix to chapter 3, we outline our methodology for the decomposition.

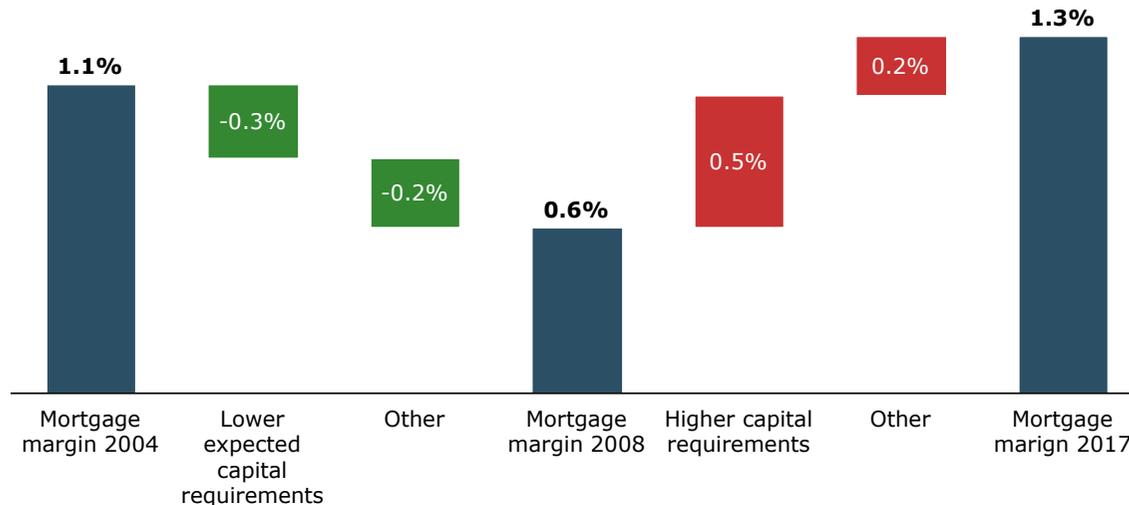
MORTGAGES ARE OFTEN PROVIDED ALONG WITH OTHER BANKING PRODUCTS

Note that the decomposition only includes factors that could impact the *change* of the mortgage margin – this is not an analysis of the *level* of mortgage margins.

offer on their total banking activities, and have less attention to the profitability of the individual products. As such, factors that impact the general costs of banking, but not directly costs of mortgages, could also have affected the mortgage margin – these factors are not included in the analysis.

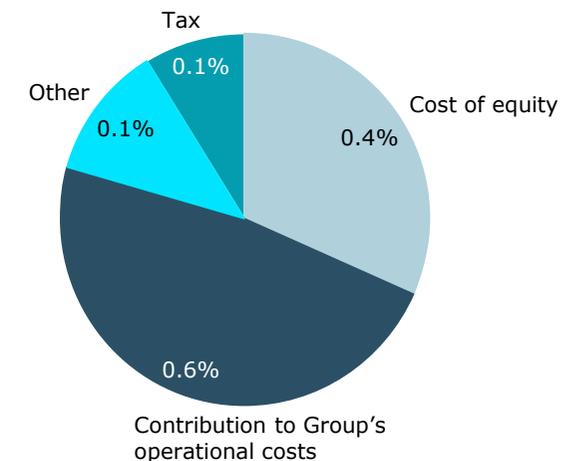
Mortgage institutes are normally part of larger banking groups. They provide customers with an

Decomposition of the development in mortgage margin since 2004



Note: The decline in equity cost in 2008, is based on the fully implemented Basel II rules. Numbers are rounded. Resolution fee is included in the interest expenses from the income statements. The methodology of the calculation is outlined in appendix to chapter 3. Source: S&P's SNL database and Copenhagen Economics

Mortgage margin in 2017 of 1.3%



Note: Contribution to Group's operational costs is calculation as a residual. Source: SNL database

Changes in capital requirements are the main driver behind mortgage margin fluctuations

DECLINE IN CAPITAL REQUIREMENTS FROM 2004-2008

In 2008, new capital requirements were being implemented. The new requirements required banks to finance around 0.5% of mortgages with equity, against 4% in 2004, *cf. bottom figure*.¹ In an international context, there were relatively low capital requirements for mortgages, which is due to Swedish mortgages being a low-risk asset with a strong history of low default rates. Consequently, Swedish banks started reducing the mortgage margin in spring 2005 when the new lower capital requirements were revealed.

CAPITAL INCREASED AGAIN AFTER THE CRISIS

After the financial crisis, capital requirements increased again, especially for mortgages. First, the relief in capital requirements announced in 2005 was not fully implemented (a phase was extended), and several additional requirements were added, e.g. systemic risk buffer, capital conservation buffer etc. This means that that mortgage institutes must now use equity to finance some 5.2% of mortgages, representing an increase of 4.7 percentage points, *cf. figure*.

Swedish banks will correspondingly use 4.7 percentage point less debt finance as a result of the capital requirements. However, the overall funding costs are still higher as equity finance is around 10 percentage points more expensive than debt finance. Specifically, we estimate that the higher capital requirements increased the mortgage margin by some 0.4 percentage points.

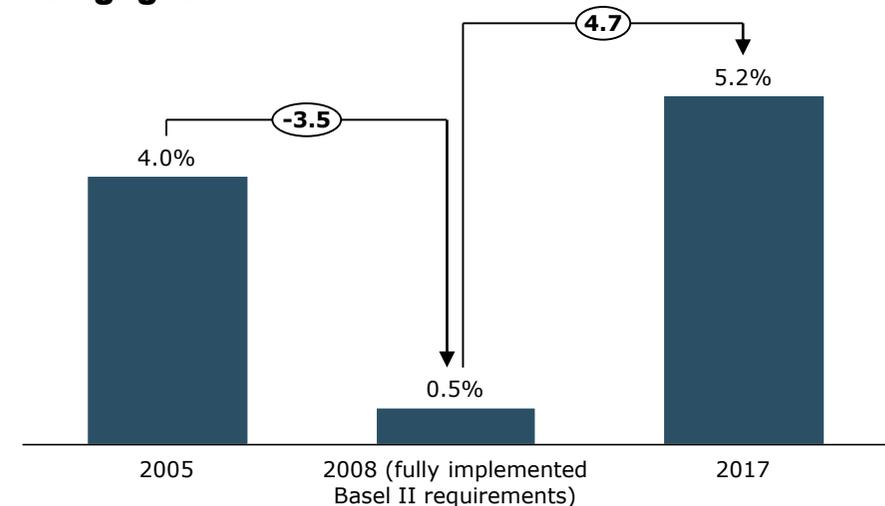
In addition, banks prefer to have a buffer above the capital requirements and are also expected to do so by rating agencies and financial authorities. For the four largest institutes, the capital buffers are somewhat bigger today than before the financial crisis (between some 0.5 and 3 percentage points), which could contribute further to an upward pressure on mortgage margins. This is not included in the decomposition on the previous page.

In our calculation of the cost of increasing capital requirements, we have used a constant (after tax) required turn on equity of 8%. See appendix p. 60-62 for a thorough discussion of this assumption.

NEW FINANCIAL REGULATION HAS INCREASED MORTGAGE RATE BY 0.5% SINCE THE FINANCIAL CRISIS

In total, we estimate that the financial regulation implemented since the financial crisis has increased the average mortgage rate by just above 0.5 percentage points. This corresponds to around SEK 5,000 per year for an average Swedish homeowner.² The cost of financial regulation primarily arises from higher capital requirements – but the resolution fee and liquidity requirements have also contributed (see appendix to chapter 3).

Development in capital requirements for mortgages



Note: See appendix p. 53 for assumptions used in the calculation.
Source: SNL database and Copenhagen Economics

1) Fully implemented in 2009, but we assume full effect in 2008, see appendix, part 2. / 2) In 2016, the average Swedish homeowner had around SEK 1 million of mortgage debt.

Swedish FSA uses an alternative method for calculating mortgage margin

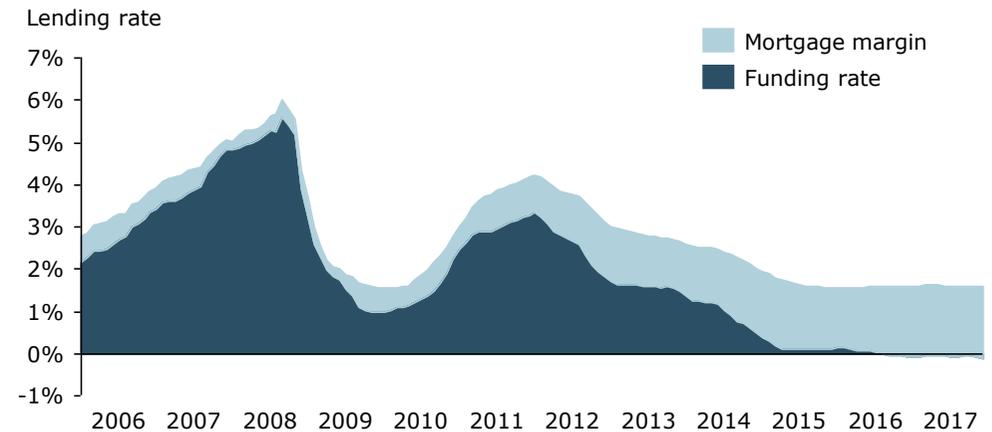
The FSA uses an alternative measure of the mortgage margin. Instead of looking directly at net interest income from the mortgage institutes' financial statements (the accounting approach), they estimate funding costs for a *floating rate* mortgage for *retail* customers compared to the average lending rate (obtained from SCB) – thus, this is a different figure than our preferred mortgage margin.

The FSA's chosen method implies that its estimated mortgage margin follows the financial market rates more closely than the accounting approach and is in this way more volatile. Especially during the financial crisis, the FSA estimated that the mortgage margin was below 0.3 percentage points, which would leave almost no room to cover operational costs; as a result, we do not see this as an accurate reflection of the actual lending margin for the mortgage institutes at the time.

Specifically, we find that the FSA might underestimate the mortgage margin in 2008 since it uses the interbank rate (STIBOR) as a proxy for the deposit rate. This might be problematic as the deposit rate is considerably below STIBOR at the time (see appendix, p. 54 for a discussion of this). This should be taken into consideration when decomposing the mortgage margin, and we estimate that it can explain some 0.5 percentage points of the increase from 2008 to 2017, *cf. bottom figure*.

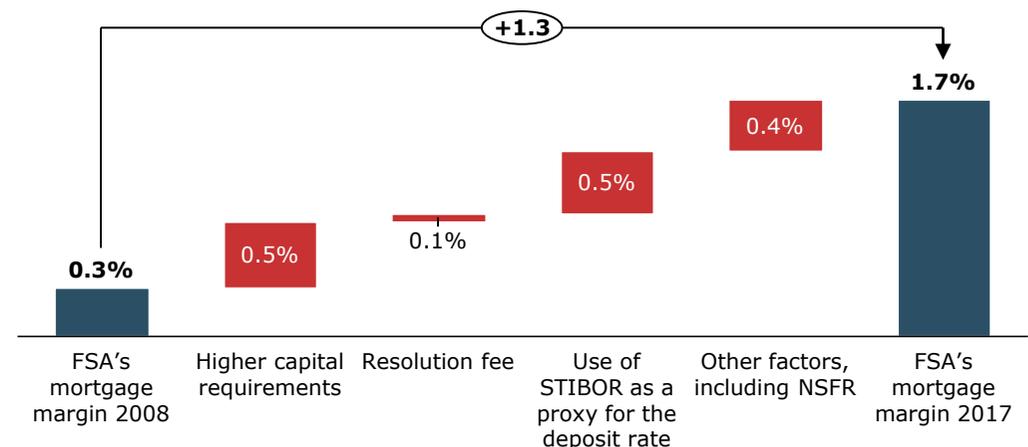
In total, higher capital requirements, the resolution fee and the use of STIBOR as a proxy for the deposit rate can explain around 1 percentage point out of the total 1.3 percentage points increase in the floating rate mortgage margin since 2008 (numbers are rounded), *cf. bottom figure*. In addition, the NSFR (net stable funding ratio) requirement could further have increased the mortgage margin. The regulation has required banks to increase the duration on their debt, which is more expensive. The requirement is applicable on group level and it is therefore difficult to quantify the exact impact on the mortgage margin, as described in appendix on p. 58.

FSA's estimation of mortgage margin and funding cost for a floating rate mortgage



Source: Swedish FSA and SCB

Increase in FSA's mortgage margin decomposed



Note. Figures are rounded. See appendix p. 54 for methodology.
Source: Swedish FSA, SCB, SNL and Copenhagen Economics

Swedish mortgage rates are among the lowest in Europe

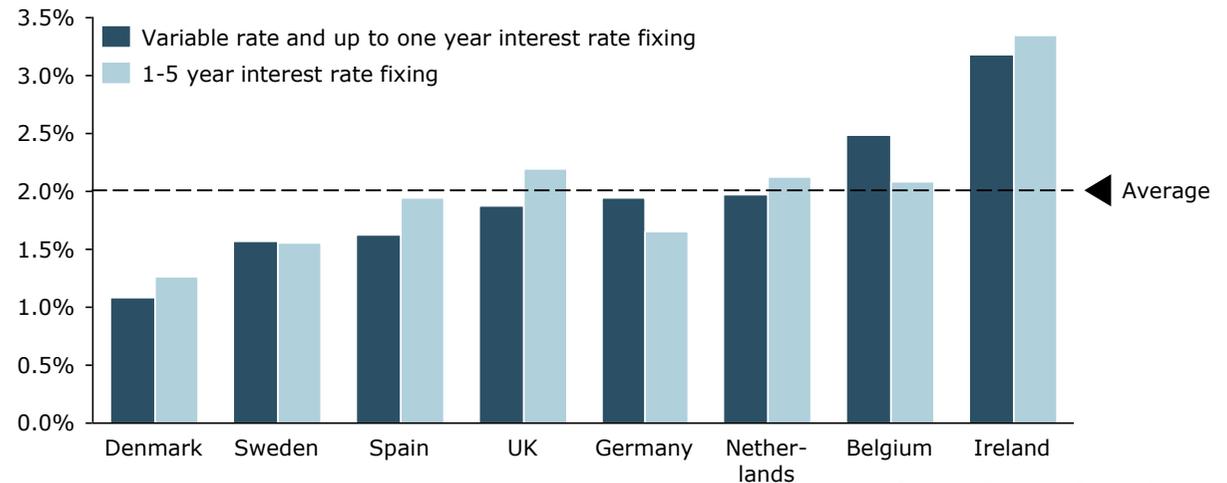
To add perspective to the current discussion in Sweden, on this page and the next we outline an international comparison of the mortgage markets.

Sweden has some of the lowest mortgage rates in Europe, *cf. top figure*. Currently, the Swedish rate for both variable-rate and one to five year fixed-rate mortgages is around 1.5% - only Denmark has lower rates.

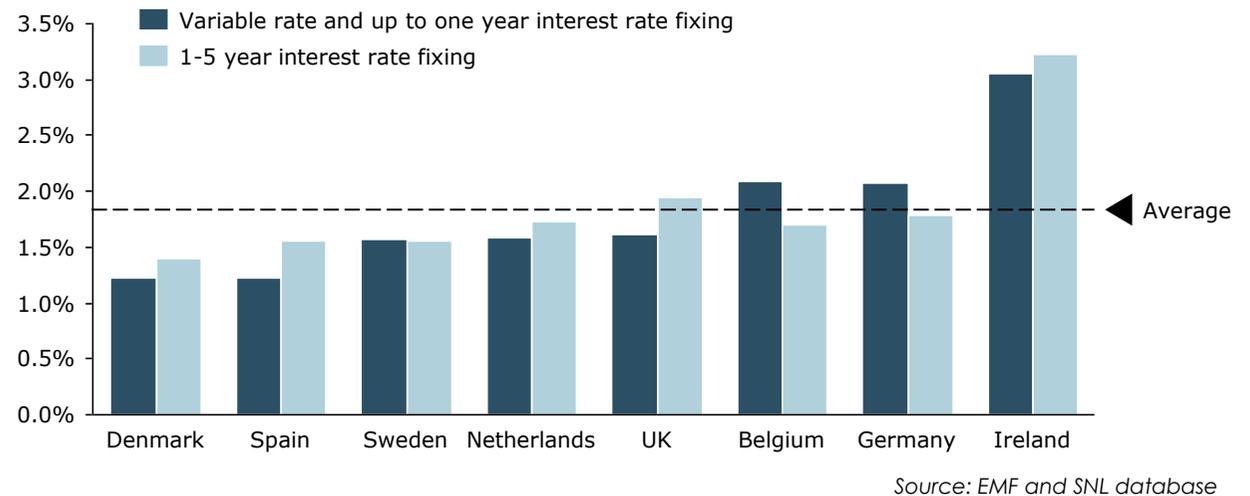
One reason for the low Swedish mortgage rates is that loans from Swedish mortgage institutes are generally lower than the value of houses. In Sweden, you can only borrow 85% of the value of the house, whereas you can borrow 100% in the Netherlands, for example. This is important since it is significantly more risky for the mortgage institutes to finance the last 10-20% of the property value, and they therefore have to charge a higher rate to cover the risk.

When we adjust for differences in the average shares of mortgage financing of properties, we still find that Swedish mortgage rates are among the lowest, although only slightly below rates in the Netherlands, Belgium and UK, *cf. bottom figure*.

Mortgage rates in different countries, 2017



Mortgage rates in different countries, while adjusting for LTV requirements, 2017



Swedish mortgage margins have increased the most among Nordic countries

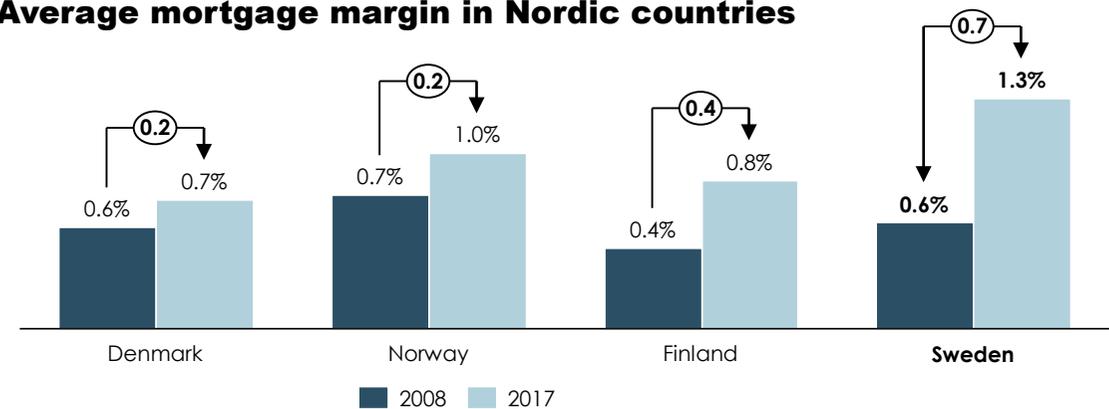
Another factor that can lead to variation in mortgage rates between different countries is the mortgage institutes' cost of finance. However, the structures of the mortgage markets and, hence the funding of mortgage institutes are very different across different countries, and it is difficult to obtain a comparable measure.

Looking specifically at the Nordic countries, which have somewhat similar mortgage markets, they have all experienced increasing mortgage margins since the financial crisis, *cf. top figure*. Of the Nordic countries, Sweden currently has the highest mortgage margin and has also experienced the biggest increase since 2008. This should be seen in light of the fact that Sweden has also experienced the biggest increase in capital requirements of the four countries since the financial crisis, *cf. bottom figure*.

In addition, there can be differences in the volumes of maturity transformations a mortgage institute typically conducts, e.g. in Denmark there is generally no maturity mismatch between assets and liabilities, as mortgages are match-funded. This makes it possible for mortgage institutes to offer lower ongoing costs but in turn leads to high establishment costs.

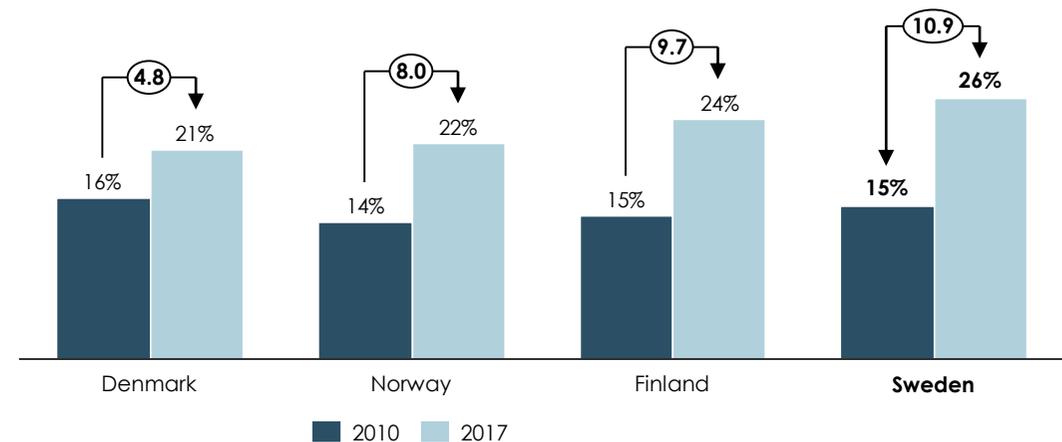
Thus, there are trade-offs involved in designing the funding structure of loans. The Swedish system is well-designed to minimise switching costs, while e.g. the Danish system may be better at minimising funding risks and costs, as outlined on the next page. Both issues should be reviewed when considering how mortgage systems provide value for consumers.

Average mortgage margin in Nordic countries



Note: Denmark includes BRF Kredit, Totalkredit and Realkredit Danmark. DNB Boligkreditt represents the Norwegian mortgage sector, while OP Mortgage Bank represents the Finnish. Source: SNL database

Average total capital ratio in Nordic countries



Source: SNL database

Pros and cons of different types of mortgage systems

	Floating interest rate	Fixed interest rate	Match funding
Price	The price will on average be lower since the consumer takes on the interest rate risk, i.e. the variability in the interest rate.	Investors take on the interest risk, which results in a higher price for the consumer, i.e. the consumer pays for the insurance against rising rates.	In Denmark, mortgages are match-funded, meaning that there is a one-to-one correspondence between the mortgage and the covered bond used as funding in terms of maturity and interest rate. This has both some pros and cons compared to e.g. the Swedish system:
Consumer flexibility	Makes it cheap, and in Sweden costless, to redeem the loan and therefore offers higher flexibility.	There could be capital losses when redeeming the loan if the interest rate has fallen since the loan was granted. This would lead to a financial lock-in effect for the customer, and a fixed-rate mortgage is thus less flexible.	<p>Price</p> <p>The one-to-one correspondence means there are substantial costs associated with establishing a new loan. In this sense, the match-funded system is more expensive than the "normal" system (e.g. Swedish mortgage market) with flexible funding. However, the match-funded system removes any maturity and interest risks from the mortgage institute. The lower risk enables the institutes to offer a lower interest rate to customers.</p> <p>In short, the match-funded system means lower ongoing costs, but high establishment costs.</p>
Consumer risk	Poses a bigger risk to consumers, e.g. if interest rates increase to a point where the consumer can no longer keep up with payments.	The consumer has insured against interest rate fluctuations, and therefore has no risk of increasing rates.	<p>Flexibility</p> <p>Due to the higher establishment costs, there are significant lock-in effects and thus less flexibility for the customer.</p>
Systemic risk	If a large share of the mortgage portfolio of a bank is floating rate, it poses a systemic risk; if interest rates increase drastically, the increase in interest expenditures could result in elevated default rates.	There is no risk of customers defaulting due to increasing interest expenditures, and there is therefore less systemic risk associated with fixed interest rates.	<p>Consumer risk</p> <p>The match funding of mortgages does not impact the risk for the consumer.</p> <p>Systemic risk</p> <p>The fact that there are no interest and maturity risks for the mortgage institute leads to lower systemic risks.</p>

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5

APPENDIX

THE OUTLINE THE APPENDIX IS AS FOLLOWS:

- **APPENDIX TO CHAPTER 1 AND 2**
- **APPENDIX TO CHAPTER 3 ABOUT THE MORTGAGE MARGIN**
- **DISCUSSION ON RETURN ON EQUITY FOR SWEDISH BANKS**

Data for the analysis

DATABASE

The calculations in the report are based on data extracted from the S&P Global Market Intelligence platform, a subsidiary of the S&P Global, called the SNL database.

Most data are drawn from financial statements of individual companies, which is complemented with data from ECB, MFI and EBA. This standardized approach makes a sound foundation for international comparison the banks.

BANKING SECTOR INTERVIEWS

In addition, we have in making this report conducted six interviews with experts from the Swedish banking sector. These interviews have provided us with background knowledge of competition in the Swedish banking market, and have been used throughout the report, in particular for the more qualitatively analyses.

BANKS INCLUDED IN ESTIMATIONS IN CHAPTER 2

In competition analysis, we present two estimations; we estimate the correlation between increase in costs and lending margin and we estimate the price sensitivity of customers (outlined on p. 47).

In those two estimations, we are only including Swedish banks, which have credit transmission as their main business activity.

CRITERIA FOR SELECTING BANKS

Concretely, we use the following selection criteria in

selecting banks:

- Data available from 2011 to 2017 in the S&P's SNL database (to our knowledge all banks with public income statements are presents)
- Net loans/total assets larger than 50% in 2011 and 2017
- Net customer loans larger than SEK 1 bn. In 2011 and 2017

Consumer/high credit risk

- ICA bank
- Bluestep bank
- Resurs bank

In addition, the following two banks have been excluded from the interest-costs-correlation figure as outliers (both had strong increase net interest earning and operational costs suggesting changing credit portfolio):

- Sparbanken Skåne
- Leksands Sparbank

Other (only in price sensitivity estimation):

- Nordea: Majority of the credit portfolio is outside Sweden and we do not have data on interest income on the Swedish credit portfolio.
- Länsförsäkringar bank: Excluded due to strong volatility in capital ratio and Risk Exposure Amount (REA).

FIGURES ARE MEASURED AS A SHARE OF REA

In estimating the correlation between costs and lending margin, we are measuring as a share of REA. The measure is the assets of the bank weighted with

the risk the assets' have.

The reason to use this method is as follows. Risky assets will tend to involve more credit assessment from the bank and also yield higher return. For example, there is more credit assessment involve in making an unsecured consumer loan (per SEK) than by granting a mortgage. Therefore, if a bank switch to a more risky profile, it is expected that costs must go up, measured as a share of total assets. To measure as a share of REA, will somewhat control for this effect, as REA will increase if a bank switch assets with higher risk.

We have also estimated the correlation with net interest as a share of total assets – this provided a similar pictures with a positive correlation.

Calculation of the concentration index

On this page, we outline our calculation of the concentration measure, the Herfindahl-Hirschmann Index (HHI).

The HHI Index is computed as the sum of squared market shares of individual institutions in the banking sector:

$$HHI = \sum_{i=0}^N s_i^2$$

, where N is the total number of institution in the sector and s is the individual market share of institution i .

Market shares used in our calculations are based on the share of domestic loans for each bank and loans from foreign banks to the given country. Other studies have measured the HHI by total assets or deposits.

A MEASURE OF INDUSTRY CONCENTRATION

The HHI is often used as a statistical indicator of industry concentration of market shares. As such, the HHI Index is inversely related to the degree of competition. A market characterised by high concentration of market shares is interpreted to be less competitive. We use a scale running within the interval from zero to 100. An index value of 100 indicates complete market concentration, i.e. a full-blown monopoly.

METHODOLOGY

For simplicity, we restrict the sample to include

institutions with total net customer loans above EUR 1 bn.

To correct for mergers and acquisitions between institutions in the sample, we have evaluated the growth in domestic loans for each observation. Observations showing abnormal growth in loans have been investigated; if due to mergers, we have left out observations of the acquired institution after the acquisition has taken place, to avoid double counting.

For Germany, “Sparkassen-Finanzgruppe” and “Genossenschaftliche FinanzGruppe Volksbanken Raiffeisenbanken” are treated as individual banks and based on 2016 figures.

In cases where the SNL database have reported missing observation the volumes of loans are found in annual reports.

Estimation of price elasticity for Swedish banking customers

WE USE AN IV ESTIMATION

When estimating price elasticity of banking customers, a spurious result can be obtained if using a simple correlation between price and market shares. The issue is, that it is not possible to establish a clear direction: We primarily expect that changing prices (interest spread to STIBOR), will affect the banks' market share – but the causality could go in the other direction; changing market shares could cause banks to change their prices.

CAPITALISATION AS AN INSTRUMENT

To correct for this, we instead use an IV estimation, using capitalisation as an instrument. The idea is that capitalisation is a somewhat exogenous variable affecting the price setting of banks; capitalisation is costly for banks, as a result, in optimising their balance sheet, they keep capitalisation as low as possible. However, certain external factors could force banks to increase capitalisation, primarily increased regulatory requirements, but also requirements from investors, increase risks in the market, etc. When the capital requirements increase, cost of banking increases and banks will (all other things being equal) increase prices. Different banks have been exposed to different changing capital requirements, which gives variability in our dataset. As such, we can use capitalisation as an instrument for increasing prices.

THE ESTIMATION

To conduct the estimation of the price elasticity, we use an IV fixed effect estimation, with capitalisation as an instrument.

Data

- Dataset contains 1) relative change in market share, 2) per centage point change in interest spread to STIBOR and 3) per centage point change in capitalisation (measured as total capital in percent of total REA) for all banks from 2011-2017.
- Selection criteria for the banks included in the dataset are outlined on p. 45.

Estimation results

- First, we regress interest spread on capitalisation to test capitalisation's usability as an instrument. We find that capitalisation is significant with a coefficient on a 99% confidence interval
- In the IV estimation, the interest spread obtains a coefficient of -0.15 (significant on a 95% confidence interval). This means that banks roughly experience a decline in market share of 1.5% every time they increase the interest spread by 0.1% (as such, the coefficient is in fact a semi-elasticity).
- When we estimate a simple OLS with market share as a function on prices and lagged prices (t-1 and t-2), we obtain a coefficient of -0.20 (compared to IV estimation of -0.15) and the t-1 and t-2 lags obtain a coefficient of around -0.04 - (which are borderline significant).

UNCERTAINTY OF ESTIMATION

- At first, it can appear somewhat surprising that the OLS yields higher coefficient than the IV estimation. If banks were aware of their market power & there was monopolistic competition, they

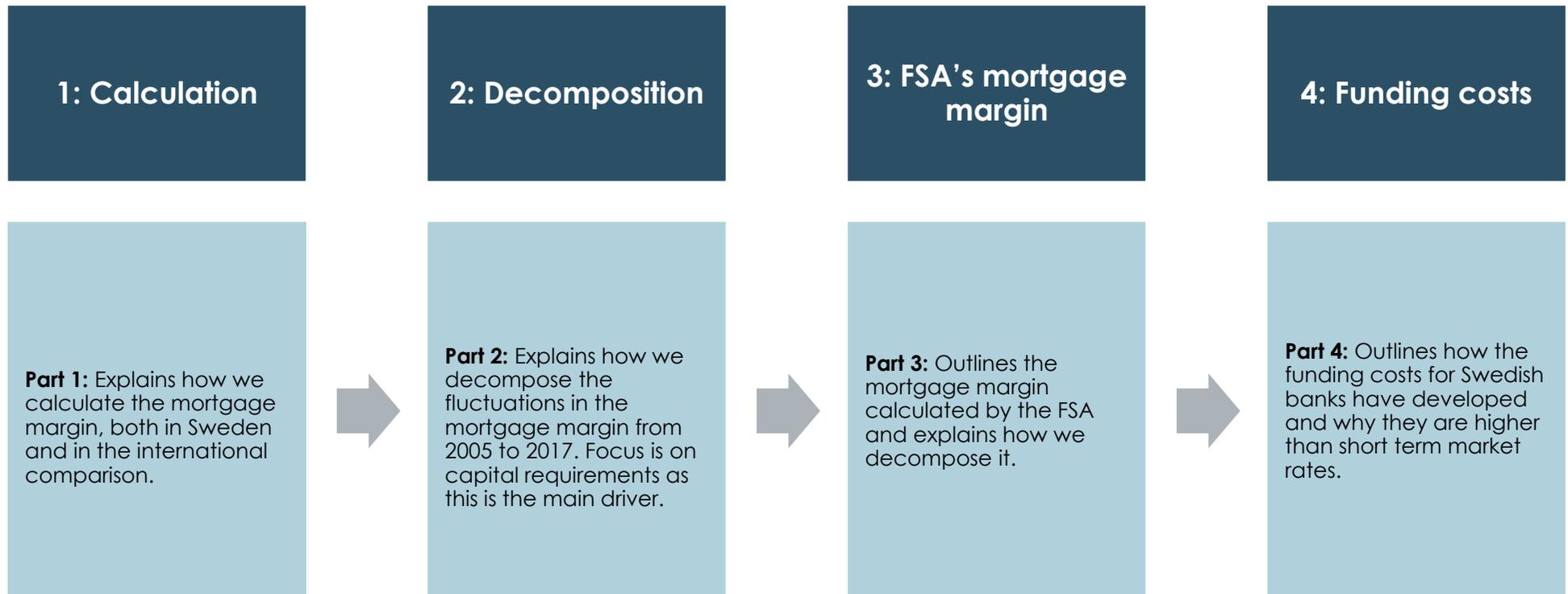
would increase prices as a response to increasing market share – this would pull in the direction of a coefficient closer to zero, i.e. a numerical smaller coefficient in the OLS estimation.

- One possible reason is that capitalisation increase for all banks, which then force all to increase prices simultaneously – which will yield a lower coefficient for prices impact on market share in the IV estimation.
- The OLS estimation will also capture, when banks strategically decide to lower prices to gain market share, and thus might be a more realistic coefficient. As such, the coefficient of the IV estimation of -0.16 can be seen as a lower bound estimate.
- In general, there are several uncertainties that can affect and potentially bias the result and there are several ways in which, the coefficients could capture spurious correlations. For example, a bank could decide to obtain credit growth among more risky customers. As a result, they would increase prices, to compensate for the higher risk, but could still undercut competitors in the given market and obtain market share.
- Or there could be differences in how banks react to changes in STIBOR.
- Consequently, the estimations presented should merely be seen as indications of a dynamic credit market in line with the other figures presented in the report.

APPENDIX TO CHAPTER 3 ABOUT THE MORTGAGE MARGIN

Overview appendix of chapter 3

This appendix describes the analyses behind the results in the chapter 3 of the report. The appendix is split into four parts as outlined below:



Calculation of the mortgage margin

On this page, we outline our calculation of the mortgage margin.

The lending margin on mortgages (i.e. the mortgage margin) can be observed in the financial statements from the Swedish mortgage institutes (hypoteks) as:

$$\frac{\text{Interest income}}{\text{Customer loans}} - \frac{\text{Interest expenses}}{\text{Financial liabilities}}$$

In 2017, 95% of the assets of Swedish mortgage institutes consisted of mortgage loans; the rest consisted of bank loans and derivatives.

A MEASURE OF AVERAGE LENDING MARGIN

The above calculation provides a measure of the average mortgage margin. In Konkurrensverket (2018:1), they use a similar approach to calculate the mortgage margin and obtain comparable results.

The estimate of the mortgage margin reflects a weighted average over the different types of mortgages in the mortgage portfolio:

- Swedish mortgage institutes have both retail and business (primarily cooperative tenants associations) customers; in 2016, 77% of the mortgage loans were retail and 25% wholesale.
- The mortgages also have different interest fixing; around 2/3 have interest fixing at least every year, whereas 1/3 have interest fixing less than every year.

LIMITATIONS IN DATA

We base the calculation on the three largest

mortgage institutes in Sweden: Stadshypotek (Handelsbanken), Nordea Hypotek and Swedbank Hypotek:

- SEB does not have a separate mortgage institute and are not included in the calculation
- We do not have detailed data going back in time for the other mortgage institutes, excluding them as well.

These three institutes covers the majority of the Swedish mortgage market.

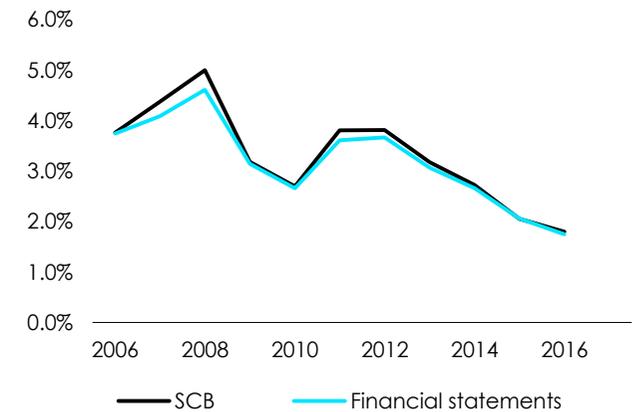
ASSUMPTIONS

Using financial statements of the three institutes to calculate the mortgage margin, we further assume that:

- The debt and interest expenses reported in the financial statements of the mortgage institutes are accurate representations of the actual debt used to finance the mortgages. We have had this assumption confirmed by our sector interviews.
- The interest income rate in the financial statements is reported accurate. We have this confirmed by comparing financial statements to data for the mortgage rate from SCB, *cf. figure*.

In the international comparison, a similar methodology is used to calculate the mortgage margin. On the next page, we outline how we control for different levels of LTV when comparing mortgage rates.

Average mortgage lending rates



Note: The figure shows the average of all mortgages
Source: SNL database and SCB

Accounting for the different LTV levels when comparing mortgage rates

On this page, we explain methods used to account for the different LTV requirements on mortgages.

The so-called loan-to-value ratios (LTV), is to measure the size of the loan compared to the value of the house. Sweden allows for a max LTV of 85%; in Denmark and Germany, the LTV for standard mortgage financing is 80%, while other countries like the Netherlands allow for 100%. Hence, in countries like the Netherlands the last 20% of the mortgage value may also be financed by mortgage institutes.

We find that higher LTV significantly increases the mortgage margin. Specifically, we find that the mortgage rate typically increase by around 0.25 percentage points every time the LTV requirements increase by 10 percentage points. Thus the LTV level significantly impacts the average mortgage margin.

A REGRESSION APPROACH

First, we use a regression approach, where we compare mortgage rates to the LTV requirements. Here, we find a clear pattern that countries with higher LTV limits also have higher mortgage rates, cf. top figure. Looking at variable mortgage rates instead gives more or less the same result.

A CASE ANALYSIS APPROACH

Second, we have looked into the mortgage margins in Denmark, where mortgage institutions report individual margins (so-called "bidragssatser") depending on the LTV of the mortgages.

For the biggest four mortgage institutes, the margins

follows more or less the same pattern; the margins increase by around 0.44-0.58% when the LTV increase by 20 percentage points. This amounts to 0.22-0.29% increase for every 10 point increase in LTV, i.e. more or less the same result as we found above.

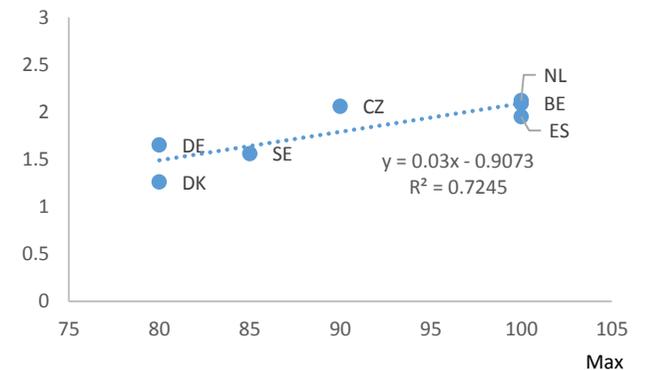
It should be noted that these results are based on broad averages of the entire mortgage pools with different LTVs and the lending margin within these pools could be affected by other factors. If these factors are correlated with the LTV, our estimate could be upwards biased. As such, our estimation could overestimate the "LTV-corrected" mortgage rate for Sweden.

RECOURSE

Another factor that could impact the mortgage rate is the recourse/non-recourse dimension of mortgages. This determines the lenders position upon default of the borrower. With a recourse mortgage, the lender have the right to collect the debt from the borrower's unsecured personal assets and from his future income. This is more or less the situation in most European countries, although there are some differences. Generally, the recourse situation of mortgages in Europe increases a lenders chance of getting their money back in case of default. Most US states has a non-recourse policy.

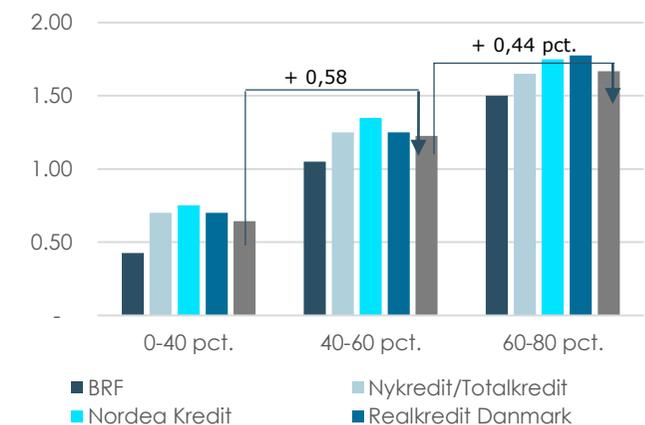
Relation between mortgage rate and LTV requirements

Mortgage rate, 1-5 year fixing (pct.)



Source: SNL and EMF

Relation between mortgage rates and LTV in Denmark



Source: EMF and SNL

Decomposition of fluctuations in the mortgage margin

WE LOOK AT COSTS DIRECTLY IMPACTED MORTGAGE MARGIN

When we explain the fluctuations in the mortgage margin, from 2005 to 2017, we include factors that directly impacts the mortgage margin. Factors that might influence the general price setting of Swedish banks – but do not have directly impact on the mortgage margin – is not covered. It should be noted that there are many aspects that influence the price setting of banks, which normally is based on a multi-optimisation process.



EFFECT OF HIGHER CAPITAL REQUIREMENTS

As mentioned, higher capital requirements is the most significant component in explaining the increase since the financial crisis. Concretely, the effects of capital requirements are in each year calculated as:

*Capital requirements' impact on lending margin = (After tax required return on equity – Average debt funding rate) * capital requirements on mortgages*

The after tax required return on equity is assumed constant throughout the period at 8%, although the after tax required return fluctuates since the corporate tax rate has decreased from 28% in 2005 to 22% in 2017. Consequently, the after tax required return on equity declines from 11.1% in 2004 to 10.3% in 2017.

The average debt funding cost is depicted on page 17.

DIFFICULT TO SINGLE OUT THE EFFECT OF INCREASED COMPLIANCE REQUIREMENTS

Since the financial crisis, compliance and reporting requirements have increased substantially for Swedish banks. For example:

- Banks are obliged to make recovery plans and to report interest rate and liquidity risk for each currency
- The regulatory checklist when granting loans or opening bank accounts has increased substantially.

Viewed in isolation, these measures have increased operational costs in Swedish banks, both in terms of IT and staffing resources. This could have increased the lending margin in Swedish banks. However, these increased compliance costs impacts the general costs of banking and, as already described, it is difficult to isolate its directly impact on mortgage lending. In addition automatisations and closing of branches have reduced operational costs in Swedish banks the recent years.

Development in capital requirements

To decompose the increase in mortgage margin, we have estimated the capital requirements for Swedish mortgages in 2005, 2009 and 2017 as outlined below:

2005

Swedish banks were operating under Basel I rules, which meant that mortgages had a risk-weight of 50% and a total capital requirement of 8%. This gives $50\% \cdot 8\% = 4\%$ capital requirement for mortgages, i.e. when a Swedish bank grants a mortgage, 4% should be financed with equity (compliant with Basel I rules).

2008

In 2008, we assume that Swedish banks based their price setting on the fully implemented Basel II capital requirements. Mortgages usually runs for many years and Swedish mortgage institutes will therefore likely included the expected average capital cost throughout the duration of the mortgage.

Basel II rules implied a significant reduction in the capital requirements for mortgages. With Basel II, capital requirements were now based on estimated risk on the different assets by internal models of the different banks.

As Swedish mortgages in general were considered secure assets with a strong history of low default, they obtained an average risk-weight of some 6%.¹ With a total capital requirement of 8%, this gave capital requirement for mortgages of $6\% \cdot 8\% = 0.5\%$. In addition, banks were required to hold capital due

to “operational risks”, which constituted around 0.1% of total assets for mortgage institutes.

A phase in process was implemented, implying that capital requirements should gradually decline the new Basel II requirements. However, in summer 2009, it was announced that the phase process will be prolonged and that the capital requirements should be 80% of the Basel I requirements.² We include the prolonged phase in period as part of the increase in capital requirements after the financial crisis, as described below.

2017

After the financial crisis, the capital requirements for Swedish banks have increased significantly – especially for mortgages. First, as described, the Basel I floor was extended, then a risk-weight floor of 15% was introduced in 2013, which later was increased to 25% in 2014. In addition, a range of Pillar 2 capital buffer requirements were implemented given raise to an average total capital requirements for Swedish banks (excluding the minimum risk-weights) of 20%. With 25% risk-weights on mortgages this corresponds to a capital requirement for mortgages of just above 5% ($20\% \cdot 25\% = 5\%$). In addition, operational risks for mortgage institutes increased to some 0.2% making the total capital requirements for mortgages some 5.2%.

CALCULATION OF COST OF EQUITY FOR MORTGAGES

There are several types of capital requirements that can impact the cost of capital for Swedish banks. Risk-weight floors, leverage ratio requirements, pillar 1 and 2 capital requirements, for both mortgage institutes and banking group (which the mortgage institutes are a part of).

In this analysis, we assume that Swedish banks base their price setting on the marginal capital cost the mortgage institutes inflict on the banking group, when granting a mortgage. Today, the Basel 1 floor is not binding for the four largest Swedish banks, and when granting a mortgage the Basel 1 floor does as a result not impact the cost of capital.³

The Basel 1 floor is binding looking at mortgage institutes specifically, but in the internal capital planning process, banking groups are primarily focus on solvency of the entire banking group. As such, there are some capital reserves in the mortgage institutes that contributes to the solvency of the overall banking group and the binding Basel 1 floor in the mortgage institutes does not pose an actual cost to the banking group.

1) See: http://www.riksbank.se/Documents/Rapporter/FSR/2013/FSR_2/rap_fsr2_art1_131128_eng.pdf_page_25 / 2) See: http://www.norges-bank.no/contentassets/731a809841714bf3a28cddfcbcaa0f1/economic_commentaries_2012_8.pdf / 3) See: http://www.fi.se/contentassets/9b4839ef4863439e8f4accd538c82d40/kapital_pm_2016kv4eng.pdf

FSA's mortgage margin decomposed

The FSA provides a lending margin on a single product, namely a floating rate mortgage for retail customers; whereas (our) accounting approach gives an average over mortgages with different maturities for both retail and business customers.

When calculating the mortgage margin, the FSA assumes that Swedish banks reissue their covered bond pool every month. This makes their measure of the mortgage margin follow market rates more closely than the accounting approach.

In addition, from 2004 to 2015, the FSA uses STIBOR as a proxy for the deposit rate. This could be problematic as the deposit rate sometimes differ quite substantially from STIBOR, *cf. figure*.

DIFFERENCE BETWEEN STIBOR AND DEPOSIT RATES IN 2008

In 2008, STIBOR increased strongly but it was not fully reflected in the deposit rates of the mortgage institutes, *cf. figure*. Thus, using STIBOR as a deposit rate will overestimate the funding costs, resulting in a correspondingly underestimated mortgage margin. This, in turn, will lead to an excessively high increase in mortgage margin from 2008 to 2017.

When decomposing the mortgage margin we correct for this factor as follows:

- In 2008, STIBOR was around 2 percentage point higher than the average deposit rate of the mortgage institutes.
- Deposit took up around 23% of the total debt finance.

- As a result, using the STIBOR as a proxy for deposit rate in 2008, would lead to a deposit rate, which would be around $23\% \cdot 2\% = 0.5\%$ higher than the actual funding costs of the mortgage institutes. Thus, 0.5% of the increase in the mortgage margin from 2008 to 2017 can be attributed to a difference between STIBOR and the deposit rates in 2008.

In addition, the market uncertainty, with a rapidly increasing perceived default risk of covered bonds during the financial crisis, could have led to higher estimated funding costs for covered bonds compared to what the mortgage institutes actually had on their book.

Using STIBOR as a proxy for the deposit rate is inaccurate



Note: "Deposit rate" is from SCB. "STIBOR" is the three month STIBOR
Source: SCB.

1) See Monthly report on the eurosystem's covered bond purchase programme march 2010.

Funding costs have declined but are still above market rates

In the remaining of this appendix, we go through the development in funding costs of Swedish mortgage institutes and explain why the funding costs generally are higher than the currently negative market rates.

Note that in a competitive market changing funding costs of the mortgage institutes, will be passed on to customers. As a result, the mortgage margin should be unaffected by changing funding costs.

AVERAGE FUNDING COSTS HAS DECLINED

Swedish mortgage institutes use bonds (primarily covered bonds) and deposits to fund mortgages, *cf. top figure*.

Funding costs for Swedish mortgage institutes have not declined to the same extent as market rates; in 2014, STIBOR (the Swedish interbank rate) was on average around -0.5, but the average funding costs for Swedish mortgages institutes were around 0.5%, with both deposits and senior debt having positive rates. The reason for this discrepancy is explained on this page for deposits and the next two pages for wholesale funding.

DEPOSITS

Although short term market rates are below zero, Swedish banks still provide customers with positive or zero rates on their deposits, *cf. bottom figure*. This naturally increases Swedish banks funding costs, compared to a situation where the deposit rate followed STIBOR.

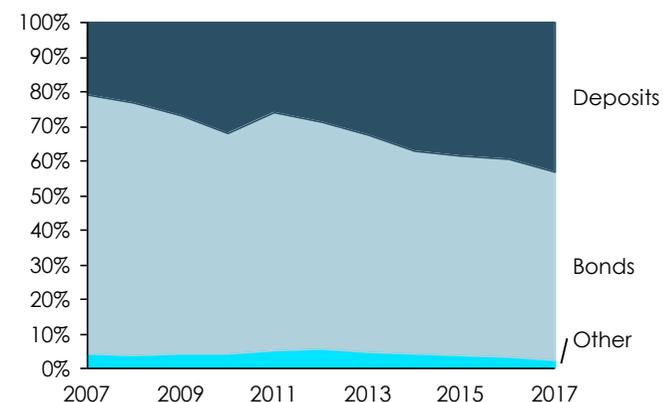
There could be several reasons for Swedish banks prefer to give non-negative deposit rates despite the negative market rates; from fear that customers would move all their money holdings into cash or simply losing the customer.

SPREAD BETWEEN STIBOR AND DEPOSIT RATE

By using our accounting approach to calculate the mortgage margin, the positive deposit rates will simply increase funding costs and does not affect the mortgage margin.

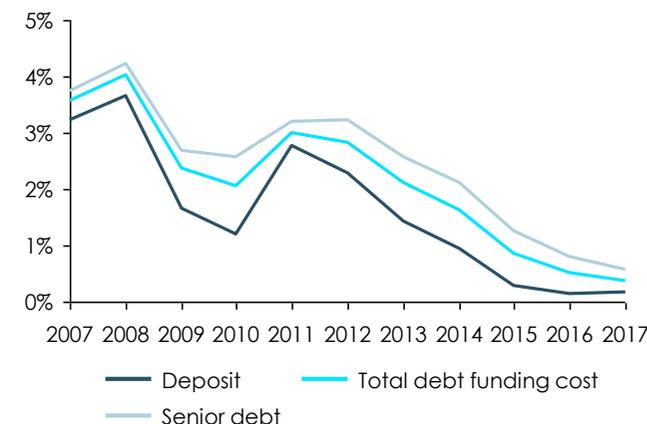
An alternative way of measuring the lending margin is to calculate the difference between the current market rates, e.g. STIBOR, and lending rate. With this methodology, the positive deposit rates would increase the mortgage margin, as the difference between STIBOR and the deposit rate would need to be covered by the mortgage margin. Then, this effect would have to be factored in when decomposing the increase in the mortgage margin.

Funding composition of Swedish mortgage institutes



Source: SNL database

Average funding rates



Source: SNL database

Funding costs of wholesale funding

Wholesale funding of Swedish mortgage institutes consists primarily of covered bonds. Most of the covered bonds issued by Swedish banks have fixed interest rate as this is more in line with market demand, e.g. pensions funds and other assets manager with longer obligations.

As many Swedish households have mortgage with short term interest fixing, Swedish banks use swaps to transform the interest payments from a fixed to a floating rate in order to eliminate interest rate risk.

However, there are at least three factors that create a wedge between the funding costs of Swedish mortgage institutes and the market rates, as outlined below and on the next page:

1: INTEREST FIXING

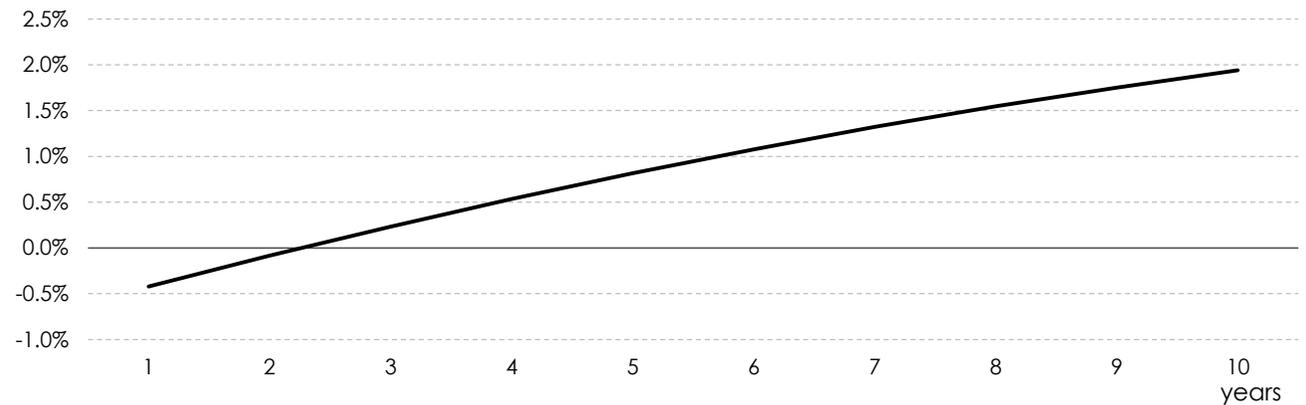
Around 2/3 of Swedish mortgage customers have interest fixing below one year, but 1/3 of Swedish mortgages still have a interest between 1-10 years, *cf. bottom figure*. This pulls the average funding costs on wholesale funding up, e.g. the five year yield on covered bonds in Sweden is around 0.7 per cent, *cf. top figure*.

2: EARLIER ISSUED COVERED BONDS

Swedish mortgage institutes do not refund their mortgage pool every month, and a large part of the covered bond pool of Swedish mortgage institutes is issued before interest rates turned negative.

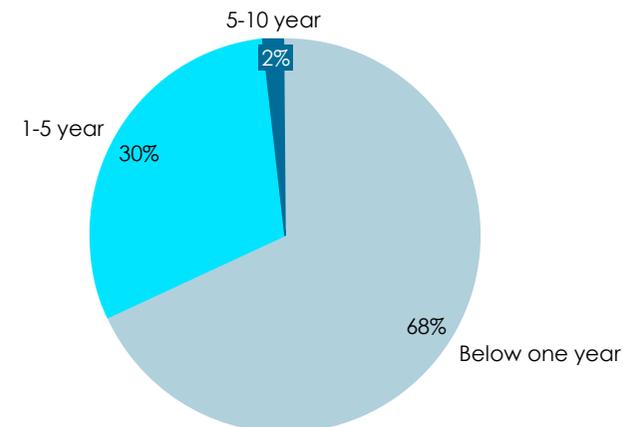
In this way, Swedish banks can on average pay a higher interest rate on older issued debt, where the interest rate risk has not been swapped.

Yield curve for Swedish covered bonds



Note: The yield curve is estimated based on actual yields for different covered bonds.
Source: SNL

Interest rate fixing of Swedish mortgages



Note: Data is from 2016.
Source: EMF

Funding costs of wholesale funding - continued

3: SWAP SPREAD

Although the majority of the Swedish mortgage loans have a short term interest fixing, mortgages often have a longer maturity. As a result, Swedish mortgage institutes seek to have longer maturity on their funding, than the term of the interest fixing (also due to the NSFR requirement, see next page, *cf. left figure*).

As mentioned, Swedish mortgage institutes then eliminate the interest rate risk through interest rate swaps. However, Swedish mortgage institutes cannot

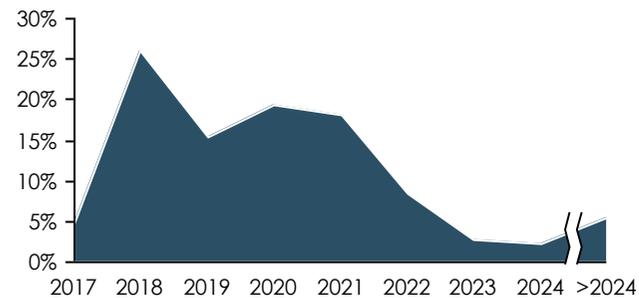
fully cover their fixed interest payments through interest rate swaps due to a swap spread. For example, the swap spread for 7 year Swedish covered bonds was around 0.6 percentage points in 2017, *cf. middle figure*.

The swap spread gives Swedish banks an effective funding rate above current market rates. Thus, longer maturity on the covered bonds increases funding costs for the mortgage institutes. In the *right figure*, we have estimated the current funding rate for covered bonds with different maturities - where

we have swapped to a floating rate, assuming a STIBOR of 0.5%. Combining the below figures, we can estimate the funding rate of Swedish mortgage institutes, if they swapped their entire pool of covered bonds to floating rates – similar to what is assumed in calculation of the FSA (when estimating the mortgage margin on a floating rate mortgage). This gives average funding cost close to zero confirming the estimation by the FSA, under the given assumptions.

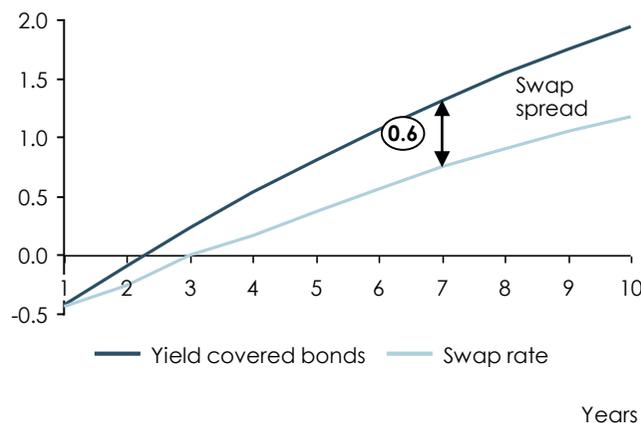
Maturity profile of Swedish covered bonds

Share of covered bonds



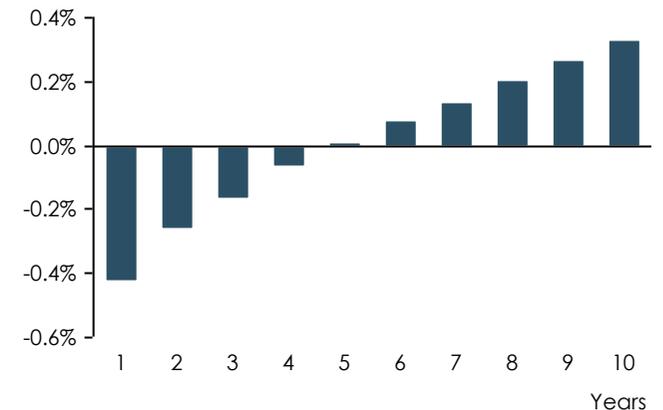
Swap spread towards Swedish covered bonds

Covered bond yield



Yields for covered bonds with different maturities, swap to floating rate

Floating funding rate



Note: Data is from 2016. The yield and swap curve is estimated based on actual yields for different covered bonds.
Source: SNL

Regulatory measures that have impacted the general cost of banking

Below we comment on regulatory measures - implemented after the financial crisis - that could have impacted the cost of funding for Swedish mortgage institutes.

LCR

The Liquidity Coverage Ratio requirement (LCR), requires banks to hold liquid assets corresponding to the total net cash outflows over a 30-day stress period. In general, Swedish mortgages are to a high degree funded by long term bonds, for which there is no potential cash outflow (as long as the remaining maturity of the bond is longer than 30 days). Thus, we find the impact on mortgage margin to be rather small (below 0.05%).

NSFR

Net stable funding ratio (NSFR) requires banks to have a stronger correspondence between the maturity of their assets and liabilities. In practice, this means that banks are required to increase the maturity on their debt.

Deposit is regarded as being very stable in NSFR. Looking specifically at the mortgage institutes, they are compliant with NSFR through their holdings of deposits. The fact that deposits are allocated to the mortgage institutes could mean that the mother banks are required to issue costly senior bonds, to be compliant with NSFR. As such, the mortgage institutes could pose an indirect cost for the mother bank, which then is covered through the mortgage margin.

It is difficult to quantify this cost based on public available data and the figure is therefore not included in our decomposition of the increase in the mortgage margin.

However, the effect could be non-trivial. For example, assume that the deposit rate is allocated a premium of 0.4 percentage points (which is the difference between the average interest rate on deposit and bonds for the mortgage institutes). As deposits take of around 40% of funding, such a premium would increase the mortgage margin by $40\% \cdot 0.4 = 0.16$ percentage points.

Resolution fee

In 2017, Swedish banks were obliged to pay a so-called resolution fee, which corresponded to around 0.05% of total mortgages.

The resolution fee is already included in the reported interest expenses by the mortgage institutes and does hereby not impact our decomposition of the mortgage margin - but should be taken into account when using the methodology of the FSA.

Concretely, the resolution fee was in 2017 9 basis points of the fee base, which is total loans minus shareholders' equity and deposits covered by the deposit insurance. In the period between 2008 and 2017, the resolution fee and its predecessor, the stability fee (that had many similarities with the resolution fee), were introduced and gradually raised.

TLAC/MREL

TLAC/MREL requires a part of the senior debt of banks to be bail-in-able. In short, the intention is that senior debt holders should acquire losses on their debt and as such shielding the public from bailing out financial institutions.

Concretely, the TLAC requirement states that 6% of total liabilities must be funded with bail-in-able funding. The interest rate of bail-in-able debt has a spread of around 0.6 percentage points to non-bail-in-able senior debt. MREL, a similar measure, is already implemented in Sweden and the largest Swedish banks are generally expected to be compliant with TLAC by rating agencies.

Equity is naturally considered a bail-in-able type funding as it is directly loss absorbing. Due to the strong capital requirements for mortgages on 5.2%, there is only a TLAC shortfall of around 0.8% for mortgages. Thus, TLAC will have a small effect on the mortgage rate (below 0.01%).

Return on equity is generally higher than on other types of liabilities

Equity is an expensive source of finance for banks compared to debt. Two important reasons are discussed below:

1) BANK DEBT IS AN ATTRACTIVE ASSET

Bank debt is an attractive asset making it a cheap source of finance for banks:

- Bank debt is used by households and business as a medium to store value. Temporary surplus liquidity is usually stored in deposits, whereas longer term savings can be stored as fixed-term deposits or bonds.
- Bank bonds are regarded a standard financial product with large turnovers, driving down funding costs. Swedish covered bonds are in particular a very generic financial product, with a strong history of low default, making it an attractive asset for investors.

2) RETURN ON EQUITY IS MORE VOLATILE THAN ON DEBT

Debt holders are promised a fixed return on their debt, meaning that return on equity must absorb the volatility in earnings for banks.

Changes in earnings could arise from loss on customer loans or changing demand on loan products for example due to business cycle movements. Furthermore, the value of equity is affected by changes in the business outlook for banks, such as threat of new disruptive technologies, risk of new financial regulation etc.

Finally, in case of a complete resolution of a bank, debt holders receive their debt before equity holders. However, giving the current robustness of the large Swedish banks with capital requirements above 20%, this factor only plays a minor role (for less robust banks this is a significant factor contributing to a higher required return on equity).

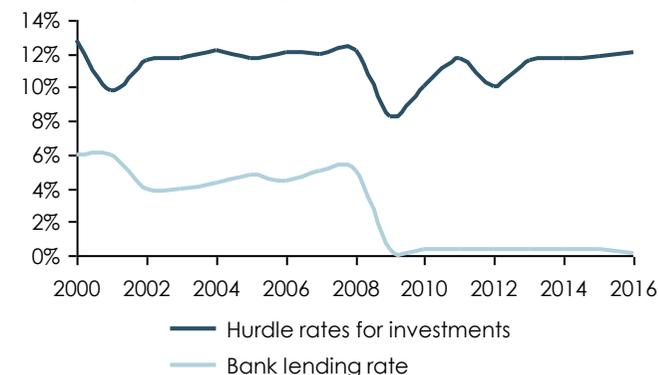
When capital requirements increase, there will be larger equity-base to share the volatility in earnings, which somewhat decreases the required return on equity. This mitigates (but not eradicate) the increase in the overall funding costs when capital requirements increase, as discussed on the next page.

NO SIGN THAT REQUIRED RETURN ON EQUITY SHOULD HAVE DECLINED SINCE THE FINANCIAL CRISIS

In the decomposition of the mortgage margin in chapter 3, we have assumed a constant return on equity throughout the period. In general, the required rates of returns for equities across industries have not been reduced in line with lower policy rates:

- The decline in long interest rates in very recent years is more a result of mismatches in liabilities and assets on global scale than a sign of low expectations of low future returns.¹
- Investors have not diminished their required rate of return on investments despite the general decline in funding costs, *cf. figure*.²

Hurdle rates remain elevated despite lower average funding costs (UK data)



Source: Bank of England

1) See: https://www.bis.org/publ/work519_economicreview.pdf / 2) See: <http://www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2017/q1/q1pre.pdf>

Required return on equity does not appear to be decreasing with higher capital requirements

According to the so-called Modigliani-Miller (MM) theorem, the share of equity in funding should not affect the overall funding costs of a company. The basic intuition is that if overall risk to the firm do not increase, neither should the overall cost of capital. So MM suggests that when the equity share goes up, the required *average* required returns for both equity and debt goes down, keeping the total cost of capital constant.

However, when tested empirically, this simplistic view does not hold:

- **Bank debt is an attractive asset:** As discussed in the main report, the high liquidity of bank debt makes it an attractive asset for investors and households. So funding costs is not only about probability of losses being spread been holders of

debt and equity but also the attractiveness of the different assets class for investors, e.g. linked to liquidity.

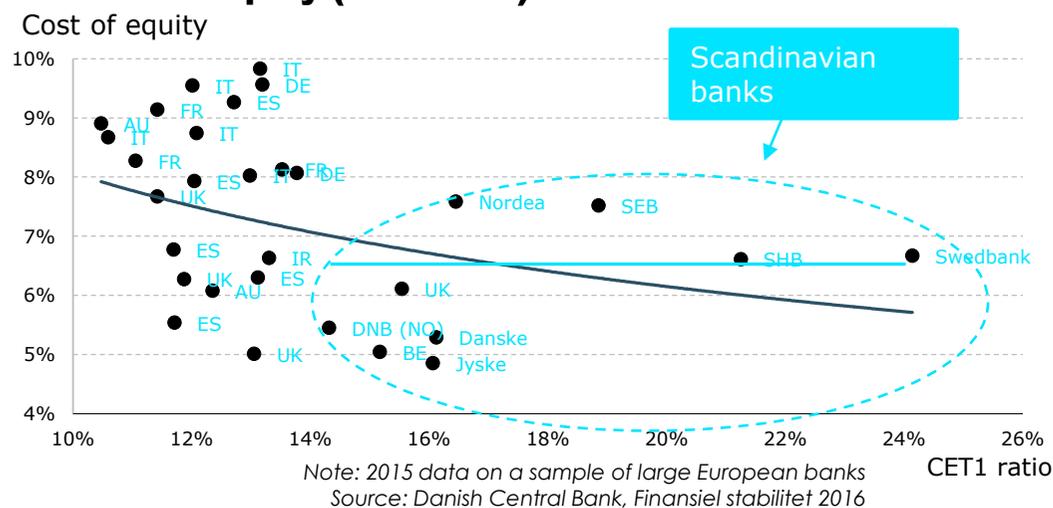
- **Tax shield:** In contrast to equity, debt payments are tax exempt and shifting to more equity will increase funding costs. Put simply, a bank needs to provide a larger return on investment simply to pay more in corporate taxes.
- **Explicit guaranties:** By the deposit guarantee, the risk to private depositors (up to 100,000 euros in Sweden) is guaranteed. So depositors will not reduce their required rates of return particular when banks are already well capitalised.
- **Implicit guaranties:** When banks are too big to fail, the government implicitly takes on a part of the default risk. This plays a minor role in Sweden now because banks are so well capitalised, with

high credit ratings etc. However, it may have played role in the first rounds of capital requirement increases after the crisis.

In the previous report by Copenhagen Economics, *Cumulative impact of financial regulation in Sweden (2016)*, we found that capital requirements do not lower the cost of equity for Swedish banks (see appendix of the report for a discussion on the MM-effects).

This is in line with statements from the industry reporting that they have not experienced a decrease in required return from investors due to recent increases in capital requirements. In other words, there are declining benefits to higher capital requirements also from a funding perspective.

The cost of equity (2015 data)



Required return on equity for Swedish banks of 8%

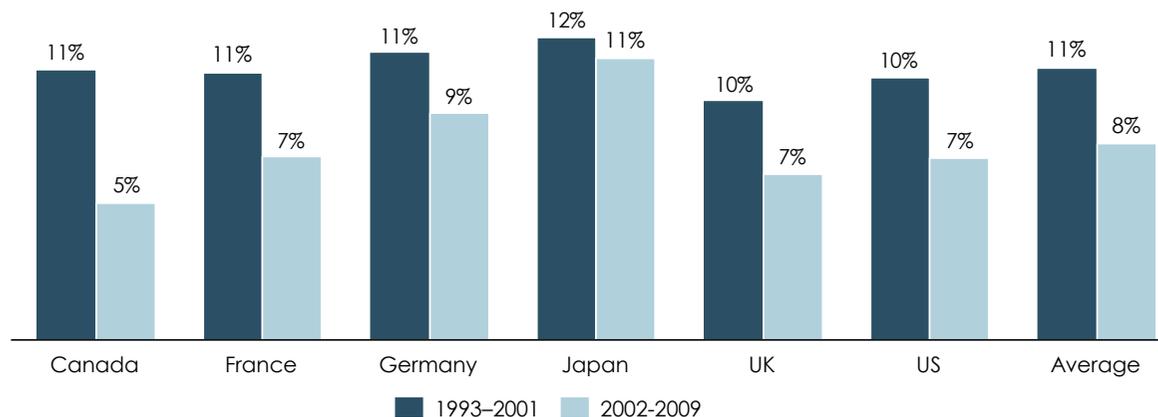
In the report, we have assumed a constant required return on equity for Swedish banks of 8%. The assumption is based on different sources:

- Estimated average beta (from a CAPM model) for the four largest Swedish banks the past five years is around 1 (unweighted), *cf. bottom figure*. With a average market return of 6% and a long-run risk-free interest of 2%, the average required return for Swedish banks is of around 8%.
- Based on CAPM model, BIS finds that the average required return for selected European countries from 2002–2009 was around 8%, *cf. top figure*. This is a decline from the average required return in the nineties of around 11%.

The BIS paper, which lay the theoretical foundation for the Basel III reform, use a return on equity for western banks from 1993–2007 of around 15% as their measure of cost of equity.¹

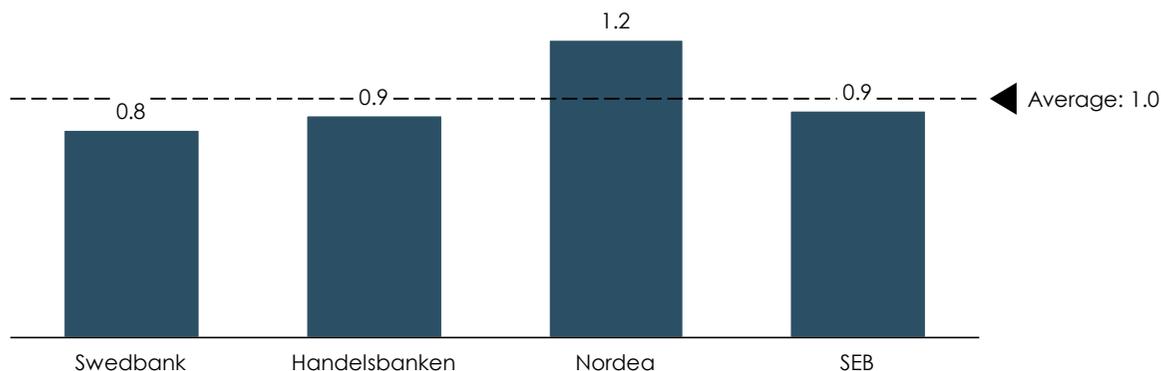
In practice, capital requirements do not specifically target total equity, but different capital measures such as CET1 and total capital, and there are several requirements for different kinds of capital. In this estimation, we focus on total capital, which we assume have the same required return as equity. For the four largest Swedish banks, the two measures are very similar; in 2017 total equity for the four largest banks was some EUR 76 bn. whereas total capital was some EUR 74 bn. Total CET1 was some EUR 59 bn., i.e. around 80% of total capital. As tier 1 and tier 2 capital usually have a lower return than 8%, we in this analysis hereby implicit assume that the required return on CET1 is slightly higher than 8%.

Estimated required return on equity for selected countries



Note: The figure shows bank real cost of equity estimates based on a CAPM model. The average is unweighted.
Source: The cost of equity for global banks: a CAPM perspective from 1990 to 2009

Estimated betas the past five years for Swedish banks



Note: The figure shows bank betas estimated in a CAPM model by Thomson Reuters, using price data for the past five years. The average is unweighted.
Source: Thomson Reuters

1) see: <https://www.bis.org/publ/bcbs173.pdf> page 21

Swedish business cycle situation is favourable for profitability

As described in the main report, the return on equity in 2016, was some 3 percentage points higher than our estimated required return for Swedish banks. This difference can to a large degree however, be explained by the current strong business cycle situation in Sweden.

Sweden escaped the international financial crisis relatively easy; after a massive drop in 2009 ,GDP bounced almost back to trend level again in 2010, *cf. bottom figure*. In total, the average GDP growth in Sweden has been around 1.5% since 2008. The strong business cycle situation in Sweden has naturally been favourable for the profitability in Sweden through limited credit losses and a stimulated credit demand, which enables strong credit growth.

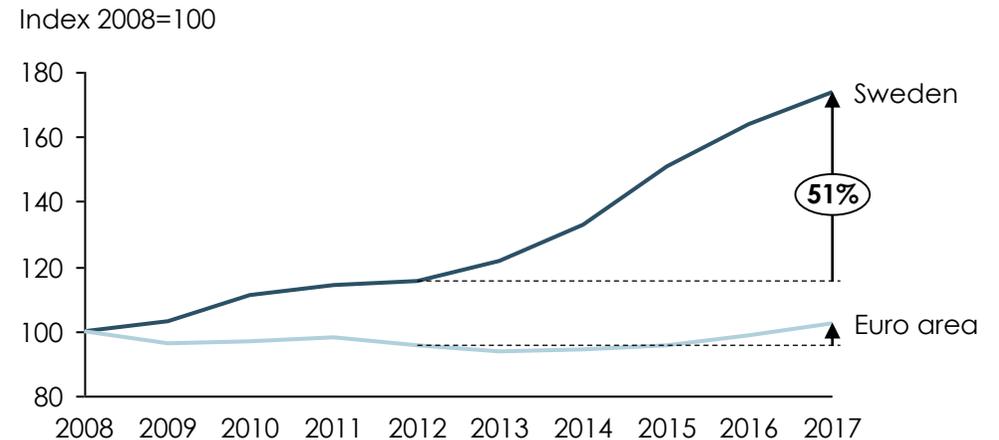
BOOMING HOUSING MARKET ALSO POSE A RISKS TO SWEDISH BANKS

The housing market has in particular given Swedish banks favourable conditions; since the 2012, housing prices has increased more than 50% and even more in the big cities. A large part of this leap has been financed by the Swedish banking sector stimulating earnings in Swedish banks.

In the same time, the booming housing markets also give raise to increasing risks for Swedish banks, as many analysts point towards risks of a strong correction in housing prices, especially parallel to increasing interest rates. On the time of writing this report, the housing prices have started to decline nationwide.

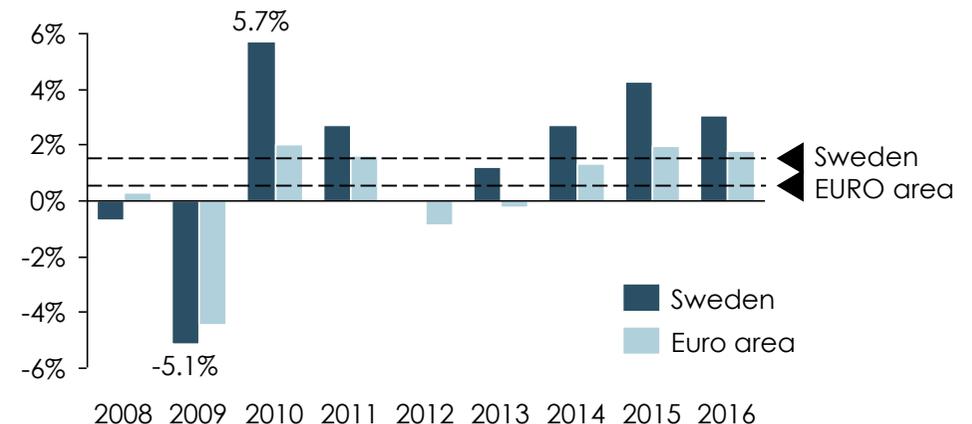
As such, we expect that the current strong profitability in Sweden will wear off in the coming years together with a correction of the housing prices in Sweden – either gradually with a soft landing on the housing market, or potentially a more stark decline if the current weakening on the housing market gains momentum.

Housing prices in Sweden and the Euro area



Source: OECD

GDP growth in Sweden and the Euro



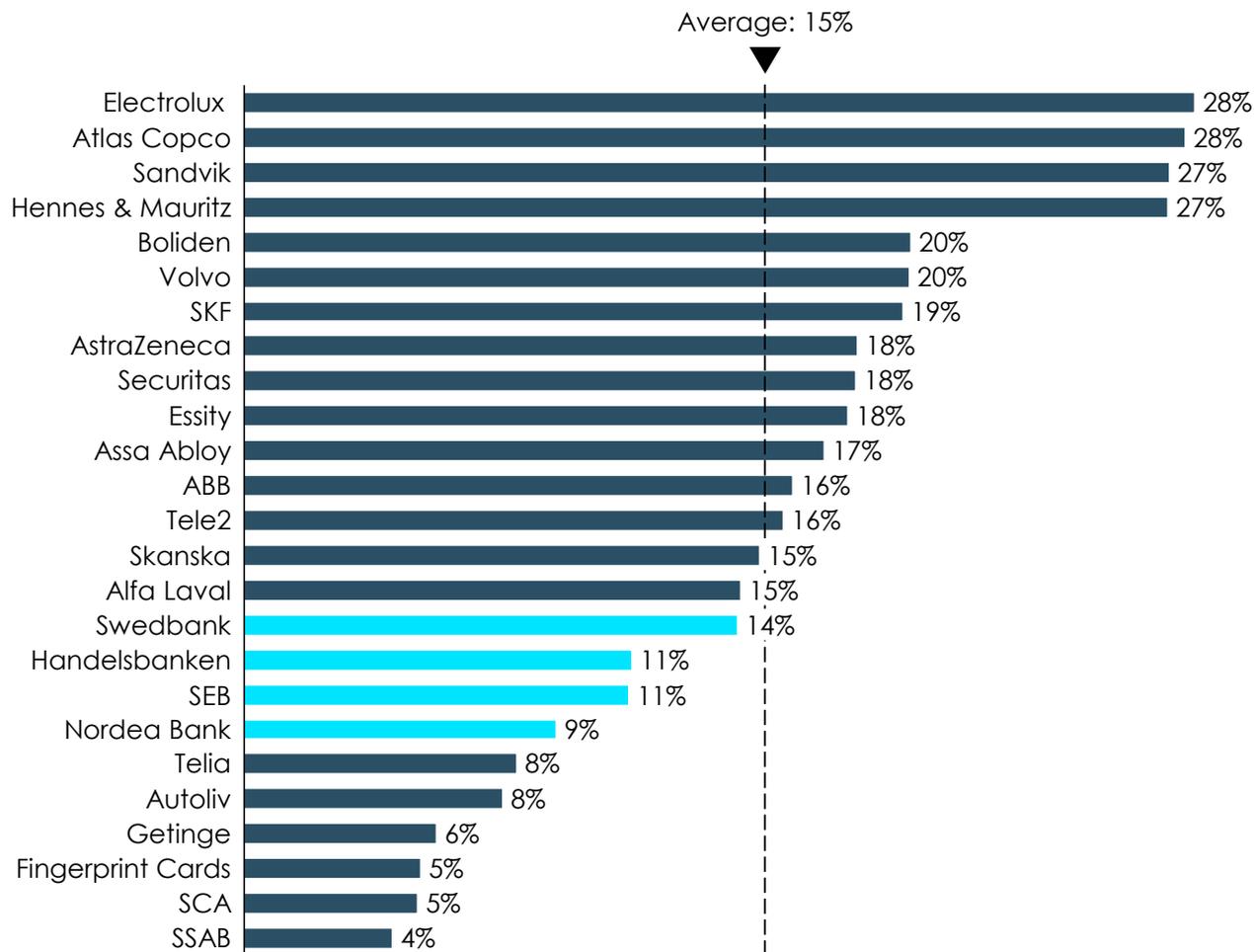
Source: OECD

Return on equity for Swedish banks is on line with other sectors

In 2017, the average return on equity for the thirty biggest listed Swedish companies was around 15% (unweighted). In comparison, the return of equity for the four largest Swedish banks were in the range 9%-14%, *cf. figure*.

Naturally, the figure is affected by the current business situation at the different companies, which fluctuates from year to year. In addition, the risk profiles of the companies are an important driver of the required return on equity from investors. Nevertheless, the figure point towards that earnings in Swedish banks are in line with other Swedish sectors.

Return on equity for top 30 biggest listed companies in Sweden, 2017
% of equity



Note: Kinnevik and Investor are not include in the figure, as their profits are mainly driven by equity investments
Source: money.net

Hard facts. Clear Stories.

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