Competition in the Norwegian Mortgage Market

Use of Diversion Ratios to Investigate the Competitive Proximity between DNB and Sparebanken Vest

Ingrid Rage Dahle & Martine Listou Ellefsen

Supervisor: Øivind Anti Nilsen

Master thesis, MSc in Economics and Business Administration,

Financial Economics and Economics

NORWEGIAN SCHOOL OF ECONOMICS

Acknowledgements

This thesis is written as a part of our Master's degree in Economics and Business Administration at the Norwegian School of Economics (NHH). We are grateful for the opportunity to study an interesting topic within our area of interest, which also is meaningful in a societal perspective. Writing this thesis has been both educational, challenging and rewarding.

We would like to thank Roar Gjelsvik from the Norwegian Competition Authority and Lars Sørgard for providing useful information regarding the research topic and methodology. Further, we want to thank DNB and an anonymous bank for providing market share information. Next, a special thank you to the participants in our survey. Without their responses, it would not have been possible to carry out this thesis.

Furthermore, we would like to thank our family and friends for their encouragement and support through our years at the Norwegian School of Economics.

Finally, we want to express our sincerest gratitude to our supervisor Øivind Anti Nilsen for giving us advice on interesting topics and the guidance throughout the research process. His wisdom, presence and constructive comments are greatly appreciated.

Norwegian School of Economics

Bergen, May 2022

Ingrid R. Dahle

_____

Ingrid Rage Dahle

Martine L. Ellefsen

_____

Martine Listou Ellefsen

Abstract

In this thesis, we use an empirical approach to investigate which implications a potential merger between DNB and Sparebanken Vest will have on the competitive situation in the mortgage market and if there are any distinctions in the answers and diversion ratios between marginal, non-marginal, and average customers. We conduct a survey on a sample of residents in Bergen with a mortgage in DNB or Sparebanken Vest. We find that a potential merger will cause an upward pricing pressure and an increased market concentration which raises competition concerns. The diversion ratios between the banks are relatively high. However, from the critical loss analysis, we find that the banks not will benefit from a price increase, which indicates that they not are close competitors and that it is not likely that a merger will cause anticompetitive behavior. Moreover, we find that there are distinctions between marginal, non-marginal and average customers. Our findings indicate that marginal customers are more active in the banking market and take more advantage of the competition. In addition, we find that the estimated marginal and non-marginal diversion ratios from DNB to Sparebanken Vest differ significantly. This indicates that when the competition authorities assess mergers, they should not assume that all customers have the same responses and are non-marginal, as this may lead to a wrong conclusion.

Table of contents

1. Introduction

The percentage of Norwegians who own their own home is high compared to many other countries (Eurostat, 2021).[1] For the sake of individual household finances as well as social welfare, efficient competition in the mortgage market is critical. Well-functioning competition in the mortgage market is important both for economic growth and to secure satisfactory terms and service for the customers.

This master's thesis examines the competitive situation of the mortgage market in the municipality of Bergen by investigating the competitive proximity between DNB and Sparebanken Vest through the analysis of a hypothetical merger. In addition, we examine whether the methods used by the Norwegian Competition Authority in its assessments of corporate mergers are appropriate.

1.1 Purpose and motivation

The mortgage market in Norway is affected by vulnerable competition, which is of great importance to competition authorities. The Norwegian Competition Authority conducted a study in 2015 that identified restrictions for well-functioning competition in the mortgage market (Skjæveland et al., 2015). The study was carried out in response to recent developments such as banks' active communication of future interest rates, a new regulatory framework for banks, and a widespread perception of low consumer mobility in the market.

The media frequently mentions the competitiveness in the Norwegian banking sector. DNB's acquisition of Sbanken, for example, was debated on a regular basis during the last year. The secretary-general of *Huseierne* emphasized that Norway's banking market is complicated and characterized by low competitiveness and that the market will lose an important participant if DNB is allowed to purchase Sbanken (Ghaderi, 2021). Both the focus on this issue and the importance of competition in the banking industry prompted us to investigate the mortgage market.

Estimating diversion ratios from survey data to examine corporate mergers and to determine the competitive proximity of the parties has been increasingly common among competition

---

[1] In 2020, 80.80% of all Norwegians living in private households owned their own home (Eurostat, 2021).

authorities in recent years. One of the primary purposes of the survey conducted in the current study is to collect data in order to discover the diversion ratios to examine the competitive proximity between DNB and Sparebanken Vest. Although former research has been done on the competitive situation in the mortgage market, we believe it is appropriate to conduct new analyses, in terms of both providing new, reliable results and improving existing analyses regarding the research methodologies employed. In addition, it is reasonable to assume that the mortgage market has evolved since former papers using diversion ratios to evaluate the competitive situation in the banking market were written, with respect to both the way banks function and the preferences of the customers.[2] The Norwegian Competition Authority solely examines the relevant parties in a merger when using diversion ratios to assess competitiveness, because it is their customers' preferences that are relevant. Consequently, in contrast to previous studies, this thesis concentrates on the competitiveness between DNB and Sparebanken Vest. These banks are selected because they are the largest banks in Bergen's banking sector (Bergen Næringsråd, 2021, p. 5), and thus important candidates in the market. Therefore, focusing on these banks will make it easier to acquire a sufficient number of respondents and help providing valid analyses.

Another purpose of the current study is to investigate whether diversion ratios, as measured by a survey, are a useful tool for analyzing corporate mergers. A key question is whether we can distinguish between the estimated diversion ratios between marginal, non-marginal, and average customers. When analyzing the competitive situation in a market, it is common to assume that marginal and non-marginal customers have the same responses. If there are disparities in the answers, there are coverage errors, which indicates that competition authorities may make mistakes by studying only non-marginal customers when interpreting diversion ratios. Analyzing this question can contribute to new insights because, to the best of our knowledge, no such research has been done in this market previously.

We aim to complement existing research on the competitive situation in the mortgage market. We believe this research will be of great interest to market participants, mortgagors, regulatory bodies, and anyone with a general interest in banking, finance, and competition analyses.

---

[2] More information about former research is available in Section 2.

To study competitiveness using diversion ratios, it is critical to confine the population to a limited geographical area. In this light, Bergen is the chosen nominee market for the survey. Bergen is the second-largest city in Norway and has a diverse population, with residents of various ages. Although the analysis is based on Bergen, it is reasonable to assume both that a sample of Bergen's population can be typical of other Norwegian municipalities and that the analysis and results can be of interest for both a Norwegian and an international audience.

1.2 Research question

The following research question is proposed to assess the competitive proximity between the selected banks and to analyze the difference between marginal, non-marginal, and average customers:

Which implications will a potential merger between DNB and Sparebanken Vest have on the competitive situation in the mortgage market and what distinctions exist between marginal, non-marginal, and average customers?

To answer the research question, we examine a hypothetical merger between DNB and Sparebanken Vest. The analysis should reveal if together, the banks can engage in anticompetitive behavior. We conduct an empirical survey and use analytical tools such as critical loss, diversion ratios, and upward pricing pressure to address this question. We also investigate differences in diversion ratios and use regression analyzes to study potential differences between marginal, non-marginal, and average customers.

1.3 Outline

This master thesis is organized as follows: In **Section 2,** we present an overview of related literature. **Section 3** describes the Norwegian banking market, the Norwegian mortgage market and the relevant banks for the current study. **Section 4** consists of an explanation of the data. In **Section 5**, the descriptive statistics in the analysis are listed, including an analysis of potential differences between marginal, non-marginal and average customers. **Section 6** includes an analysis of critical loss, diversion ratios, and upward price pressure. Finally, our concluding remarks are presented in **Section 7.**

2. Related literature

2.1 Related literature regarding the banking market

Competition and stability

The relationship between competition and stability is subject to a great amount of research in the banking market, both theoretically and empirically. See for instance Vives (2016), Nilsen et al. (2016), Canta et al. (2018) and Klapper et al. (2008). Empirically, the relation between stability and competition is not yet well understood. The literature also provides ambiguous results. For example, Canta et al. (2018) find that competition leads to more risk taking. By using a dataset covering Norwegian banks and firms in the period 2000–2013 to empirically investigate the possible trade-off between risk and competition, they find that stability is, potentially, negatively affected by competition. A negative relationship between concentration and risk taking is also found. Looking at lending behaviour, more competition will imply that interest rates are lower. It is more difficult to obtain a loan, but firms that do will be able to get more funding. These effects apply in particular for newly established and small firms. However, Canta et al. (2018) claim banks' risk taking as a consequence of tougher competition can be partially compensated for by banks' increased loan loss provision rates, while Klapper et al. (2008) show that risk may be counterbalanced by higher equity capital ratio.

Klapper et al. (2008) provide an empirical investigation, and also find negative implications for competition. They claim that measures for increased competition can undermine financial stability. Bank failures is also enhanced by tougher competition. The two main paradigms in literature are discussed: the competition-fragility view and the competition-stability view. The competition-fragility view, which is supported both empirically and theoretically, argues that financial stability is hurt by competition as a result of banks' increased exposure to risk. With more competition, market power is eroded, profit margins decreased, and it results in reduced franchise value that encourages banks to take risks (Klapper et al., 2008). The alternative hypothesis, the competition-stability view, argues that competition leads to less risk. When markets are more concentrated it will be more difficult for loan customers to repay their loans, as interest rates are higher. Thus, bank risk will be increased (Klapper et al., 2008). This leads to exacerbated moral hazard incentives as borrowers may shift into more risky projects. Adverse selection may also be a problem, as banks may accept more risky customers when interest rates are high. Another possible source of risk related to highly concentrated markets

is that banks may increase their risk taking if they believe that they are too big to fail and hence likely to be protected by the government safety net (Klapper et al., 2008).[3]

Other research find that market, regulatory and institutional features of a country can explain large cross-country variation in the relationship between competition and stability. It is claimed that in countries where, among other things, activity restrictions are stricter and there are lower systemic fragility, increased competition will have a greater impact on banks' fragility (Beck et al., 2013).

While most literature finds detrimental effects on stability of banks of competition, Boyd and De Nicolo (2005) challenge this view and argue that more concentrated markets lead to an increased probability of failure, hence, financial stability is enhanced by competition. A competitive banking market may have beneficial effects to society by for example increasing firms' and households' availability for fundings and reducing cost (Canta et al., 2018). Nilsen et al. (2016) contribute to both theoretical and empirical literature. Their empirical findings suggest that if competition already is dampened, further dampening of competition is harmful for the stability in the market. Therefore, it is crucial to consider the initial condition of the market. Furthermore, from a theoretical model they find that dampened competition will lead to higher risk in the banks' portfolios. This is due to the banks' incentives when margins are higher to serve more customers, even though new customers imply more risk. Therefore, dampened competition leads to more risk taking and thereby less stability in the banking market. That more concentrated markets lead to a higher probability of bank failure is also supported by for instance a Southeast Asian study where the relationship between banks' risk taking and competition is examined, and the result indicates that competition does not increase banks' risk taking (Liu et al., 2012). Martinez-Miera and Repullo (2010) also find that competition leads to lower risk taking, even though lower margins may also lead to more bank failures.

The banking market

The Norwegian bank market has been thoroughly investigated. See for instance Hetland et al. (2017), Juelsrud and Wold (2020), Juranek et al. (2021), and Johannessen and Skarstein

---

[3] "Too-big-to-fail" refers to a company that the government consider too important for the financial system and will not allow it to go bankrupt (Legal Information Institute, 2021).

(2018). Hetland et al. (2017) investigate the Norwegian corporate banking market. Juelsrud and Wold (2020) use a 2013 Norwegian policy reform to study how banks react to higher capital requirements and how these adjustment transmit to the real economy, while Johannessen and Skarstein (2018) examine the proximity in the bank-borrower relationship. For analyses of bank mergers in the Norwegian bank market, see Juranek et al. (2021). They conduct an analysis of the merger between DnB and Gjensidige, the two banks with the largest and third largest market shares at the time of their study.

Norges Bank has provided several publications concerning the financial system in Norway. For instance, see Norges Bank (2021b) for an overview of Norway's financial system and Norges Bank (2022a) for the financial infrastructures' challenges and development trends. A review of vulnerability and risk in the financial system is found in Norges Bank (2022b), while Norges Bank (2022c) presents an assessment of financial imbalances and the banks' development. The reports are revised annually to retain their relevance. Except *Monetary Policy Report with financial stability assessment* (Norges Bank, 2022c) which is revised quarterly.

As mentioned previously, the Norwegian Competition Authority investigated the Norwegian mortgage market in 2015 with intentions to identify potential limitations for well-functioning competition. According to the report, the Norwegian banking market is vulnerable for banks to cooperate to set the interest rate. If banks are able to publicly signal their plans for future changes in interest rates, the market will be exposed to weakened competition (Skjæveland et al., 2015). Furthermore, barriers to entry and expansion, such as low customer mobility, limit the possibility for new and smaller banks to challenge the larger banks' interest rate setting. In addition, the market contains search costs and switching costs, which is generally negative for competition.

In the literature on customer mobility, the Nordic Competition Authorities (2006) discusses its importance for a competitive market, while Juul (2006) studies customer mobility in the Nordic countries and states that both the costs and the services provided to customers vary greatly, both at the national level and among the Nordic countries. In its discussion, the Nordic Competition Authorities (2006) states that switching banks should be easy, something that should be facilitated, and emphasizes the importance of a transparent market. In comparison to other sectors, the customer mobility in the financial sector lies at a lower level (Juul, 2006). Juul (2006) observes that the lack of customer mobility is connected to people finding the

banking market complex and associating it with high transaction costs in addition to low interest from the customers.

There is considerable literature on bank mergers. DeYoung et al. (2009) supply a review of the post-2000 literature of financial institutions' mergers and acquisitions (M&As) and cover more than 150 studies. Furthermore, Hagendorff and Nieto (2012) study a sample of European bank mergers from 1997 to 2007 and reveal no evidence for or against the banks' safety and soundness due to M&As. They find that strict supervision is associated with improved results after M&As. Strict rules also matter in cross-border acquisitions: The merging party will become financially stronger given that the acquirer comes from a country with stricter supervision compared to the targets (Hagendorff & Nieto, 2012).

The literature seems to provide varied accumulated effects of performance after bank mergers. Altunbaş and Marqués (2008), Hagendorff and Keasey (2009) and Beccalli and Frantz (2009) study post-merger bank performance. Altunbaş and Marqués (2008) and Hagendorff and Keasey (2009) find improved performance post-merger, while Beccalli and Frantz (2009) find that M&As have a slightly negative effect on profit gains. However, Beccalli and Frantz (2009) agree that cost efficiency is improved, but cost efficiencies are transferred to consumers. Differences in banks' strategies can also affect the degree to which mergers succeed, but variations between domestic and cross-border M&As exist (Altunbaş & Marqués, 2008). Hagendorff and Nieto (2012) also claim that a beneficial effect of bank mergers is that weaker banks are acquired and are thereby safer and financially stronger after the merger. This is true both within countries and across EU members. On the other hand, banks of increased size can cause trouble, especially in times like the financial crisis of 2007–2009, when issues regarding large financial institutions were discovered. Bailouts of large institutions cause large social and economic costs and raise major political concerns regarding risk and financial stability (DeYoung et al., 2009). Mergers also lead to more interdependent institutions, which can cause systemic risk because of increased similarity in investment portfolios, business lines, and common exposures post-merger.

After the 2000s, the evolution of bank M&As proved that in North America, bank mergers can improve efficiency, in spite of the mixed picture regarding stockholder wealth creation. However, in Europe, both efficiency gains and stockholder value enhancement have been accomplished (DeYoung et al., 2009). Sturdy evidence shows that high CEO compensation,

especially in the US, is linked to merger activity, and the "too-big-to-fail" status is a strong motivator for large bank acquisitions (DeYoung et al., 2009).

2.2 Related literature including diversion ratios

Use of diversion ratios to investigate competition in the banking market

In the recent acquisition case between DNB and Sbanken, as mentioned in Section 1, diversion ratios are used. In April 2021, DNB announced that they wished to acquire Sbanken. The Norwegian Competition Authorities prohibited the acquisition because they believed that it would both restrict competition in the market for mutual funds and harm consumers through higher prices and poorer service (The Norwegian Competition Authority, 2021a). Sbanken has a significant market position and has been an important challenger in the market, and on this basis, Oslo Economics conducted a survey on behalf of *Huseierne* in which diversion ratios were an important element. The bank customers' second choices were discovered, and the diversion ratios between DNB and Sbanken were of fundamental importance. Both the price-diversion and forced-diversion question were asked; thereby, second choices for both marginal and non-marginal customers were mapped. Competitive proximity and diversion ratios were located for mortgages, daily banking, savings accounts, funds, and stock trading (Oslo Economics, 2021). It turned out that the diversion ratio from DNB to Sbanken was high for all products, while the diversion ratio the opposite way was low. This indicates that Sbanken is a close competitor to DNB and assisted in the decision to halt the acquisition. In spite of this, DNB later received permission for the acquisition after a complaint to the appeals board, *Konkurranseklagenemda*.

Konjuhi and Olsen (2014) and Valgermo (2014) have investigated the banking market in Bergen, using surveys to derive diversion ratios. Konjuhi and Olsen (2014) study the retail customer banking market in Bergen, while Valgermo (2014) studies the competition in Bergen's mortgage market. Due to lack of respondents, most of Valgermo's results are not reliable. However, DNB and Skandiabanken (now Sbanken), and Sparebanken Vest and Skandiabanken, do show acceptable margins of error and would with great probability be able to harm the competition in the market in the case of a merger. Sbanken proves to be an important competitor. It has been 8 years since this analysis was carried out, and as is shown later in the current study, Sbanken proves to be an important competitor to date, which is interesting considering the recent acquisition case of DNB and Sbanken. Konjuhi and Olsen

(2014) only gathered information from six banks, assuming they constitute the whole market. Based on the diversion ratios, their analysis reveals that DNB and Sparebanken Vest are by far the biggest competitors in the retail customer banking market in Bergen.

Use of diversion ratios to investigate competition in other markets

The UK and the USA are examples of countries where diversion ratios are recognized by competition authorities. A well-known case from England is Somerfield's acquisition of 115 Morrison Supermarkets in 2005. The Competition Commission (CC) identified 14 local markets in Great Britain where competition concerns were raised due to the acquisition, and they conducted a survey among the customers to identify the diversion ratios in all the stores of concern (Competition and Markets Authority, 2005). The survey identified the customers' second choice. An important factor was the extent which the customers diverted from a Morrison store to a Somerfield store if the store in question was not available. The survey also provided information on how this affected the income (Clarke, 2005). Because the survey was conducted after the acquisition, the intention was to figure out how close rivals they were before the acquisition. The CC concluded that 12 stores were expected to lead to a significant lessening of competition locally (Competition and Markets Authority, 2005). Another case in which diversion ratios play an important role is the Ryanair/Aer Lingus merger case. The fact that they were each other's closest competitors was captured by the diversion ratios and contributed to the decision to halt the merger (Holt, 2009). In Norway, the Norwegian Competition Authority has also used surveys to derive diversion ratios in several merger cases. Examples are Peppes/Dolly, SATS/Elixia, and Coop/Ica.

Mathiesen et al. (2011) used observed diversion ratios to show that they can be used in merger simulation by using an example from a local grocery market in Voss, Norway. In the study, Halleraker and Wiig (2008) conducted a survey to analyze diversion ratios to investigate the competitive proximity between different grocery stores. Calibrating demand from market shares, in addition to a few other parameters, is a common approach to merger simulation used in antitrust cases. However, Mathiesen et al. (2011) argue that this method may result in large differences in actual diversion ratios and in diversion ratios calculated from market shares. Using diversion ratios will also result in more accurate price changes. According to their model, the average price increase in this case was as much as 40% lower than in the model they made based on market shares. In general, the price change can go either way.

Models using market shares can introduce biases, making it important to go beyond market shares. They capture less information about substitutability than diversion ratios, and other characteristics of the products may be of greater importance to the observed diversion ratio than market shares (Mathiesen et al., 2011). In markets where customers differentiate the products based on prominent characteristics, market shares will be problematic. Customers may divert to other substitutes that they perceive as close in terms of characteristics, to which market shares will have difficulties catching up. Diversion ratios can be costly to obtain. However, it also turns out that only a subset of observed diversion ratios is required to significantly change the prediction from a merger simulation based on market shares and will improve the price prediction (Mathiesen et al., 2011).

3. The banking market

3.1 The Norwegian banking market

The financial system plays an important role in the economy, where it has three primary tasks: (i) providing payment services, (ii) managing risk, and (iii) providing consumers and businesses with borrowing and savings opportunities (Norges Bank, 2021b). The banks play an essential role by acting as intermediaries between economic agents, and they are the only financial institutions that are permitted to accept ordinary deposits from the public.

The Norwegian banking market consists of savings banks and commercial banks. The ownership structure, not the services provided, distinguishes the two types of banks (Norges Bank, 2021b). Commercial banks are normally public liability companies while savings banks are mutually owned foundations in which equity consists of previous years' retained earnings, and for some of the larger savings banks also equity certificates (Norges Bank, 2021b). There are a numerous savings banks in Norway, of which many are relatively small but part of a larger alliance, such as the Sparebanken 1 Alliance and the Eika Alliance. An alliance can be beneficial and boost earnings because it can, to a greater extent, offer customers a complete range of services and products. The formation of the alliances was based on the idea that although the individual banks themselves continue with their actual banking activities, joint product companies for non-banking activities will be established (Norges Bank, 2021b).

Both government lending institutions and subsidiaries or branches of foreign banks also operate in the Norwegian market. Foreign banks, with a 22% market share in the Norwegian retail banking market as of December 31, 2020, have been authorized to operate in the Norwegian banking market since 1985 (Norges Bank, 2021b). The Norwegian State Housing Bank and the Norwegian State Educational Loan Fund are the two major government lending institutions. The loans are funded by government borrowing and aim to fund politically prioritized activities, such as generating equal opportunities in education (Norges Bank, 2021b). Innovation Norway is another key government lending institution that provides grants, loans, and advisory services to support business innovation and long-term growth.

With a relatively high degree of concentration, Norwegian-owned banks dominate the Norwegian banking market (Norges Bank, 2021b). DNB is the largest bank in Norway, with a market share in the retail banking market of 26%. Next come the Sparebanken 1 Alliance

with 21%, then other savings banks, Nordea, the Eika Alliance, branches of foreign banks, and other commercial banks with 13%, 12%, 11%, 10%, and 8% respectively (Norges Bank, 2021b). The figure below shows the banks' market shares of total loans in the retail banking market.
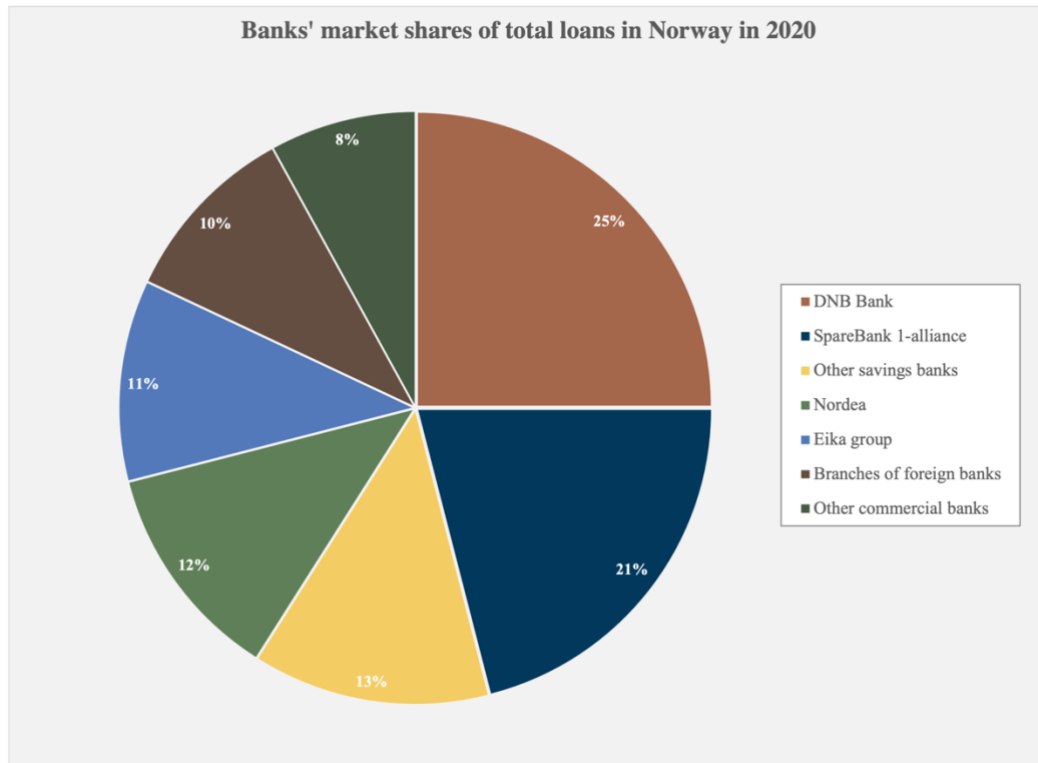

Banks' market shares of total loans in Norway in 2020

Figure 1 – Overview of banks' market share of total loans in the retail banking market in 2020 (Norges Bank, 2021a)

Because of the many M&As in the banking market, the total number of banks has fallen sharply, especially in the period from the 1960s until 2000s. In 1929, there were 638 savings banks in Norway, while in 2019, there were only 96 (Anda, 2021). Technological development has made it possible for people to carry out many necessary banking services from home; banks no longer need to have as many branches as they used to, so the number of branches has also fallen.

In Norway and other Nordic countries, the evolution of the financial sector during the 1980s and 1990s was characterized by three factors in particular: M&As, deregulations, and the establishment of financial superpowers. A common feature of financial groups is that they result from a series of mergers (Juul, 2006). One of the main purposes of the deregulation was to use the competition in the market as a tool for an efficient allocation of financial services (Finansdepartementet, 2000). This periods M&As in the Norwegian banking market happened both within different financial industries and across financial industries (Torsvik, 1999). Due

to the M&As, the market became much more concentrated; over 70% of total assets became concentrated in the 10 largest savings banks, the market share of Norwegian commercial banks was significantly reduced (Norges Bank, 2021b), and many alliances between smaller savings banks were formed.

Bank merger evolution in other countries

In the same period, bank mergers also increased internationally, both in number and size, and often involving large banks. This seems to be driven by four connecting forces: regulatory reform, globalization in both financial and nonfinancial markets, excess capacity, and technological change including the development of electronic banking (OECD, 2000). Most mergers happened within nations. Even though there are few regulatory barriers between OECD countries, political obstacles may stand in the way (OECD, 2000). Only a small number of the mergers have been of concern to competition and thereby blocked, and when they are, it is often due to negative effects on small and medium sized companies (OECD, 2000). Vives (2016) argues that at the local level, European national authorities do not see market power as a problem. After the financial crisis of 2007–2009 however, M&A activity in Europe collapsed and has remained at a low level since. Mergers after the financial crisis seem to consist of large and stable institutions acquiring smaller ones, with a domestic focus (Figueiras et al., 2021). Cross-border M&As also happen to some extent but following existing financial links, often in countries where physical presence through subsidiaries already exists (Figueiras et al., 2021). Regulatory changes also play an important role for the evolution of the US market, and made a nationwide banking market possible, leading to an outbreak of mergers during the 1990s. The US market widened; in addition, barriers to entry were reduced, and multi-market contracts among US banks escalated (Figueiras et al., 2021). According to Jones and Critchfield (2005), the number of banks in the US was reduced by almost 50 percent due to M&As over the 20-year period starting in the 1980s.

3.2 Rules and regulations for the banking market

To ensure that the banking market functions properly and provides a stable and effectively market, the banks meet strict requirements by the authorities, namely capital requirements, liquidity requirements, and requirements to be able to settle current payment obligations (Norges Bank, 2019).

The bank's capital requirements are meant to secure the banks' ability to withstand losses without having to restrict lending activities or in the worst case, go bankrupt (Finansdepartementet, 2019). It is required for all banks to have Common Equity Tier 1 (CET1) of 4.5% at any time of the bank's calculation basis (IBM, 2021). In addition, the Tier 1 Capital, consisting of CET1 and Additional Tier 1, should constitute at least 6% of the calculation basis; the total capital ratio, consisting of Tier 1 capital and Tier 2 capital, should constitute at least 8% (Finansdepartementet, 2019). The calculation basis for the capital requirements is the banks' risk-weighted assets. Risk weighting indicates that the value of each loan and other assets is adjusted based on the assumed loss probability and potential losses (Finansdepartementet, 2019).

The banks are also facing buffer requirements, which are meant to ensure that the banks have sufficient amounts of equity during bad times so as to be able to avoid restricting their lending activities too much and avoid violating the minimum requirements for total capital ratio (Finansdepartementet, 2019). Two different buffer requirements are the systemic risk buffer (which should be 4.5%) and countercyclical capital buffer. The systemic risk buffer is a tool with the intended purpose of meeting long-term systemic risk, while the countercyclical capital buffer is there to amplify the bank's resilience during periods in which financial imbalances are increasing (Scott, 2011). This is meant to prevent setbacks from being intensified due to restricted lending activities during bad times. The banks are also facing a capital conservation buffer of 2.5% with the purpose of making the financial institutions able to withstand future periods of economic stress (IBM, 2021). Systemically important bank, DNB and Kommunalbanken, have an extra requirement for buffers.[4] In addition, the Financial Supervisory Authority can give requirements for buffers to individual banks.

Requirements are also imposed by the Basel III measures, which apply to internationally active banks. The regulations also apply in Norwegian law. The purpose of the measures is to strengthen the regulation, supervision, and risk management of the whole banking sector (Bank for International Settlements, n.d.). Basel III regulates both how much capital should be held by financial institutions and the quality it should have. During the financial crisis in the 2000s, deficiencies in financial regulations were revealed; the ambition is to prevent the economy from ending up in a similar situation, and strong requirements for liquidity and

---

[4] To be identified as systemically important, the bank's total assets need to be at least 10% of the mainland GDP in Norway or stand for at least 5% of total lending to the consumers in Norway (Finansdepartementet, 2019).

solidity have been imposed (IBM, 2021). Basel III aims to increase the banks' liquidity, decrease their leverage, and also strengthen their transparency and disclosures.

There are several requirements for capital in consequence of Basel III. Among other things, the requirement for Higher Common Equity Tier 1 has increased from 2% to 4.5%, and the minimum total capital ratio is set to 8% (IBM, 2021). To withstand future periods of stress, financial institutions are also required to hold a capital conservation buffer of 2.5% and a countercyclical capital buffer, consisting of fully loss-absorbing capital, should lie within a range of 0% and 2.5%, depending on national circumstances (IBM, 2021).

A minimum leverage ratio is required by Basel III and can be calculated by dividing Tier 1 capital by the bank's average total consolidated assets. The leverage ratio should exceed 3% (IBM, 2021).

Basel III has introduced two required liquidity ratios. One is the Net Stable Funding Ratio (NSFR) which provides long-term resilience by creating incentives for financial institutions to hold the sufficient stable funding required to endure a 1-year period of extended stress (Scott, 2011). The other liquidity requirement, the liquidity coverage ratio (LCR), enforces banks to hold sufficient high-quality liquid assets to be able to survive a 1-month period of severe stress. Mathematically, LCR is expressed as follows:

$$LCR = \frac{High\ quality\ liquid\ assets}{Total\ net\ liquidity\ outflow\ over\ 30\ days} \geq 100\%$$

3.3 Competition in the Norwegian banking market

While two of the most important factors for competition are price and quantity, other factors matter in the competition for bank customers, such as employee competence, the bank's location and reputation, and user-friendly mobile and online banking. For this reason, banks may have priorities other than price to attract the different customer groups. The importance of online banking has increased in recent times, while the bank's location has lost importance to some customers. User-friendly online banking, including good technical solutions, has become important to more people. It is easy to use and gives the customers a good overview of their finances; at the same time, it saves the customers time because they do not need to visit the bank or make a phone call whenever they need something. Therefore, online banking

has become a priority for many banks. Competition is important for an effective market but should not be at the expense of the stability of the market.

As shown from existing literature in Section 2, there are different views on how competition affects the stability of the market. Failures in the banking and financial system, such as credit overexpansion, bank misconduct, euphoric growth in real estate, and financial intermediaries' excessive risk-taking can often be associated with competition. However, competition is good for society as long as regulations and supervision are adequate (Vives, 2016). When looking into competition in the banking market, it is important to keep in mind that this sector differs from other sectors. The banking sector has a special responsibility toward society. Norwegian borrowers borrow almost exclusively from the banks, which must at all times be able to issue loans and guarantee that depositors have access to withdrawing their money. The banks are important for financial stability; if this sector is exposed to a shock, it could cause serious consequences for the society. If the banking sector does not function properly and is not able to handle the shock, a crisis throughout the economy can be triggered. Otherwise, however, the banking sector should be treated like other sectors, and a competitive market with price competition is beneficial (Sørgard, 2019). Too much risk-taking by banks can lead to instability and an increased risk of crisis, but still price competition should be facilitated because stability will be secured through capital requirements and other direct measures. If the banks acquire high margins, it can lead to too much lending and thus increased risk (Sørgard, 2019). High prices also lead to poorer competition and poorer conditions for the customers. A competitive market is an important factor to effectively use and produce financial services and to provide incentives for the financial institutions to both retain existing customers and attract new ones (Finansdepartementet, 2000).

Due to the sector's great technological developments in recent years, the potential for good competition is present: Many banks can cover the whole country, and customers do not need to visit the banks' branches to get what they need; hence, customers have a great number of choices, which is good for competition. On the other hand, many people find the banking market difficult to navigate in. Studies have shown that people find the banking market complex and that few local and regional banks are doing a good job marketing outside their primary area, even though they say they are nationwide (Pihl, 2020). With so many banks covering the entire country, or large parts of it, and customers not really knowing about the choices they have result in a banking market with lower competition than it should have. Thus, the potential for great competition is present, but customers must take advantage of the

possibilities available to them, and the banks must communicate to their customers and the market.

Competitive effects of mergers

Similar to other sectors, mergers can be beneficial for the participating parties but sometimes damaging to the market as a whole. In some cases, mergers afford the participants a dominant market position, especially if large competitors merge. This development can be related to two sources of financial gains: market power and an increase in operational efficiency (Jones & Critchfield, 2005). Which bank is in control following a merger has also proved significant in terms of efficiency gains. The likelihood of an efficient merger will increase provided the more efficient bank is in control and has previously been involved in a successful acquisition (OECD, 2000). Often, bank mergers are rationalized based on efficiency claims, like reduced risk due to loan diversification or economies of scope and scale, such as consolidating administration or back-office functions. Savings due to closing redundant bank branches have also been important efficiency claims in bank merger cases (OECD, 2000). However, research suggests to be careful when assessing such efficiency claims in a merger review, unless they are particular to this merger or highly likely to be achieved post-merger (OECD, 2000).

There are two potential anticompetitive effects of a merger: unilateral effects, implying the merging party's possession of more market power than what each of them jointly possessed pre-merger; and coordinated effects, representing the firms' ability to take part in different anticompetitive coordinated behavior (OECD, 2000). Competitive constraints imposed by the pre-merging parties on each other will be removed, and unilateral effects will make the merging party able to push prices above costs (Vives, 2016). The risk of harmful coordinating effects following a bank merger will be increased in a market characterized by few corporations, high barriers to entry, inelastic demand, homogeneous products, transparency (easy-to-track prices), easily predicted demand and costs, a high level of industry cooperation, and stable and relatively similar market shares (OECD, 2000).

The Norwegian banking market is relatively small; and hence, there is a limit to how many mergers can take place before it leads to negative effects for the competition. If too many banks merge, there will be inefficiencies in the market; banks will acquire great market power and there will be weak incentives for cost-effectiveness. Prices will be high, and the incentives for innovation and development will also be reduced.

3.4 The mortgage market in Bergen

Today, bank customers have a large selection to choose from regarding which bank they want to use; the possibilities are much greater than just the banks represented locally. Nevertheless, some banks are more relevant than others in different areas. An explanation for this is that people are not really aware of all the banks available in their region, so it is easiest to choose a local bank or a bank that is represented locally. As mentioned above, many people find the bank market complex and do not know about all the choices they have. Some also prefer to use the local savings bank, as many savings banks use some of their profits to support local projects.

Some of the most relevant banks in Bergen are DNB, Sparebanken Vest, Sbanken, Nordea, Fana Sparebank, Sparebank 1 SR-bank, Danske Bank and Handelsbanken. There are approximately 130 banks in Norway that offer mortgages (Finans Norge, n.d.). Several elements must be considered by banks when determining lending rates, including the policy rate, deposit rate, bank competition, and costs. In Norway, the policy rate is the interest rate on banks' overnight deposits in Norges Bank (Norges Bank, 2022d). The policy rate in Norway was last adjusted on March 23, 2022, from 0.50% to 0.75% (Norges Bank, 2022f), and at the most recent meeting on May 4, Norges Bank decided to keep the policy rate unchanged (Norges Bank, 2022e). The policy rate influences the banks' interest rates on loans, with lending rates in Norway often being 1–2 percentage points higher than the policy rate.

Selected banks

DNB is the largest bank in Norway and also one of the largest in the Nordic countries. The bank was founded in 1822 and was formed through a series of mergers. The first merger took place in 1990, when two of the biggest banks in the country at that time, Den norske Creditbank and Bergen Bank, merged to become DnB. Later, DnB merged with Postbanken and then with Gjensidige NOR; in 2011, it changed its name to DNB (Norges Bank, 2021b). DNB has more than 2.1 million retail customers and 231,000 corporate customers. More than 9,000 employees work at DNB (DNB, n.d.-a). The bank's head office is located in Oslo, but DNB is also represented in 23 locations internationally (DNB, n.d.-b). As of December 31, 2021, DNB had a 25% market share in the home mortgage market (DNB, 2022, p. 15). The bank intends to continue efforts to innovate in the field of home mortgages and to digitalize the mortgage process, with an emphasis on providing the best possible customer experiences

(DNB, 2022, p. 49). DNB also uses its strong position in the housing market to entice home mortgage customers to choose DNB for a broader range of services (DNB, 2022, p. 127).

Sparebanken Vest is a Norwegian savings bank founded in 1823 and is the second-oldest savings bank in the country. It is the result of the merger of many banks in western Norway and was originally founded to help poor people with their finances (Sparebanken Vest, n.d.-a). Every year, the bank distributes some of the profit to projects in the local community. Sparebanken Vest's domestic market consists of around 1.4 million citizens, equivalent to 26% of Norway's population (Sparebanken Vest, 2022a, p. 7). The head office is in Bergen and has more than 290,000 customers, 600 employees, and 34 offices (Sparebanken Vest, n.d.-b). In the retail banking market, Sparebanken Vest has a market share of 0.5% in Møre og Romsdal, 27.8% in Vestland and 7.0% in Rogaland (Sparebanken Vest, 2022a, p. 7). The retail market accounts for 76% of Sparebanken Vest's loan portfolio, and about 99% of this portfolio consists of loans secured by mortgage on housing (Sparebanken Vest, 2022b, p. 65). The first pure mobile banking concept in Norway, Bulder Bank, is a banking idea of Sparebanken Vest's, with a lending volume of around 20 billion (Sparebanken Vest, 2022a, p. 7).

Market shares for the home mortgage market

In Bergen, a mortgage has been registered on approximately 88,000 properties. Even though inhabitants of Bergen have the option of taking out a mortgage from any bank or institution that offers mortgages, some banks stand out and are capturing significantly larger market shares than others.

Without full insight into and complete information from the various banks, it is difficult to acquire numbers on how much each bank has lent out in volume to mortgagors. Furthermore, we lack statistics on the overall loan volume in Bergen, making it difficult to estimate market share based on volume.

Looking at mortgages in the property register is the closest we can get to a distribution of market shares in Bergen. The market share data has been gathered from the property register as of the first quarter of 2022. We have information from the property register on the number of mortgages, not the loan volume. The fact that a property may have mortgages from multiple banks might be a source of error; for example, as a part of a guarantee secured by a mortgage, both DNB and Sparebanken Vest may have a mortgage on the same property.
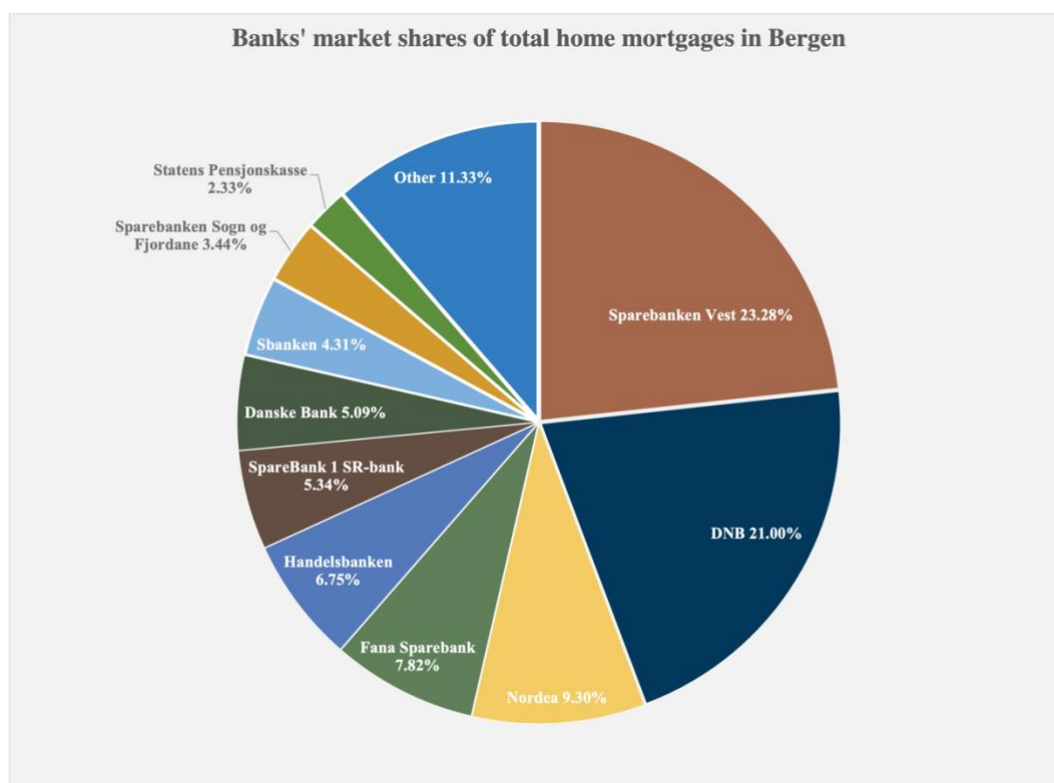
Figure 2 – The banks' market shares of total home mortgages in Bergen as of December 31, 2021

Figure 2 shows that DNB and Sparebanken Vest have the largest market shares in Bergen for mortgages, with market shares of 21% and 23.28% respectively.[5] The market share data gathered from the property register seem to be consistent with both information we have received from DNB and an anonymous bank, and market shares used in past research assessments. According to a representative from the anonymous bank, the bank's lending volume is roughly the same percentages as number of mortgages; the difference in percentage between the lending volume and the number of mortgages is only 0.09%.

Due to late market share information, the survey conducted in connection with this thesis does not include all of the banks with the top 10 market shares as answer options. Sparebanken Sogn og Fjordane and Statens Pensjonskasse, with the 9th and 10th largest market shares respectively, are not included as answer options. On the other hand, the eight banks with the largest market shares are included, and the respondents had the opportunity to write in the other banks in the "Others" alternative. Furthermore, we have excluded banks like Himla Bank and Bulder Bank as answer options, which can have two possible limitations. First,

---

[5] Bulder Bank is included in the market share for Sparebanken Vest, and Himla Bank is part of the market share for Fana Sparebank

respondents who are a customer at Bulder Bank may answer Sparebanken Vest. Second, the graph illustrating market shares shows Bulder Bank as a part of Sparebanken Vest. We have no way to distinguish between the customers of these banks. In the answer option "Other," eight respondents answered Bulder Bank. These respondents are not included as a part of the diversion ratios for Sparebanken Vest because it was not one of our concrete answer options, and the results from Sparebanken Vest may also have differed if we had included Bulder Bank as an option. Mentioning that respondents could answer Sparebanken Vest or including Bulder Bank as its own answer option could have improved our analysis and given a more valid result.

The market concentration in the Norwegian banking market is relatively high. The study calculate the Herfindahl-Hirschman Index (HHI) to measure market concentration and determine market competitiveness, pre and post the hypothetical merger between DNB and Sparebanken Vest (Hayes, 2021). Even if HHI is a simple metric that fails to account for the complexities of various markets, it can give an indication of the implications of the merger. Using the market shares from Figure 2, the pre-merger HHI for the mortgage market in Bergen has been calculated to ≈ 1395, which implies a moderately concentrated market (The Norwegian Competition Authority, 2021b).[6] A merger between DNB and Sparebanken Vest will result in an increased market concentration, with a HHI ≈ 2372, only looking at market shares and assuming 100% of the market shares are combined. Hence, the delta, the change in the HHI, is 978. The post-merger HHI is over 2000 and the change in HHI is over 150, which exceeds the threshold values (European Commission, 2004). This raises competition concerns, as there is a probability that the merger might harm competition, i.e., in terms of a significant increase in market power and increase of the prices. This lays the foundation for further analysis of the competitive proximity between DNB and Sparebanken Vest.

---

[6] See Appendix A for HHI threshold values and for calculations of HHI.

4. Data

4.1 Data source

The study's data is gathered by conducting an online customer survey with a random sample. For a good practice in terms of design, implementation and reporting, the survey builds on guidelines from the Competition and Markets Authority (2018). The participants in the survey answer hypothetical questions, demographical questions, and questions about their mortgage.[7] Among other things, the responses reveal preferred characteristics, price sensitivity and diversion. The survey data is essential for not only the analysis of the competitive proximity between DNB and Sparebanken Vest but also the comparison of marginal, non-marginal, and average respondents.

When designing a survey, it is necessary to first specify the target population (Hurley, 2011). The target population should include all the individuals that a researcher intends to study (Diamond, 2000), which in the current study is residents in Bergen who have an existing mortgage with either DNB or Sparebanken Vest. These are the people directly affected by a potential price increase, which may occur as a result of the merger. Additionally, they have direct knowledge for the relevant products and services. Furthermore, the subpopulations of interest should be clearly defined (Competition & Markets Authority, 2018, p. 10). In the current study, the subpopulations are the customers from each of the banks separately, and the marginal and the non-marginal customers. Asking everyone in the target population is time- and resource-demanding. Therefore, a representative sample must be drawn. In this light, the strategy is to obtain as many respondents as possible. This study employs the free-find sampling technique, because no customer lists on which residents have a mortgage with DNB or Sparebanken Vest are accessible (Competition & Markets Authority, 2018, p. 15). In this method, the sample is randomly drawn from a larger group than the target group before a screening question is used to eliminate respondents who do not belong in the target group.[8] When using the free-find sampling technique, it is important to ensure that the recruitment approach is robust, with clear standards for selecting households (Competition & Markets Authority, 2018, p. 16). In the current study, the selection of participants took place regardless

---

[7] The full-scale questionnaire is available in Appendix B.3.

[8] The participants answer the screening question: *Do you have a mortgage in DNB or Sparebanken Vest*? Respondents who answer that they do not have or do not know if they have a mortgage in the banks are eliminated from the survey.

of residents' age, gender, income, and nationality, which provides a representative sample of the target population where each resident have an equal probability of being included.

For the analysis to have full evidential weight, the survey should aim for a sample size with at least 100 respondents within any pre-defined group of interest (Competition & Markets Authority, 2018, p. 52). The minimum goal is 100 respondents from DNB and 100 respondents from Sparebanken Vest. Furthermore, we aim for 100 marginal and 100 non-marginal respondents to perform a valid comparison of marginal, non-marginal, and average customers.

Minimizing survey error should be of concern while designing a questionnaire. For good practice in design and presentation of questionnaires, see for instance the Competition and Market Authority (2018), Choi and Pak (2005), Edwards (2013) and Hurley (2011). The mentioned papers are used actively in the design of the survey in the current study. To minimize measurement error, we avoid asking several questions in one and emphasize simple wording. Furthermore, the questions are formed to be neutral, not leading the respondents to give certain answers, and are at an appropriate length to keep the respondents focused throughout the entire survey. Additionally, the order options are randomized to avoid order effect biases. These factors contribute to a well-designed questionnaire and increase the validity of our results.

Sampling error occurs when the sample size is not big enough to generalize the answers to the population they represent (Hurley, 2011). A smaller sample will give a lower degree of confidence to the estimator; hence we aim to secure a large and representative sample with acceptable margins of error via the data collection method and a well-designed questionnaire.

The next possible source of error is the response bias, which may be extremely damaging for the survey. People who are very interested in the subject or have strong opinions about it are more likely to participate in the survey than others, which may lead to exaggerated results. This may lead to biases towards certain groups of customers, and a low response rate may therefore damage the survey results' accuracy and reliability (Hurley, 2011). To prevent attracting more attention from some particular customer groups, we carefully consider what information the respondents receive when they get the questionnaire in the mailbox, giving only very general information about the survey. The age group 65+ may also lead to a possible non-response bias. People at this age may not be as familiar with QR codes and online surveys as younger people, which may result in a low number of participants from this group.

For the survey results to be informative, the representativeness of the sample is of fundamental importance. Coverage error can occur when all individuals in the population are not equally likely to be drawn. This is problematic when the under- or overrepresented respondents have different preferences than the rest of the population of interest (Hurley, 2011). We distribute the questionnaire in a variety of areas and neighborhoods throughout the municipality, so no areas have a higher probability of being picked. However, we do not have access to the mailboxes to many people that live in apartment complexes, as these often are locked on the inside. Therefore, with the exception of the apartment complexes, there is reason to believe that the likelihood of coverage error in our survey is relatively low.

4.2 Data collection

This survey's data collection strategy is the postal method, which is less expensive and time-consuming than approaches like face-to-face interviews and telephone interviews. Although it is difficult to estimate the exact number of persons in the target group, the postal method enables a distribution of the survey among a large number of residents. However, the response rate for postal surveys is lower than for other methods. The Competition and Markets Authority (2018) is hesitant to accord full evidential weight to surveys with a response rate of less than 5%. In order to maximize the likelihood of a response we implement the following initiatives: The design of the postal survey is visually appealing and well-organized, containing only the most important details, the respondents are guaranteed that their responses is treated confidentially, and the survey includes a respondent incentive, where the respondents have the opportunity to enter a drawing for a gift card.[9]

Prior to the full-scale survey, we undertook a first pilot study of the questionnaire to both identify potential deficiencies and secure an understandable format (Hurley, 2011) and a second pilot study to pre-test the data collection procedure (Van Teijlingen & Hundley, 2001). To uncover deficiencies and potential sources of error, it is required with 5 to 10 respondents from the target group (Gripsrud et al., 2010); 12 respondents from the target group participated in the first pilot study. The valuable feedback from the respondents indicated that the questionnaire was easily understandable and that the answer options were complementary.[10]

---

[9] The prize is a gift card (kr 1000) which can be used in Bergen City Center. To be trade-politically neutral, the respondents are given the option of changing the gift card to a location of their choice.
[10] The feedback from the respondents of the first questionnaire and the implemented changes are available in Appendix B.2.

Furthermore, the feedback lead to minor adjustments; hence the survey's face validity was improved (Taherdoost, 2016).[11] In the second pilot study, the full-scale questionnaire was distributed, in the mailbox, to 300 citizens in Bergen; 27 respondents participated, including 5 respondents with a mortgage at DNB and 8 respondents with a mortgage at Sparebanken Vest. This offers an overall response rate of 9.0% with 300 distributed questionnaires, which is an acceptable response rate and indicates that the data collection method is applicable.

The full-scale survey was distributed to many types of houses in different areas in Bergen to ensure a representative sample. The questionnaire was distributed over the course of 12 days in the period from March 1 to March 16. We drove to different areas, and distributed a note, in the mailboxes to the individuals in the sample, with an invitation to participate in the survey.[12] The note includes instructions for completing the survey and a QR code for accessing the questionnaire.[13] As a result of the Covid19-pandemic, more people are familiar with QR codes, which reduces non-response errors. To ensure that respondents who are unfamiliar with QR codes have the opportunity to participate in the survey, a URL link to access the survey and our contract information is included on the note.

A potential limitation with the postal method is that we do not ask the respondents shortly after a recent relevant decision. With the increased use of online-banking, it is difficult to know when each customer makes a relevant decision. In addition, conducting a survey on customers visiting a bank's branch is time-consuming and victim for coverage errors. Furthermore, the respondents complete the questionnaire without supervision or prompting, which may limit the complexity of questions that can be asked; yet, the extra time available to respondents in completing postal surveys may raise the quality of responses.

In total, 1020 respondents answered the questionnaire. With 13,700 notes distributed, the response rate for the full-scale study is 7.45%. There are 174 respondents from DNB and 138 respondents from Sparebanken Vest, with a distribution of 145 marginal respondents and 167 non-marginal respondents. The remaining respondents, who do not have a mortgage in DNB or Sparebanken Vest, are eliminated from the survey and analysis.

---

[11] Validity explains how well the collected data covers the intended area of investigation (Taherdoost, 2016). Face validity evaluates the questionnaire's feasibility, readability, uniformity of style and formatting, and the clarity of the language.

[12] A more precise description of time and place for the distribution of the survey is available in Appendix B.1.

[13] The full-scale questionnaire was quality assured by Roar Gjelsvik from the Norwegian Competition Authority, our supervisor Øivind Anti Nilsen and Lars Sørgard. The note is available in Appendix B.3.

5. Descriptive statistics

5.1 Demographic analysis

The ability to generalize the results requires a random selection of individuals (Altermatt, 2009).[14] For the sample to be representative of the rest of the population, the respondents must be balanced in terms of age and gender.

Figure 3 visualizes the gender distribution in the survey's sample. A total of 168 women and 144 men participated in the survey, resulting in a distribution of 53.85% women and 46.15% men. The citizens in Bergen (18–65+ years) in 2020 show a gender distribution of 49.94% women and 50.06% men (Statistics Norway, 2022b). On a general basis, women are more likely to participate in surveys than men (Curtin et al., 2000). This may explain the disparities in gender distribution in our sample and the gender distribution in Bergen. Hence, there is nothing that indicates that the sample is misrepresented in terms of the gender distribution.
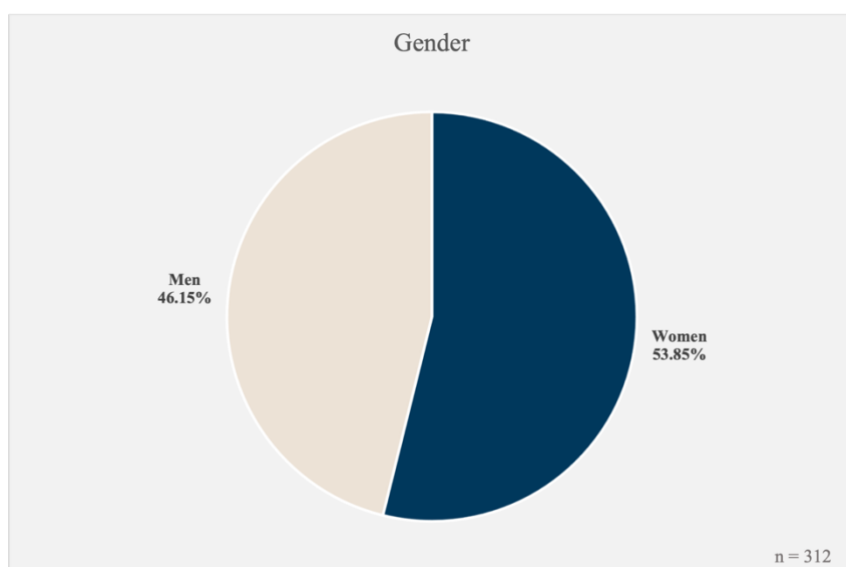
Figure 3 - Gender distribution in the survey sample

Figure 4 illustrates both the age distribution in the study's sample and the age distribution in Bergen (Statistics Norway, 2022b).[15] The age groups of 18–24 and 65+ years are underrepresented in the sample compared to the age distribution in Bergen, whereas the age

---

[14] A description of the random selection of individuals is available Appendix B.4

[15] The age distribution in Bergen is for the total population (18-65+ years) and not exclusively for inhabitants who hold a mortgage.

groups of 35–54 years are overrepresented. The response rate increases significantly between the youngest age group, with few respondents, and the age group of 35–44 years, with the greatest number of respondents. This supports the premise that few individuals buy a property at a young age, because they lack sufficient equity and income. The fact that many individuals take out a mortgage when they first start working, and hence have sufficient equity and income, may explain the increase in responses from 18–24 years to 35–44 years. A potential lack of knowledge of online surveys may explain the decrease in responses between the age group of 35–44 years and the age group of 65+ years. Furthermore, plausible explanations for the lower response rate from the age group of 65+ compared to the age group of 35–44 years is that when individuals get older, they pay off their mortgages and fewer people take out new mortgages. In light of these remarks, the age distribution in the sample appears to be representative, given what we expect of the population.
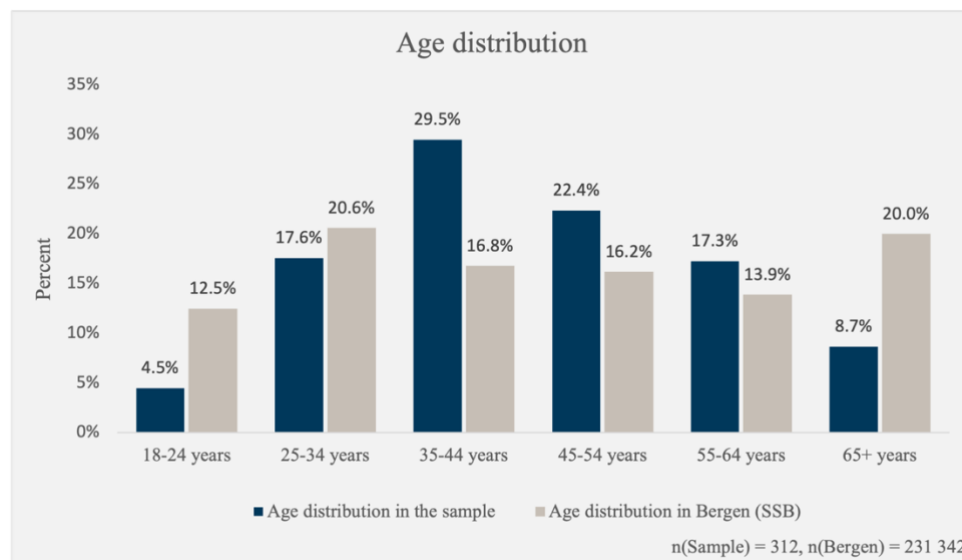
Figure 4 - Age distribution in the sample and in Bergen (2020)

Figure 5 displays a comparison between the level of education in the sample and in Bergen (Statistics Norway, 2022a). The statistics for the level of education in Bergen include 16-years-old inhabitants. Very few in this age group own their own home, which helps explain why the percentage with of participants with only compulsory schooling is much higher for Bergen than the sample. The sample shows that the higher the respondents' education, the greater the response rate in the sample. This supports the finding that those who are more educated and more affluent in general are more likely to participate in surveys than those who are less educated and less affluent (Goyder et al., 2002). In addition, people with higher education are more likely to earn a higher income and are thus more likely to own homes (Business Wire, 2016). In 2015, the difference in homeownership rates among those without a high school

diploma versus those with a bachelor's degree or higher was 28%. For these reasons and because the statistics for Bergen refer to the total population and not exclusively to those who hold a mortgage, it is plausible to claim that the sample appears to be representative, given what we expect from the population.
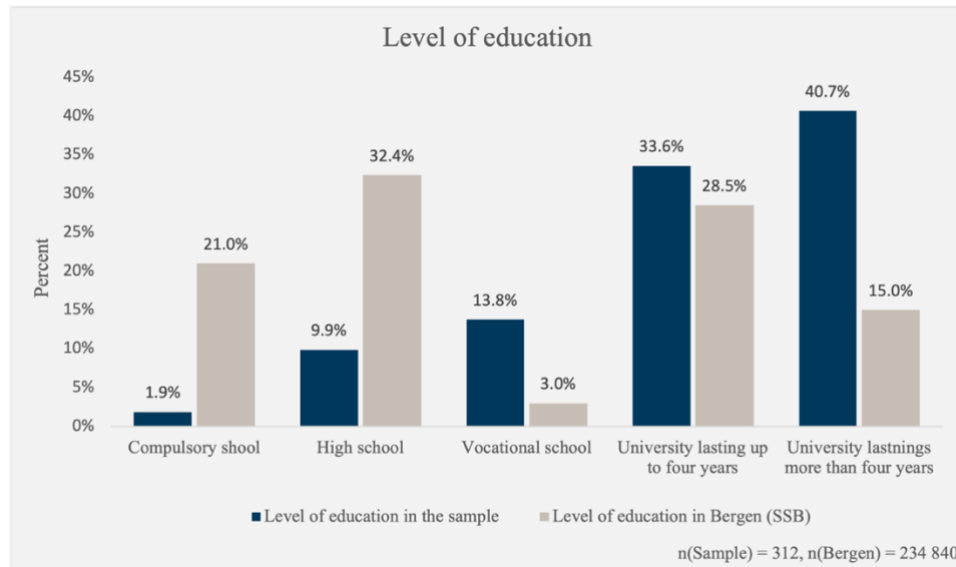
Figure 5 - Level of education in the sample and in Bergen (16-65+ years)

5.2 Importance of banks' characteristics

The respondents answered the following question regarding 10 different characteristics: *How important was the following characteristics when you chose your current mortgage bank?* To ensure content validity, it is important that the survey includes all necessary items (Boudreau et al., 2001). When examining the importance of characteristics when choosing a bank, non-price attributes such as competence, bank's location, and reputation in addition to price characteristics are included in the questionnaire.

For most of the characteristics, the respondents from DNB and Sparebanken Vest answer approximately the same way.[16] However, for the characteristics of (i) Interest rates or fees, (ii) Good customer service, and (iii) Bank's location, differences were revealed. The figures show the answers as a percentage of each of the banks' responses and are therefore comparable.

---

[16] See Appendix C.2 for full overview of the importance of the characteristics for DNB and Sparebanken Vest customers.
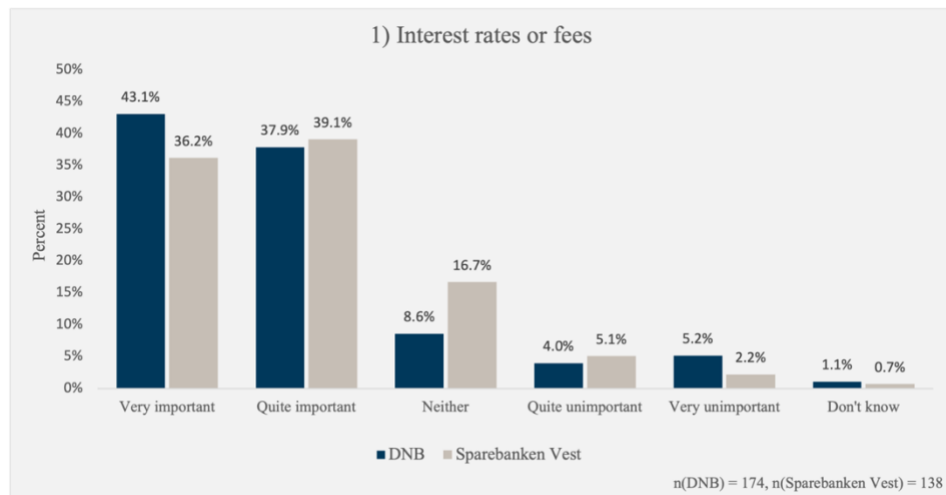
Figure 6 – Importance of Interest rates or fees when choosing mortgage bank

Figure 6 displays the responses to the question *How important were interest rates and fees when you chose your current mortgage bank?* According to the responses, DNB mortgage customers valued this characteristic significantly higher than Sparebanken Vest mortgage customers did when choosing their mortgage bank. In comparison to 36.2% respondents from Sparebanken Vest, 43.1% respondents from DNB considered the characteristic "Very important" when making their decision. The largest percentage of Sparebanken Vest customers consider the characteristic to be "Quite important," with 39.1%.
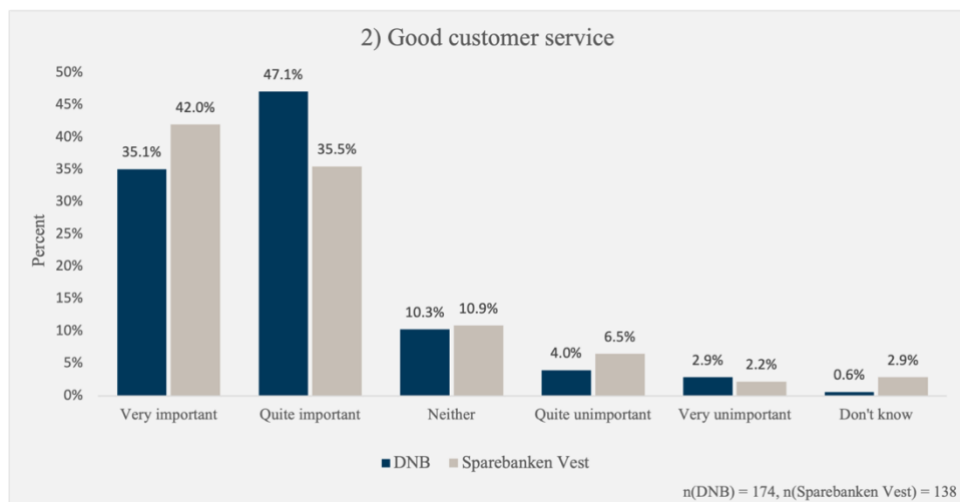
Figure 7 – Importance of Good customer service when choosing mortgage bank

Figure 7 shows an overview of the responses to the question *How important were good customer service when you chose your current mortgage bank?* The responses indicate that the characteristic was more important for Sparebanken Vest mortgagors. The highest percentage of the participants from Sparebanken Vest define "Good customer service" as

"Very important," with 42.0%. Furthermore, most DNB respondents define the characteristic as "Quite important," with 47.1%.
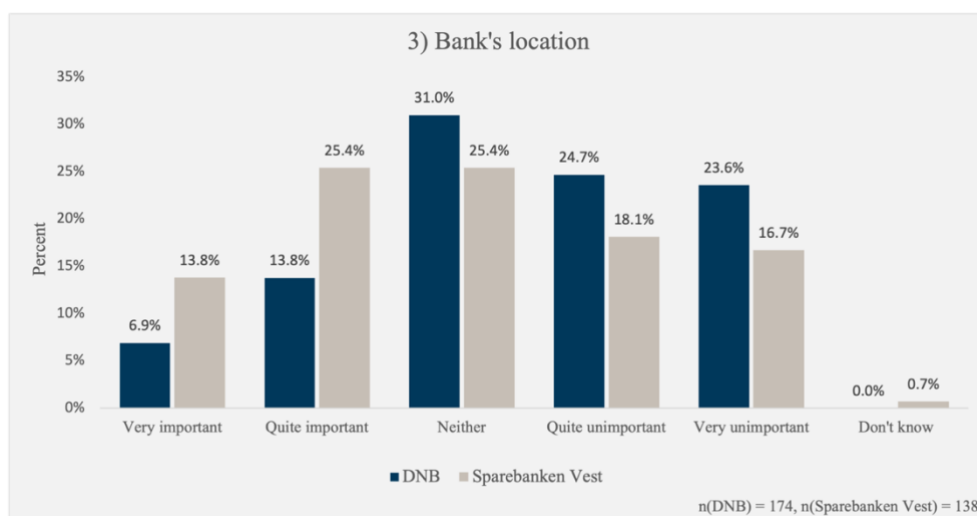
Figure 8 – Importance of Bank's location when choosing mortgage bank

Figure 8 displays an overview of the responses for the question *How important were bank's location when you chose your current mortgage bank?* Clearly, this characteristic was more important for Sparebanken Vest mortgagors than for DNB mortgagors. Compared to 6.9% of DNB respondents, 13.8% of Sparebanken Vest respondents define the characteristic as "Very important." In addition, 25.4% of Sparebanken Vest respondents define it as "Quite important," compared to 13.8% of the DNB respondents.
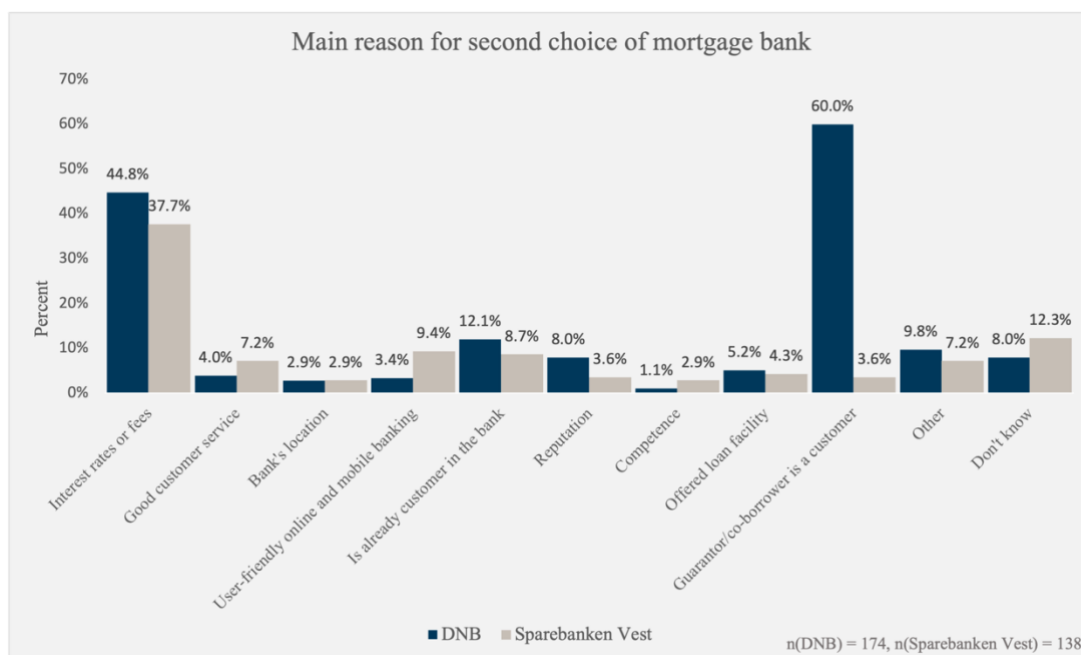
Figure 9 - Main reason for second choice of bank

Furthermore, Figure 9 displays the results from the question *What is the main reason for your second choice of mortgage bank?* According to the responses, the characteristic "Interest rates and fees" is definitely the most important characteristic for the majority of DNB and Sparebanken Vest mortgagors. We can also observe that Sparebanken Vest respondents are substantially more likely than DNB respondents to give "User-friendly online and mobile banking" and "Good customer service" as their main reason. On the other hand, more DNB respondents than Sparebanken Vest respondents identify "Reputation" and "Was already a customer with the bank" as the main reason. Furthermore, 8.0% of DNB respondents and 12.3% of Sparebanken Vest respondents give "Don't know" as the main reason, indicating that they are unfamiliar with the situation or feel they lack the knowledge to answer. When the option to answer "Don't know" is included, the frequency of that answer this increases, especially if it is explicitly presented (Hurley, 2011, p. 59); however, it is necessary to include it when one does not want to press respondents to provide an answer if they do not have one. Excluding the option may jeopardize the validity of the study.

5.3 Margin of error

It is improbable that each group will respond to the survey questions in precisely the same way, therefore sampling variation between various samples is a concern (Hurley, 2011). The margin of error describes how successfully the sample survey may be extrapolated to the target population. According to Hurley (2011) the marginal benefit of a growing sample size is diminishing. A growing sample size is a compromise since as the sample size grows, the time and cost of conducting the survey will grow as well.

To calculate the margin of error, we use the following formula:

$$(1) \quad m = \sqrt{Z^2 * \frac{p * (1 - p)}{n} * \frac{N - n}{N}}$$

where Z is the z-value, N is population size, n is the sample size and p is the sample proportion.

The sample size in this study, $n = 312$, is low in comparison to the population N. As a result, the formula's last term is omitted, leaving us with

$$(2) \quad m = \sqrt{Z^2 * \frac{p * (1 - p)}{n}}$$

We calculate the survey's margin of error to test the survey's overall reliability:

$$m = \sqrt{(1.96^2 * \frac{0.5 * (1 - 0.5)}{312})} = 5.55\%$$

where Z is equal to 1.96 for a confidence level of 95% and p is set to be 0.5.

The margin of error indicates that if the entire population responds to the survey, there is a 95% certainty that the answers are within +/- 5.55% of the surveyed answers. At a 95% confidence level, an acceptable margin of error is normally between 4% and 8% (Jahankhani et al., 2020, p. 229), which suggests that the 5.55% margin of error is acceptable. The margin of error can be applied to questions regarding where the respondents hold their mortgage, but not to queries about diversion ratios from one bank to another. As a result, we calculate the margin of error for DNB and Sparebanken Vest using Equation 2. [17]

Bank	Respondents	Calculated margin of error
DNB	174	7.43%
Sparebanken Vest	138	8.34%

Even if both margins of error are close to the threshold value of 8%, we accept these margins of error. The margins indicate that the results from the respondents from DNB and Sparebanken Vest have good reliability.

5.4 Price sensitivity

To detect price sensitivity and further diversion, the participants in the survey answer a price-diversion question and a forced-diversion question. The respondents first answer the price-diversion question, which makes it easier to distinguish between marginal and non-marginal customers (Competition & Markets Authority, 2018, p. 36). The current study finds the marginal respondents by asking the following price-diversion question: *What would you do if only your bank increased the mortgage interest rate with 0.25 percentage points?* This is equal

---

[17] See Appendix C.1 for the calculations of the margins of errors for the banks.

to a percentage increase of 12.5%. Normally, it is preferable to use absolute amounts to percentages in the diversion questions, as the participants may struggle to understand what an increase in percentage actually means (Competition & Markets Authority, 2018, p. 36). For this reason, the question also includes an example, "from 2.00% to 2.25%." Marginal respondents are those who answer that they would move their mortgage to another bank if the interest rate increased. Non-marginal respondents are those who answer that they would continue to have their mortgage at their current bank or that they do not know what they would do if the interest rate increased. The non-marginal respondents are further asked a forced-diversion question.[18]
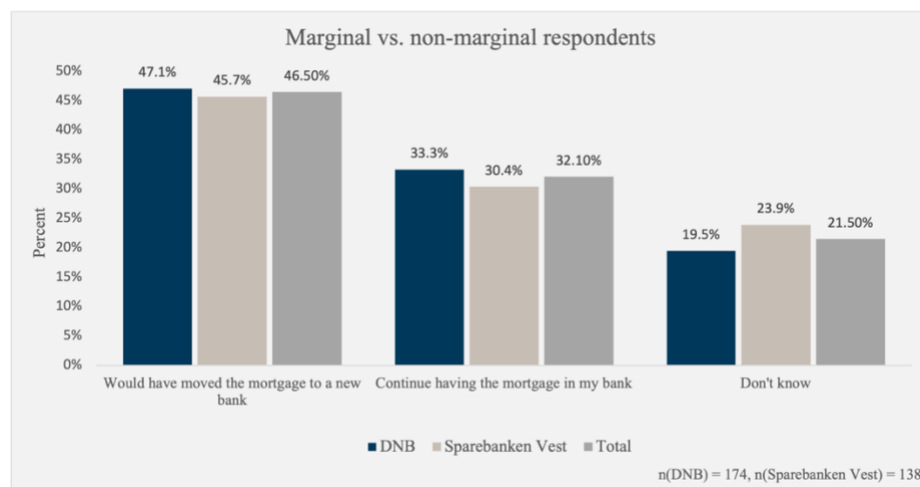
Figure 10 – Detection of marginal and non-marginal respondents

To examine the differences between marginal, non-marginal, and average customers, we calculate the margin of error for marginal and non-marginal respondents for all respondents:[19]

	Respondents	*Calculated margin of error*
Marginal (all respondents)	145	8.14%
Non-marginal (all respondents)	167	7.58%

We accept both margins of error even if the margin of error for the marginal respondents is 0.14% higher than the defined threshold value. One can use these margins of error for questions that do not distinguish between customers from DNB and Sparebanken Vest. If we

---

[18] The forced diversion question is a question about which bank the respondents would choose if their current bank was unavailable. This question is discussed and analyzed in Section 6.2.

[19] See Appendix C.1 for the calculations of the margin of error for marginal and non-marginal respondents.

want to distinguish between the banks here, we must calculate the margin of errors for marginal and non-marginal respondents from each bank.

	Respondents	*Calculated margin of error*
Marginal (DNB)	82	10.82%
Non-marginal (DNB)	92	10.22%
Marginal (Sparebanken Vest)	63	12.35%
Non-marginal (Sparebanken Vest)	75	11.32%

The margins of errors for marginal and non-marginal respondents from each bank are over the acceptable value of 8%, and the results for price sensitivity where we distinguish between the banks must therefore be interpreted cautiously.

When analyzing the differences between marginal and non-marginal customers, and hence average customers, in Stata, the dependent variable is a categorical dummy variable. The dummy variable, with the notation "Marginal," takes the value 0 if the respondent is non-marginal and the value 1 if the respondent is marginal. The analysis utilizes the logistic regression model, which is a modeling technique appropriate when the dependent variable is a dummy variable (Pfeifer, 2017). A standard procedure in economics is to use marginal effect, showing the predicted probabilities, when using a logistic regression.
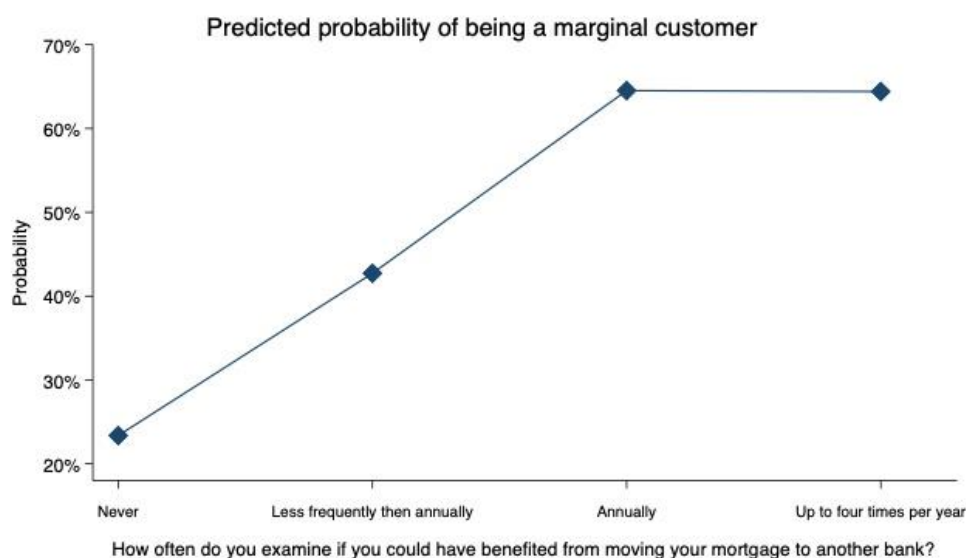

Figure 11 – The impact of examination frequency on the predicted probability of being a marginal customer

Figure 11 displays the predicted probability of being a marginal customer given how often the respondent examines if they could have benefited from moving their mortgage to another bank.[20] The predicted probability of being a marginal customer is 23.38% for someone who **never** examines it and 42.73% for someone who examines it **less frequently than annually**. Furthermore, if a respondent examines it **annually**, the likelihood of their being a marginal customer is 64.52%. Lastly, the predicted probability of being a marginal customer for someone who examines it **up to four times per year** is equal to 64.41%. The margins are statistically significant at a 95% confidence level, and they indicate that the more often the respondents examine whether they could have benefited from moving their mortgage to another bank, the higher the probability of being a marginal customer. An exception is from "annually" to "up to four times per year," where the margins are approximately the same.
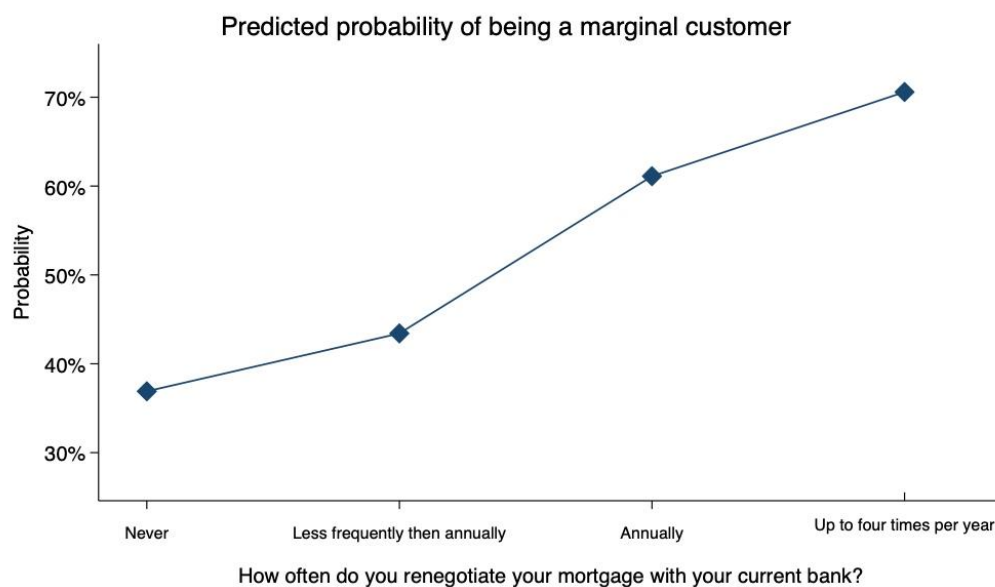
Figure 12 – The impact of renegotiation frequency on the predicted probability of being a marginal customer

Figure 12 displays the predicted probability of being a marginal customer given how often the respondent renegotiates their mortgage with their current bank.[21] The predicted probability of being a marginal customer for someone who **never** renegotiates is equal to 36.90%. It increases to 43.42% for someone who renegotiates **less frequently than annually**. For someone who renegotiates **annually,** the predicted probability of being a marginal customer is 61.11%. Lastly, if a respondent renegotiates their current mortgage **up to four times per**

---

[20] The Stata output for the predicted probabilities is available in Appendix C.3.

[21] The Stata output for the predicted probabilities is available in Appendix C.3.

year, the likelihood of their being a marginal customer is 70.59%. The margins are statistically significant at a 95% confidence level, and they indicate that the more often the respondents renegotiate their mortgage with their current bank, the higher the probability of being a marginal customer.

The results from the regressions and calculated margins in Figure 11 and Figure 12 indicate that marginal customers are more active in the banking market and take more advantage of the competition by renegotiating and by investigating offers from other banks. In addition, the difference between marginal and non-marginal customers implies that there is a difference in the responses between marginal and average customers.

Furthermore, the study examines whether there are significant differences between marginal and non-marginal respondents in terms of how important different characteristics were to them when they chose their current mortgage bank. If we can identify significant differences between marginal and non-marginal respondents, it indicates that we can distinguish between marginal and average customers patterns of behavior. The dependent variable in this logistic regression model is the dummy variable with the notation "Marginal," as explained above. The independent variables are the age groups and characteristics "Interest rates and fees," "Bank's location," "User-friendly online and mobile banking," "Was already a customer with the bank," and "Offered-loan facility".[22] The majority of the variables does not yield significant findings, indicating great similarities in what the marginal and non-marginal customers find important. When looking at this alone, it implies that there is minimal reason to differentiate between marginal and non-marginal respondents, and that the Norwegian Competition Authority is accurate in assuming that all respondents are non-marginal. However, the margins for the characteristics "Bank's location" and "Was already a customer with the bank" provide interesting findings.

Figure 13 displays the predicted probabilities of being a marginal customer given the importance of the characteristic "Was already a customer with the bank."[23] The predicted probability of being a marginal customer decreases from 61.15% for respondents who find the characteristic "Very unimportant" to 39.85% for respondents who find the characteristic neither important nor unimportant. The predicted probability of being a marginal customer for

---

[22] The Stata output for the predicted probabilities is available in Appendix C.3.
[23] The Stata output for the predicted probabilities is available in Appendix C.3.

the ones who answered "Quite important" and "Very important" is 42.66% and 43.38% respectively. The results indicate that marginal customers find the characteristic less important than non-marginal customers. The margins are statistically significant at a 95% confidence level.
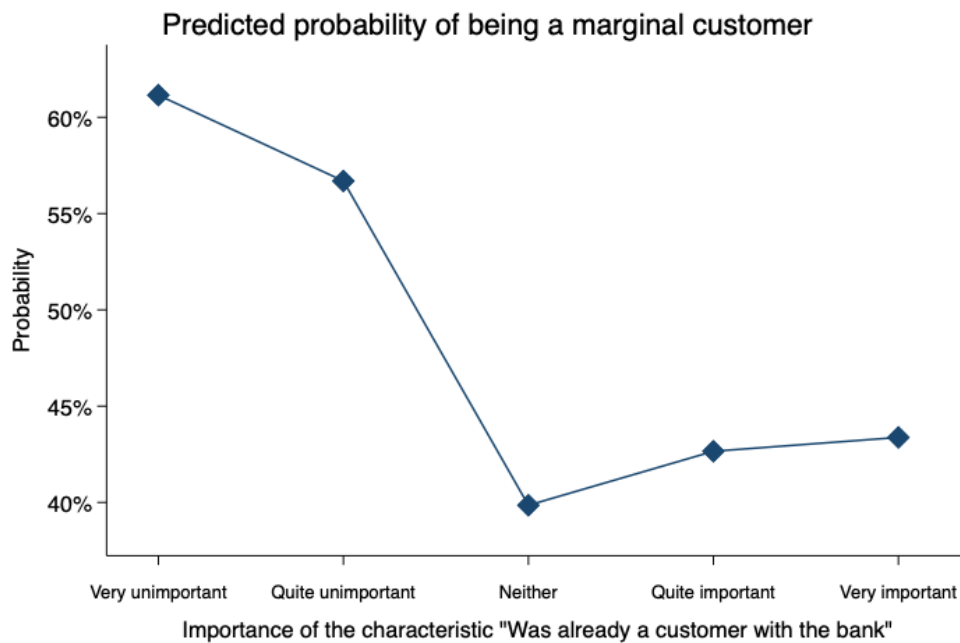
Figure 13 – The importance of the characteristic "Was already a customer with the bank" in terms of predicted probability of being a marginal customer

The study also treats the predicted probability of being a marginal customer based on the importance of the characteristic "Bank's location," as Figure 14 shows.[24] For this characteristic, the margins indicate that the more important the characteristic was in the choice of current mortgage bank, the higher the predicted probability of being a marginal customer. The predicted probability of being a marginal customer for those who responded "Very unimportant" is 38.69%, while the predicted probability is 65.54% for the respondents who answered that the characteristic was "Very important." The margins are statistically significant at a 95% confidence level.

---

[24] The Stata output for the predicted probabilities is available in Appendix C.3.
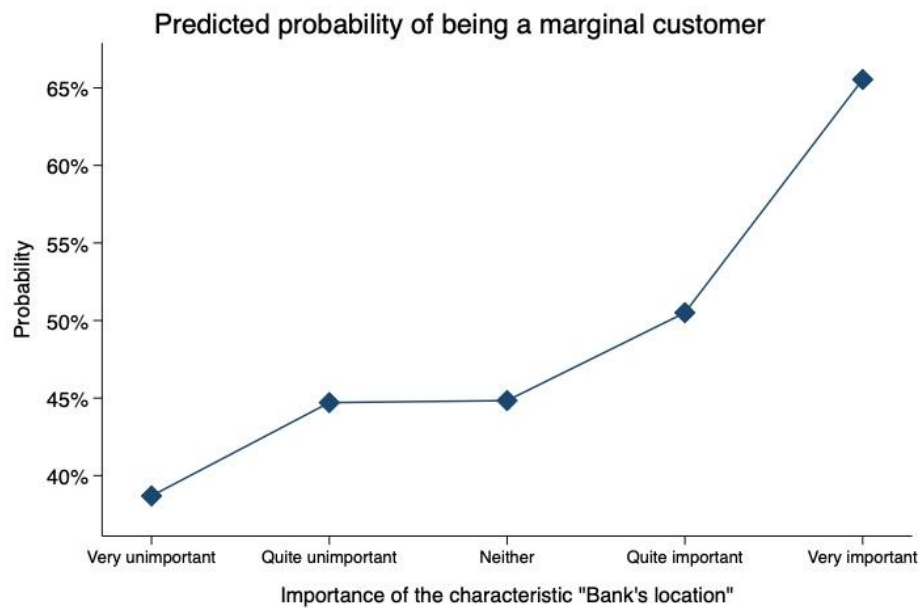
Figure 14 – The importance of "Bank's location" in terms of predicted probability of being a marginal customer

The results from Figure 13 and Figure 14 show that there are significant differences between marginal and non-marginal respondents, and hence, between marginal and average customers. Compared to the results for the other independent variables, the results for "Was already a customer with the bank" and "Bank's location" imply that the Norwegian Competition Authorities may make mistakes with only looking at non-marginal customers when examining corporate mergers using diversion ratios. Since the results for the different characteristics point in different directions and we want to examine differences in estimated diversion ratios, a further analysis of the distinctions between marginal, non-marginal and average customers follows in Section 6.2.

6. Analysis of the competitive situation

6.1 Critical loss

The current study conducts a critical loss analysis, which considers whether a hypothetical monopolist finds a price increase profitable, to analyze the competitive effects of mergers (O'Brien & Wickelgren, 2003). Critical loss refers to a decline in sales whereby profit after a price increase is equivalent to profit before the price increase (Hjelmeng & Sørgard, 2014, p. 151); if additional sales are lost, any price increases will be unprofitable. In other words, critical loss is the limit of what can be tolerated before a hypothetical monopolist chooses not to increase the price by certain amount.

The critical loss must be compared against the actual loss, which is the share of sales the hypothetical monopolist actually loses when the price increases (Hjelmeng & Sørgard, 2014, p. 149). If the actual loss is greater than the critical loss, this implies that the product has close substitutes that customers can switch to, making the price increase unprofitable. Hence, the market is undefined. On the other hand, if the actual loss is smaller than the critical loss, the market is relevant. To identify actual loss, usually the product's own-price elasticity and/or cross-price elasticity is needed. Information about elasticities is typically difficult to obtain, and finding it may necessitate extensive data collection and complex calculations (Hjelmeng & Sørgard, 2014, p. 158). However, diversion ratios instead of elasticities can be employed to make the analysis easier to implement (Sørgard, 2010, p. 28).

In order to derive the critical loss analysis mathematically, some assumptions have to be made. The first assumption is that the banks set the price to maximize profits (O'Brien & Wickelgren, 2003, p. 8) and they are price setters competing in a market characterized by Bertrand competition. The second assumption is that customers react equally to price increases and reductions, resulting in linear demand. The banks set price p, produce quantity q, and have a marginal cost c; the price after the price increase is represented by p^*. The change in quantity, Δq, is negative because increasing the price leads to a smaller quantity sold. A hypothetical monopolist will find the price increase profitable if $\pi(p^*) > \pi(p)$, where profit is given by $\pi = (p - c) * q$.

The size of the price increase multiplied by the quantity sold at the new price is represented by $\Delta p[q + \Delta q]$, that is the benefit to the hypothetical monopolist from the price increase. The

cost of the price increase, $-(p-c)\Delta q$, is equal to the pre-merger margin multiplied by the quantity reduction caused by the price increase. The benefit of the price increase is equal to the cost of the price increase if the following applies:

$$\Delta p[q + \Delta q] = -(p - c)\Delta q$$

The critical loss formula can be determined by dividing both sides of the equation by *pq:*

$$\frac{\Delta p}{p}\left[1 + \frac{\Delta q}{q}\right] = -\left(\frac{p - c}{p}\right)\frac{\Delta q}{q}$$

The critical loss is the percentage reduction in quantity, $-\frac{\Delta q}{q}$, that satisfies the condition above. Solving for the critical loss results in the following:

$$Critical\ loss = -\frac{\Delta q}{q} = \frac{\dfrac{\Delta p}{p}}{\dfrac{\Delta p}{p} + m}$$

where the margin *m* is equal to $\frac{p-c}{p}$.

Knowing that $\frac{\Delta p}{p}$ is simply the percentage price increase simplifies the critical loss formula. Hence, the symmetric critical loss for an *X* percent price increase and margin *m* is

$$Symmetric\ critical\ loss = \frac{X}{X + m}$$

In the current study, the price increase *X* is given by the percentage increase in the interest rate, and *m* is the bank's price-cost margin. The formula illustrates that, for a certain interest rate increase of *X* percent, the critical loss will be smaller the higher the bank's price-cost margin is. Implicitly, a larger margin results in a greater loss in profit for a given quantity reduction. Hence, the lower reduction in quantity is required for a given interest rate increase to be profitable.

The bank's price-cost margin, *m,* is given by the lending margin divided by the lending rate. The lending margin is the lending rate minus the money market rate, NIBOR. This is the most widely used benchmark rate for loan agreements in NOK between banks, for companies, and for bonds and interest rate derivatives; NIBOR reflects the price of unsecured interbank loans

in Norway (Tafjord, 2015). In February 2022, the banks' average lending margin was 1.00 (Statistics Norway, 2022c), and the NIBOR rate was 1.19 (Statistics Norway, 2022d).[25] This gives an average price-cost margin of $\frac{lending\ margin}{lending\ rate} = \frac{lending\ margin}{lending\ margin\ +\ NIBOR} = \frac{1.00}{1.00+1.19} =$ 0.4566 = 45.66%.[26] For additional calculations, the analysis uses the lending margin and NIBOR from February 2022 as the most recent update at the time of writing (April 25, 2022) and as the relevant data given the timing of our survey.

As mentioned in Section 5.4, we ask the respondents what they would do if the mortgage interest rate in their bank increased by 0.25 percentage points, from 2.00% to 2.25%. This is equivalent to a price increase of 12.5%. Normally, a price increase of 5%–10% is used. However, in some cases another level might be more appropriate to use (Competition Commission, 2003). The current study includes a higher price increase because a rise from 2.00% to 2.25% is a price increase familiar to respondents and hence easier for them to respond to. Choosing a different percentage increase might affect the validity of the dataset because the validity of the answers will be reduced if there are misperceptions relating to the price increase.[27] On this basis, namely the 12.5% interest rate increase and the price-cost margin of 45.66%, the critical loss for a symmetric price increase is the following:

$$Symmetric\ critical\ loss = \frac{0.1250}{0.1250 + 0.4566} = 0.2149 = 21.49\%$$

The symmetric critical loss is 21.49%. Hence, the profit after the price increase of 12.5% is equal to the profit before the price increase, with a decline in sales of 21.49%.

So far, we have merely assumed symmetric banks, with equal market shares and margins, and symmetric price increases. The assumption of symmetry between the banks is often unrealistic. Hence, we calculate the asymmetric critical loss.[28] In the case of asymmetric banks and an asymmetric price increase, where only one of the banks increases the price, we calculate the asymmetric critical loss with the following equation:

---

[25] To find the lending margin, the optional variable "Loans margin, total outstanding loans secured on dwellings" is used for the "Household" sector

[26] We have calculated critical loss from January 2021 to February 2022. The calculations show how lending margins and NIBOR affect the price-cost margins, and therefore the critical loss. See Appendix D.1 for the calculations and critical losses.

[27] See Appendix D.1 for the critical loss values in case of a 5% and a 10% price increase.

[28] Asymmetric banks are explained in Section 6.2.

$$Asymmetric\ critical\ loss\ = \frac{X}{m}$$

The price-cost margin, m, is still equal to 45.66%. There is no information regarding the price-cost margins for each bank, and this study therefore assumes that the banks' margins are equal. This can be a limitation for the study–when they are asymmetric, it is unlikely that the banks have equal margins.

Given the price-cost margin of 45.66% and the interest rate increase of 12.5%, the critical loss for an asymmetric price increase is the following:

$$Asymmetrical\ critical\ loss = \frac{0,1250}{0,4566} = 0.2738 = 27.38\%$$

The critical loss for the symmetric price increase for symmetric banks of 21.49% is smaller than the critical loss for an asymmetric price increase for asymmetric banks of 27.38%. Hence, symmetric banks will more easily meet the criterion for a profitable symmetric price increase, compared to an asymmetric price increase. Thus, the bank will choose to increase the price of both products. For asymmetric banks, the situation may be different. The diversion ratio one way can possibly be large enough for an asymmetric price increase to be profitable, while the symmetric price increase is not.

6.2 Diversion ratios

As stated above, price elasticities are not always available; thus, the critical loss analysis can be restructured into incorporate diversion ratios, which only require data from those participating in the proposed merger (Conlon & Mortimer, 2013, p. 2).

The diversion ratio from bank A to bank B is calculated using the following equation:

$$D_{ab} = -\frac{\frac{\partial q_b}{\partial p_a}}{\frac{\partial q_a}{\partial p_b}} = -\frac{\partial q_b}{\partial q_a}$$

Diversion ratios are normally grouped into customer diversion ratios and revenue diversion ratios. According to the Norwegian Competition Authority (2016, p. 103), revenue diversion ratios are suitable for direct interviews, and customer diversion ratios are suitable for online

surveys. Because the data is collected via an online customer survey and there is no available information on customer revenue, the current study exclusively examines the customer diversion ratio, which refers to the increase in unit sales of substitute B as a result of a price increase for product A, as opposed to a decrease in unit sales of product A (Oxera, 2009). In other words, the customer diversion ratio is the percentage of bank A customers who have bank B as their second choice.

Based on the answers of the survey's respondents, the following tables in this section show the calculated customer diversion ratios for marginal, non-marginal, and average respondents from DNB and Sparebanken Vest who have the banks in the left column as their second choice.

To distinguish between marginal and non-marginal customers, the participants first answer a price-diversion question. Marginal customers are price-sensitive customers who would switch to their second choice of bank if their current mortgage bank increased their interest rate by 0.25 percentage points.[29] The margin of error for marginal customers is 8.14%, as calculated in Section 5.4. Furthermore, the margin of error is 10.82% for respondents from DNB and 12.35% for respondents from Sparebanken Vest.[30] The results for marginal customer diversion must therefore be interpreted cautiously.

The marginal respondents answer the question *Which new bank would you move the mortgage to?* From this question, we calculate the diversion ratios. If a respondent is marginal but answers "Don't know" to the question of which bank, then the answer is partially informative for the current analysis; they say they will divert to another bank instead of staying with their current bank, but have no clear option. In these situations, it is common practice to allocate the "Don't know" responses in the same proportions as those who have selected the bank to which they want to divert (Competition & Markets Authority, 2018, p. 46). There are 37.24% "Don't know" responses to the question on which bank, which creates some uncertainty related to the estimates of the diversion ratios.

The higher the diversion ratio, the greater the risk that a merger between DNB and Sparebanken Vest would give rise to unilateral effects and that the two banks are close

---

[29] The participants in the survey answer to the price-diversion question *What would you have done if only your bank increased the mortgage interest rate with 0.25 percentage points? (E.g., from 2.00% to 2.25%)? Assume that it is not possible to renegotiate the mortgage interest rate.* This question is also discussed in Section 5.4.

[30] The Norwegian Competition Authority requires at least 100 respondents to accurately reflect reality. This study has 82 respondents from DNB and 63 respondents from Sparebanken Vest. The margins of error are calculated in Appendix C.1.

substitutes for the customers (Sørgard, 2015, p. 28). A hypothetical monopolist may therefore find it profitable to increase the price of both products.

Table 1 – Calculated marginal customer diversion ratios

	DNB	**Sparebanken Vest**
DNB	-	**13.51%**
Danske Bank	24.07%	8.11%
Fana Sparebank	5.56%	5.41%
Handelsbanken	3.70%	0.00%
Nordea	16.67%	8.11%
Sbanken	24.07%	27.03%
Sparebank 1 SR-bank	7.41%	8.11%
Sparebanken Vest	**9.26%**	-
Other	9.26%	29.73%

The marginal customer diversion from DNB to Sparebanken Vest is 9.26%, while the marginal customer diversion from Sparebanken Vest to DNB is 13.51%. However, both DNB and Sparebanken Vest have a higher marginal diversion to other banks. For DNB, the marginal customer diversion ratio is highest to Danske Bank and Sbanken, both with a diversion ratio of 24.07%. For Sparebanken Vest, the marginal customer diversion ratio is highest to Sbanken, with a diversion ratio of 27.03%.

Non-marginal customers are respondents who would continue to have their mortgage in their current bank or do not know what they would do if the bank increased the interest rate by 0.25 percentage points. To map the non-marginal diversion, we had the non-marginal respondents answer the following forced-diversion question: *Assume that you no longer can have the mortgage in your bank. Which bank would you choose then?* As for the marginal diversion, the "Don't know" responses are allocated in the same proportions as those who have selected the bank to which they want to divert (Competition & Markets Authority, 2018, p. 46). There

are 29.94% "Don't know" responses to the question on which bank, which creates some uncertainty related to the estimates of the non-marginal diversion ratios.

The margin of error for non-marginal customers in the current study is 7.58%, which is acceptable. Furthermore, the margin of error for non-marginal respondents for DNB is 10.22% and for Sparebanken Vest 11.32%, which is over the acceptable limit, and the results must therefore be interpreted cautiously.

Table 2 – Calculated non-marginal customer diversion ratios

	DNB	*Sparebanken Vest*
DNB	-	**11.11%**
Danske Bank	15.87%	5.56%
Fana Sparebank	7.94%	25.93%
Handelsbanken	6.35%	0.00%
Nordea	6.35%	1.85%
Sbanken	23.81%	31.48%
Sparebank 1 SR-bank	4.76%	5.56%
Sparebanken Vest	**20.63%**	-
Other	14.29%	18.52%

The non-marginal diversion from DNB to Sparebanken Vest is 20.63%, while the non-marginal diversion from Sparebanken Vest to DNB is 11.11%. The diversion from DNB to Sparebanken Vest is significantly higher than the diversion from Sparebanken Vest to DNB. This means that if we are only looking at non-marginal customers, then Sparebanken Vest is a closer substitute for DNB customers than DNB is for Sparebanken Vest customers. In addition, the result indicates that the banks are asymmetric. For both DNB and Sparebanken Vest, the highest non-marginal diversion is to Sbanken, with 23.81% and 31.48% respectively.

The Norwegian Competition Authority (2016) clarifies that the average diversion is the most relevant when analyzing competitive proximity using diversion ratios. Because there are usually not enough price-sensitive respondents for a reliable analysis, competition authorities

normally assume that all customers have the same responses and are non-marginal (Competition & Markets Authority, 2018, p. 36). It is unlikely that there is one home mortgage for the average customer that is preferred over all others, so we may say that home mortgages are horizontally differentiated. Regarding disparities between marginal and average customers, some argue that when products are horizontally differentiated, the results are unlikely to differ significantly (Competition Commission & Office of Fair Trading, 2011). This hypothesis is tested in the current study by investigating potential disparities in estimated diversion ratios among marginal, non-marginal, and average customers. The average customer diversion ratios are derived by using the average of all respondents in the sample, with the premise that the diversion for the two groups is equal, so the marginal and non-marginal respondents are neither distinguished or weighted (R. Gjelsvik 2022, personal communication, January 19). The margin of errors for average customers are lower than when we distinguish between marginal and non-marginal customers; using average diversion ratios will therefore improve the reliability of the survey. The margin of error is 7.43% for average respondents from DNB and 8.34% for average respondents from Sparebanken Vest.

Table 3 – Calculated customer diversion ratios for average customers

	DNB	**Sparebanken Vest**
DNB	-	**12.09%**
Danske Bank	19.66%	6.59%
Fana Sparebank	6.84%	17.58%
Handelsbanken	5.13%	0.00%
Nordea	11.11%	4.40%
Sbanken	23.93%	29.67%
Sparebank 1 SR-bank	5.98%	6.59%
Sparebanken Vest	**15.38%**	-
Other	11.97%	23.08%

The average diversion from DNB to Sparebanken Vest is 15.38%, while the average diversion from Sparebanken Vest to DNB is 12.09%. This means that the diversion both ways is relatively high and may indicate that it is profitable to increase the price of the products.

The following table displays an overview of the estimated diversion ratios for marginal, non-marginal, and average customers for DNB and Sparebanken Vest.

Table 4 – Comparison of estimated diversion ratios for marginal, non-marginal and average customers

Diversion from DNB to Sparebanken Vest			Diversion from Sparebanken Vest to DNB		
Marginal	**Non-marginal**	**Average**	**Marginal**	**Non-marginal**	**Average**
9.26%	20.63%	15.38%	13.51%	11.11%	12.09%

For the diversion ratio from DNB to Sparebanken Vest, there are significant differences in the estimated diversion ratios for marginal, non-marginal, and average customers. The marginal diversion ratio is significantly lower than the non-marginal diversion. This indicates that if the competition authorizes assume that all customers have the same responses and are non-marginal, they may come to another conclusion than if they also map marginal diversion. Furthermore, there are no big differences in the different estimated diversion ratios from Sparebanken Vest to DNB. This indicates that there are very small differences between marginal and non-marginal customers from Sparebanken Vest.

Furthermore, the current study examines the competitive proximity between DNB and Sparebanken Vest by incorporating the calculated average diversion ratios in three different scenarios of the critical loss analysis: with (i) symmetrical banks and a symmetric price increase, (ii) asymmetric banks and an asymmetric price increase, and (iii) asymmetric banks and a symmetric price increase. We utilize the symmetric and the asymmetric critical loss calculated in Section 6.1 in the following analyses.

Symmetric banks and a symmetric price increase

If we assume full symmetry between DNB and Sparebanken Vest, the actual diversion ratio $D_{ab} = D_{ba} = D$.

The unweighted average of the diversion ratios between the banks, D, is given by

$$D = \frac{D_{AB} + D_{BA}}{2} = \frac{15.38\% + 12.09\%}{2} = 13.74\%$$

The following condition is decisive for whether the two symmetric banks will benefit from a symmetric price increase:

$$D > \frac{X}{X + m}$$

A price increase is profitable when the actual diversion ratio, D, is greater than the critical diversion ratio. The symmetric critical diversion ratio, $\frac{X}{X+m}$, is equal to 21.49%, as calculated in Section 6.1. The actual diversion ratio of 13.74% is not greater than the critical diversion ratio of 21.49%. Therefore, assuming symmetric banks and a symmetric price increase, there is no evidence to conclude that DNB and Sparebanken Vest can benefit from a price increase if they merge. According to the results for the given margin and interest rate increase, there is no reason to believe that DNB and Sparebanken Vest are close competitors nor that a merger between them will engage anticompetitive behavior.[31]

Asymmetric banks

Asymmetric banks can be found by looking at their market shares. If one of the players has a large market share and the other a relatively small one, then there is asymmetry (Sørgard, 2010). In the relevant market for the current study, DNB and Sparebanken Vest have almost the same market share, with 21% and 23.28% respectively. Furthermore, the diversion ratios can be used to figure out whether there is asymmetry, which often reflects the market shares. If the diversion ratios between two players differ significantly, it is a sign of differences in market shares; a natural assumption is that a price increase on the part of the small actor would be profitable in a potential merger (Sørgard, 2010). The diversion ratios in the current study are very similar, with an average diversion from DNB to Sparebanken Vest equal to 15.38% and an average diversion from Sparebanken Vest to DNB equal to 12.09%. Nevertheless, the diversion ratios do differ, and it may be relevant to conduct an asymmetric test because of the

---

[31] A Z-test can be used to determine whether the diversion ratios are statically significant over the critical loss. However, it is not relevant in the current analysis since it is clear that the actual diversion ratio is lower than the critical diversion ratio.

banks' ability to differentiate their products, for instance, with regard to customer service and digital solutions.

Asymmetric banks and a symmetric price increase

In the first critical loss analysis with asymmetric banks, we assume a symmetric price increase. Because the banks have different market shares, the diversion ratios should be weighted according to the banks' respective market shares. DNB and Sparebanken Vest are assumed to have the same margins ($m = m_a = m_b$), but their sales volumes are different. The critical diversion ratio, 21.49%, remains unchanged from the analysis of symmetric banks and symmetric price increase.

When the weighted average diversion ratio is greater than the critical diversion ratio, DNB and Sparebanken Vest will enter into the same relevant market:

$$D_V > \frac{X}{X + m}$$

The weighted diversion ratio is as follows (Daljord & Sørgard, 2011):

$$D_V = D_{ab} * \frac{s_a}{s_a + s_b} + D_{ba} * \frac{s_b}{s_a + s_b}$$

D_{ab} is the diversion ratio from DNB to Sparebanken Vest, and D_{ba} is the opposite. The market shares for DNB and Sparebanken Vest are s_a and s_b respectively.

The weighted average diversion ratio between DNB and Sparebanken Vest is as follows:

$$D_V = 15.38\% * \frac{21.00\%}{21.00\% + 23.28\%} + 12.09\% * \frac{23.28\%}{21.00\% + 23.28\%} = 13.65\%$$

The weighted diversion ratio, 13.65%, is not greater than the critical diversion ratio of 21.49%. Therefore, it is reasonable to assume that the banks not are close competitors and that a merger not will result in anticompetitive behavior.

Asymmetric banks and an asymmetric price increase

With asymmetric banks and an asymmetric price increase, the banks will profit from a price increase if

$$D_{ab} \geq \frac{X}{m}$$

The asymmetric critical diversion ratio, $\frac{X}{m}$, is equal to 27.38%, as calculated in Section 6.1 The average diversion ratio is 15.38% from DNB to Sparebanken and 12.09% from Sparebanken Vest to DNB. None of these diversion ratios are greater than the critical diversion ratio, and there is no evidence leading us to believe that a merger between the banks will cause anticompetitive behavior.

The actual average diversion ratios are lower than the critical diversion ratios in all of the critical loss tests this study undertakes. This also accounts for actual marginal diversion ratios, implying that the result for competitive proximity in the study of this hypothetical merger will be, for the given margin and price increase, the same for marginal and average customers. Hence, no market is defined, and there is no evidence that a merger between DNB and Sparebanken Vest will cause anticompetitive behavior.

Potential mergers with other banks

Even though this study focuses on DNB and Sparebanken Vest, it might be interesting to look at the diversion ratios from DNB and Sparebanken Vest to other banks to see if there are any other intriguing relationships worth investigating in future studies.[32]

The highest average diversion ratio from both DNB and Sparebanken Vest is to Sbanken, with 23.93% and 29.67% respectively.[33] These diversion ratios do not reflect Sbankens market share in Bergen of 4.31%. However, Sbanken is an important challenger in the Norwegian banking market. The bank was the first purely online bank in Norway and has been named the best bank in Norway in terms of both customer satisfaction and mobile banking (Sbanken, 2021). The high diversion ratios to Sbanken indicate that many customers from DNB and Sparebanken Vest will choose Sbanken if they change banks and that there is significant competition between DNB and Sbanken, and between Sparebanken Vest and Sbanken. Even though we do not know the diversion ratios from Sbanken to DNB Sparebanken Vest, it is reasonable to assume that diversion ratios of this level would make a potential merged entity

---

[32] The data only includes the diversion ratios from DNB and Sparebanken Vest to the other banks, not the opposite direction.
[33] The diversion ratio from DNB to Sbanken was also high in the study performed by Oslo Economics. This study is explained in Section 1.1 and Section 2.2.

able to increase the price profitably with a symmetrical test. Furthermore, the diversion ratio from Sparebanken Vest to Sbanken is greater than the critical diversion ratio, which may indicate that an asymmetric price increase would be profitable.

In addition, DNB has got a relatively large average diversion ratio, 19.66%, to Danske Bank. Similarly, like DNB, Danske Bank is also a large and solid financial group, the largest in Denmark and the third-largest bank in Bergen and Norway (Danske Bank, n.d.). In this light, it is natural to assume that many customers see Danske Bank as a good substitute to DNB.

Lastly, Sparebanken Vest has a relatively big average diversion ratio, 17.58%, to Fana Sparebank, which is a local bank in Bergen that has been present for a long time and is well known and important to the local community, just like Sparebanken Vest. There are thus great similarities between these banks, and especially for those that wish to support a local bank that supports local projects, these banks are excellent substitutes.

6.3 Upward pricing pressure (UPP)

Farrell and Shapiro (2010) recommend the upward pricing pressure (UPP) test as an alternative to critical loss analysis. UPP considers whether a proposed corporate merger will cause a upward price pressure (Hjelmeng & Sørgard, 2014, p. 635). To determine whether a hypothetical merger is harmful to competition, the market must be delimited in a critical loss analysis, whereas UPP focuses directly on the incentives of the merged firms to increase post-merger prices (Das Varma, 2009).

For the UPP test, we assume full symmetry between DNB and Sparebanken Vest, in the sense that the marginal cost $c_A^M = c_B^M$, the price $p_1 = p_2$, and the diversion ratio $D_{AB} = D_{BA} = D$. The analysis bases the assumption of symmetry on the fact that DNB and Sparebanken Vest have nearly identical market shares and average diversion ratios.[34] Furthermore, the merging banks may want to examine a potential price increase for both banks' products (Farrell & Shapiro, 2010).

---

[34] The market shares for DNB and Sparebanken Vest are 21.00% and 23.28% respectively. The average diversion ratios are 15.38% from DNB to Sparebanken Vest and 12.09% from Sparebanken Vest to DNB.

The method requires limited information. There are three factors that are decisive for whether the merged banks have incentives to increase the price of the products as a result of a corporate merger (Sørgard, 2010, p. 30). The first factor is the size of the reduction in marginal cost, expressed by E. Second, the incentive to increase the price depends on D, which is the unweighted average of the diversion ratios between the banks; the value was calculated in Section 6.2 and is equal to 13.74%. The third factor is the profit on each unit of the products sold, which is expressed by the price-cost margin L.[35]

There will be an upward price pressure for DNB and Sparebanken Vest if

$$\frac{D}{1-D} > E * \frac{1-L}{L}$$

A post-merger upward price pressure is more probable (i) the smaller the reduction in marginal cost, (ii) the higher the price-cost margin and (iii) the higher the diversion ratios.

Farrell and Shapiro (2010) assert that mergers are frequently associated with competitive reductions and that mergers result in cost reductions. They propose utilizing a 10% reduction in marginal cost in the UPP analysis, because this is a small cost reduction that neither party has to prove. The price-cost margin is equal to 45.66%, as calculated in the critical loss analysis.

$$\frac{13.74\%}{1-13.74\%} > 10\% * \frac{1-45.66\%}{45.66\%} \quad \rightarrow \quad 15.93\% > 11.90\%$$

The critical diversion ratio of 11.90% is lower than 15.93%, indicating that a hypothetical merger between DNB and Sparebanken Vest would result in an upward price pressure; one can expect the prices to rise, as one bank will capture customers who leave the other as a result of a price increase. The findings in our test demonstrate that the merger would be scrutinized more closely by the competition authorities.[36] There is no need for any additional analyses in this study because we have already calculated diversion ratios and conducted a critical loss analysis where the results do not substantiate the results from the UPP test.

---

[35] This study assume an equal price-cost margin for all banks in the market. Hence, the critical diversion ratio is equal.

[36] The competition authorities receive a significant number of merger notifications (Mathiesen et al., 2012). Because the traditional tools for approving mergers that are not anticipated to have anti-competitive effects, market shares and market concentration, may be erroneous, the UPP-test can be used as an alternative screening method (Farrell & Shapiro, 2010).

7. Concluding remarks

In this thesis, we aimed to provide empirical evidence on how a hypothetical merger between DNB and Sparebanken Vest will affect the competitive situation in the mortgage market in Bergen. These banks were chosen because they are the largest banks in Bergen's mortgage market. A part of the analysis of the competitive proximity between the banks was whether we can distinguish between marginal, non-marginal, and average respondents' answers and estimated diversion ratios.

To collect data to answer the research question, we conducted a survey on a random sample of the target population. The target population was residents in Bergen who have an existing mortgage in either DNB or Sparebanken Vest. The questionnaire was distributed to 13,700 mailboxes. We achieved a total of 1020 respondents, including 174 respondents from DNB and 138 respondents from Sparebanken Vest. The data from the survey contained information regarding the respondents' mortgages, customer preferences, demography, price sensitivity and second choice of bank.

Several studies have used diversion ratios to investigate competitive proximity, both in the Norwegian banking market and in other markets. However, to the best of our knowledge, there are no previous studies on whether diversion ratios between marginal and average customers, as measured by a survey, differ in the Norwegian mortgage market. In the examination about whether we can distinguish between marginal, non-marginal, and average respondents' answers, we performed a logistic regression analysis by using predicted probabilities. We found that the more often the respondents examine whether they could have benefited from moving their mortgage to another bank and the more often the respondents renegotiate their mortgage with their current bank, the higher the probability of being a marginal customer. This implies that there is a difference between marginal and average customers, where marginal customers are more active in the banking market and take more advantage of the competition. On the other hand, in the examination of how important different characteristics were when they chose their current mortgage bank, we found that the majority of the characteristics does not yield significant findings, indicating great similarities in what the marginal and non-marginal customers find important. However, the characteristics "Was already a customer with the bank" and "Bank's location" show that there are significant differences between marginal and non-marginal respondents, and hence, between marginal and average customers. Moreover, there are significant differences between the marginal, non-

marginal, and average diversion ratio from DNB to Sparebanken Vest, which indicates that the competition authorities should not assume that all customers are non-marginal. Furthermore, there are no large distinctions in the marginal, non-marginal, and average diversion ratios from Sparebanken Vest to DNB and we cannot conclude that there are significant differences between marginal, non-marginal, and average customers. However, when distinguishing between marginal and non-marginal respondents from each bank, the margin of errors are not acceptable and we can therefore not provide statistically significant results. The results from this current study indicate that the competition authorities not should assume that all customers have the same responses and are non-marginal.

For the analysis of which implications a potential merger between DNB and Sparebanken Vest will have on the competitive situation, we examined the market concentration and calculated the HHI. The result from the HHI analysis indicates that a merger between the banks will result in increased market concentration, which raises competition concerns, as there is a probability that the merger might harm competition in terms of increased market power and increase of prices. Moreover, the result from the UPP test indicates that a merger will result in an upward pricing pressure; one bank can expect the prices to rise, as one bank will capture customers who leave the other as a result of a price increase. Furthermore, the diversion ratios between the banks are high, which indicate that a merger can give unilateral effects and that the two banks are close substitutes for the customers. DNB and Sparebanken Vest also have higher diversion ratios to other banks. To examine whether the banks will benefit from a price increase in the case of a merger, we incorporated both the marginal and average diversion ratios in the critical loss analyses; there are no evidence to conclude that the banks will benefit from a price increase if they merge, that they are close competitors not that a merger will engage anticompetitive behavior.

We have contradicting results for which implications a potential merger will have on the competitive situation in the mortgage market and some of the results must be interpreted cautiously. Given the large market shares in Bergen's mortgage market, it is reasonable to assume that the banks are close competitors and it is surprising that the critical loss analysis do not indicate that the banks not will benefit from a price increase and that they not are close competitors. Utilizing other price-cost margins, price increases and surveying a larger sample can give another result. Hence, it would be interesting to conduct a similar analysis of the competitive proximity on a greater sample in the future, utilizing the banks' real margins and using a lower price increase in the diversion questions.

8. References

Altermatt, B. (2009). External Validity. Retrieved 16.05.2022, from https://psych.hanover.edu/classes/ResearchMethods/Readings/External_Validity.pdf

Altunbaş, Y., & Marqués, D. (2008). Mergers and acquisitions and bank performance in Europe: The role of strategic similarities. *Journal of economics and business*, *60*(3), 204-222. https://doi.org/10.1016/j.jeconbus.2007.02.003

Anda, S. (2021). *Det vil bli færre og større sparebanker*. Finansfokus. Retrieved 20.04.2022 from https://www.finansfokus.no/2021/03/18/det-vil-bli-faerre-og-storre-sparebanker/

Andersen, E. (2014). Folkeveksten er høy, men avtar noe. *Samfunnsspeilet*(5). Retrieved 04.05.2022, from https://www.ssb.no/befolkning/artikler-og-publikasjoner/_attachment/210122?_ts=14aca2b7f80

Bank for International Settlements. (n.d.). *Basel III: international regulatory framework for banks*. Bank for International Settlements. Retrieved 24.04.2022 from https://www.bis.org/bcbs/basel3.htm

Beccalli, E., & Frantz, P. (2009). M&A operations and performance in banking. *Journal of Financial Services Research*, *36*(2), 203-226. https://link.springer.com/article/10.1007/s10693-008-0051-6

Beck, T., De Jonghe, O., & Schepens, G. (2013). Bank competition and stability: Cross-country heterogeneity. *Journal of financial Intermediation*, *22*(2), 218-244. https://doi.org/10.1016/j.jfi.2012.07.001

Bergen Næringsråd. (2021). *Finansbyen Bergen 2021 - En kartlegging av ressursgruppe finans*. https://bergen-chamber.no/media/4066/finansbyen-bergen-rapport.pdf

Boudreau, M., Gefen, D., & Straub, D. (2001). Validation in IS research: A state-of-the-art assessment. *25*, 1-24. Retrieved 27.03.2022, from https://www.semanticscholar.org/paper/Validation-in-Information-Systems-Research%3A-A-Boudreau-Gefen/e23671b8ff8b9cdaf5931195d50ec9160afeab10

Boyd, J. H., & De Nicolo, G. (2005). The theory of bank risk taking and competition revisited. *The Journal of finance*, *60*(3), 1329-1343. https://doi.org/10.1111/j.1540-6261.2005.00763.x

Business Wire. (2016). *Relationship Between Educational Attainment and Homeownership Becoming More Important, According to First American Homeownership Progress Index*. Retrieved 02.05.2022 from https://www.businesswire.com/news/home/20160505005314/en/Relationship-Between-Educational-Attainment-and-Homeownership-Becoming-More-Important-According-to-First-American-Homeownership-Progress-Index

Canta, C., Nilsen, Ø. A., & Ulsaker, S. (2018). *Competition in local bank markets: risk taking and loan supply*. https://konkurransetilsynet.no/wp-content/uploads/2019/02/13_2018-Bank.pdf

Choi, B. C., & Pak, A. W. (2005). Peer reviewed: a catalog of biases in questionnaires. *Preventing chronic disease*, *2*(1). https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1323316/

Clarke, C. (2005). *Somerfield plc and Wm Morrison Supermarkets plc: A report on the acquisition by Somerfield plc of 115 stores from Wm Morrison Supermarkets plc*. The Stationery Office.

Competition & Markets Authority. (2018). Good Practice in the Design and Presentation of consumer Survey Evidence in Merger Cases. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/708169/Survey_good_practice.pdf

Competition and Markets Authority. (2005). *Somerfield must sell 12 stores*. C. Commission. https://assets.publishing.service.gov.uk/media/5519480640f0b614010000f7/53-05.pdf

Competition Commission. (2003). *Merger references: Competition Commission Guidelines*. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.183.3516&rep=rep1&type=pdf

Competition Commission & Office of Fair Trading. (2011). Merger Assessment Guidelines. http://oft.gov.uk/shares_oft/mergers/642749/OFT1254.pdf

Conlon, C. T., & Mortimer, J. H. (2013). An experimental approach to merger evaluation. Retrieved 24.04.2022, from https://www.nber.org/papers/w19703

Curtin, R., Presser, S., & Singer, E. (2000). The effects of response rate changes on the index of consumer sentiment. *Public Opinion Quarterly*(64), 413-428. https://www.jstor.org/stable/pdf/3078736.pdf

Daljord, Ø., & Sørgard, L. (2011). Single-product versus uniform SSNIPs. *International review of law and economics*, *31*(2), 142-146. https://doi.org/http://dx.doi.org/10.2139/ssrn.1554963

Danske Bank. (n.d.). *Om oss*. Danske Bank. Retrieved 28.04.2022 from https://danskebank.com/no/om-oss

Das Varma, G. (2009). Will Use of the Upward Pricing Pressure Test Lead to an Increase in the Level of Merger Enforcement? Retrieved 29.04.2022, from https://heinonline.org/HOL/LandingPage?handle=hein.journals/antitruma24&div=9&id=&page=

DeYoung, R., Evanoff, D. D., & Molyneux, P. (2009). Mergers and acquisitions of financial institutions: A review of the post-2000 literature. *Journal of Financial services research*, *36*(2), 87-110. https://link.springer.com/article/10.1007/s10693-009-0066-7

Diamond, S. S. (2000). Reference guide on survey research. *Reference manual on scientific evidence*, *221*, 228. Retrieved 20.03.2022, from https://www.researchgate.net/profile/Shari-Diamond/publication/241465628_Reference_Guide_on_Survey_Research/links/0deec528ecac36a017000000/Reference-Guide-on-Survey-Research.pdf

DNB. (2022). Årsrapport 2021. Retrieved 09.05.2022, from https://www.ir.dnb.no/sites/default/files/DNB_Arsrapport_2021.pdf

DNB. (n.d.-a). *DNB-konsernet*. DNB. Retrieved 25.03.2022 from https://www.dnb.no/om-oss/om-dnb.html

DNB. (n.d.-b). *Historien vår*. DNB. Retrieved 25.03.2022 from https://www.dnb.no/om-oss/om-konsernet/historien-vaar.html

Edwards, K. (2013). *Estimating Diversion Ratios: Some Thoughts on Customer Survey Design*. Hart Publishing

Guidelines on the assessment of horizontal mergers under the Council Regulation on the control of concentrations between undertakings, (2004). https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex%3A52004XC0205%2802%29

Eurostat. (2021). *Home ownership rate in selected European countries in 2019 and 2020, by country*. Eurostat. Retrieved 23.05.2022 from https://www.statista.com/statistics/246355/home-ownership-rate-in-europe/

Farrell, J., & Shapiro, C. (2010). Antitrust evaluation of horizontal mergers: An economic alternative to market definition. *Available at SSRN 1313782*. https://doi.org/10.2139/ssrn.1313782

Figueiras, I., Gardó, S., Grodzicki, M., Klaus, B., & Lebastard, L. (2021). Bank mergers and acquisitions in the euro area: drivers and implications for bank performance. *Financial Stability Review*, *2*. https://www.ecb.europa.eu/pub/financial-stability/fsr/special/html/ecb.fsrart202111_02~33910adb15.en.html

Finans Norge. (n.d.). *Slik setter bankene boliglånsrenten*. Retrieved 01.05.2022 from https://www.finansnorge.no/tema/bank/slik-setter-bankene-boliglansrenten/

Finansdepartementet. (2000). *Konkurranseflater i finansnæringen*. Retrieved 03.05.2022 from https://www.regjeringen.no/no/dokumenter/nou-2000-9/id117179/?ch=5

Finansdepartementet. (2019). Tilpasninger i kapitalkravene for banker. https://www.regjeringen.no/contentassets/e983855b130241fdbd1688306a5e9695/horingsnotat-2096774.pdf

Ghaderi, H. (2021, 20.04). Konkurransetilsynet om bankfusjon: – Undersøker om det vil skade konkurransen. https://e24.no/boers-og-finans/i/R97zod/konkurransetilsynet-om-bankfusjon-undersoeker-om-det-vil-skade-konkurransen

Goyder, J., Warriner, K., & Miller, S. (2002). Evaluating socio-economic status (SES)

bias in survey nonresponse. *Journal of Official Statistics*(18(1)), 1-11. https://www.scb.se/contentassets/ca21efb41fee47d293bbee5bf7be7fb3/evaluating-socio-economic-status-ses-bias-in-survey-nonresponse.pdf

Gripsrud, G., Olsson, U. H., & Silkoset, R. (2010). *Metode og dataanalyse – Beslutningsstøtte for bedrifter ved bruk av JMP*. (2. ed.). Høyskoleforlaget.

Hagendorff, J., & Keasey, K. (2009). Post-merger strategy and performance: evidence from the US and European banking industries. *Accounting & Finance*, *49*(4), 725-751. https://doi.org/10.1111/j.1467-629X.2009.00306.x

Hagendorff, J., & Nieto, M. J. (2012). The Safety and Soundness Effects of Bank M&A in the EU: Does Prudential Regulation Have any Impact? https://doi.org/10.1111/j.1468-036X.2013.12022.x

Halleraker, N., & Wiig, G. (2008). *Empirisk undersøkelse av konkurransen i dagligvaremarkedet* https://openaccess.nhh.no/nhh-xmlui/bitstream/handle/11250/166304/A24_10_%281%29.pdf?sequence=1&isAllowed=y

Hayes, A. (2021). *Herfindahl-Hirschman Index (HHI)*. Investopedia. Retrieved 15.04.2022 from https://www.investopedia.com/terms/h/hhi.asp

Hetland, O. R., Mjøs, A., & Zhang, L. (2017). *Det norske bedriftsbankmarkedet: en beskrivende analyse av bankmarkedet for norske bedriftskunder* (8249109597). https://openaccess.nhh.no/nhh-xmlui/handle/11250/2573021

Hjelmeng, E. J., & Sørgard, L. (2014). *Konkurransepolitikk - Rettslig og økonomisk analyse*. Fagboklaget Vigmostad & Bjørke AS.

Holt, D. (2009). Diversion ratios: why does it matter where customers go if a shop is closed? Retrieved 18.05.2022, from https://www.oxera.com/wp-content/uploads/2018/07/Diversion-ratios-updated_1-1.pdf-1.pdf

Hurley, S. (2011). The use of surveys in merger and competition analysis. *Journal of Competition Law and Economics*, *7*(1), 45-68. https://doi.org/10.1093/joclec/nhq017

IBM. (2021). *Basel III Summary*. IBM. Retrieved 22.04.2022 from https://www.ibm.com/docs/en/bfmdw/8.8?topic=accord-basel-iii-summary

Jahankhani, H., O'Dell, L. M., Bowen, G., Hagan, D., & Jamal, A. (2020). *Strategy, Leadership, and AI in the Cyber Ecosystem: The Role of Digital Societies in Information Governance and Decision Making*. Academic Press.

Johannessen, R. G., & Skarstein, F. L. (2018). *Proximity in Bank-Borrower Relationships* https://beccle.no/files/2018/08/Masteroppgave-Skarstein-Johannessen.pdf

Jones, K. D., & Critchfield, T. (2005). Consolidation in the US banking industry: is the long, strange trip about to end. *FDIC Banking Rev.*, *17*, 31. https://doi.org/10.2139/ssrn.686101

Juelsrud, R. E., & Wold, E. G. (2020). Risk-weighted capital requirements and portfolio rebalancing. *Journal of Financial Intermediation*, *41*, 100806. https://doi.org/https://doi.org/10.1016/j.jfi.2018.10.002

Juranek, S., Nilsen, Ø. A., & Ulsaker, S. A. (2021). Bank consolidation, interest rates, and risk: A post-merger analysis based on loan-level data from the corporate sector. *NHH Dept. of Economics Discussion Paper*(20). https://doi.org/http://dx.doi.org/10.2139/ssrn.3985998

Juul, H. (2006). *Mobiliteten i den nordiske finansielle sektor*. Nordic Council of Ministers. https://doi.org/10.6027/TN2006-507

Klapper, L. F., Turk-Ariss, R., & Berger, A. N. (2008). *Bank Competition and Financial Stability*. https://www.researchgate.net/publication/24008322_Bank_Competition_and_Financial_Stability

Konjuhi, T., & Olsen, H. E. (2014). *En empirisk undersøkelse av konkurransen i bankmarkedet* https://openaccess.nhh.no/nhh-xmlui/bitstream/handle/11250/223582/masterthesis160.PDF?sequence=1&isAllowed=y

Legal Information Institute. (2021). *Too big to fail*. Cornell Law school. Retrieved 28.05.2022 from https://www.law.cornell.edu/wex/too_big_to_fail

Liu, H., Molyneux, P., & Nguyen, L. H. (2012). Competition and risk in South East Asian commercial banking. *Applied Economics*, *44*(28), 3627-3644. https://doi.org/10.1080/00036846.2011.579066

Martinez-Miera, D., & Repullo, R. (2010). Does competition reduce the risk of bank failure? *The Review of Financial Studies*, *23*(10), 3638-3664. https://doi.org/doi.org/10.1093/rfs/hhq057

Mathiesen, L., Nilsen, Ø. A., & Sørgard, L. (2011). Merger simulations with observed diversion ratios. *International review of law and economics*, *31*(2), 83-91. https://doi.org/10.1016/j.irle.2011.01.003 (International Review of Law and Economics)

Nilsen, Ø. A., Sørgard, L., Heimdal, K. W., & Solberg, K. J. (2016). *Competition and the riskiness of banks' loan portfolios*. https://www.eba.europa.eu/sites/default/documents/files/documents/10180/1431348/747ef905-f0d1-4a22-b2c9-b1816c753c4a/Paper%20-%20Session%202-%20Oivind%20A.%20Nilsen%20%28Norwegian%20School%20of%20Economics%29.pdf

Nordic Competition Authorities. (2006). *Competition in Nordic Retail Banking*. https://konkurransetilsynet.no/wp-content/uploads/2018/08/06_RETAIL_BANKING.pdf

Norges Bank. (2019). *Hvorfor er banker så viktige?* Norges Bank. Retrieved 26.03.2022 from https://www.norges-bank.no/kunnskapsbanken/finansiell-stabilitet/hvorfor-er-banker-sa-viktige/

Norges Bank. (2021a). Bank's market share of total loans in Norway 2020, by type of lender. https://www.statista.com/statistics/1054368/bank-s-market-share-of-total-loans-in-norway-by-type-of-lender/

Norges Bank. (2021b). Norway's Financial System. https://www.norges-bank.no/contentassets/97a4fd6249bb48c0a80cfef7ff64ddb1/nfs_norways-financial-system-2021.pdf?v=09/01/2021102524&ft=.pdf

Norges Bank. (2022a). *Financial Infrastructure Report*. N. Bank. https://www.norges-bank.no/contentassets/7437af41dbd94dbfaee9e7f0d231a3ba/financialinfrastructure_2022.pdf?v=05/20/2022142610&ft=.pdf

Norges Bank. (2022b). *Financial Stability Report*. N. Bank. https://www.norges-bank.no/contentassets/c4ffd169504b47249d646ed5753b0da0/financial_stability_2021.pdf?v=11/08/2021194448&ft=.pdf

Norges Bank. (2022c). *Monetary Policy Report with financial stability assessment*. N. Bank. https://www.norges-bank.no/contentassets/b3ee6e75f0a8406ea80e1ca624b6140b/mpr_1-22.pdf?v=04/01/2022141217&ft=.pdf

Norges Bank. (2022d). *The policy rate*. Retrieved 28.04.2022 from https://www.norges-bank.no/en/topics/Monetary-policy/Policy-rate/

Norges Bank. (2022e). *Rate decision May 2022*. Norges Bank. Retrieved 25.05.2022 from https://www.norges-bank.no/en/topics/Monetary-policy/Monetary-policy-meetings/2022/may-2022/

Norges Bank. (2022f). *Rentebeslutning mars 2022*. Retrieved 28.04.2022 from https://www.norges-bank.no/tema/pengepolitikk/Rentemoter/2022/mars-2022/

O'Brien, D. P., & Wickelgren, A. L. (2003). A critical analysis of critical loss analysis. *Antitrust LJ*, *71*. https://www.ftc.gov/sites/default/files/documents/reports/critical-analysis-critical-loss-analysis/wp254_0.pdf

OECD. (2000). Mergers in financial services. https://www.oecd.org/competition/mergers/1920060.pdf

Oslo Economics. (2021). *Konkurranseanalyse av DNBs oppkjøp av Sbanken*. Huseierne. Retrieved 18.05.2022 from https://www.huseierne.no/globalassets/rapporter/2021/osloeconomics-dnb-sbanken-for-huseierne-juni2021.pdf

Oxera. (2009). *Diversion Ratios: Why does it Matter Where Customers Go if a Shop is Closed?* Retrieved 22.04.2022 from https://www.oxera.com/wp-content/uploads/2018/07/Diversion-ratios-updated_1-1.pdf-1.pdf

Pfeifer, P. E. (2017). Logistic Regression: Modeling Dummy Dependent Variables. Retrieved 15.05.2022, from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2975105

Pihl, C. H. (2020). *Vær en aktiv bankkunde!* Huseierne. Retrieved 24.03.2022 from https://www.huseierne.no/nyheter/var-en-aktiv-bankkunde/

Sbanken. (2021). *Norges mest tilfredse kunder har Norges beste mobilbank!* Sbanken. Retrieved 01.05.2022 from https://sbanken.no/aktuelt/info/epsi-2021/

Scott, H. S. (2011). Written testimony of Hal S. Scott. Retrieved 20.04.2022, from https://financialservices.house.gov/uploadedfiles/061611scott.pdf

Skjæveland, M., Evertsen, C., Reiso, K. H., & Larsen, S. H. (2015). *Konkurransen i boliglånsmarkedet*. https://konkurransetilsynet.no/wp-content/uploads/2018/08/rapport_konkurransen-i-boliglansmarkedet1.pdf

Sparebanken Vest. (2022a). Regnskapspresentasjon 1.kvartal 2022. Retrieved 09.05.2022, from https://www.spv.no/om-oss/investor-relations/rapporter

Sparebanken Vest. (2022b). Årsrapport 2021. Retrieved 09.05.2022, from https://www.spv.no/om-oss/investor-relations/rapporter

Sparebanken Vest. (n.d.-a). *Bankens historikk*. Sparebanken Vest. Retrieved 24.03.2022 from https://www.spv.no/om-oss/om-banken/historikk

Sparebanken Vest. (n.d.-b). *Vi er her for deg*. Sparebanken Vest. Retrieved 24.03.2022 from https://www.spv.no/om-oss/om-banken

Statistics Norway. (2022a). Educational attainment of the population: 08921: Educational attainment, by county, age and sex (C) 1980 - 2020. Retrieved 01.05.2022, from https://www.ssb.no/en/statbank/table/08921/

Statistics Norway. (2022b). Population: 07459: Population, by sex and one-year age groups (M) 1986 - 2022. Retrieved 29.04.2022, from https://www.ssb.no/en/statbank/table/07459/

Statistics Norway. (2022c, 05.05.2022). *Renter i banker og kredittforetak*. SSB. Retrieved 24.04.2022 from https://www.ssb.no/en/statbank/table/10749/tableViewLayout1/

Statistics Norway. (2022d, 05.05.2022). *Renter i banker og kredittforetak*. SSB. Retrieved 25.04.2022 from https://www.ssb.no/en/statbank/table/10701/tableViewLayout1/

Sørgard, L. (2010). Økonomisk analyse av fusjoner og oppkjøp: Markedsavgrensning vs konkurranseanalyse. *Samfunnsøkonomisk Debatt SØD-22*, *10*. https://beccle.no/files/2011/08/sorgard-samfunnsokonomen.pdf

Sørgard, L. (2015). Vil konkurranse undergrave stabiliteten i banksektoren? *Samfunns- og næringslivsforskning AS*. https://openaccess.nhh.no/nhh-xmlui/bitstream/handle/11250/295773/A07_15.pdf?sequence=1&isAllowed=y

Sørgard, L. (2019). *Fungerer konkurransen i det norske bankmarkedet?* Finans Norge. Retrieved 01.04.2022 from https://www.finansnorge.no/contentassets/5e657baeea15450da125159cbc723039/lars-sogard-konkurransetilsynet-om-konkurransen-i-bankmarkedet.pdf

Tafjord, K. (2015). En dekomponering av NIBOR. https://www.norges-bank.no/contentassets/663366cca6b34474a98776964e55c798/aktuell_kommentar_3_2015.pdf?v=03/09/2017123154&ft=.pdf

Taherdoost, H. (2016). Validity and Reliability of the Research Instrument; How to Test the Validation of a Questionnaire/Survey in a Research. Retrieved 26.03.2022, from https://hal.archives-ouvertes.fr/hal-02546799/document

The Norwegian Competition Authority. (2016). *V2016-6 – offentlig versjon - Umoe Restaurants AS – Dolly Dimple's Norge AS – konkurranseloven § 16, jf. § 20 – inngrep mot foretakssammenslutning*. Retrieved 19.04.2022 from https://konkurransetilsynet.no/wp-content/uploads/2018/08/v2016-6-offentlig-versjon-umoe-restaurants-as-dolly-dimples-norge-as-konkurranseloven-16-jf-20-inngrep-mot-foretakssammenslutning.pdf

The Norwegian Competition Authority. (2021a). *Still considering to intervene against DNB's acquisition of Sbanken*. The Norwegian Competition Authority. Retrieved 18.05.2022 from https://konkurransetilsynet.no/still-considering-to-intervene-against-dnbs-acquisition-of-sbanken/?lang=en

The Norwegian Competition Authority. (2021b). *Vedtak V2021-13 - Offentlig versjon - DNB Bank ASA - Sbanken ASA - konkurranseloven § 16 - inngrep mot foretakssammenslutning - forbud*. Retrieved 20.04.2022 from https://konkurransetilsynet.no/wp-content/uploads/2022/01/V2021-13-Offentlig-versjon-DNB-Bank-ASA-Sbanken-ASA-konkurranseloven-§-16-inngrep-mot-foretakssammenslutnig-forbud.pdf

Torsvik, R. M. (1999). *Bankkrisen*. SSB. Retrieved 20.04.2022 from https://www.ssb.no/bank-og-finansmarked/artikler-og-publikasjoner/bankkrisen

Ubøe, J. (2021). *Statistikk for økonomifag* (6. utgave. ed.). Gyldendal.

Valgermo, J. (2014). *Empirisk undersøkelse av konkurransen i boliglånsmarkedet: anvendelse av diversjonsrater for fusjonsvurdering* https://openaccess.nhh.no/nhh-xmlui/handle/11250/222460

Van Teijlingen, E. R., & Hundley, V. (2001). The importance of pilot studies. *Department of Sociology: University of Surrey*(35). https://aura.abdn.ac.uk/bitstream/handle/2164/157/SRU35%20pilot%20studies.pdf?sequence=1&isAllowed=y

Vives, X. (2016). Competition and stability in banking. In *Competition and Stability in Banking*. Princeton University Press. https://doi.org/10.1515/9781400880904

Appendix A: Market Concentration

Threshold values

In a market with a post-merger HHI of less than 1000, the Commission is unlikely to find horizontal competition concerns (European Commission, 2004). In most cases, such markets do no necessitate extensive analysis. A post-merger HHI between 1000 and 2000 and a delta below 250 is unlikely to raise competition concerns. Likewise, a post-merger HHI over 2000 and a delta below 150 is unlikely to raise competition concerns.

Calculations

The HHI is calculated by summing the squares of all of the market's individual market shares (European Commission, 2004):

$$HHI = \sum_{i=1}^{n} (MS_i)^2$$

MS = the market share percentage of bank i.

Calculation of the pre-merger HHI for the home mortgage market in Bergen:

$$HHI = 23.28^2 + 21.00^2 + 9.30^2 + 7.82^2 + 6.75^2 + 5.34^2 + 5.09^2 + 4.31^2 + 3.44^2 + 2.33^2 + 11.33^2 = 1394.79 \approx 1395$$

Calculation of the post-merger HHI for the home mortgage market in Bergen:

$$HHI = 44.28^2 + 9.30^2 + 7.82^2 + 6.75^2 + 5.34^2 + 5.09^2 + 4.31^2 + 3.44^2 + 2.33^2 + 11.33^2 = 2372.55 \approx 2373$$

Appendix B: Research Methodology

B.1 Data collection

Table 5 - Overview of time for data collection and number of sheets distributed

Area	Date	Day	Time	Number of sheets
Ytre Sandviken, Eidsvåg	March 01	Tuesday	12:00-16:00	900
Åsane	March 02	Wednesday	12:00-16:00	900
Tertnes	March 03	Thursday	12:00-16:00	900
Laksevåg	March 04	Friday	12:00-16:00	950
Årstad, Minde	March 08	Tuesday	10:00-16:00	1000
Fyllingsdalen	March 09	Wednesday	08:30-16:00	1300
Fyllingsdalen, Bønes	March 10	Thursday	08:30-14:30	1600
Loddefjord	March 11	Friday	14:00-18:30	1000
Loddefjord	March 13	Sunday	16:30-19:30	600
Søreide, Sandsli	March 14	Monday	10:00-16:30	1800
Rådal, Skjold	March 15	Tuesday	09:30-16:30	2100
Hop, Paradis	March 16	Wednesday	11:30-15:00	650
Total		*12 days*	*60 hours*	*13,700 sheets*

Figure 15 – Note distributed in the mailboxes

B.2 Pilot studies

Prior to the first pilot study, our supervisor Øivind Anti Nilsen and Roar Gjelsvik from the Norwegian Competition Authority gave feedback on the questionnaire; the evaluation by experts in the study field improve the content validity (Taherdoost, 2016). Nilsen suggested us to include a question regarding how long the respondent has had their existing mortgage in their current bank. Furthermore, Gjelsvik mentioned that the questionnaire was well-organized, but he recommended to include "Don't know" as an answer option for question 1 and suggested that we should change the formulation in question 7 and question 8.

The 12 respondents in the first pilot study also provided feedback on the pilot questionnaire. The pilot questionnaire is available on request. The respondents' remarks, as well as potential changes are displayed:

Feedback 1: *The question about how important different characteristics are in the choice of mortgage bank is missing one characteristic: A family member is co-borrower.*

We included the characteristic "Guarantor/co-borrower is customer with the bank" as an alternative both in the mentioned question and the question regarding the most important characteristic for the second choice of bank.

Feedback 2: *SpareBank 1 SR-bank should be included instead of SpareBank 1, because it is SpareBank 1 SR-bank that has offices in Bergen.*

We changed to SpareBank 1 SR-bank, based on the fact that SpareBank 1 is an alliance.

Feedback 3: *Should consider to include Sparebanken Sogn og Fjordane as an alternative where different banks are listed.*

Even if Sparebanken Sogn og Fjordane has an office in Bergen, it was not included as an alternative because of an assumed low market share and the option to choose "Other".

Feedback 4: *The question about what the action will be if the mortgage interest rate increases is missing one option: Renegotiate the mortgage interest rate with the current mortgage bank. In addition, two respondents commented that it depends how the mortgage interest rates are in the other banks.*

We discussed different options and possibilities. Because only one respondent commented on the lack of an option that includes renegotiation and the potential overlap with "Continue having the mortgage with my bank", this option was not included. Instead, a clarifying sentence was added: "Assume that it is not possible to renegotiate the mortgage interest rate".

B.3 Full-scale questionnaire

The questionnaire was originally provided in Norwegian. The original questionnaire is available on request.

Q1 Do you have a mortgage in DNB or Sparebanken Vest? **(Mandatory, single)**
[ ] Yes, in DNB
[ ] Yes, in Sparebanken Vest
[ ] No (Screened out of the survey)
[ ] Don't know (Screened out of the survey)

Q2 For how long have you had your mortgage in your current bank?
(Mandatory, single)

[ ] 0–3 years
[ ] 4–7 years
[ ] 8–11 years
[ ] 12+ years
[ ] Don't know

Q3 How important were the following characteristics when you chose your current mortgage bank?
(Mandatory, single per characteristic)
Answer options per characteristic: Very important, Quite important, Neither, Quite unimportant, Very unimportant, Don't know

1) Interest rates or fees
2) Good customer service
3) Bank's location
4) User-friendly online banking and mobile banking
5) Was already a customer with the bank
6) Reputation
7) Competence
8) Offered-loan facility
9) Guarantor/co-borrower was a customer with the bank

Q4 How often do you examine if you could have benefited from moving your mortgage to another bank?
(Mandatory, single)

[ ] Up to four times per year
[ ] Annually
[ ] Less frequently than annually
[ ] Never
[ ] Don't know

Q5 How often do you renegotiate your mortgage with your current bank?
(Mandatory, single)

[ ] Up to four times per year
[ ] Annually
[ ] Less frequently than annually
[ ] Never
[ ] Don't know

Q6 How do you think it is to find information about change of bank?
(Mandatory, single)

[ ] Very difficult
[ ] Quite difficult
[ ] Neither
[ ] Quite easy
[ ] Very easy
[ ] Don't know

Q7 Which of the following situations suit you?
(Mandatory, single, randomized besides "None of the situations suit me")

[ ] I have taken out a new mortgage during the three last years
[ ] I have moved existing mortgage to a new bank during the three last years
[ ] I have considered moving the mortgage to a new bank during the three last years
[ ] None of the situations suit me

Q7.1 is only displayed if "I have moved existing mortgage to a new bank during the three last years" is selected in Q7
Q7.1 Which bank did you move the mortgage from?
(Mandatory, single, randomized besides "Other" and "Don't know")

[ ] DNB
[ ] Danske Bank
[ ] Fana Sparebank
[ ] Handelsbanken
[ ] Nordea
[ ] Sbanken
[ ] SpareBank 1 SR-bank
[ ] Other: _____
[ ] Don't know

Q8 What would you have done if only your bank increased the mortgage interest rate with 0.25 percentage points? (E.g., from 2.00% to 2.25%)? Assume that it is not possible to renegotiate the mortgage interest rate.
(Mandatory, single, randomized besides "Don't know")

[ ] Would have moved the mortgage to a new bank
[ ] Continue having the mortgage in my bank
[ ] Don't know

Q8.1 is only displayed if "Would have moved the mortgage to a new bank" is selected
Q8.1 Which new bank would you move the mortgage to?
(Mandatory, single, randomized besides "Other" and "Don't know", DNB/Sparebanken Vest is removed as an answer option for respondents who chose on of the banks in Q1)

[ ] DNB
[ ] Danske Bank
[ ] Fana Sparebank
[ ] Handelsbanken
[ ] Nordea
[ ] Sbanken
[ ] SpareBank 1 SR-bank
[ ] Other: _____
[ ] Don't know

Q8.2 is only displayed if "Continue having the mortgage in my bank" or "Don't know" is selected in Q8
Q8.2 Assume that you no longer can have the mortgage in your bank. Which bank would you choose then?
(Mandatory, single, randomized besides "Other" and "Don't know", DNB/Sparebanken Vest is removed as an answer option for respondents who chose one of the banks in Q1)

[ ] DNB
[ ] Danske Bank
[ ] Fana Sparebank
[ ] Handelsbanken
[ ] Nordea
[ ] Sbanken
[ ] SpareBank 1 SR-bank
[ ] Other: _____
[ ] Don't know

Q9 What is the main reason for your second choice of mortgage bank?
(Mandatory, single, randomized besides "Other" and "Don't know")

[ ] Interest rates or fees
[ ] Good customer service
[ ] Bank's location
[ ] User-friendly online banking and mobile banking
[ ] Was already a customer with the bank
[ ] Reputation
[ ] Competence
[ ] Offered-loan facility
[ ] Guarantor/co-borrower was a customer with the bank
[ ] Other: _____
[ ] Don't know

Q10 Gender
(Mandatory, single, randomized)

[ ] Man
[ ] Woman

Q11 Age
(Mandatory, single)

[ ] 18-24
[ ] 25-34
[ ] 35-44
[ ] 45-54
[ ] 55-64
[ ] 65+

Q12 Education
(Mandatory, single)

[ ] Compulsory school (10-year compulsory school)
[ ] High school
[ ] Vocational school - Vocational education
[ ] University or college of higher education lasting up to four years
[ ] University or college of higher education lasting more than four years

Q13 Would you like to be entered into a drawing for a gift card?
(Mandatory, single)

[ ] Yes, _____ (The personal information cannot be linked to the respondents answers
[ ] No

Appendix C: Descriptive Statistics

C.1 Margin of error

Calculation of the margin of error for DNB:

$$m = \sqrt{(1.96^2 * \frac{0.5 * (1 - 0.5)}{174})} = 7.43\%$$

Calculation of the margin of error for Sparebanken Vest:

$$m = \sqrt{(1.96^2 * \frac{0.5 * (1 - 0.5)}{138})} = 8.34\%$$

Calculation of the margin of error for marginal respondents (everyone):

$$m = \sqrt{(1.96^2 * \frac{0.5 * (1 - 0.5)}{145})} = 8.14\%$$

Calculation of the margin of error for non-marginal respondents (everyone):

$$m = \sqrt{(1.96^2 * \frac{0.5 * (1 - 0.5)}{167})} = 7.58\%$$

Calculation of the margin of error for marginal respondents (DNB):

$$m = \sqrt{(1.96^2 * \frac{0.5 * (1 - 0.5)}{82})} = 10.82\%$$

Calculation of the margin of error for non-marginal respondents (DNB):

$$m = \sqrt{(1.96^2 * \frac{0.5 * (1 - 0.5)}{92})} = 10.22\%$$

Calculation of the margin of error for marginal respondents (Sparebanken Vest):

$$m = \sqrt{\left(1.96^2 * \frac{0.5 * (1 - 0.5)}{63}\right)} = 12.35\%$$

Calculation of the margin of error for non-marginal respondents (Sparebanken Vest):

$$m = \sqrt{\left(1.96^2 * \frac{0.5 * (1 - 0.5)}{75}\right)} = 11.32\%$$

C.2 Description of the survey's results

Number of years holding a mortgage in current bank

n(DNB) = 174, n(Sparebanken Vest) = 138

Degree of difficulty: Find information about change of bank

n(DNB) = 174, n(Sparebanken Vest) = 138

How often do you examine if you could have benefited from moving your mortgage to another bank?

	Up to four times per year	Annually	Less frequently than annually	Never	Don't know
DNB	22.4%	20.1%	34.5%	21.8%	1.1%
Sparebanken Vest	14.5%	19.6%	36.2%	28.3%	1.4%

■ DNB   ■ Sparebanken Vest

n(DNB) = 174, n(Sparebanken Vest) = 138

How often do you renegotiate your mortgage with your current bank?

	Up to four times per year	Annually	Less frequently than annually	Never	Don't know
DNB	6.9%	18.4%	47.7%	25.9%	1.1%
Sparebanken Vest	3.6%	15.9%	50.0%	28.3%	2.2%

■ DNB   ■ Sparebanken Vest

n(DNB) = 174, n(Sparebanken Vest) = 138

Which of the following situations suit you?

	I have taken out a new mortgage during the three last years	I have moved existing mortgage to a new bank during the three last years	I have considered moving the mortgage to a new bank during the three last years	None of the situations suit me
DNB	26.4%	2.9%	29.3%	41.4%
Sparebanken Vest	29.0%	13.0%	27.5%	30.4%

■ DNB   ■ Sparebanken Vest

n(DNB) = 174, n(Sparebanken Vest) = 138

How important were the following characteristics when you chose your current mortgage bank?

4) User-friendly online banking and mobile banking

	Very important	Quite important	Neither	Quite unimportant	Very unimportant	Don't know
DNB	43.7%	39.1%	9.8%	1.7%	4.6%	1.1%
Sparebanken Vest	38.4%	37.7%	9.4%	5.1%	7.2%	2.2%

n(DNB) = 174, n(Sparebanken Vest) = 138

5) Was already a customer in the bank

	Very important	Quite important	Neither	Quite unimportant	Very unimportant	Don't know
DNB	27.0%	25.3%	22.4%	10.3%	13.2%	1.7%
Sparebanken Vest	26.8%	28.3%	19.6%	10.9%	14.5%	0.0%

n(DNB) = 174, n(Sparebanken Vest) = 138

6) Reputation

	Very important	Quite important	Neither	Quite unimportant	Very unimportant	Don't know
DNB	13.8%	43.7%	30.5%	5.7%	4.0%	2.3%
Sparebanken Vest	18.1%	42.0%	27.5%	6.5%	3.6%	2.2%

n(DNB) = 174, n(Sparebanken Vest) = 138

7) Competence

DNB / Sparebanken Vest

- Very important: 40.8% / 39.1%
- Quite important: 36.2% / 42.8%
- Neither: 16.7% / 11.6%
- Quite unimportant: 2.9% / 2.9%
- Very unimportant: 1.7% / 2.2%
- Don't know: 1.7% / 1.4%

n(DNB) = 174, n(Sparebanken Vest) = 138

8) Offered loan facility

DNB / Sparebanken Vest

- Very important: 42.5% / 46.4%
- Quite important: 35.1% / 33.3%
- Neither: 14.4% / 9.4%
- Quite unimportant: 5.7% / 6.5%
- Very unimportant: 0.6% / 3.6%
- Don't know: 1.7% / 0.7%

n(DNB) = 174, n(Sparebanken Vest) = 138

9) Guarantor/co-borrower was a customer in the bank

DNB / Sparebanken Vest

- Very important: 9.2% / 14.5%
- Quite important: 16.7% / 14.5%
- Neither: 29.3% / 24.6%
- Quite unimportant: 9.8% / 9.4%
- Very unimportant: 25.3% / 27.5%
- Don't know: 9.8% / 9.4%

n(DNB) = 174, n(Sparebanken Vest) = 138

C.3 Logistic regression: Margins

Predicted probability of being a marginal customer

given how often the respondent examine whether they could have benefited from moving their mortgage to another bank

	Margin	std. err.	z	P > |z|	[95% confidence interval]	
				Delta-method		
Never	0.2337662	0.0482310	4.85	0.000	0.1392352	0.3282972
Less frequently than annually	0.4272727	0.0471661	9.06	0.000	0.3348288	0.5197166
Annually	0.6451613	0.0607650	10.62	0.000	0.5260640	0.7642586
Up to four times per year	0.6440678	0.0623338	10.33	0.000	0.5218958	0.7662397

Predicted probability of being a marginal customer

given how often the respondent renegotiate their mortgage with their current bank

	Margin	std. err.	z	P > |z|	[95% confidence interval]	
				Delta-method		
Never	0.3690476	0.0526502	7.01	0.000	0.2658552	0.4722401
Less frequently than annually	0.4342105	0.0402028	10.8	0.000	0.3554146	0.5130065
Annually	0.6111111	0.0663401	9.21	0.000	0.4810869	0.7411353
Up to four times per year	0.7058823	0.1105102	6.39	0.000	0.4892864	0.9224783

Predicted probability of being a marginal customer

given the importance of the characteristic "Bank's location"

	Margin	std. err.	z	P > |z|	[95% confidence interval]	
				Delta-method		
Very unimportant	0.3869201	0.0586932	6.59	0.000	0.2718836	0.5019567
Quite unimportant	0.4470780	0.0593521	7.53	0.000	0.3307501	0.5634060
Neither	0.4483826	0.0534029	8.40	0.000	0.3437148	0.5530505
Quite important	0.5050493	0.0669549	7.54	0.000	0.3738202	0.6362785
Very important	0.6554117	0.0883087	7.42	0.000	0.4823297	0.8284936

Predicted probability of being a marginal customer

given the importance of the characteristic "Was already a customer with the bank"

	Margin	std. err.	z	P > | z |	[95% confidence interval]	
			Delta-method			
Very unimportant	0.6115168	0.0748243	8.17	0.000	0.4648638	0.7581698
Quite unimportant	0.5969228	0.0874666	6.48	0.000	0.3954914	0.7383542
Neither	0.3985104	0.0594693	6.70	0.000	0.2819527	0.5150681
Quite important	0.4265529	0.0568854	7.50	0.000	0.3150595	0.5380464
Very important	0.4337597	0.0586297	7.40	0.000	0.3188652	0.5486542

Appendix D: Competition analysis

D.1 Critical loss

The following table shows an overview of different lending margins with the NIBOR rate belonging to the same time period from January 2021 to February 2022, to show how the relationship between these affects the price-cost margin. The critical loss is calculated with the interest rate increase of 12.5%.

Date	Lending margin	NIBOR	Lending rate	Price-cost margin	Critical loss
February 22	**1.00%**	**1.19%**	**2.19%**	**45.66%**	**21.49%**
January 22	0.97%	1.13%	2.10%	46.19%	21.30%
December 21	1.02%	0.97%	1.99%	51.26%	19.61%
November 21	1.14%	0.84%	1.98%	57.58%	17.84%
October 21	1.06%	0.75%	1.81%	58.56%	17.59%
September 21	1.22%	0.59%	1.81%	67.40%	15.64%
August 21	1.38%	0.43%	1.81%	76.24%	14.09%
July 21	1.50%	0.32%	1.82%	82.42%	13.17%
June 21	1.63%	0.20%	1.83%	89.07%	12.31%
May 21	1.61%	0.24%	1.85%	87.03%	12.56%
April 21	1.56%	0.30%	1.86%	83.87%	12.97%
March 21	1.48%	0.39%	1.87%	79.14%	13.64%
February 21	1.42%	0.46%	1.88%	75.53%	14.20%
January 21	1.39%	0.49%	1.88%	73.94%	14.46%

A smaller price increase will result in a lower critical loss value, given the same price-cost margin. However, it is important to remember that a smaller price increase most likely would result in fewer marginal customers.

If the price increase is 5%, the interest rate will increase from 2.00% to 2.10%. A symmetric price increase results in a critical loss equal to 9.88% and an asymmetric price increase results in a critical loss equal to 10.96%. A price increase of 10% will increase the interest rate from 2.00% to 2.20%. A symmetric price increase results in a critical loss equal to 17.98% and an asymmetric price increase results in a critical loss equal to 21.90%. From the calculations in Section 6.2, we have that the average diversion from DNB to Sparebanken Vest is 15.38% and the average diversion from Sparebanken Vest to DNB is 12.09%. In light of this, the diversion ratios seem to be higher than the critical loss values calculated with a 5% price increase, while it is clear that they are lower than the critical loss with a 10% price increase.

A Z-test can be used to determine whether the diversion ratios are statistically significant over the critical loss value. In this thesis, the Z-test is not conducted in the analysis as it is clear that the diversion ratios are smaller than the critical loss with a price increase equal to 12.5%. It is important to remember that the analysis conducted in this thesis does not give long-term answers. Even though a price increase in the event of a merger, with the given lending margin of 1% and NIBOR rate of 1.19% will not be profitable and thus not have harmful effects on the market, using different values will give other results. The analysis does not consider that the conditions may change. Therefore, a Z-test is conducted here for a 5% price increase to show how it is done.

The Z-test can be formulated as follows:

$$Z = \frac{D - C}{\sqrt{C(1 - C)/n}}$$

Where D is the observed diversion ratio, C is the critical loss and n is the number of respondents per bank. A one-sided test for binominal experiments is used. Based on 100 degrees of freedom and a significance level of 5%, the critical value will be 1.645 (Ubøe, 2021). If the banks' Z-value is larger than the critical Z-value, the diversion ratio will be significantly bigger than the critical loss. Using the price-cost margin of 45.66% and a price increase of 5% provides the following results:

The critical loss for a symmetric price increase is $\frac{X}{X+m} = \frac{0.05}{0.4566+0.05} = 0.0987 = 9.87\%$

The null- and alternative hypothesis for a symmetrical price increase is given by:

$$H_0: D \leq 0.0987 \qquad H_A: D \geq 0.0987$$

From DNB there were 174 respondents, while there were 138 from Sparebanken Vest. The calculation is using the weighted average diversion ratio of 13.65%.

Z-value for DNB:

$$Z = \frac{0.1365 - 0.0987}{\sqrt{0.0987(1 - 0.0987)/174}} = 1.67$$

Z-value for Sparebanken Vest:

$$Z = \frac{0.1365 - 0.0987}{\sqrt{0.0987(1 - 0.0987)/138}} = 1.49$$

This means that the diversion ratio from DNB to Sparebanken Vest for all customers, with a Z-value of 1.67 is statistically large enough to reject the null hypothesis, hence the diversion ratio is statistically significant over the critical loss. For this value there is reason to believe that the two banks are close competitors.

For the remaining results, the Z-values are smaller than the critical Z-value of 1.645, hence they do not provide statistically significant results, and therefore give no reason to believe that the two banks are close competitors.