Internal Pricing and the Effect of Liquidity Requirements

A qualitative review of Swedish banks

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by

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Internprissättning och effekten av likviditetskrav

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Abstract

The fundamental business model of banks is based on receiving short-term deposits and giving long-term loans which means that active banks are naturally subject to liquidity risk. During the last financial crisis poor liquidity risk management was seen as one of the main causes which has led to an increased focus on the management of liquidity risk and the introduction of the first minimum requirements for liquidity in banks, through Basel III. As the topic of internal pricing in banks and the effects of the introduction of the liquidity coverage ratio (LCR) and the net stable funding ratio (NSFR) is not extensively covered by existing research, the aim of this thesis is to identify and discuss internal pricing and liquidity cost allocation mechanisms used in practice by Swedish banks. The study also aims to investigate the impact of changes in liquidity requirements on internal pricing and liquidity cost-benefit allocation mechanisms in a Swedish setting.

The key findings are that firstly, there are large variations regarding the sophistication of banks funds transfer pricing practices and liquidity cost allocation methods. The banks using less sophisticated methods may be exposed to model risk if they themselves are not aware of the implications of this. Two consequences of using simplified approaches may be distorted assessment of profitability and unwanted maturity transformation. Secondly, the findings indicate that the link between risk management and internal pricing in the banks is rather weak. Lastly, the introduction of LCR and NSFR have had a significant impact on the bank’s risk management but the effect on internal pricing practices and methods for allocating liquidity costs is very limited.

Key-words: Funds Transfer Pricing, Internal Pricing, Liquidity Cost Allocation, Basel III, Liquidity Coverage Ratio, Net Stable Funding Ratio
Sammanfattning

Den fundamentala affärsmodellen för en bank baseras på mottagandet av kortfristig inlåning och utgivandet av långfristiga lån vilket innebär att banker är utsatta för likviditetsrisk. I samband med den senaste finansiella krisen sågs undermålig hantering av likviditetsrisk som en av de centrala orsakerna vilket har lett till ett ökat fokus på likviditetsriskhantering samt införandet av det första minimikraven gällande likviditet på banker genom Basel III. Då internprissättning hos banker samt effekten av att likviditetstäckningsgrad (LCR) och stabil nettofinansieringsgrad (NSFR) införts är ämnen som inte i någon större utsträckning täckts av tidigare forskning är syftet med rapporten att identifiera och diskutera internprissättning och metoder för allokering av likviditetskostnader. Vidare är syftet även att undersöka effekten av ändringar och kommande ändringar av regelverk på internprissättning och allokering av likviditetskostnader hos Svenska banker.

De mest centrala slutsatserna är för det första, att det finns stora skillnader i hur avancerade banker medier göra internprissättning och allokering av likviditetskostnader. Bankerna som använder mindre avancerade metoder kan vara exponerade mot en modell-risk om de inte är medvetna om följderna av att använda en förenklad modell. Två konsekvenser av att använda en förenklad modell är att bedömningen av lönsamhet kan bli snedvriden samt att det kan uppmuntra till oönskad löptidstransformering. För det andra indikerar resultatet på att kopplingen mellan bankernas riskhantering och internprissättning är relativt svag. Slutligen så indikerar studien att LCR och NSFR har haft en signifikant effekt på bankernas riskhantering men att effekten på internprissättning och allokering av likviditetskostnader är mycket begränsad.

Nyckelord: Internprissättning av Finansiering, Internprissättning, Allokering av Likviditetskostnad, Basel III, Likviditetstäckningsgrad, Stabil Nettofinansieringsgrad
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List of Abbreviations

EBA European Banking Authority
IFTP Internal Funds Transfer Pricing
LCR Liquidity Coverage Ratio
NSFR Net Stable Funding Ratio
1 Introduction

This chapter presents the setting in which the aim of the study and the research questions are formed. The chapter begins with a background to the topic to give the reader an overview of the area and the development thereof during recent years. Thereafter, the problematization and research questions are presented followed by delimitations and the expected contributions of the thesis. Lastly, the outline of the thesis is presented.

1.1 Background

The fundamental business model of banks is based on receiving short-term deposits and giving long-term loans. Due to this, a number of risks arise. The two major contributors to bank risk, in terms of bank default, are credit risk and liquidity risk. The Basel Committee defines credit risk as "the potential that a bank borrower or counter-party will fail to meet its obligations in accordance with agreed terms" (Basel Committee on Banking Supervision, 1999). For banks, the issuance of loans is most likely to be the largest source of credit risk. Liquidity is defined by the Basel Committee as the bank’s ability to fund asset increases and to meet upcoming obligations (Basel Committee on Banking Supervision, 2008). Furthermore, since the fundamental role of banks can be understood as receiving short-term deposits and giving long-term loans this mismatch in maturities are bound to make banks vulnerable to liquidity risk (Finansinspektionen, 2017c). Credit risk and liquidity risk have been shown to affect the risk of bank default both separately and in joint effect which is why the management of risk is paramount to the banking system as a whole (Imbierowicz and Rauch, 2014). However, the Basel Committee has noted that the development of financial markets has increased the complexity of the financial system, financial risks and the management thereof (Basel Committee on Banking Supervision, 2008).

Management control systems, which is a generic name for different methods of measuring business performance, have been extensively covered in management and accounting literature (Otley, 1999). However, in a banking context, management control systems were not a priority for a long time, as needs for controls were largely served by supervisors (Gooneratne and Hoque, 2013). Following the global financial crisis and changes on both macro and micro levels, for example demands from regulators, the focus on management control systems in banking increased (Gooneratne and Hoque, 2013). This brought for example funds transfer pricing into the spotlight, as the internal pricing of risks is an
identified best practice by regulators as well as a defined element of management control systems in value-based management in the literature (Mikes, 2009). Funds transfer pricing can be described as the process where the funding center of a bank, usually the treasury division, distributes centrally aggregated funds. By utilizing this central distribution an internal market for liquidity is created, as they balance excesses and shortages among the units. The main purpose of funds transfer pricing is to aggregate the interest exposure for more effective management, but it has also become a method for allocating the funding cost (Tumasyan, 2012).

The global financial crisis served as a reminder of the importance of risk management in banks. Regulators found that many banks had poor management and governance structures which in some cases led to irresponsible lending, excessive risk taking and poor accounting practices (Gooneratne and Hoque, 2013, Basel Committee on Banking Supervision, 2008). One central aspect, which in part caused the crisis, was a few banks’ inability to meet cash flow obligations. Due to the banking system being so interconnected, in the sense that many banks were dependent on each other, this turned out to have system-wide effects. It was later determined by the Basel Committee that several banks had failed to take into account a number of basic principles regarding liquidity risk management such as internal pricing of the liquidity risk (Basel Committee on Banking Supervision, 2008). In a report by Grant conducted for the Australian Prudential Regulation Authority in 2011, the process of liquidity transfer pricing in 38 banks from nine different countries was reviewed. In the review, Grant found several examples of poor transfer pricing practices regarding liquidity. Grant especially highlighted three ways in which these banks failed to handle the liquidity transfer pricing process:

− Failing to attribute liquidity cost of credits to business activities
− Using standardized or average rates which then fails to reward long-term funding benefits from liabilities and to penalize long term funding commitments
− Not incorporating changes in the actual market funding cost

Failing in the ways mentioned might lead to an internal profit and loss system which encourages maturity transformation without regard to the amount of liquidity risk generated. In practice, this means that liquidity generators were not fairly compensated for the value of their liquidity creation while liquidity users received funds too cheaply, thus leading to distorted profit and performance assessments (Grant, 2011). Grant also argues that the cost of carrying a liquidity buffer should not be attributed to the treasury
Capital requirements have become an instrumental tool for preventing excessive risk taking and increasing the resilience of financial institutions. Pioneering work such as Sharpe (1978) and Merton (1977) illustrated the need for regulations in order to control leverage and asset risk undertaken by banks. Basel III is the Basel Committee’s response to the global financial crisis and is supposed to address shortcomings in previous regulatory frameworks. The main purpose of Basel III is to increase the resilience of banks by strengthening the global capital framework, for example by requiring banks to hold capital of a higher quality and by introducing a global liquidity standard (Basel Committee on Banking Supervision, 2011). The main aspects of Basel III which are focused on liquidity risk are the liquidity coverage ratio (LCR), which aims to increase banks’ short term liquidity risk profile, and the net stable funding ratio (NSFR), which aims to promote a stable funding profile. Basel III introduces the first global liquidity standards which will establish minimum requirements (Basel Committee on Banking Supervision, 2011).

1.2 Problematization and purpose

Although using a funds transfer pricing process to account for and price exposures to liquidity risk is viewed as a best practice from regulators, the method used or the design of the funds transfer pricing process is not subject to strict regulations. This is seen as one reason as to why there are many different approaches and ways to enforce this in practice (Grant, 2011). Some investigations and reviews of how banks manage liquidity risk through management control systems have been conducted but they have focused mainly on larger institutions which often utilize a technically advanced and sophisticated funds transfer pricing process. Therefore, the purpose of this study is to extend the knowledge on different practical approaches to funds transfer pricing and how liquidity costs and benefits are included in the management control systems of Swedish financial institutions.

1.3 Research questions

The aim of this study is to identify and discuss internal pricing and liquidity cost allocation mechanisms used in practice by Swedish banks. The study also aims to investigate
the impact of changes in liquidity requirements on liquidity cost allocation mechanisms in a Swedish setting.

Following the aim of the study, three research question are derived:

**RQ1:** How is internal funds transfer pricing used by Swedish banks?

**RQ2:** What do the liquidity cost allocation mechanisms in Swedish Banks look like?

**RQ3:** How have NSFR and LCR affected the funds transfer pricing and liquidity cost allocation mechanisms in Swedish Banks?

The first and second research questions are designed to lay the foundation for the thesis as this topic is not extensively covered by previous research. The third research question is based partly on the first two questions as this is focused more on the changes in funds transfer pricing process practices and liquidity cost allocation related to recent and upcoming regulations related to liquidity risk.

This thesis will investigate the above questions using a qualitative approach and is in large part based on interviews conducted with nine Swedish banks of varying size and business model.

### 1.4 Delimitations and assumptions

One delimitation of the scope is the conscious choice of only focusing on LCR and NSFR. This means that other new regulations, following Basel III or other initiatives, will not be covered by this thesis.

This study will focus on funds transfer pricing and liquidity cost allocation mechanisms. Therefore, other aspects or liquidity risk and funding risk measuring, managing and pricing may not be covered although they may still be of high relevance when assessing bank risk management from a broader perspective or when trying to make a broader assessment of the impact of the LCR and the NSFR.

The scope of this study is limited to investigating the above stated research questions which are focused on the design of and methods used for funds transfer pricing and liquidity cost allocation in Swedish banks. Therefore, other perspectives on the funds transfer pricing and liquidity cost allocation will not be included in this review.
1. Introduction

Another delimitation set to reduce the scope is that only one employee from each bank will be interviewed. Although conducting several interviews might provide deeper insight on these topics as well as limit the effect of personal biases, it was deemed as a necessary delimitation due to the limited time available.

1.5 Related literature and research contribution

While banks for long have played an important role in the economy, management control systems were for long not a priority. Before 1970’s, inspections by supervisors largely served the control needs. As the competitive landscape has evolved the need for management control systems in banks has increased. Operating in complex environments puts higher demands on accurate measures and organizational efficiency. On a macro level, political, economical and regulatory changes has led to increased competition and eroding margins. Combined with changes on the micro level, such as decentralized organizational structures and product innovation, banks are faced with the growing complexity of performance management, risk management and resource allocation (Gooneratne and Hoque, 2013).

The funds transfer pricing process is a management control system which is regarded to be best practice for internal pricing and profit allocation by regulators and has been addressed by several previous studies. However, there is no single agreed methodology for calculating internal prices. For example, in a report from 2010 by CEBS, several institutions were asked to present their approaches to internal pricing and liquidity cost/benefit allocation. The institutions ranged from international investment institutions to domestically based retail institutions. The approaches ranged from taking a risk-free curve and adding relevant credit default swap spreads, to an approach which decomposes the funding cost into a risk-free rate and a risk premium which includes both a liquidity premium specific to the maturity and a credit risk premium specific to the institution and maturity. The majority of the banks included in the review also tried to incorporate some indirect costs, such as cost of funding requirements (CEBS, 2010). Lindblom and Elliot(2017) conducted a review of how two major Swedish banks (SEB and Swedbank) included liquidity premiums in their funds transfer pricing. However, the impact and handling of liquidity premiums or the effect of recent liquidity regulatory requirements in the setting of a smaller bank which is not necessarily utilizing a technically sophisticated funds transfer pricing as management control systems has not been covered. Hence, this thesis will extend the knowledge of how different types of banks
have responded to liquidity risk and regulatory requirements.

The lack of attention to the role of management control systems in small or medium-sized companies is also something that Chenhall (2003) highlights. Gooneratne and Hoque (2013) notes that the area of customer or product profitability has received little attention in previous literature. They also note that the institutional setting, for example public or private sector, is not covered in previous literature, why a comparative case study would be appealing as to bridge this gap.

Despite the importance of management control systems in banking being highlighted in several papers, an extensive review of the available literature by Gooneratne and Hoque(2013) revealed that there is little research available on the interaction between risk management and management control systems in banks. Therefore, investigating the link between risk management and management control systems in the selected banks and how this link has been affected by change in regulations will be an empirical contribution and give further insights to how regulations have affected processes, interactions and behaviours within the banks.

Theoretical work on banking regulations has mainly been focused on capital requirements. Subsequent theoretical work has focused on how bank risk appetite is affected by changing capital requirements and the incentives present in asset risk choice (Furlong and Keeley, 1989). There is however an ambiguity in the theoretical literature regarding the effect of capital requirements and asset risk choice. A number of studies show that the total volume of risky assets may be reduced by implementing capital requirements while others, when using the assumption of a risk averse bank’s objective function, show how capital requirements can distort the bank portfolio such that the average risk increases due to highly correlated returns (Acharya, 2009). There are various studies regarding the impact of Basel III and some has focused specifically on the impact of introducing LCR and NSFR. In 2013, King conducted one of the first comprehensive assessments on the NSFR for a selected number of banks and also discussed different strategies to meet the requirement. By using available balance sheets the author was able to highlight potential trade-offs between liquidity regulation and profitability as well as highlighting the different challenges for banks based on their balance sheet structures. One of King’s conclusions was that the banks may come to favour different types of assets and liabilities after the NSFR is introduced to become more cost efficient. For example, King believes that banks will prefer to raise deposits and thereby increase the funding. Although this will be at a higher average cost than previously and that banks
to some extent will increase the number of corporate loans and mortgages on behalf of retail loans as the funding requirements for these are lower. This can also be seen in figure 1 where approaches to increasing the NSFR as identified by King are presented. King also highlights that there were no or very few theoretical or empirical studies on the topic of liquidity regulations and also notes that the lack on experience related to liquidity regulations may lead to unintended consequences.

![Figure 1: Approaches to increasing the NSFR (King, 2013)](image)

The change in demand and supply caused by Basel III was also covered in a paper by Al-Darwish et al. (2014) where unintended consequences of Basel III and Solvency II were discussed. They argued that covered bonds and sovereign bonds will likely be favoured as these instruments qualify for both the NSFR and the LCR. This highlights the relevance of investigating how these regulations affect liquidity cost allocation mechanisms as this is an important component when banks determine the most cost-efficient strategy for complying with the NSFR.
Summary of contribution

In summary, this thesis is positioned in relation to existing literature in a way which indicates a number of contributions. Firstly, it will provide an empirical contribution to existing literature related to funds transfer pricing and the allocation of liquidity costs on the Swedish market and for banks with different business models. Secondly, this thesis will make an empirical contribution on the link between risk management and management control systems in the setting of a bank and the role of management control systems in small and medium-sized entities. Lastly, it will make a contribution to the current knowledge of how LCR and NSFR have affected banks.

It is worth to note that this study does not aim to provide a conclusive answer to the stated research questions. Instead the aim is to provide empirical insights which can help determine relevant areas of future research.

1.6 Outline

This paper proceeds as follows:

Chapter 1 introduces the reader to the topic and presents the context in which the aim of the thesis and the research questions are formed. The aim and research questions which will be investigated are introduced together with a brief overview of existing literature and a summary of the expected contributions. Lastly, the delimitations of the study are discussed and the structure of the report is outlined.

Chapter 2 gives a more detailed description of the setting which the banks are operating in and presents the reader with information regarding the Swedish economy, the banking industry and current regulations.

Chapter 3 aims to give the reader a theoretical foundation within management control systems, funds transfer pricing and related theoretical frameworks.

Chapter 4 describes the research design and the methods applied in this thesis. In addition to this, the scientific quality in terms of validity, reliability and generalizability is also discussed.

Chapter 5 presents the reader to a more detailed description of the sample included in the review and the empirical data from the conducted interviews in a summarized and
Chapter 6 aims to present the initial analysis of the findings and position them in relation to previous research.

Chapter 7 presents the general discussion surrounding the main themes and aims to discuss the implications and the contribution to research of the findings presented in chapter 6. Lastly, the limitations of the study are discussed.

Chapter 8 concludes the study by presenting the key findings and the answers to the research questions. Additionally, implications of the main findings from both an academic and industrial perspective are summarized and suggestions for future research are outlined.
2 Institutional setting

This chapter aims to give the reader an overview of the setting which the investigated institutions operate in. It will give the reader an introduction to the banking industry as well as current regulations.

2.1 Current economic state

According to Finansinspektionen the Swedish economy has been strengthened during 2017 which has further reduced concerns regarding the overall stability of the Swedish and European financial systems. Positive development on a macro-level has also had positive implications for the Swedish financial sector. Examples are the current economic upswing in the US with low unemployment figures and strong growth and the strengthened European banks. These factors in combination with increased regulations regarding capital and liquidity have improved the Swedish Banking sector’s overall resilience. However, Finansinspektionen notes that it is usually during ”good times”, strong business cycles and strong financial markets when the optimism is at it strongest that the likelihood of excessive risk taking increases. At the present time, the low interest rate environment is a factor that might increase risk taking which will not be sustainable in the long-term perspective (Finansinspektionen, 2017b).

2.2 The Swedish Banking industry

The financial sector and systems related to savings, financing, payment solutions and risk management are fundamental for the Swedish economy (Finansinspektionen, 2017c). The financial sector in Sweden employs approximately 2% of the total workforce. In 2015, the financial sector was responsible for approximately 4.8% of Sweden’s total GDP and had a balance-sheet total of SEK 19 600 billion, which corresponded to 4.7 times Swedish GDP (Svenska Bankföreningen, 2017a). At this time, banks accounted for 37% of the balance-sheet total of the financial sector.

During the last few years, the financial sector has been subject to several major changes. For example, the decreasing importance of local bank offices for customer service as an effect of increased online services and the emerging fintech sector has led to a stronger competition in the banking market. Between 2006 and 2016 the number of banks de-
creased by 7% from 126 to 117 banks. During this period the number of commercial banks saw a large increase, from 27 to 39. This was mainly due to the large number of securities firms which have been reformed as commercial banks. However, due to the large number of mergers between small savings banks, the number of savings banks for the period decreased, from 68 to 47, which offsets the increase in commercial banks.

By the end of 2017 there were a total of 117 banks active on the Swedish financial market and most can be categorized into one of the three categories presented in the following sections (Finansinspektionen, 2017c).

**Universal banks**

The Swedish banking sector is dominated by Handelsbanken, Nordea, SEB and Swedbank which all can be categorized as universal banks (Finansinspektionen, 2017c). These four players account for 63% of all consumer deposits and more than 80% of the total lending on the Swedish market (Svenska Bankföreningen, 2017a, Finansinspektionen, 2017b). A universal bank offers a wide range of financial services, relies mainly on market financing and is system critical as they provide a large number of functions essential to the economy. Large exposure to the real estate market and the dependence on market financing are some of the characteristic risks for this type of bank (Finansinspektionen, 2017c).

**Retail banks**

Retail banks tend to be more focused on private consumers and small and medium sized enterprises. The income is mainly driven by net interest and funds it’s activities using both consumer deposit and market financing. Retail banks tend to have large exposures to the real estate, mainly due to a focus on mortgage products, and the lack of diversity in both assets and liability drives concentration risk (Finansinspektionen, 2017c). In contrast to the universal banks, the retail banks are not as active abroad but have the majority of their business in Sweden. Examples of Swedish retail banks are Länsförsäkringar Bank, SBAB Bank and Skandiabanken. Retail banks hold approximately 5% of the total assets in the Swedish banking system (Finansinspektionen, 2017c).
Savings banks

A savings bank tends to be a smaller bank with focus on traditional banking services and products which is active on a local or regional level. The profits in Savings banks tend to be driven by the banks net interest (Finansinspektionen, 2017c). While they on an aggregate level only account for about 7% of total consumer deposits, their market share on a local and regional level can be significantly larger (Svenska Bankföreningen, 2017a). Since savings banks are active in a specific region, they become vulnerable to negative economic development in their geographic area (Finansinspektionen, 2017c).

2.2.1 Lending and savings behaviour of Swedish consumers

Swedish banks are the main credit suppliers to Swedish households and the total lending to consumers has grown at a steady pace after the financial crisis in 2008 (Finansinspektionen, 2017c). At the end of 2016, the total lending to Swedish consumers amounted to SEK 6 000 billion.

Swedish consumers are primarily using lending to finance their home purchases. In 2016, 83% (SEK 2 902 billion) of the total lending to consumers (SEK 3 516 billion) was loans with a residential property as security. In Sweden, approximately 70% of households owns their residential property and out of these households 90% has a mortgage. This is a relatively high rate of mortgages which indicates a mature mortgage market (Svenska Bankföreningen, 2017a). Housing agencies are currently the largest lender to consumers, 64% of total loans, and the banks account for about 34% of the total consumer lending.

The Swedish consumers’ financial assets have increased by almost 200% since 1996. At the present time, bank deposits constitutes the main part, 36%, of Swedish consumers financial assets. Other common forms of savings are unit-linked and life assurance (Svenska Bankföreningen, 2017a).

2.3 Requirements and regulations

This section will first provide the reader with a brief overview of the regulatory landscape for banks operating on the Swedish market and will then give a more detailed explanation of LCR and NSFR.
2. Institutional setting

2.3.1 Oversight of the Swedish banking sector

The most essential tasks of the financial system in Sweden are the ability to transform deposits to funding, providing efficient payment solutions and risk management. As the stability of the financial system is of great importance to the Swedish society a number of rules and regulations has been instated with the aim of ensuring financial stability. The responsibility for oversight is divided between three instances:

- Finansinspektionen is an authority which answers to the ministry of finance. Finansinspektionen’s main task is the oversight of the companies which are active on the financial markets. Finansinspektionen also aims to contribute to the financial system’s stability and efficiency as well as working for strong consumer rights. Finansinspektionen is not a legislator (laws are passed through the Swedish parliament) but develops guidelines and gives advice on how laws should be interpreted and what is deemed to be sound practices. Finansinspektionen is the instance responsible for granting licenses for different businesses, for example the banking licenses (Svenska Bankföreningen, 2017b)

- Riksbanken is an independent authority which answers directly to the Swedish parliament. The main task of Riksbanken is to maintain a stable monetary value, but their aim is also to work towards stability of the financial system by supporting the payment actors and being prepared to handle a financial crisis. Riksbanken carries out their duties by using monetary policy operations (Svenska Bankföreningen, 2017b)

- Riksgälden has traditionally been responsible for monitoring and managing the Swedish state debt and financing. However, over the years their responsibilities has also been increased and now includes some areas related to financial stability. For example, Riksgälden is responsible for handling banks in distress and for the deposits guarantee (Svenska Bankföreningen, 2017b)

2.3.2 Capital requirements and regulations in the Swedish context

The fundamental purpose of capital requirements for banks is to reduce the risk of default by regulating the least amount of equity allowed in relation to debt. The requirements are also meant to cover, to some extent, potential losses. This is thought to increase the general stability in the financial system (Finansinspektionen, 2014).
The assessment process in Sweden is called the internal capital and liquidity assessment (IKLU) and the banks are required to submit a IKLU document where they present their calculations and estimates. This could be seen as the equivalent of the internal capital adequacy assessment process and internal liquidity adequacy assessment process which are part of the supervisory review and evaluation process.

Capital requirements can be divided into four different categories:

- **Pillar I:** The capital requirements of pillar one are sometimes referred to as the "minimal requirement" and includes capital adequacy for the banks credit and counterpart risk, market risk and operational risk.

  Operational risk is the risk of losses due to failed processes, human error, faulty systems or external risk. Legal risk is also included in this definition. Credit risk is the risk of default of outstanding credits and market risk includes interest rate risk, equity risk, settlement risk, commodity risk and the risk of credit calculation adjustment (Finansinspektionen, 2014). Most of the propositions in Basel III are focused on pillar 1.

- **Pillar II:** The pillar two capital requirement is an addition to the first pillar and is meant to, among other things, cover risks not covered or only partly covered in pillar one. It is mainly focused on regulation of processes and methods used to continuously assess and retain enough capital and liquidity, in terms of amounts, types and distribution, so that current and future risks will be covered (Finansinspektionen, 2014).

- **Pillar III:** The third pillar is established to improve the transparency and to ensure that the minimum requirements regarding capital and liquidity requirements are met.

- **Combined buffer requirements:** Swedish banks are also required to maintain a number of capital buffers which they are allowed to use only under certain conditions. This will further strengthen the banks resilience and hinder problems from spreading to different parts of the financial system (Finansinspektionen, 2014).
2. Institutional setting

2.3.3 Liquidity coverage ratio

The liquidity coverage ratio (LCR) is a minimum standard for funding liquidity. The purpose of the LCR according to Basel Committee on Banking Supervision is to increase the short term liquidity risk profile in banks by ensuring that banks have an adequate reserve of high-quality liquid assets which can be converted easily to provide liquidity in stressed scenarios. The LCR is focused on a 30 day stressed scenario. The Basel Committee stresses that the LCR establishes a minimum level of liquidity required and that banks are still expected to meet previous standards regarding sound liquidity management practices (Basel Committee on Banking Supervision, 2013).

The LCR is based on a coverage ratio methodology which has been used by many banks to assess exposure to liquidity events. The standards require that in a situation absent of financial stress, the ratio between total net cash flow for the next 30 days and the value of the stock of high quality liquid assets should be at least 100%.

\[
LCR = \frac{\text{High quality liquid assets}}{\text{Net cash outflow for 30-day period}} \geq 100\%
\]

High quality liquid assets are defined as assets which are considered to be easily converted into cash without a significant loss of value. Therefore, some of the fundamental characteristics of high quality liquid assets are that they are low in risk, there is a certainty of valuation, they have low correlation with risky assets and are listed on a recognized exchange (Basel Committee on Banking Supervision, 2013).

The high quality liquid assets can be divided into level 1 and level 2 assets. Level 1 assets are for example coins and notes, central bank reserves and sovereign bonds. Level 2 assets are deemed more risky and are therefore only allowed to comprise a maximum of 40% of the high quality liquid assets stock and are subject to haircuts. Examples of Level 2 assets are corporate debt securities and covered bonds, residential mortgage backed securities and equity shares (Basel Committee on Banking Supervision, 2013).

The second component, the total net cash outflow for the next 30 calendar days, is defined as:

\[
\text{Total net cash outflow} = \text{Total expected cash outflows} - \min(\text{Total expected cash inflows}; 75\% \text{ of total expected cash outflows})
\]

Banks are not allowed to double count items which means that cash inflows from assets included in the high quality liquid assets stock may not be included in the expected cash
inflows when calculating the total net cash outflow. The expected outflows for example for deposits, are determined by whether they are assessed to be stable or less stable. Stable deposits are assumed to have a 3% run off rate while less stable are assumed to have a 10% run off rate (Basel Committee on Banking Supervision, 2013).

In Sweden, a requirement similar to the LCR was enforced already in 2013 as Finansinspektionen saw a need for liquidity requirements while the EU standard was not yet implemented. A major difference in the requirement from Finansinspektionen was that they required banks to meet the minimum standard both on an aggregated basis but also for EUR and USD specifically (Finansinspektionen, 2017a).

2.3.4 Net stable funding ratio

The net stable funding ratio (NSFR) will be a minimum standard for funding and purpose of the NSFR according to the Basel Committee is to promote a more stable funding profile for banks as it, among other things, requires banks to limit their reliance on short term wholesale funding (Basel Committee on Banking Supervision, 2014).

The NSFR is defined as:

\[ NSFR = \frac{\text{Available amount of stable funding}}{\text{Required amount of stable funding}} \]

The calibration of the NSFR is meant to reflect two dimensions of the stability of liabilities, namely the funding tenor and the funding type. The amount of available stable funding is based on a number of aspects related to an institution’s funding. Capital and liabilities are first assigned to one of five categories defined in the regulations. Based on the capital or liabilities assigned category, an available stable funding factor is assigned which is used to determine the total available stable funding (Basel Committee on Banking Supervision, 2014).

Below is a brief overview of the five different levels of available stable funding factors and which types of capital and liabilities are categorized into the different factor categories:

- 100%: Regulatory capital, capital with effective maturity of one year or more and secured and unsecured borrowings with an effective residual maturity of one year or more
2. Institutional setting

- 95%: Stable deposits and term deposits with residual maturities of less than one year by small and medium-sized enterprises customers

- 90%: Less stable deposits and term deposits with residual maturities of less than one year by small and medium-sized enterprises customers

- 50%: Funding with residual maturities of less than one year by non-financial corporate customers, operational deposits, funding with residual maturities of less than one year by sovereigns or public sector

- 0%: Funding with residual maturities of less than six months from central banks and financial institutions

The amount of required stable funding is determined based on the characteristics of the bank’s liquidity risk profile. The required stable funding is calculated by assigning assets to listed categories. Each category then has a required stable funding factor which multiplied with the amount of assets assigned to the category gives the total required stable funding from that category. Unless it’s specifically stated, the NSFR framework uses the same definitions as the LCR framework (Basel Committee on Banking Supervision, 2014).

Below is a brief overview of the different levels of required stable funding factors and which types of capital and liabilities are categorized into the different factor categories:

- 0%: Coins, notes and central bank reserves

- 5%: Marketable securities for claims on or guaranteed by sovereigns and central banks assigned with 0% risk weight for credit risk in Basel II

- 15%: Marketable securities for claims on or guaranteed by sovereigns and central banks assigned with 20% risk weight for credit risk in Basel II, corporate debt securities and covered bonds rated AA- or higher

- 50%: Residential mortgage backed securities, corporate debt securities and exchange-traded equity shares

- 65%: Residential mortgages which are unencumbered and has a residual maturity of one year
2. Institutional setting

- 85%: Unencumbered performing loans with 35% or higher risk weight for credit risk in Basel II and physical traded commodities

- 100%: Assets that are encumbered for a period of at least one year

In addition to the assets and liabilities listed above which are affecting the available stable funding and required stable funding, off-balance sheet activities are also to some extent included in the framework. Although many such activities may require little or no immediate funding they can require significant amounts of liquidity in the future (Basel Committee on Banking Supervision, 2014).
2.4 Basel III impact assessment

EBA has published a number of reports which assesses the impact of Basel III on European banks based on the assumption of full implementation. In addition to this, it also gives an indication regarding the progress of European banks implementation and compliance (EBA, 2018a,b).

Liquidity coverage ratio

The report from EBA on liquidity measures is based on data reported in December 2017. The report concludes that the weighted average LCR has an upward trend which is driven mainly by an increase in high quality liquid assets and the weighted average LCR now amounts to 145% (EBA, 2018b).

The report also notes that while all banks are well above the 100% requirement, EBA sees that the dispersion of the LCR level differs between different business models. On average, which is shown in figure 2, mortgage banks reports the highest levels of LCR, 256% on average, while cross-border universal banks reports the lowest average level. Savings banks reports an average LCR of 179%. The bank business model also seems to have an effect on the composition of the liquidity buffer (EBA, 2018b).

![Figure 2: LCR across business models (EBA, 2018b)]
Net stable funding ratio

The assessment based on data as of December 31, 2017, shows that banks included in the review require an additional EUR 27.8 billion which is equal to 2.7% of total assets. Figure 3 shows the development of the two components of the NSFR, the available and required stable funding over time. EBA believes that the spike in NSFR driven by a change in available stable funding in December 2013 was caused by revisions made to the requirements. During 2017, the main driver of the increase in NSFR has been the increase of available stable funding.

Figure 3: NSFR (left scale: lhs) and change in its determinants (right scale: rhs) – balanced sample (%) (EBA, 2018a)
3 Theoretical framework

This chapter aims to give the reader an understanding of the theoretical foundations and theoretical models on which the study is based on. The chapter will begin with an overview of management control system. The aim of this is to give a brief overview of the topic as well as to present research related to management control systems in banks. This overview will also include previous research on frameworks for how management control systems can be analyzed. Further, the theoretical background and foundation of funds transfer pricing is presented.

3.1 Management control systems

Definition

Management control systems, or measurement of business performance, have traditionally been focused on financial performance (Otley, 1999). For example, accounting was for long viewed as the foundation of management control (Hussain, 2005). However, as the term “performance” is a somewhat ambiguous term, there has been a number of definitions in the literature which extends beyond the purely financial aspect usually captured by accounting practices (Gooneratne and Hoque, 2013). For example, Anthony (1965) defined it as “the process by which managers ensure that resources are obtained and used effectively and efficiently in the achievement of the organization’s objectives”. If viewed from a more technical point of view, management control systems can also be defined as an analytic process which is used to make decisions based on organizational objectives. As technology has developed, many argue that traditional management accounting practices fail to fully capture and measure the relevant variables, which is why the literature has focused on other ideas related to performance measurement and more complex management control systems (Hussain, 2005). Regarding the application of management control systems, large organizations tend to be associated with a higher degree of formalization of procedures, specialization of internal functions and sophisticated control systems (Chenhall, 2003). In addition to this, management control systems can also be viewed as a social construct which is a result of the social, economic and political pressure which an organization is subject to (Otley, 1999).
Management control systems in banks

Management control systems were for long not a priority in banks and before 1970’s, inspections by supervisors largely served the banks’ control needs. However, as the competitive landscape evolves the need for management control systems in banks has increased as operating in complex environments puts higher demands on accurate measures and organizational efficiency. On a macro level, political, economical and regulatory changes has led to increased competition and eroding margins. Combined with changes on a micro level, such as decentralized organizational structures and product innovation, banks are faced with a growing complexity of performance management, risk management and resource allocation (Gooneratne and Hoque, 2013).

The financial service industry has evolved rapidly why the determinants of cost and revenue efficiency has received more attention during recent years. This has in turn led to an increased awareness of profitability, pricing, quality and soundness. While the development of the sector has allowed for new competitors and greater freedom when setting prices, it is also a highly competitive market. Hence, cost and performance management is regarded to be a key for long term success (Hussain, 2005). The importance of effective management control systems for banks were highlighted after the recent global financial crisis. The global financial crisis brought attention to the fact that many banks had poor management and governance structures, which in turn led to irresponsible lending as well as poor accounting and risk management practices (Arnold, 2009, Gooneratne and Hoque, 2013). The events that took place during the global financial crisis further highlighted how closely connected risk and performance management is in banking. In a case study of four Swedish banks by Hussain(2005), it was found that the three of the investigated banks relied heavily on activity based cost management.

Management control systems and risk management

During the recent years, many risk management practices have been collected under the term enterprise risk management. Despite that applications of enterprise risk management can be viewed as a type of management control systems, it has not been given much attention in accounting research (Mikes, 2009). However, enterprise risk management can be analyzed based on frameworks for management control systems to investigate the role and organizational significance of these calculative practices (Mikes, 2009). Also, Using a risk-based capital allocation approach makes it possible to determine risk-adjusted
returns for business units which adds another dimension of accountability to financial management control systems (Mikes, 2009). Common techniques to achieve this risk dimension in the management control systems are methods such as risk-adjusted return on capital, risk pricing or risk transfer (Mikes, 2009).

**Frameworks for analysis**

Changes in management accounting practices have three major roles in relation to organizational change; creating visibility, concretize abstract phenomenons and creating “domains of economic actions” (Cobb et al., 1995). Innes and Mitchell(1990) proposed a theoretical framework for analyzing changes of accounting processes where the change process is described in terms of facilitators, motivators and catalysts. Facilitators are necessary but not sufficient, motivators are general factors of change (i.e. competition) and catalysts are factors which are directly related to the change and the timing thereof. In addition to this, Chenhall(2003) argues that when analyzing management control systems, the outcomes can be separated into three categories; usefulness, behavioral outcomes and organizational outcomes.

### 3.2 Funds Transfer Pricing

Funds transfer pricing is an essential management tool for banks as it is a process which attributes costs, benefits and risks to business units within a bank. After the global financial crisis, funds transfer pricing has received more attention as the failure to price risks in transfer pricing models was one of the causes of the crisis. The fundamental thought is to transfer costs and benefits, for example related to liquidity, to a central pool usually managed by treasury. This is achieved as the treasury charges users of funds (assets/loans) and credits providers of funds (liabilities/deposits) for the respective costs and benefits (Grant, 2011). This theory has its foundation in the separation theorem and therefore implies that the maturity mismatch between assets and liabilities can be settled on the financial market (Lindblom and Elliot, 2017).

There is a fundamental problem in evaluating profitability of loans and deposits as only the cost or the return is known. Using deposits as an example: the costs, such as interest payments and personnel, are known, while the return is complicated to determine since the funds are used to finance a number of various assets, such as consumer and corporate
loans. Therefore, there is a need for determining a specific fund transfer price in order to be able to correctly price products, evaluate the performance of specific products and designing the banks strategy (Dermine, 2012).

3.2.1 An illustrative example

In a simple setting, where a bank is thought to have only two branches the business unit $L$ is focused on loans while business unit $D$ is focused on taking in deposits. If this bank would have no access to the financial market, the scenario would be that unit $L$ would have to purchase funds from unit $D$ while unit $D$ must sell all its deposits to unit $L$, thus implying that the volume of loans is equal to the volume of deposits. In this simplified setting, the bank’s profit ($\pi$) is maximized when the marginal revenue of loans is equal to the marginal cost of deposits which can be seen in figure 4.

![Figure 4: Optimal loan and deposit volumes, Dermine (2012)](image_url)

In modern banks, the treasury division usually acts as an internal market maker to which business units can turn to in order to settle any imbalance in loans and deposits of maturity $t$ for each unit. Given that the funds transfer price reflects the opportunity cost of both loans and deposits with maturity $t$, the true contribution from the business units to the bank can be determined. As a result of utilizing a funds transfer pricing process, a bank can obtain a more detailed performance measurement and can decentralize decision making since the business units, based on the funds transfer price set by treasury, can determine the contribution of each potential transaction on decision (Lindblom and Elliot, 2017).

Lindblom and Elliot argues that the decentralized decision making reaches its full poten-
3. Theoretical framework

tial when the access to efficient financial markets is low so that the previous constraint, that the volume of loans is equal to the volume of deposits, can be relaxed. In this scenario, the separation theorem implies that the business units can make decisions separately and somewhat independently from the previously determined optimal volume.

Note that since treasury may take positions to adjust the liquidity exposure or be subject to other costs or profits, a separation of the banks profit $\pi$ can be written as

$$\pi = \pi_L + \pi_D + \pi_T$$

where right hand side of the equation represents the profits from the loans division, the deposits division and the treasury.

3.2.2 Liquidity premium in funds transfer pricing

The importance of internal pricing of liquidity risk was addressed by Grant (2011) who notes that not properly pricing liquidity risk can lead to an internal profit and loss system which encourages maturity transformation without regard to the amount of risk generated. Lindblom and Elliot (2017) also discusses the effects on the internal interest rate in a scenario where treasury adds a liquidity premium to the funds transfer pricing.

If a bank is a net borrower, i.e. that the volume of loans is larger than the volume of deposits, including a liquidity premium would distort the optimal levels so that the optimal level of loans decrease while the optimal level of deposits increase. However, in the event that the bank is a net liquidity provider, i.e. that the volume of loans is lower than the volume of deposits, a problem arises as treasury will not be able to sell the fund surplus at the internal rate (Lindblom and Elliot, 2017). Based on the banks internal demand and supply curves, the effect of imposing a liquidity premium to the profit is negative if volumes remain unchanged from the initially optimal levels determined by funds transfer pricing without a liquidity premium (Lindblom and Elliot, 2017).

3.2.3 Model approaches

There are several approaches to designing the funds transfer pricing process. One approach to funds transfer pricing is to assign funds to one or more predefined pools based on different criteria. The classification of funds can for example be based on origination, instrument type, term or other fund characteristics (Wyle and Tsaig, 2011).
When using a pooled approach, the bank can use single or multiple pools. While the single pool method is easy to understand and implement, it values all funds equally which may give specific units an unfair advantage or disadvantage as some fund attributes are not taken into consideration in the pricing (Wyle and Tsaig, 2011). The complexity of the pooled approach depends on the number of pools and the classification method. However, using a multiple pool approach makes it possible to mitigate some of the disadvantage from the single pool approach as funds with different attributes can be assigned to different pools (Wyle and Tsaig, 2011).

The simplest method of funds transfer pricing within the pooled approach is the single average rate approach. In this approach, one rate is used for the crediting and charging of liabilities and for assets gathering irrespective of duration (Grant, 2011). In the single average approach there is no separation of interest rate risk and credit risk which is a disadvantage if the purpose of adapting funds transfer pricing is risk management (Kawano, 2005). This approach is suitable for small banks with stable funding and few providers and users of funds (Kawano, 2005). An example of a graphic representation of the single average approach is shown in figure 5.

![Figure 5: Simple average cost of funds, Grant (2011)](image)

When using a pooling approach, the transfer rate can be either an average or a marginal rate. If an average rate is used, it should be based on the incomes or expenses that are related to the pool, i.e. the total interest expense divided with the average total deposits. Note that adjustments for float and reserve requirements should be made as well. Using an average rate has the advantage of connecting back to historical performance and...
minimizing the fluctuations form changes in the market rate. However, it is not forward
looking and does not take current market conditions into consideration which makes it
less suited for marginal decision making (Kawano, 2005).

Marginal rates are based on market rates such as LIBOR, STIBOR, T-rate bills etc.
depending on what market is the most representative. While a marginal rate reflects the
current market and is well suited for marginal decision making, it does not account for
historical performance, there may be significant fluctuations and it is not well suited for
fixed-rate instruments (Kawano, 2005).

The matched maturity approach to funds transfer pricing can be seen as an extension
of the multiple pool approach. In this approach, the characteristics of the funds are
assessed at a cash flow level. In this approach the sources transfer rates are maturity
specific and the expected cash flow stream and the interest rate at origination determines
the use of the funds. A matched maturity approach is generally the preferred model for
a number of different reasons. For example, by using this model approach it is possible
to determine the contribution margin on a transaction level and to measure profitability
of the funding center (Wyle and Tsaig, 2011). A graphic representation of an example of
a matched-maturity approach to liquidity transfer pricing can be seen in figure 6.

Figure 6: Matched-maturity marginal cost of funds approach, Grant (2011)
4 Method

The purpose of this chapter is to explain the research design and methodology as well as to motivate the choice of the used methods. It also gives a more detailed description of the empirical data collection, the sample and the data analysis. The chapter ends with a discussion of the scientific quality of the study.

The purpose of this thesis is to investigate the impact of changes in liquidity requirements on liquidity cost allocation mechanisms in a Swedish setting. The study also aims to identify and discuss the liquidity cost allocation mechanisms used in practice by Swedish banks. Following the stated aim of the study, the research approach will be descriptive and exploratory (Collis and Hussey, 2013).

The formulated research questions are the following:

**RQ1:** How is internal funds transfer pricing used by Swedish banks?

**RQ2:** What do the liquidity cost allocation mechanisms in Swedish Banks look like?

**RQ3:** How have NSFR and LCR affected the funds transfer pricing and liquidity cost allocation mechanisms in Swedish Banks?

In order to answer the above research questions and make it possible to both describe and create an understanding of the banks’ funds transfer pricing practices and the impact of regulations, as well as to discover and analyze characteristics of the population and the sub-groups based on business model, a multiple case study approach is used. Using case studies to conduct research regarding management control systems in banking is customary (Gooneratne and Hoque, 2013).

The empirical strategy for answering these research question will be to collect empirical data through structured interviews with employees in comparable roles from a number of Swedish banks. The interviews are focused on investigating internal pricing practices and how the enforcement of NSFR and LCR has affected the allocation of liquidity cost within Swedish banks.

The qualitative data collected from the interviews is analyzed based on a thematic analysis which is a method for analyzing themes within data (Braun and Clarke, 2006), (Blomkvist and Hallin, 2014). In addition to an initial literature review focused on previous research, the regulatory frameworks and information about the Swedish Banking industry, new
literature will also be added after the interviews based on the empirical findings as the study utilizes an exploratory approach to the subject.

To be considerate of the ethical aspect and the fact that internal pricing practices can be sensitive to share in a competitive market, confidentiality and anonymity were offered to all participating banks in the study.

In the following sections, a detailed description of the interview questions, the sample selection and the method for the analysis is given. Lastly, the scientific quality of the method is discussed.

4.1 Empirical data collection method

The empirical data is collected through structured interviews with open questions as the purpose is to explore the topic and to gather broad information (Collis and Hussey, 2013). The interview questions are mainly based on EBA’s guidelines regarding the internal capital and liquidity adequacy assessment process, information collected for the supervisory review and evaluation process (EBA, 2016) and on common procedures and methodologies for supervisory review and evaluation process purposes regarding liquidity cost allocation and liquidity transfer pricing practices (EBA, 2016, 2014). By doing so, it is ensured that the questions are framed in a consistent way and are using the customary technical terms as well as ensuring that the banks should be able to provide the information asked for as it should be available for regulatory purposes.

In order to make the interviews as comparable as possible the interviews are held using a structured approach, meaning that the same questions are used in all interviews. Interviews are held face-to-face or over telephone. Before interviews are conducted, the interviewee is informed that neither the bank nor the employee will be mentioned by name at any time in the thesis.

The initial set questions is focused on describing the mechanism of the banks’ internal pricing practices, their liquidity cost allocation and the methodology thereof. In addition to this, it also includes questions on the banks’ liquidity risk management as this is important to address in order to understand how internal practices are interconnected. The second set of questions focus on how the internal pricing and the mechanism of liquidity cost allocation and the methodology thereof have changed following the enforcement of LCR and NSFR at the banks. The full set of interview questions can be
found in appendix A.

4.2 Population and sampling

Following the purpose of the thesis, the target population is limited to Swedish retail banks. Since the information related to funds transfer pricing practices in some cases can be viewed as sensitive, convenience sampling is used to create a list of sixteen banks. These banks were deemed to be suitable for the purpose of the thesis and contacts within the Treasury division or other divisions related to funds transfer pricing are available. The banks are selected so that institutions of different sizes and business models would be represented in the study.

The 16 banks are contacted with an email from KPMG which had previously had interactions with the contacted individuals. The initial email contains a brief description of the thesis but not the full set of questions. If a bank agrees to participate in the study, a second email is sent which contains the full set of questions together with suggested interview times. The banks who are asked to participate in the study themselves suggest which person at the bank would be most relevant to interview based on the purpose and topic of the thesis. The outcomes of the interview requests are shown in table 1.
4. Method

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<tr>
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<td></td>
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<td>Participated</td>
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</tr>
<tr>
<td></td>
<td>U3</td>
<td>Participated</td>
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Table 1: Contacted banks

4.3 Empirical data analysis

The structure of the data analysis follows the general analytic approach to qualitative data analysis which consists of three activity flows; reducing, displaying, drawing and verifying conclusions (Collis and Hussey, 2013). Following this structure, the first step of the analysis is the synthesizing or reducing of the data, which is described as the process of reducing and drawing together the data to give a general explanation of what is occurring. This was done by transcribing and summarizing the material which means that the first activity of the analysis, the reduction, has already been conducted when the results are presented to the reader.

The thematic analysis is structured based on the three themes as presented through both the research questions and the interview questions. During the process of data reduction and structuring the data was coded to highlight themes and patterns. Based on these findings, the theorizing is conducted through discussion and analysis of the themes and patterns found through the coding of the data. The theorizing includes forming hypotheses and theories based on lateral thinking and comparing data from
different settings around the patterns and themes (Collis and Hussey, 2013).

4.4 Scientific quality

This section aims to discuss the scientific quality of the method based on three main perspectives: reliability, generalizability and validity. Validity refers to how well suited the approach and method is to based on the study’s aim and research questions. Reliability refers to a study’s accuracy and whether the results are repeatable and generalizability refers to how applicable the results are elsewhere (Collis and Hussey, 2013).

Validity

The method applied is appropriate given the purpose and the time frame of the thesis. However, the reliability of the findings would increase significantly if several sources were used for collecting empirical so that it would be possible to triangulate the investigated areas. This could for example be done by in addition to conducting interviews also doing a survey related to these topics. Furthermore, it would also be suggested to include several respondents from the same organization. This would help create a clearer picture of how the internal methods for example are perceived as well as to reduce personal biases and views, which may now have a significant effect on the findings.

Reliability

One potential problem with using interviews as noted by Collis and Hussey is that interviewees may sometimes give answers based on what he or she believes to be expected or what is regarded as ”correct” or ”acceptable” answers to a certain question. Measures taken to limit this bias was to inform that interviewees before the interview started that both the bank and interviewees names would remain anonymous as well as using open questions to increase the depth of the interviews.

One challenge with analyzing qualitative data is that there is no clear and universally accepted conventions compared to the analysis of quantitative data (Collis and Hussey, 2013). Also, another drawback with using qualitative data is that it is very time consuming which may cause problems as the time spent on this thesis is limited (Collis and Hussey, 2013). However, in order to not collect too much data given the time available
a constraint regarding the number of interviews and the time period in which interviews will be held is limited.

As this study relies heavily on data collected through interviews the study is hard to replicate and it is also harder to establish reliability compared to a quantitative study. However, detailed description of the institutional setting, the context of the interview subjects and a detailed list of the questions used for the interviews are used to minimize subjectivity in the analysis.

Lastly, the sample used in this thesis consists of nine banks from three different categories, savings banks, niche banks and universal banks, can be considered to be very small. Having a small sample can lead to a number of biases, for example it may lead to a higher variability which reduces the reliability. Further, since it was voluntary for the asked interviewees to part in the study, the findings are subject to voluntary response bias. One risk with this may be that individuals with strong views are over-represented in the sample. Given this, one can not draw any conclusions following the findings of this thesis. However, findings can be used to inspire and give indications for further research.

**Generalizability**

The study has a relatively low generalizability as it relies on qualitative data to a large extent. While some attempts are made to generalize the findings, the lack of ability to test the conclusions on different data sets leads to a discussion of accuracy in the conclusions. However, due to the fact that it is primarily focused on the characteristics of the phenomena which are not firm specific, the generalizability of the analysis is increased.
5 Empirical data

The aim of this chapter is to present the empirical data. The chapter begins with a description of the sample and some statistics. Thereafter, the cases are presented through a brief description of the interviewee and a summary of the data collected from each interview.

5.1 Description of sample

A total of sixteen banks were asked to participate in the study and nine of those accepted to participate and were able to do so within the time frame set for conducting interviews. The banks themselves suggested who would be the most suitable interviewee which is why the titles of the interviewees differ. The sample for the review is described in table 2. The banks are categorized into subgroups based on their business models to further highlight in which context they are operating and to facilitate easier reading. The banks are listed in no particular order within the categories.

No bank directly declined to participate in the study. However, four savings banks and two niche banks did not respond to the interview request at all. One savings bank and one niche bank accepted to participate but was not able to do so within the time frame set for conducting interview, which is why they are not included in the review. An overview of the contacted banks is shown in table 1 in section 4.2. One difference between the requested banks and the participating bank is the distribution between the categories. Universal banks constitute 33% of the interview sample while they only account for approximately 4% of the total number of Swedish banks. This may lead to universal banks being over-represented in the review compared to the distribution between categories on the actual market.

Table 3\textsuperscript{1,2} presents some descriptive statistics of the sample. The descriptive statistics show that there are large variations in the sample on all the selected data points. Table 4 gives some additional insight into the banks within the three categories. The purpose of this is to further highlight the differences between the business models and banks included in the sample as this gives an indication of which setting and context the banks are operating within.

\textsuperscript{1}Numbers based on annual reports from 2017.

\textsuperscript{2}Results from one bank are converted from EUR to SEK using the exchange rate as of 31/01-2017.
5. Empirical data

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</tr>
<tr>
<td></td>
<td>U3</td>
<td>Head of Liquidity Management and Steering</td>
<td>In person</td>
<td>60 min</td>
</tr>
</tbody>
</table>

Table 2: Summary of interview sample

<table>
<thead>
<tr>
<th>Operational profit (mSEK)</th>
<th>Balance-sheet total (mSEK)</th>
<th>Total capital relation</th>
<th>LCR</th>
<th>Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min</td>
<td>70</td>
<td>4 915</td>
<td>16.8%</td>
<td>133%</td>
</tr>
<tr>
<td>Median</td>
<td>748</td>
<td>22 371</td>
<td>20%</td>
<td>210%</td>
</tr>
<tr>
<td>Max</td>
<td>39 368</td>
<td>5 727 017</td>
<td>28.3%</td>
<td>925%</td>
</tr>
</tbody>
</table>

Table 3: Descriptive statistics

5.2 Interview results

The interview results for each bank are presented below according to the order shown in table 2. The interviews are presented according to the structure of the interview so that the results are presented in a consistent manner for all interviews. Since the interviews are voluntary and based on open questions, the answers given may vary both in detail and in length. Also, the knowledge of the bank’s funds transfer pricing systems varied largely between interviewees which is why some results may differ significantly in depth.

5.2.1 Savings banks

S1

The interview was held with the bank’s CFO who is responsible for the bank’s financing, accounting and the financial reporting.

The measurement and management of liquidity and financial risk is determined by the
5. Empirical data

<table>
<thead>
<tr>
<th>Average</th>
<th>Operational profit (mSEK)</th>
<th>Balance-sheet total (mSEK)</th>
<th>Total capital relation</th>
<th>LCR</th>
<th>Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Savings banks</td>
<td>119</td>
<td>27 436</td>
<td>20%</td>
<td>255%</td>
<td>266</td>
</tr>
<tr>
<td>Niche Banks</td>
<td>760</td>
<td>14 679</td>
<td>18%</td>
<td>474%</td>
<td>252</td>
</tr>
<tr>
<td>Universal banks</td>
<td>27 066</td>
<td>3 576 985</td>
<td>26%</td>
<td>142%</td>
<td>19 448</td>
</tr>
</tbody>
</table>

Table 4: Average values per category

banks risk policy document which is approved by the bank’s board. The liquidity risk is measured on both assets and liabilities on the balance sheet.

The bank has an internal pricing system which is based on the bank’s funding cost. The pricing is constructed by adding charges for example for cost of capital and duration to the base rate. The internal price is updated daily to reflect movements in the market. The charges made for example for the liquidity cost are meant to reflect the levels of liquidity and financing risk allowed in the risk policy, which is how the internal prices are affected by the bank’s risk appetite.

The bank measures its results on an office level since every transaction’s result can be determined as the difference between the interest rate charged and the internal interest rate.

The bank started to work with the LCR and the NSFR when the Basel III was published. The interviewee perceives that the LCR requirement has had a significant impact on the bank’s business model and the balance sheet structure, especially since the bank has had to increase the duration of the balance sheet on the liabilities side. The introduction of the LCR and the NSFR have also increased the complexity of the internal pricing model which previously did not include a liquidity cost which was not directly connected to the interest rate reset period. In the current pricing model, in addition to a premium for the interest rate reset period there is also another component which is based on duration and is related to the NSFR. The interviewee means that the introduction of LCR and NSFR has to some extent increased the awareness around the internal pricing practices at the bank and to that the methodology is reviewed slightly more often compared to previously.

S2

The interview was held with the bank’s CFO who is responsible for the bank’s financing, accounting and the financial reporting.
The measurement and management of liquidity and financial risk is determined by the banks risk policy document which is approved by the bank’s board annually. Overall, S2 is a risk averse bank and has limited mandate to make financial investments other than those necessary for the liquidity reserve.

S2 uses the funds transfer pricing system of Swedbank which includes a liquidity premium and is updated daily. However, the details of how the liquidity cost is calibrated in the funds transfer pricing is not known by the interviewee. According to the interviewee, there is no close connection between the funds transfer pricing and the banks risk management or strategy.

Financial results are primarily measured on an office level. The offices have mandate to set prices towards the customers and the funds transfer pricing is an important component in the pricing decisions as the internal prices from the funds transfer pricing are used to determine the margin of a transaction.

The bank started to report LCR and NSFR in 2014. The interviewee says that one significant difference since after the LCR was introduced is that the liquidity buffer has increased in size and that the bank now feels obligated to buy more secure bonds, for example municipal bonds, which makes it harder for the bank to achieve higher return on the liquidity portfolio. The bank does not perceive that the LCR and NSFR has in any way changed the method or calibration of the liquidity cost allocation mechanism. However, the interviewee means that these regulations have tightened up the financial management and that they have highlighted the issue of liquidity risk and liquidity management so that bank employees on all levels now are more aware.

S3

The interview was held with the bank’s CFO who is responsible for financing and reporting in the bank.

The bank measures liquidity risk and financing risk mainly on a monthly basis and they focus their attention on the measures LCR, NSFR and an internal cash-flow measure. The internal cash-flow measuring method focuses on the banks liquidity needs on both a short or intra-day basis and on a more long-term basis of 30 days. In addition to monitoring the NSFR, the bank also monitors the ratio of deposits and loans and other more general balance sheet ratios. The interviewee sees no close connection between the bank’s allocation of liquidity costs and the risk management.
S3 uses a simple model for internal pricing which is based on the banks funding cost. The funding curve is formed from the deposit and the market financing curve and determined by the ratio between the two. The same funding curve is used for all products. The cost of liquidity is included in the internal pricing model as a premium related to the actual cost of holding the liquidity reserve determined by the LCR framework. The cost of the LCR reserve is allocated equally for all types of products. The liquidity cost included in the internal interest rate is not dependent on product duration or maturity. However, there is another component to the internal price which takes duration of regulatory capital into account.

The bank measures results per office and the office’s result is determined by the profit and loss statement. Each office pays for their liquidity need and gets paid for the liquidity they are creating through deposits based on the internal interest rate. When it comes to liquidity driving products such as deposits and loans, the bank does not evaluate the profitability of individual products. The treasury function of the bank does not have its own result of profit-loss statement. If there is a positive return from the management of the liquidity reserve, its allocated back to the local offices according to a predetermined key.

The bank started working with LCR in 2013 and NSFR in 2014 and the CFO had the main responsibility for adjusting the internal pricing methodology to fit these new measures. Before LCR was introduced, the liquidity risk assessment was based on an internal measurement which said how many days cash-flow was available based on the banks liquid assets. However, after using both this internal measure and LCR the bank discarded the previous internal measure and is now focused on the LCR. The introduction of the LCR has not had an impact on the methodology behind the allocation of the liquidity cost and has only had a marginal impact on the internal interest rate since the liquidity reserve according to the LCR framework is slightly lower than the previous reserve which was based on an internal limit of 10% of all deposits. The NSFR has had little to no impact on the bank according to the interviewee since a large part of the bank’s balance sheet consists of deposits, which is classified as stable type of funding and the NSFR moves rarely.

The method for allocating liquidity cost is reviewed annually and is communicated to the management and the local office heads. LCR and NSFR regulations have not had any impact on this. According to the CFO, the introduction of the LCR and NSFR also has not had any impact on the connection between internal pricing and the bank’s
risk management or impacted decision making on the generation of new assets and liabilities.

5.2.2 Niche banks

N1

The interview was held with the head of Treasury and Risk Management who is responsible for the management and reviewing of market, liquidity and credit risk. This role also includes capital management and asset and liability management.

Liquidity and financing risks are reviewed daily based on regulatory as well as internal measures. The internal measures for liquidity risk have a structure similar to the LCR but with tighter limits. In connection to quarterly reports, a more detailed review of the risk measures and the structure of the balance sheet is done.

N1 has a simple approach towards internal pricing. Their balance sheet consists almost solely of private and corporate deposits which means that the banks funding cost moves very seldom. Therefore, the bank has decided not to use an internal price based on market rates but is rather based on the banks actual funding curve. Due to this, the price is not updated with any particular frequency as the deposit rate moves very seldom.

The cost of liquidity which is added to the internal price is not related to the duration of the contract but is based on the size of the required liquidity reserve. As previously mentioned, the size of the liquidity buffer is determined by the LCR and similar internal measures. The cost of the entire liquidity reserve is determined as the negative carry of the deposits used for the liquidity reserve, i.e. the difference between the return from the liquidity reserve and the cost of deposits. The return from the liquidity reserve is assumed to be equal to the 3M STIBOR. For example, for private products it is assumed that 10% of the funding must be placed in the liquidity reserve which then determines the size of the liquidity premium added to the internal price. However, it is worth to note that only the cost of the required liquidity reserve as determined by LCR and internal limits is allocated through the internal pricing. Any additional holdings are allocated to a specific business line where the funds are managed and evaluated as a separate portfolio. When it comes to the pricing, the allocation of the liquidity cost does not have a large impact as the allocation is standardized with a portfolio approach, so that it is actually not dependent on for example duration. The credit risk of the clients tend
to have a larger effect on the profitability and the price charged for contracts. One reason for this according to the interviewee might be that the lack of market funding does not make the maturity matching as prominent and important in the pricing compared to banks with a different financing structure.

N1 measure results internally per business area and the results are calculated as the difference between interest paid or received to clients and internal prices paid or received. In some cases, the bank also evaluates the performance per credit rating bucket. The internal pricing methods are communicated to the business areas, the internal control functions and the top management. The method of and the assumptions used in the internal pricing is reviewed when deemed necessary but at least annually.

The bank started to use LCR in 2013 and NSFR in 2015. The LCR has not significantly changed the bank’s view on liquidity risk as the previous internal limit for usage of deposits, which is the majority of the financing, is higher than the one stipulated in the LCR and therefore the size of the liquidity reserve has not changed substantially after the regulation was introduced. However, the LCR regulation has affected how the bank manages its liquidity reserve. For example, the bank now invests more in government and municipal bonds compared previously. Due to the nature of the bank’s method for allocating liquidity cost the LCR and NSFR have not had any impact on neither the calibration nor the allocation between products which is why they have not had any effect on the product pricing or profitability.

The interviewee does not perceive that the introduction of LCR and NSFR have had any effect on how the method for internal pricing is communicated or how often the internal pricing practices are reviewed.

N2

The interview was held with the CRO. The CRO is part of the bank’s independent risk function and is strategically and operationally responsible for the bank’s risk control. The purpose of the risk control function of the bank is to make sure that all major risks which the bank is or can be exposed to are identified and managed.

The measuring and management of N2’s liquidity risk on a daily basis is done by the treasury division. The liquidity risk is measured using both external and internal measures. Examples of internal measures are the ratio between the liquidity reserve and deposit volumes as well as monitoring certificates and bonds expiring within the next 30 days. The forecasting of future cash flow is a central part of the liquidity risk manage-
ment and conducting stress tests is a method used to evaluate the banks sensitivity in different scenarios.

N2 uses a method for internal pricing method which is based on the banks funding cost. However, the methodology differs between corporate and private products. When it comes to corporate loans, the loans tend to be large corporate loans or real estate credits where one transaction may amount up to several hundred millions. In order to be able to evaluate the profitability of these transactions, an internal interest rate is used. This internal interest rate is based on the bank’s market funding cost and the cost of foreign exchange swaps or forwards depending on the issue currency. In addition to this, there are also premiums added to account for liquidity requirements and quality of the loan book. For the private products, the bank utilizes a portfolio based approach where the funding cost and the negative carry from the liquidity reserve is allocated between products based on loan volumes. The internal prices are updated on a monthly basis.

The bank measures profitability on a product level. The internal prices are communicated to the risk, accounting, and credit divisions as well as to the heads of the business areas. When prices are communicated, the underlying computations are also included so that the calculations for each component can be reviewed. The methodology behind the internal prices and the internal interest rate are reviewed when necessary but at least annually.

The bank started to work with LCR and NSFR during 2014. The interviewee perceives that the LCR and NSFR has had a significant influence on the liquidity and financing risk management process. However, since the bank has been undergoing significant change during the last few years it is hard to isolate what the drivers for changes in the risk management and internal pricing were. For example, the bank applied for a banking licence in 2014 and has developed from a factoring firm with a total balance sheet of approximately SEK 2 billion to a bank with approximately SEK 20 billion in total balance sheet. The interviewee notes that since the bank to a large extent is financed by deposits they have not had any trouble complying with the NSFR. However, the interviewee highlights that the LCR has significant impact on the composition and management of the liquidity reserve. The interviewee notes that adjustments have been made to make the internal pricing model take LCR and NSFR into account and one example is using slightly longer duration on the debt side. However, the interviewee means that the levels stipulated in the LCR and NSFR does not always seem well
suited to the bank’s business model, why they have developed internal versions of these measurements which they feel better reflect the true liquidity risk.

The interviewee does not perceive that the introduction of LCR and NSFR has had an impact on to who the methodology behind the internal practices are communicated to but believes that the introduction of these measures has put more focus on the management of liquidity and financing risk. The introduction of LCR and NSFR has not increased the frequency with which the internal pricing practices are reviewed.

**N3**

The interview was held with the bank’s CFO who is responsible for financing and reporting in the bank. In addition to these responsibilities, the interviewee is also in charge of the business area of private loans.

N3’s process for risk measuring and managing can be divided into several parts. On one hand the bank works with risk from a regulatory perspective where measures such as LCR and NSFR are central. In addition to this, and as a part of the internal liquidity adequacy assessment process they are also working actively with stress testing through combining different assumptions thus constructing scenarios. These regulatory approaches are central when it comes to the liquidity risk management. The bank also uses a number of internal key figures which are used as a complement to the regulatory measures. One example of an internal key figure is the survival horizon, which is a measure of how many days the bank would survive without additional funding.

The bank has a complete treasury division and is using a simplified approach to internal pricing. The internal pricing is based on the bank’s funding curve which today is more or less equal to the deposit curve since the bank has an excess of private deposits. Since the bank has virtually no funding other than deposits and equity, the internal price for loans with longer duration are calculated using both the funding curve and then the swap curve to adjust for the maturity mismatch. Then premiums to account for interest rate reset and duration among other things are added to the funding curve to construct to the internal price. The liquidity cost is calculated by using the products average duration which mean that there is no differentiation within a product type. The premium is then calculated using the swap curve. The internal prices are updated monthly.

The interviewee highlights that while the internal pricing can be used for steering to some extent he also notes that the steering is not necessarily done through that channel. As an example, the interviewee means if there would arise a situation where the bank
requires more funding through deposits this would be communicated directly to the responsible division rather and a discussion held regarding what rates to pay to increase volumes rather than shifting the internal price through the funding curve to create more incitements or possibility for the division to increase the interest rate paid for deposits.

The bank does forecasts of the financial results per business area which also includes the treasury management. However, the result generated from the treasury management is defined as the excess return from the management of funds excluding the liquidity reserve. This means that changes affect product profitability and financial results but has no impact on the treasury divisions financial performance. The method used for determining internal prices is communicated to all business areas which require or generate liquidity and the funds transfer pricing method is reviewed when needed but at least annually in connection to the business planning process and the internal liquidity adequacy assessment process reporting.

The interviewee is not completely sure about when the bank started to work with LCR and NSFR but is certain that it was before it was required from Finansinspektionen and for the last year, the bank has worked with NSFR both as a risk limit and as an early warning signal for the structure of the financing. A direct consequence of the introduction of LCR and NSFR at the bank is that the measures have been integrated into the business planning process which means that they are taken into account for all strategic decisions and the effect of strategic decisions on these measurements are discussed throughout the planning process. However, the introduction of LCR and NSFR has not had any impact on the allocation method or the calibration of liquidity costs through the internal pricing. This means that the measures have an impact on the steering of the bank although not through the internal pricing mechanism.

The interviewee perceives that the introduction of LCR and NSFR has made the topic of liquidity risk a more integrated part of the communications to the top management and that it has made the communication more transparent. The interviewee also perceives that it has become easier to steer the business plans in a way that takes liquidity and funding risk into account since regulatory measurements are harder to ignore compared to internal measures, which has led to this perspective becoming more integrated in the planning of the different business areas. The introduction of the LCR and NSFR at the bank has not had an impact on how often the internal pricing methodology is reviewed and updated.
5.2.3 Universal banks

U1

The interview at bank U1 was held with the Group Controller who is responsible for the internal management and steering of the bank through internal pricing, internal allocation of capital, internal interest rates and similar. The Group Controller reports directly to the CFO and works closely together with the Treasury division.

Although bank U1 has a very decentralized structure and has a significant presence on its six different home markets as well as a number of branches, the bank’s Treasury function is completely centralized. This means that the Treasury function is responsible for handling all the financing of all of the banks activities across countries, and all of the banks liquidity risk exposure lies centrally. The interviewee means that cash flow forecasting is a central part of the liquidity management.

Since bank U1 has a decentralized organizational structure, the local offices have full responsibility for business decisions towards clients. Therefore, there are no formal budgets and the internal steering is done through internal pricing which is determined centrally in the bank. The internal price is based on a transfer pricing method and is meant to reflect all costs related to a specific business decision, such as financing cost, the cost of capital requirements and other type of central costs. The bank has a transfer pricing method so that each loan that may be used in the bank has an internal price which can be found on the bank’s intranet. When an office decides on the final price to offer to a client, they have to include their local administrative costs in the margin. The bank’s main principle is that the internal price should reflect the true cost of the transaction as well as the bank’s true funding cost. In order to do this, they look at the cost of financing centrally and this is the basis for the internal price. The financing cost is determined by the most liquid financing market, which in bank U1’s case is the euro market for senior funding, as this is the market in which they have most bonds, and in addition to this they also take into account the cost of swapping from Euro to the needed currency. When it comes to deposits, the bank views this as a separate product so that the local offices can profit from both loans and deposits. Therefore, the treasury pays an internal rate for the deposits which means that the office receives the difference in the internal rate and the deposit rate for customers as the profit on deposits. This is an important part of the centralized treasury function, as otherwise the offices would also manage liquidity locally through deposits. The bank also uses a large amount of covered
bonds which tend to have a lower cost compared to senior funding. This lower funding cost is applied to real estate loans and mortgages although always in combination with other types of funding as covered bonds typically can’t be used as 100% funding for these products. The secured bonds are more closely linked to a specific currency.

The internal interest rate is reviewed at monthly meetings between Treasury and internal control. In addition to the monthly review, adjustments can also be done if there are significant market movements which are deemed to affect the funding market significantly for a longer period of time.

The allocation of liquidity costs in the internal pricing methodology is linked to the risk management as the duration is adjusted according to the NSFR and the different maturity buckets. By doing this adjustment, the liquidity cost is adjusted so that the financing is compliant to the NSFR which then can be seen as a form of risk management. While the NSFR is not a binding requirement yet, bank U1 sees this ratio as a significant constraint since they previously had no such restrictions of the duration of the balance sheet. On the liabilities side of the balance sheet, the LCR has a large impact and the pricing of deposits are for example largely dependent on how the deposit is assessed and valued according to the LCR regulations.

The offices are evaluated on the ratio between costs and revenues, where the costs are largely based on the internal price they pay to the Treasury.

The LCR and NSFR was introduced at the bank in late 2010 after the first Basel III paper was published and were measured from 2011 and onward, i.e. both measures were introduced shortly after the bank adapted its funds transfer pricing system which was introduced in early 2010. The interviewee perceives LCR and NSFR to have had a significant impact on the banks processes for measuring and managing liquidity and funding risk as it put more focus on not only charging based on funding cost or on the interest rate reset period but that duration, even when it came to loans with variable interest rate, has a risk and therefore also a cost. The bank did make adjustments for duration in their funds transfer pricing prior to these measurements were used, but after the calibration was done differently to adjust duration according to the duration-buckets as applicable when viewed through the NSFR framework. So one significant effect of introducing LCR and NSFR is how the behavioural duration of contracts are viewed. However, even though the calibration of liquidity cost has changed in the funds transfer pricing the effect on the internal price has been marginal.
Both LCR and NSFR are regarded as the most important measures for liquidity and funding risk. The interviewee does not perceive that introducing the LCR and NSFR as changed to whom the internal prices and the methodology behind the funds transfer pricing are communicated to or that the methodology is being reviewed more often than previously.

U2

The interview was held with the Head of Funds Transfer Pricing and Capital Frameworks who is responsible for the internal pricing of financing, liquidity and capital.

The bank’s liquidity and funding pricing model is based on three pillars; internal models and stress tests, requirements from rating agencies and lastly the regulatory measures.

The bank has an internal pricing method where the price is based on the market cost of funding and updated on a daily basis. The measured performance is risk adjusted which means that the bank strives for the internal price to also price in all risks related to a transaction. The liquidity cost is based on a weight-of-evidence view of the risk for different transaction based on how it is treated in the three different pillars of the risk measurement. The bank measures performance internally on a number of different levels but most common is to view it from a business area or portfolio perspective. However, large clients and transactions tend to be evaluated individually.

The interviewee believes that the bank introduced LCR around 2011 and NSFR around 2015. The interviewee perceives the introduction of LCR and NSFR to have had a significant impact on the banks risk management since the view on the risk exposures as seen through these regulations differ from the banks internal measures and from the rating agencies models. Thereby, they provided a new perspective to the liquidity and funding risk management. This is also reflected in the internal pricing as it affects the view on liquidity risk which is what the bank strives to price. The interviewee perceives that the liquidity cost has become a larger component of the internal price after the LCR and NSFR was introduced.

The interviewee perceives that working with LCR and NSFR have increased transparency regarding which products and transactions drive liquidity needs. In turn, this has made it easier to communicate around liquidity risks. The periodicity with which the internal pricing methodology is reviewed has not been impacted by the introduction of LCR and NSFR and the bank strives to review it annually.
The interviewee at this bank has the title Head of Liquidity Management and Steering. This function is global and is part of the Treasury function of the bank. The function focuses on asset and liability management and steering and is responsible for principles and guidelines related to the bank’s internal funds transfer pricing system. This function is also responsible for suggesting limits related to for example liquidity risk related measures based on their balance sheet analyses.

Bank U3 has one system which is used for both measuring risk, controlling risk and steering the business. The system has a bottom up approach where it is possible to review each branch, office or legal entity for example down to a product and client basis. By using this approach, it is possible for the bank to adjust assumptions to specific markets and products.

Liquidity and financing risk is measured using a number of internal and external measures. They review the measures through a snap-shot of the balance sheet at a given point in time. In addition to this, they also have a practice for analyzing the balance sheet based on contractual and behavioural maturities. By reviewing the different measurements and ratios from these different perspectives, the bank is able to conduct stress tests and review outcomes in different scenarios. Analyzing the balance sheet in this manner is also done to determine suitable limits for different measurements. One central internal measure is the survival horizon, which is a measure of how many days the bank would survive in the worst case scenario without additional liquidity. Limits are set individually for example for different currencies and subsidiaries. Measures and limits are reviewed daily. One thing that is highlighted by the interviewee is the number of important stakeholders when it comes to measuring for example liquidity. For example, the liquidity risk measures used by important rating agencies such as Moody’s and S&P differ significantly from the LCR and NSFR for example.

U3 uses an internal pricing approach which they call internal funds transfer pricing (IFTP) which has been used since before Basel III was introduced and which is an important tool for steering the bank. The IFTP is based on a number of principles and guidelines which determine how the price is structured and how different products should be treated by the system. For example the duration of deposits according to the IFTP guidelines is not equal to the contractual duration but to an adjusted duration which is based on both the behavioural duration and the duration as suggested in regulatory framework. The IFTP is based on a maturity funding principle, which mean that it is
assumed that the duration of the funding should match the duration of the loan. The
IFTP is a way to make sure that all liquidity risk and interest rate risk is transferred
centrally to the Treasury division which then is responsible for the management of those
exposures. Since the business lines should not be exposed to any risk, the risk of each
transaction should be reflected in the internal price. Due to this, the duration of the
liquidity component is determined not only based on the constraints that the LCR and
NSFR pose but is determined based on a cumulative assessment based on both regulatory
restrictions and risk based on empirical data.

The curves used as input for the IFTP models are the banks funding curves based on
different types of financing and currencies. However, internal prices are always the same
regardless of which branch or division of the bank is looking to execute the transac-
tion. The funding curves are determined daily, however, unless there are large market
movements the internal prices from the IFTP are changed bi-weekly and changes are
announced by email. The principles and guidelines for the IFTP as well as the updated
prices are always available to all bank employees through the internal website. The prin-
ciples and guidelines are reviewed annually but can be updated at any time if deemed
necessary. However, the bank strives not to make changes in the IFTP too often as this
makes the evaluation of performance very hard as previous results might not be at all
comparable after changes in the IFTP has been made.

The bank has a client focus when assessing profitability although it can also be done
at a profit center level. When it comes to mass-market products which are priced
equally, they tend to evaluate it as a portfolio. The profitability calculations vary in
sophistication and granularity. For example a more tailored assessment may be done for
large corporates while mass-market or common retail products tend to be assessed on a
more aggregated level. The Treasury is viewed as a profit center and the result comes
from the divisions mandate to manage and take some interest rate and liquidity risk.
When the banks monthly or quarterly results are reviewed, all internal transactions are
netted so that the result shows the difference between the realized funding cost and the
interest income, or then the realized margin.

The bank started to work with both LCR and NSFR right after the first Basel III
papers were published in December 2010. Before the bank started to work with the LCR
and NSFR there was a joint project for developing the previously mentioned risk and
profitability system. However, the introduction of the LCR and NSFR further pushed the
development of the system and related databases as well as the development of further
internal methods for assessing liquidity and funding risk forward. According to the interviewee, since the LCR and NSFR was by some banks seen as not always well adapted for their business model and the Swedish market it also became important to develop internal measures which in the banks opinion better reflected their true liquidity and financing risk. Although the introduction of these ratios might have sped up the process, the bank had internal measures similar to the LCR already before the introduction of Basel III. The bank was already using their IFTP model before the introduction of the LCR and NSFR which meant that the principles and guidelines had to be adapted to take the new regulations into account so that the assessment of the liquidity cost is based on both external and internal measures. The fact that the Swedish implementation of LCR was done per currency also had an effect on the IFTP policies. However, the interviewee also highlights that the bank is reluctant to make too significant changes to adapt to the NSFR since the final definition of the ratio is still not completely established.

The interviewees perception is that the introduction of the LCR and NSFR has not necessarily had an impact on the connection between the allocation method and the risk management although is in some ways changed or influenced the way that the bank chooses to view liquidity and financing risks. The interviewee also perceives that the introduction of the LCR and NSFR has to some extent increased the communications related to the IFTP and allocation of liquidity costs. However, the principles and guidelines are still reviewed with the same periodicity as earlier although the interviewee notes that the interest regarding the IFTP has increased slightly.

One example highlighted by the bank is the risk assessment of corporate deposits. Regulations classify corporate deposits as significantly less stable compared to private deposits. However, the bank can see no such indications when analyzing empirical data. Therefore, they do not deem it reasonable to add a liquidity premium as according only to the regulations but also adjust it according to their perceived liquidity risk for the product. The assessment of corporate deposit also differs between the regulatory frameworks and liquidity risk assessments from rating agencies. According to the new regulations corporate deposits are considered to be significantly less stable compared to private deposits while the rating agencies model’s tends to favour all types of deposit over any market funding.

One issue that the interviewee highlights is the lack of an empirical base for the decisions of key levels in the LCR and NSFR frameworks. Sweden has a very large and well functioning market for covered bonds which are often used to finance mortgage lending...
and tend to be AAA rated. According to the suggested NSFR it would be "preferred" to issue a 2 year senior unsecured bond rather than a 5-7 year covered bond. However, the interviewee means that a shorter uncovered bond would be unsuitable to the banks financial stability and this is an example of how this regulation is not necessarily well adapted to the structure of the Swedish market and the business model of some of the Swedish banks.

5.3 Summary of empirical data

In summary, this section presents the reader with a description of the sample and the empirical data collected from the interviews related to the banks internal mechanisms for pricing and allocation liquidity cost. All nine interview subject uses funds transfer pricing although there is a wide range of methodologies of how the funds transfer pricing is structured and what it prices. All banks are incorporating liquidity costs in some way although most banks focus on the regulatory costs rather than pricing the risk. All banks have answered that the introduction of LCR and NSFR has had a large impact, although the perceived effects differ significantly between the banks.
6 Results and analysis

In this chapter, the empirical results are presented and analyzed. The analysis is structured according to the three main themes as presented through the research questions to create clarity for the reader throughout the chapter.

6.1 Approaches to internal pricing

All interview subjects said that internal prices are used to determine results internally as it enables the banks to view results on a more granular level such as office or products. The savings banks and U1 especially highlighted the close connection between the internal prices and the prices they are able to offer to clients. These banks all have a decentralized approach to pricing which means that the final prices are determined by the seller for each transaction. In these cases, but also in some of the other banks, this makes the internal funds transfer pricing a key tool for steering business decisions. In contrast to this, N3 mentioned that while they are using funds transfer pricing to determine prices the internal pricing is not necessary for the steering of the business. The interviewee noted that it is more convenient to simply discuss with the division or team where changes needs to be made rather than adjusting the internal rates and wait for the business to adjust. Two of the banks, U2 and U3, specifically mentioned that the aim is that the internal price should reflect all risk related to a specific transaction so that the risk-adjusted profitability of products or business areas can be evaluated. However, no other bank highlighted that there was a close connection between the internal pricing and the risk management. According to Mikes(2009), using a a risk based capital-allocation and measuring risk based returns adds a dimension of responsibility to the financial management control system.

In the interviews conducted for this thesis, all banks stated that the base rate used is the bank’s funding curve and in two cases the curve was based on solely the banks’ deposit curves as this was the main source of funding. However, by mainly using the deposit curve the bank’s internal price will not be connected to changes in the market as deposit pricing is rather sticky. As Grant noted in his review from 2011, not incorporating changes in the market funding cost is one of the poor practices for transfer pricing which in turn may lead to distorted profit and performance assessments. For example, if we assume that the deposit curve is used for internal pricing and the cost of market financing increases the deposit curve may not move due to its stickiness. If the internal
price would be based on market financing, all other prices equal, the margin on loans would decline and the profits from deposits would increase. However, if the price remains the same loans continue to look equally profitable despite the changes in the funding market.

The complexity of the funds transfer pricing approaches used by the banks in the study varies greatly. Three banks use a single pool approach where the base curve remains the same for all products and one bank uses this approach for products aimed at private clients. All three universal banks use a matched maturity approach where the curves are based on the bank funding cost for that specific type of product, i.e. it is for example adjusted for the amount of funding from covered bonds for mortgages. The drawback with using a less granular or sophisticated funds transfer pricing model is that the some products may not be fairly compensated while others become discounted. One example is the difference between mortgages and unsecured private loans. Mortgages are in many cases financed through covered bonds which tend to be cheaper compared to many other types of market financing. However, if the covered bond financing is used solely for mortgages but there is one funding curve for all products, the mortgages will only partly be compensated for their cheap funding while private unsecured loans become subsidized. This distortion of profitability can in turn lead to misguided strategic decisions.

One bank, S2, uses IT services delivered by Swedbank and is not sure exactly how the funds transfer pricing is structured. Firstly, this highlights the conclusion of Grant (2011) that more work is needed by banks and managers in order for the funds transfer pricing to become a useful tool for strategic management. Secondly, if this approach would mean that the funds transfer pricing in the savings bank is based on Swedbank’s funding cost a number of concerns arises. For example, the funding structure for Swedbank and savings banks differs as savings banks tend to be funded through deposits to a larger extent. This would mean that if a savings bank uses Swedbank’s funding curve for internal pricing, the profitability on loans may decrease while the profitability of deposits may increase thus causing a distortion in the profitability allocation. Also, if the funds transfer pricing is meant to mirror the risk of a transaction using another banks curves is problematic, given that the risk profiles of Swedbank and a savings bank most likely differ significantly.

A visual representation of the approach and purpose of the internal pricing can be seen in figure 7. Note that bank S2 is not included in the figure. This is since they were not able to describe their internal pricing approach as they are using the Swedbank system. This
visualization makes it very clear that the universal banks are using the most sophisticated approaches for determining internal prices of the reviewed banks. Also, this again shows that at least many banks in the review state that the main purpose and role of the internal pricing is to allocate cost, only two banks specifically said that they aim for the internal price to reflect all risks related to the transaction.

6.2 Liquidity cost allocation

Similar to the findings by Grant (2011), the empirical data shows that the reviewed banks have different methods for calculating and allocating liquidity cost. However, all banks have some sort of method for allocating liquidity cost either to business areas, products or transactions which was mentioned by Basel Committee on Banking Supervision (2008) as a central part of having a prudent liquidity risk management.

In line with Grant (2011), the findings indicate that the bank managers has a lack of understanding and knowledge regarding the liquidity transfer process. For example, S1 and S2 were unsure of how the size of the premium is determined although S1 highlighted that the purpose of the liquidity cost added to the internal price is to reflect the risk appetite as stipulated by the bank’s risk policy. S1 also mentioned that the liquidity cost is allocated based on duration and is mainly related to NSFR.
S3, N1 and N2 are using similar methods where the risk premium is based on the negative carry from the required liquidity reserve. In two cases the reserve is determined by LCR requirements and in the other case based on a combination of LCR and internal liquidity risk limits. These three banks lack a method which differentiates the liquidity premium on a granular level. S3 distributes the cost of the liquidity reserve equally between all products while N1 uses an allocation key such that it is assumed that 10% of the volume must be allocated to the reserve. N2 allocates the negative carry induced by the liquidity reserve based on product volume. Both of these banks have methods for allocating liquidity costs which are very clearly driven by the regulatory costs related to this aspect. The third niche bank, N3, uses the swap curve to determine the liquidity premium. However, liquidity premiums are determined per product by using the average portfolio duration. While this approach takes into account the liquidity risk on a portfolio level as priced by the market, it does not respond to the risk on a transaction level. Contrary to the two other niche banks, N3 has an allocation method which is risk driven rather than driven by the regulatory costs. Something that all three reviewed niche banks have in common is the fact that the calibrated liquidity cost has no direct relation to the transactions duration. Having no differentiation based on duration is one of the issues identified by Grant (2011). Having no differentiation based on duration benefits transactions with long duration while transactions with short duration are penalized. In extension, this may encourage unwanted maturity transformations and an increased duration of the liabilities.

All the universal banks determine liquidity costs on a transaction level and the premiums are calculated based on a number of different measures. All three universal banks highlights that their liquidity risk assessment is based on three perspectives: regulatory measures, rating agency measures and internal risk measures. U1 and U3 especially highlight that the risk assessments can have fundamentally different views on some types of products or funding which is why the banks’ approach to internal limits is a combination of all three, and this is also reflected in the liquidity costs allocated. Thus the universal banks’ allocation methods are driven by both risk and regulatory costs, in contrast to some of the niche banks where it is driven purely by the regulatory cost. Using this combined approach, where both risks and regulatory costs are taken into account, is in line with Grant (2011). Grant highlights the importance of basing the liquidity cost on risk but also mentions that the cost of carrying the liquidity buffer should be allocated to the business units and not be attributed to the treasury divisions performance.

Figure 8 shows a visual positioning of the reviewed banks based on their calibration and
6. Results and analysis

allocation methods regarding liquidity costs. Note that S1 and S2 are not included in this matrix since they were not able to give a more detailed account of the calibration and allocation of liquidity costs in their internal pricing. Although two savings banks are not included, a clear difference between the approaches can be seen between the niche banks and the universal banks. This further highlights the difference in sophistication between the methods used by the different types of banks. This also highlights that the niche banks to a larger extent seem to aim to include the regulatory costs rather than to price the assessed risk when it comes to the liquidity cost component.

Figure 8: Positioning based on liquidity cost allocation method

6.3 Impact of LCR and NSFR

Five banks stated that the introduction of LCR and NSFR has had a significant impact on their liquidity risk management. Out of the seven banks which mentioned some of their measures used to assess liquidity risk, all but one highlighted that LCR is one of the most central measures of liquidity risk. One bank, S3, mentioned that they before the introduction of LCR were using an internal measure of liquidity risk. However, after LCR became a requirement they chose to only continue with the LCR as a measure of liquidity risk.

Three banks stated that one of the effects of the requirements is that the liquidity
reserve is managed differently. They highlight that they have been forced to invest in more secure bonds and especially highlight municipal bonds which is an instrument that they previously had very little interest in. This is in line with the view of Al-Darwish et al. (2014) who argued that the preference for sovereign bonds would become stronger. However, Al-Darwish et al. also argued that covered bonds will be favoured which is not supported by the empirical findings from this study. Especially U1 and U3 highlighted the issue of how covered bonds are assessed by the new regulation. They perceived that the haircuts for covered bonds were unreasonably high considering the stable market for covered bonds in Sweden which is a very common way to fund mortgage loans and which tend to be AAA rated. This finding is in line with King’s (2013) conclusion when assessing the potential effect of NSFR on banks that the regulations would affect banks’ preferences. Another finding from the empirical data which also confirms this is the banks’ reaction to how corporate deposits are categorized by the regulations. In the NSFR corporate deposits are viewed as significantly less stable compared to private deposits although the banks themselves see no such indications in their empirical data. While the view on the liquidity risk for this type of funding varies between the regulatory perspective and the banks’ internal approaches, the banks which used this as an example of how new regulation affects their internal pricing of this type of deposits, U1 and U3, have adjusted their internal allocation of liquidity costs to partly take into account how these deposits are valued in the NSFR.

One bank, S1, says that the introduction of LCR and NSFR drove a change in the funds transfer pricing methodology as the bank saw the need for allocation liquidity cost as a component which should be unrelated to the interest rate reset period. Six of the banks perceives that the introduction of LCR and NSFR has either increased the awareness of liquidity risk and funds transfer pricing or made communications on the topic more transparent. In general, the banks do not perceive that the introduction of LCR and NSFR has led to significant changes in internal prices or prices towards clients as the effect on the internal price, even when the method for allocating liquidity cost has changed, has been marginal.
7 Discussion

The purpose of this chapter is to discuss the findings from chapter 6 and to position them in relation to existing research. Implications of the findings and the contribution to existing research will also be discussed.

7.1 Approaches to internal pricing

As mentioned previously some reviews of internal pricing have been done, although in other settings. These have shown that the fundamentals of the internal funds transfer pricing used in banks tend to be very similar although some components such as a liquidity premium can vary significantly. One of the findings of this review is that the role and the purpose of the funds transfer pricing vary significantly across the sample. In short, it was said to be very important as a tool for steering in the savings banks and the universal banks while the niche banks saw it mainly as a method of internal accounting but did not necessarily use it for the purpose of steering the business. One of the gaps in previous literature as highlighted by Chenhall(2003) was the lack of contingency based research on the role of management control systems in small and medium-sized entities and this finding may shed some light on this question in the setting of a bank. These findings may indicate that the role of the management control systems, in this case the internal pricing, depends more on the business model and the organizational structure rather than the size of the company. While the organizational structure has not been one of the central perspectives of the research questions or in the design of this review, some related patterns are emerging. Most of the banks which especially highlighted the importance of the internal pricing for steering purposes, have a decentralized organizational structure. The results from the interviews indicate that the internal price is necessary for the decentralized structure to function and to remain profitable, both in the business units and in the organization as a whole. This can be seen as an indication that the organizational structure is a dimension which should be included in future studies regarding management control systems and internal pricing in banks. Also, in the setting of this study, the organization structure appears to have more significance for the role of the internal pricing rather than the size of the organization.

Regarding the purpose of the internal pricing, the majority of the banks used it to distribute costs internally. This would implicate that the link between the risk management and the key management control systems in the reviewed banks is rather weak and that
using risk-adjusted returns is not a commonly used practice in the reviewed banks or at least it is not an activity which is related to the internal pricing. This may indicate that several of the reviewed organizations have the possibility of adding additional dimensions of accountability to the business units and to the strategic decisions which are made based on the insights given by the management control systems. Making employees and divisions accountable on all levels may lead to a deeper understanding of the risks related to a transaction as well as to promoting sustainable business decisions from a risk perspective. The interaction between risk management and management control systems was highlighted by Gooneratne and Hoque(2013) as a topic where little available research exists. The findings from this study may indicate that if the purpose of the management control system is not specifically to measure risk, the interaction between risk management and management control systems becomes rather weak. Even in the banks where the internal price is designed to account for all risks, the cooperation with the risk division was not central to the methods used for internal pricing.

The difference in approaches and the method used for internal funds transfer pricing in the reviewed banks is well highlighted in figure 7. The findings clearly indicate that the universal banks, which are significantly larger entities compared to the other banks included in the review, use more sophisticated models. This finding is in line with existing research on management control systems. For example Chenhall(2003) finds that large entities tends to be associated to sophisticated control systems. As Grant(2011) mentioned, failing to differentiate the internal funds transfer price based on products or duration may lead to a distorted assessment of performance and profits which encourages maturity transformation. The long term effect of this may be that banks using less sophisticated internal pricing models makes erroneous strategic decisions due to the distorted assessment.

7.2 Liquidity cost allocation

One of the key findings from the review is that a majority of the banks included in the sample are determining the liquidity cost based on the cost of holding the liquidity reserve, which is in line with the finding that the main purpose of the internal prices is to account for related costs, rather than related to the actual liquidity cost or to the duration. This finding contributes to previous knowledge of how liquidity costs are integrated in internal funds transfer pricing, for example reviews made by CEBS(2010) and Lindblom and Elliot(2017), as this review includes small and medium-sized banks while
previous reviews focused on larger institutions. In extension however, this means that the liquidity risk is not actually priced and duration tends to not be taken into account when allocating liquidity costs. One effect from this may be that the overall duration on the bank’s assets increase, as short duration is over-priced while long duration is under-priced. While this may not have a significant effect in toady’s economic environment where financing is easily and cheaply available, the effect may become more significant in a different economic environment. For example, in times of low liquidity and dry markets the increased maturity mismatch may become very costly for the banks. As previously mentioned, not accounting for costs or risks correctly may lead to an internal system which encourages unwanted maturity transformation and which leads to distorted performance assessment. Therefore, decisions may be based on erroneously determined performance assessment if the liquidity risk is not priced in the internal pricing model but only the regulatory costs. In a more long term perspective, this may promote a less sustainable business strategy as risks are not correctly accounted for.

One thing that especially the universal banks highlight is the complexity which follows the large number of stakeholders in the liquidity risk management, as different stakeholders have very different perspectives and approaches to assessing the liquidity risk. Also, if one wants to account for both risk and regulatory costs the solution becomes more advanced. Implementing these advanced solutions require sophisticated systems, specialist divisions and resources. At the present, it is only the large institutions, the universal banks, which have the resources to do so. The smaller organizations, both savings banks and niche banks, do not have as sophisticated systems for internal pricing which is a limitation when components are becoming increasingly complex as we have seen with the liquidity cost. One example from the review, although they did not explicitly say that the complexity was the issue, was the one bank where they choose to exchange their internal measure of liquidity risk for the LCR. One interpretation of this can be that the bank simply was not equipped systematically to handle a more complex approach where risk and the related cost were based on several different measures and approaches. And since the regulations are binding requirements it appears natural that the regulatory measures takes priority. This may indicate that smaller banks only include regulatory costs in their internal pricing since this is a more straightforward approach and since regulatory requirements are binding.
7.3 Impact of LCR and NSFR

According to Innes and Mitchell’s (1990) framework for analyzing changes of accounting processes, the change process can be described in terms of:

- Facilitators, which are necessary but not sufficient
- Motivators, which are general factors of change
- Catalysts, which are factors directly related to the change and the timing of the change

Based on the findings from the review of the nine banks, the regulations can be characterized as both motivators and catalysts for different aspects of change of the internal pricing or other related practices in the banks. The findings from this review indicate that the regulations have acted as a catalyst regarding the changes in the managing and measuring of liquidity risk given that a majority of the banks described that these specific regulations have led to changes. For example, LCR is now regarded to be one of the most relevant methods for measuring of liquidity risk. However, the findings regarding internal pricing and liquidity cost allocation actually indicate that the regulations have not had a significant impact on the methods used for these practices. The implication from this may be that if regulators are keen to see changes in banks’ internal pricing methods and liquidity cost allocated, it may require a regulation which specifically targets these processes as LCR and NSFR seems to have had a very limited impact. Also, this finding makes a contribution to the knowledge on the interaction between risk management and the banks’ management control systems since this indicate that a change in risk management does not necessarily affect the management control systems.

However, even if the effect on methodology appears to be rather limited, based on Cobb et al.’s (1995) description of the roles of management change, the role of the changes driven by LCR and NSFR can be characterized as creating a domain of economic action, for example by creating visibility and by concretize the concept of liquidity cost which previously has been a relatively abstract component. In extension, this may in time lead to increased awareness of liquidity risk related to products or duration and how these affects the profitability of products and clients. Since the regulations appear to have helped to concretize and visualize liquidity costs in a manner which is easily attributed to products and business areas, it opens up for the possibility of a more sophisticated assessment of the business impact.
7.4 Concerns regarding the regulations

Two banks included in the review raised some concerns regarding how the regulations are designed. The concerns specifically regarded how covered bonds and deposits from cooperates are categorized by the regulations. Setting levels in the frameworks are necessary, both as guidance as well as an important signal regarding the characteristics of a specific type of instrument. However, it is very hard to create a regulation which fits all types of business models and markets equally well. For example, two of the banks highlighted that Sweden has a very well functioning market for covered bonds, where most are AAA rated, for financing mortgages which remained well functioning even during the last financial crisis. Despite this, this is not regarded as one of the more high quality types of funding according to the NSFR. This is one example where the structure of the local market has significant effect on how the regulations affects the banks. Another example that several banks highlighted was that corporate deposits are categorized as significantly less stable compared to private deposits. However, the banks’ internal view on the liquidity risk of these deposits is that they are sometimes even more stable than private deposits. In addition to this, they highlighted the fact that there has been no record of a corporate ”bank run” which supports this categorization. This can indicate that there may be reasons to make the regulations more flexible and adaptable to the settings in which the banks are operating.

7.5 Does the business model matter?

The impact assessments related to Basel III have highlighted some differences between different business models. For example, the average LCR and the dispersion within the groups were different between business models. Universal banks were found to have the lowest levels of LCR while locally active savings banks had a higher average LCR, which was well above the overall average in European banks (EBA, 2018b). While some descriptive statistics are included in the results, the sample included in this review is too small for any conclusions to be made from those statistics. However, the findings from the interviews may give an indication to different behaviours for banks with different business models or of different size. For example one of the findings, which is also highlighted in figure 7 and figure 8, is that there is a significant difference in sophistication between the methods used at the universal banks compared to the rest of the reviewed banks. This difference in approaches and sophistication in the internal pricing and the allocation of the liquidity cost may be one of the reasons behind the difference in LCR levels, which
could be seen in the Basel III impact assessment (EBA, 2018). One implication of these findings could be that a less sophisticated and granular method requires the banks to hold a larger internal liquidity reserve to ensure that they are complying with the required minimum level relatively independently of specific business decisions. Using a more sophisticated approach on the other hand may make it possible for a bank to forecast and assess the effect of individual transactions on the LCR, thereby making it possible for such institutions to hold a lower average LCR level without breaching the required minimum level.

7.6 Limitations

While the applied method is suitable to the purpose and the stated research question, the reliability and generalizability of the thesis is relatively low for a number of reasons. Firstly, as the review is of a qualitative nature the findings can not be extended to other contexts than the one specifically investigated. Secondly, due to the relatively small sample and the fact that only one interview is conducted with each bank the reliability of the results are limited. Due to this, the findings and implications discussed should be seen as an inspiration for further research. A more comprehensive discussion of the scientific quality of the study can be found in chapter 4.
8 Conclusion

This chapter will present a synthesized version of the key findings and the discussion, thus arriving at the key findings and conclusions of this thesis. Moreover, it will also summarize the possible implications of the findings on both an academic and an industrial level. Lastly, suggestions regarding possible future research are given. The findings and conclusions presented in this chapter should be considered in light of the limitations of the study.

8.1 Key results and conclusions

The purpose of this thesis is to investigate the impact of changes in liquidity requirements on liquidity cost allocation mechanisms in a Swedish setting. The study also aims to identify and discuss internal pricing practices and liquidity cost allocation mechanisms used in practice by Swedish banks.

RQ1: How is internal funds transfer pricing used by Swedish banks?

All banks have internal pricing methods but the purpose and the design vary greatly. The universal banks tend to have more sophisticated internal pricing models using a matched maturity approach while the other banks use pooled approaches. Also, only two universal banks stated that the purpose of the internal price is to reflect all risks related to a transactions while the role of the internal pricing in the other reviewed banks is mainly to account for related costs. The most common weaknesses of the internal pricing practices of the reviewed banks are the lack of differentiation, a weak connection to risk and in some cases funding curves which are largely dependent on deposit funding. The findings seem to suggest that it is the organizational structure rather than the size which affects the role of the management control systems in the investigated setting. However, there seems to be an indication that the degree of sophistication of the internal transfer pricing is related to the size of the bank. The findings also seem to suggest that the interaction between the management control system, in this case the funds transfer pricing, and the risk management might be relatively weak.

RQ2: What do the liquidity cost allocation mechanisms in Swedish Banks look like?

In line with current guidelines, all reviewed banks have a method for calculating and allocating liquidity costs. Four of the banks have a liquidity cost calculation meant to
represent the risk while three banks equates the liquidity cost to the cost of holding a
liquidity reserve as stipulated in the regulatory requirements. Two banks were unsure of
how the liquidity cost is calculated and allocated, which highlights a lack of knowledge
and understanding by bank managers of the internal pricing practices. A weakness
in several of the liquidity cost allocation practices of the reviewed banks is the lack of
differentiation based on duration, as this may lead to unwanted maturity transformation
following a distorted profit distribution.

**RQ3:** How have NSFR and LCR affected the funds transfer pricing and liquidity cost
allocation mechanisms in Swedish Banks?

The LCR and NSFR seem to have had a significant effect on the general liquidity man-
agement in a majority of the banks and especially LCR has become one of the most
central methods for measuring liquidity risk. Several banks indicate that they now man-
age their liquidity reserves differently and that their preferences for certain types of
instruments have been affected. For example, several banks highlight that they now
invest more in municipal bonds. The effect on the internal prices and the pricing meth-
ods has been limited and even the banks which said to have adapted their methods for
internal pricing following the introduction of LCR and NSFR said that the effect had
been marginal. This discrepancy highlights the low interaction that there is between the
risk management and the management control systems in the reviewed banks. However,
the findings seem to suggest that the introduction of LCR and NSFR has increased
the awareness and understanding of liquidity risk internally as the measures facilitate
transparency and concretize a relatively abstract concept.

**Summary of key results and conclusions**

In summary, this thesis investigates the topic of funds transfer pricing practices and
methods for allocating liquidity cost of Swedish banks and how these have been af-
fected by introducing LCR and NSFR. The overall conclusions are firstly that there are
large variations regarding the sophistication of banks funds transfer pricing practices
and liquidity cost allocation methods in the reviewed banks. The banks using less so-
phisticated methods may be exposed to model risk if they themselves are not aware of
the implications of this since a consequence of using simplified approaches may be a
distorted assessment of profitability and unwanted maturity transformation. Secondly,
the introduction of LCR and NSFR seem to have had a significant impact on the banks'
risk management but the effect on internal pricing practices and methods for allocating liquidity costs seem to be very limited.

8.2 Implications

Implications will be discussed based on two perspectives, industrial and academic. The industrial perspective is focused more on findings of practical use, with both banks and regulators in mind. The academic perspective is focused more on theoretical contributions or implications from the findings. However, the following implications and the discussion thereof should be viewed with the previously discussed limitations of the current study in mind.

8.2.1 Academic

Findings from this review seem to suggest that both size and business model might be important factors which suggests that these dimensions should be considered in research regarding management control system. In addition to this, the findings seem to suggest that the interaction between management control systems and risk management in this specific setting might be very weak.

8.2.2 Industrial

The findings of this review seem to suggest that there is a need, especially for small and medium-sized banks, to be aware of how the methodological decisions regarding internal pricing and liquidity cost allocation affects the assessment of profitability and the distribution of profits internally. This might be important to ensure that strategic decision takes potential distortions into account and that the bank is aware and considers that the internal pricing may unintentionally encourage increased maturity transformation. Also, the findings seem to imply that several of the reviewed banks have the possibility of using their internal pricing as a risk management tool, and thereby increasing the accountability on a business unit level, by moving towards a more risk based internal price.

The findings also seem to suggest that there might be a discrepancy between how banks view the risk and how the regulations assess the risk in a number of instruments, es-
especially regarding covered bonds on the Swedish market. This may imply that there is a need for flexibility or a possibility to adapt the requirements to suit local market conditions.

Furthermore, the findings seem to suggest that the current liquidity requirements as proposed through Basel III might not have had a significant effect on the banks' internal pricing practices of their allocation of liquidity cost. This might imply that if such a change would be desired by regulators, a more targeted regulation may be required.

8.3 Future research

Based on the findings and implications of this study, the following suggestions are made for future research:

− While this study is aimed at identifying and describing current practices for funds transfer pricing and liquidity cost allocation used by Swedish banks, it was limited in terms of time and resources and due to this, results are based on only one interview from each bank included. In order to verify the findings as well as to further contribute to the previous literature this topic may be revisited with a broader scope and sample, for example by interviewing several respondents from each bank as well as using surveys to allow for triangulation of the issues at hand. Also, including more banks in the review would increase the generalizability of the findings. This could further deepen the understanding of the topic as well as give more insight into how risk management and management control systems are linked in the banks’ internal models.

− In addition to investigating differences in internal processes based on business model, the findings from this thesis indicates that organizational structure is an influential factor. Therefore, a relevant topic for future research on management control systems in banks is to investigate between link system design and organizational structure.

− Both previous research such as King (2013) as well as this study confirms that changes in liquidity regulations have an effect on banks preferences, for example for funding instruments. In this study respondents mentioned corporate deposits, covered bonds and municipal bonds as instruments for which the regulations have had an effect on their appetite. Based on this, a more thorough quantitative
investigation to see if there seems to be an effect on these securities prices or volumes as well as a review of the effects on the economy, for example if deposits for cooperates become more expensive, would be interesting topics for future research.

− Today’s regulations stipulates key levels for all countries where these regulations are implemented. One of the findings in this study was that the perceived risk based on empirical data from the banks differed significantly from the levels stipulated in the regulations. In addition to this, as was also seen in the global financial crisis, behaviours and risks may differ significantly between different countries which are subject to the regulations. In current regulations for credit risk, banks can either use levels stipulated in the regulations or calculate the risk levels themselves if the regulator deems the bank’s model to be sufficient. A topic for a future investigation may be the effect of a similar approach towards liquidity risk. For example, what would levels look like if they were based on empirical data and if this was implemented in the regulations, what the effects might be for both the banks and the economy as a whole.
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Appendix

A. Interview questions

A.1. In English

The initial set is focused on describing the mechanism of the banks' internal pricing practices, their liquidity cost-benefit allocation and the methodology thereof.

- Briefly describe the process for identifying, measuring and controlling liquidity risk
- How is the liquidity cost-benefit allocated? Is a transfer pricing approach used?
- How is the liquidity cost-benefit calibrated? How often is the calibration updated?
- How is the liquidity cost-benefit allocation mechanism linked to the risk management?
- How is the liquidity cost-benefit allocation mechanism linked to front office decision making on asset and liability generation?
- How is the liquidity cost-benefit allocation integrated mechanism into the performance management? On what levels is the performance measured?
- How is the liquidity cost-benefit allocation mechanism integrated into the measurement of profitability for assets and liabilities?
- To who or to which divisions is the methodology behind the liquidity cost-benefit allocation mechanism communicated?
- How often is the methodology for liquidity cost-benefit allocation reviewed and updated?

The second set focuses on how the mechanism of liquidity cost-benefit allocation and the methodology thereof has changed following the enforcement of LCR and NSFR at the bank.

- When were LCR and NSFR introduced at the bank?
- Who was responsible for adapting systems to comply with the requirements?
- Who is responsible for the bank complying with LCR and NSFR?
- How has the introduction of LCR and NSFR affected the process for identifying, measuring and controlling liquidity risk?
- How has the introduction of LCR and NSFR affected the liquidity cost-benefit allocation method?
- How has the introduction of LCR and NSFR affected the liquidity cost-benefit calibration?
- How has the introduction of LCR and NSFR affected the linkage between the liquidity cost-benefit allocation mechanism and the risk management?
- How has the introduction of LCR and NSFR affected the linkage between the liquidity cost-benefit allocation mechanism and the front office decision making on asset and liability generation?
Appendix

A. Interview questions

- How has the introduction of LCR and NSFR changed to who/which divisions the methodology behind the liquidity cost-benefit allocation mechanism is communicated?
- How has the introduction of LCR and NSFR changed how often is the methodology for liquidity cost-benefit allocation reviewed and updated?

A.2 In Swedish

Den första frågorna fokuserar på att skapa en bild av de processer och mekanismer som finns på banken och som rör allokering av likviditetskostnader och vinster.

- Beskriv kortfattat processen för att identifiera, mäta och kontrollera likviditets och finansieringsrisker.
- Hur allokeras likviditetskostnader och vinster? Används en internprissättning metod (t.ex. transfer pricing)?
- Hur kalibreras likviditetskostnader och vinster (t.ex. räntekurvor, interna referensräntor för de viktigaste kategorierna av tillgångar och skulder etc.)? Hur ofta uppdateras kalibreringen?
- Hur ser kopplingen mellan mekanismen för allokering av likviditetskostnader och vinster och institutets riskhantering ut?
- Hur ser kopplingen ut mellan mekanismen för allokering av likviditetskostnader och vinster och beslutsfattande gällande generering av nya tillgångar och skulder av front office (kundtjänst)?
- Hur är mekanismen för allokering av likviditetskostnader och vinster integrerad i resultatstyrningen. På vilken nivå mäts resultat?
- Hur är mekanismen för allokering av likviditetskostnader och vinster integrerad i mätningen av lönsamheten för tillgångar och skulder?
- Till vem eller vilka avdelningar kommuniceras metoden bakom mekanismen för allokering av likviditetskostnader och vinster?
- Hur ofta granskas och uppdateras metoden bakom mekanismen för allokering av likviditetskostnader och vinster?

De resterande frågorna fokuserar på hur NSFR och LCR har påverkat de processer och mekanismer som finns på banken och som rör allokering av likviditetskostnader och vinster.

- När introducerades LCR och NSFR på banken?
- Vem var ansvarig för att anpassa systemen för att följa de nya kraven?
- Vem bär ansvaret för att banken följer reglerna gällande LCR och NSFR?
- Hur har introduktionen av LCR och NSFR påverkat processen för att identifiera, mäta och kontrollera likviditets och finansieringsrisker?
Appendix

A. Interview questions

− Hur har introduktionen av LCR och NSFR påverkat metoden för allokering av likviditetskostnader och vinster?
− Hur har introduktionen av LCR och NSFR påverkat kalibreringen av likviditetskostnader och vinster?
− Hur har introduktionen av LCR och NSFR påverkat kopplingen mellan mekanismen för allokering av likviditetskostnader och vinster och institutets riskhantering?
− Hur har introduktionen av LCR och NSFR påverkat sambandet mellan mekanismen för allokering av likviditetskostnader och vinster och beslutsfattande gällande generering av nya tillgångar och skulder av front office (kundtjänst)?
− Hur har introduktionen av LCR och NSFR ändrat till vem eller vilka avdelningar communiceras metoden bakom mekanismen för allokering av likviditetskostnader och vinster?
− Hur har introduktionen av LCR och NSFR ändrat hur ofta metoden bakom mekanismen för allokering av likviditetskostnader och vinster granskas och uppdateras?