FINANCIAL LITERACY AND MORTGAGE LENDER SELECTION: EVIDENCE FROM FINLAND

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ABSTRACT

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The development of financial markets and institutions has placed increasing demands on consumers' financial literacy. Therefore, financial literacy has gained attention both in academic research and in policymaking. However, the literature on the effects of financial literacy on one of the consumer's most important financial decisions, mortgage choice, has remained scarce. This thesis examines the effects of financial literacy on the selection between mortgage lenders and loan offers. Using an online survey data of Finnish mortgage borrowers, limited dependent variable models are estimated to explain how financial literacy affects the probability of putting the mortgage application out for tender, perceived importance of various loan offer characteristics, and bank selection determinants. The empirical results indicate that financially literate mortgage borrowers are better able to evaluate the monetary attributes of the loan offer and eventually make their mortgage lender choice strictly based on the true cost of the loan. However, financially illiterate borrowers give more weight to the loan offer attributes and financial services not related to the loan, possibly valuing the convenience of concentrating financial services on one institution. The research suggests that banks can help financially illiterate borrowers make better mortgage choices. It all comes down to reliable, clear communication.

Keywords
Financial literacy, Mortgage, Mortgage lender selection

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Rahoitusmarkkinoiden ja -instituutioiden viimeaikainen kehitys asettaa entistä suuremmat vaatimukset kuluttajan talousosaamiselle ja talouslukutaidolle. Viime aikoina talouslukutaito onkin alkanut saamaan huomiota niin politiikassa kuin akateemisessa tutkimuksessakin. Kaikesta huolimatta tutkimus talouslukutaidon vaikutuksesta yhteen kuluttajan merkittävimmistä taloudellisista päätöksistä, asuntolainan valintaan, on edelleen vähäistä. Tämä pro gradu -tutkielma käsittelee talouslukutaidon vaikutuksia asuntolainapankin ja -tarjouksen valintaan. Tutkielmassa esitellään neljä limited dependent variable -malliperheen tilastollista mallia käyttäen suomalaisilta asuntovelallisilta kerättyä kyselytytkimusaineistoa. Mallien avulla selitetään talouslukutaidon vaikutuksia kuluttajan todennäköisyyteen kilpailuttaa asuntolainansa, sekä sitä, kuinka merkittäväksi tekijäksi hakija kokee erilaiset lainatarjouksen ominaisuudet ja millä perusteella vastaaja lopulta päätyi valitsemaan pankkinsa. Empiiristen tulosten perusteella talouslukutaitoiset asuntovelalliset kykenevät paremmin tulkitsemaan lainatarjoukseen liittyviä rahallisia etuja ja ehtoja, ja päätyvät täten valitsemaan asuntolainapankkinsa edullisimman tarjouksen perusteella. Heikomman talouslukutaidon omaavat asuntovelalliset taas antavat enemmän painoarvoa muille pankin tarjoamille rahoituspalveluille ja seikoille, jotka eivät suoraan liity haettavan asuntolainan ehtoihin. Heikomman talousosaamisen omaavat asuntovelalliset siis todennäköisesti arvostavat rahoituspalveluiden keskittämisen tuomaa helppoutta. Tutkielmassa annetaan ehdotuksia, kuinka suomalaiset pankit pystyisivät paremmin auttamaan heikon talouslukutaidon omaavia kuluttajia tekemään rationaalisempia päätöksiä asuntolainaa valitessaan. Kaiken keskiössä on vastuullinen ja selkeä viestintä.

Asiasanat
Talouslukutaito, Talousosaaminen, Asuntolaina, Asuntolainapankin valinta

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1 INTRODUCTION

1.1 Background

OECD (2018) describes financial literacy as *"A combination of awareness, knowledge, skill, attitude and behaviour necessary to make sound financial decisions and ultimately achieve individual financial wellbeing."* In recent years, financial literacy has gained attention both in academic research and policymaking. Unarguably, the recent development of financial markets, institutions and services sets a requirement for good financial literacy among consumers. For example, Hämäläinen (2019) highlights the importance of lacking financial literacy and the complexity of financial products when analysing the root causes of over-indebtedness and other financial management problems of Finnish consumers. Academic research has found illiterate consumers to make suboptimal financial decisions and systematic mistakes in financial markets (see eg. Agarwal et al, 2017; Bajo & Barbi, 2018; Fernandes et al., 2014). Thus, financial literacy has proved to be very important for the overall economy and financial well-being of individuals (Lusardi & Mitchell, 2014; Behrman et al., 2012).

Globally, a major part of the individuals lacks financial literacy (OECD, 2016; Klapper et al., 2015; Lusardi & Mitchell, 2011). On the other hand, the level of Finnish consumers' financial literacy is considerably high (Kalmi & Ruuskanen, 2016; Klapper et al., 2015). However, the rising concerns about over-indebtedness and increasing probabilities of default imply that the level and role of financial literacy should be taken seriously in Finland, too. According to Kalmi & Ruuskanen (2016), Finland has been seriously late with actions to promote financial literacy. As an example of shortfalls, Finland has lacked national strategies and new institutions to promote financial literacy while other economically developed countries like the United States, UK, Canada, Poland, and Estonia have already taken action. However, as a recent action, the Bank of Finland has set up a Payments Council including a Financial Literacy Working Group to promote Financial Literacy in Finland (Rehn, 2018). Nevertheless, the research and actions regarding the enhancement of financial literacy are still quite scarce. Previously the financial literacy of Finnish consumers has been studied by Kalmi & Ruuskanen (2016) and Klapper et al. (2015) only, but no academic studies have previously focused specifically on the debt literacy in Finland.[1] In addition, there is an obvious need for further analyses on the financial and debt literacy of the Finnish mortgage borrowers, because the former studies do not address the impact of financial literacy on indebtedness or behaviour in the debt market.

[1] Debt literacy means the understanding of debt-related issues, while financial literacy covers basic financial concepts (Lusardi & Tufano, 2015). Measuring the debt literacy is discussed in more details in sections 2.2 and 3.2.

Financial literacy influences an individual's decisions in financial markets. In the mortgage market, illiterate borrowers have been observed to make suboptimal decisions (Agarwal et al,. 2018; Bajo & Barbi, 2018; Fernandes et al., 2014), hold riskier and larger credit portfolios (Disney & Gathergood, 2013; Lusardi and Tufano, 2015), pay higher interest and fees (Lusardi & Tufano, 2015), and lack confidence when interpreting the credit terms and conditions (Disney & Gathergood, 2013). Van Ooijen & van Rooi (2016) interpret that consumers' knowledge about basic financial concepts exceeds the level of knowledge about loan products, and hence, the decisions regarding mortgage lending are found especially complex. Similarly, literate borrowers tend to consult a larger number of information sources when selecting a mortgage product (van Ooijen & van Rooi, 2016). Most Finnish consumers select their financial services based on external advice but rarely use professional advisors (Kalmi & Ruuskanen, 2016). Ooijen & van Rooi (2016) also suggest that consumers tend to prefer advice from friends, family, and other non-professional parties rather than financial experts. However, there is a research gap when considering the mortgage lender choice. Dungey et al. (2015) conclude that financial literacy could affect the selection between fixed and variable rate mortgages in the Australian market, but there are no academic studies on how financial literacy affects the mortgage lender selection and which characteristics of the loan offers are perceived important.

The welfare loss and suboptimal behaviour related to financial illiteracy underscore the importance of relevant advice and financial education. Even if the financially illiterate borrowers fail to make optimal decisions in the mortgage market, their demand for financial advice is relatively low. Higher financial literacy has been proven to increase the probability of consulting an advisor both in the investment and borrowing decisions (Calcagno & Monticone, 2015; van Ooijen & van Rooi, 2016). However, Guiso et al. (2022) suggest that financially less sophisticated households need education and guidance to select the optimal mortgages. Similarly, they found these households to be vulnerable to banks' steering. Thus, banks and financial advisors should act with special responsibility towards illiterate customers. Kuchiak & Wiktorowicz (2021) describe how Polish banks include financial education in their corporate social responsibility (CSR) policies and offer financial education via social media channels. The role of financial education as a tool for preventing insolvency problems and over-indebtedness has been highlighted also in Finland (Pantzar, 2018; Hämäläinen, 2019; Kalmi & Ruuskanen, 2016). However, the intervention effects of financial education have proven to decay over time, so there is a demand for "just-in-time" education (Fernandes et al., 2014). Considering these findings, mortgage lenders might have a case to focus especially on proper advising during the mortgage origination process. This study aims to point out how financial literacy affects the comparison of loan offers and mortgage lender selection.

1.2 Research objectives

This master's thesis studies and discusses the effects of financial literacy (FL) on mortgage lender selection. The thesis aims to fill the research gap on the effects of financial literacy on mortgage lender selection. The thesis also creates the first insight into the financial and debt literacy of Finnish mortgage borrowers. To fill the research gap, the following main research question is selected:

How does Financial Literacy (FL) affect the selection between the loan offers & mortgage lenders?

Further, the research question is narrowed down into three sub-questions:

1. *Does FL have a role in putting the mortgage application out for tender?*
2. *Does FL explain which mortgage lender borrowers have selected?*
3. *How does FL affect the factors that determine the mortgage lender choice?*

First, the thesis investigates the probability of individual borrowers putting their mortgage applications out for tender. The study explores whether FL or other borrower characteristics can be used to explain the dichotomous choice of comparing loan offers from more than one bank. Second, FL and other borrower characteristics are used to evaluate the probability of an individual borrower selecting a specific mortgage lender. Thus, the thesis aims to find out if a borrower's FL has to do with selecting a specific Finnish bank. Third, the thesis investigates how much mortgage borrowers perceive various loan offer conditions and the features affecting their lender selection, and if FL and other borrower characteristics can be used to explain the variation in the perceived importance of loan offer features. Finally, the perceived importance of various loan offer features is used to predict the probability of selecting certain Finnish banks to identify if FL affects the mortgage lender selection determinants. Based on the empirical evidence, the thesis aims to conclude how financially illiterate customers end up selecting possibly suboptimal mortgages and what kind of information they could need for making more sophisticated choices. The thesis thus contributes also to the development of (traditional) banking services by making concrete suggestions on how financially illiterate borrowers could be helped to make better mortgage decisions.

1.3 Research methods

The collection of empirical data for this thesis is conducted via an online survey. Concerning the measurement of FL, this thesis builds on the former studies on the topic. FL is measured with three questions designed by Lusardi & Mitchell

(2011) and further used in various studies on financial literacy. In addition to questions regarding general FL, two specific questions designed by Lusardi & Tufano (2015) are added to measure respondents' debt literacy (DL). These questions have also become the standard way to measure debt literacy in academic studies. A more detailed description of the questions used for measuring the FL and DL and their selection is presented in chapter 3. The second section of the survey asks if the respondents compared multiple loan offers when selecting their most recent mortgage and how important the various characteristics of the loan offer were considered when selecting the mortgage. The survey was conducted in May 2022 using Cambri -tool, and 267 mortgage debtors having mortgages in various Finnish banks participated in the survey.

The role of FL on mortgage lender selection is explored by estimating limited dependent variable models based on the collected questionnaire data. First, a logit model is presented to assess the probability of comparing loan offers from more than one bank. Secondly, a multinomial logit model is used to explains the role of FL in selecting a specific Finnish bank. Third, the relationships between FL and the perceived importance of various loan offer characteristics are assessed with a multinomial logit model. At the final stage the role of monetary and non-monetary attributes affecting the bank selection is analyzed, comparing the results from financially literate and illiterate respondents' subsamples.

1.4 The structure of the thesis

This thesis is structured as follows. The following chapter gives a comprehensive overview of the literature regarding financial literacy, mortgage product selection and the Finnish mortgage market. Chapter 3 describes the data and empirical methods used. In chapter 4 the empirical results are presented and analysed. Chapter 5 includes a comparison to the previous studies and presents suggestions for the lenders based on the obtained results. Chapter 6 concludes and presents the suggestions for further studies on the topic.

2 THEORETICAL FRAMEWORK

2.1 Financial literacy in Finland and internationally

OECD (2018) defines financial literacy (FL) as "*A combination of awareness, knowledge, skill, attitude and behaviour necessary to make sound financial decisions and ultimately achieve individual financial wellbeing.*" Further, FL has been implied to cover the ability of long-term financial planning and mindfulness of life events and economic conditions (Remund, 2010). However, there are plenty of varying definitions for FL. Common for most of the definitions are the roles of knowledge of basic financial concepts, awareness of financial conditions and attitude towards financial affairs.

The academic world is quite unanimous on the effect of FL on individual wellbeing. Lusardi & Mitchell (2014) conclude that the lack of FL leads to suboptimal financial decisions and costs both before and after retirement. Behrman, Mitchell, Soo & Bravo (2012) suggest that the FL has a significant role in the wealth accumulation of individuals. Their empirical analysis implies that even if schooling is a very important factor in wealth accumulation, FL affects even more household wealth and pension contributions. This finding is aligned with the evidence of Lusardi & Mitchell (2011). They found how education and FL being included in multivariate regression models tend both to be statistically significant. Thus, education is not a good proxy for FL. Behrman et al. (2012) further suggest that investments in financial knowledge may have high payoffs in the future. Both Behrman et al. (2014) and Lusardi & Mitchell (2007; 2011) have found that FL greatly affects pension preparedness: illiterate consumers tend to be less prepared for their retirement.

How literate are consumers then? According to an international S&P Global FinLit Survey conducted in 2014, only 1-in-3 adults are financially literate (Klapper et al., 2015). However, there is strong variation among the different groups and countries. According to Klapper, Lusardi and van Oudheudsen (2015) the poor, low educated and women tend to be less financially literate. They also suggest that the usage of financial services increases with FL. What comes to the variation among countries, the individuals in major developed economies are more financially literate compared to their peers living in developing economies. (Klapper et al., 2015) Already a few years earlier, Lusardi & Mitchell (2011) analysed the results of many international surveys and came up with very similar results to Klapper et al. (2015): women are less literate than men, older people are less literate than the middle-aged and less educated are less literate than those with higher education. Both Klapper et al. (2015) and Lusardi & Mitchell (2011) have found that inflation is quite hard to understand, and the awareness about inflation rises if the economy has experienced high inflation recently. Lusardi & Mitchell (2011) suggest that the understanding of risk diversification is likely to

characterize those with a high level of FL, and both Klapper et al. (2015) and OECD (2016) suggest that risk diversification is the least understood concept of those included in the FL. OECD/INFE survey conducted in 2015 also reveals that the majority of European adults struggle to understand for example the ideas of standard interest rate compounding (OECD, 2015).

What comes to the FL of especially the Finnish consumers, Finns seem to be relatively well financially literate. However, the evidence from Finland is still quite scarce – there is only one study conducted with the OECD methodologies by Kalmi & Ruuskanen (2016). Also, the S&P Global FinLit Survey from 2014 included Finland, but the questions used in the survey were much more limited compared to the OECD methodologies. However, findings of both Klapper et al. (2015) and Kalmi & Ruuskanen (2016) signal that Finnish consumers are among the most financially literate consumers worldwide. Kalmi & Ruuskanen (2016) further reveal that especially women, unemployed and low-income respondents struggle with either financial knowledge or financial actions. They also find that the young (18-29 years old) and old (over 60 years old) are less literate than the middle-aged respondents. High education seems to be related to the high FL in Finland, too. (Kalmi & Ruuskanen, 2016) While Klapper et al. (2015) and Lusardi & Mitchell (2011) suggest that international risk diversification is the least understood financial concept tested, Kalmi & Ruuskanen (2016) reveal that the Finnish adults understand it better than their peers in other countries. What seems to be especially difficult to understand for Finnish consumers is the definition of inflation. Finnish consumers seem to know the basic definition of interest rates, interest rate calculation and interest rate compounding relatively well. (Kalmi & Ruuskanen, 2016)

However, the concept that the widely used OECD method-based FL studies fail to examine is *debt literacy* (DL). Lusardi & Tufano (2015) define DL as the knowledge of concepts related to debt and debt instruments. In their benchmark study from 2015, they design specific survey questions for measuring the DL, and further found that the US consumers' overindebtedness seems to be related to the lack of DL. They found that only a third of the US population understands the compound interest on credit card debt and show that the level of DL is especially low among women, the elderly, minorities, and those who are divorced or separated. The DL questions were further used for the case of the Netherlands by van Ooijen & van Rooi (2016), who found that the consumers' understanding of basic financial concepts (those measured in the traditional OECD FL surveys) is higher than the understanding of the debt-related issues. However, the evidence on DL and its effects on financial behaviours remains scarce, recalling the need for further studies on the topic.

2.2 Measuring Financial literacy

FL is typically measured with commonly used survey questions. Lusardi & Mitchell (2011) designed simple survey questions to measure the knowledge of basic financial concepts. These questions have later been widely used in academic studies in various countries (see eg. Lusardi & Mitchell, 2014; van Ooijen & van Rooi (2016); Klapper et al., 2015; Lusardi & Tufano, 2015; Kalmi & Ruuskanen, 2016). These widely used questions measure the understanding of interest rate and compounding, inflation, and risk diversification. The FL of the respondent is thus measured as the number of correct answers given. (Lusardi & Mitchell, 2011)

However, the bare knowledge of financial concepts does not quite meet the OECD definition of FL. Thus, the OECD method includes questions about financial behaviour and attitudes (OECD, 2018). The OECD publication *OECD/INFE Toolkit for Measuring Financial Literacy and Financial Inclusion* (2018) does not just suggest questions to be used, but also offers more detailed guidelines for the data collection, fieldwork, data analysis and reporting. Furthermore, the OECD approach does not only measure knowledge of financial concepts, but also the behaviour and attitudes of the respondent. Financial behaviour is measured with questions regarding the respondent's budgeting, active saving, avoidance of borrowing to make ends meet and choosing financial products. Financial attitudes are measured by asking how much the respondent agrees or disagrees with statements regarding their personal finances. The financial knowledge score and the financial behaviour score are calculated as the sum of correct or "financially savvy" answers. The financial attitudes score is calculated as the average response across three attitude questions. (OECD, 2018) However, the OECD method has received some criticism. For example, Kalmi & Ruuskanen (2016) suggest that there might not be "right" or "wrong" financial attitudes, and thus measuring attitudes might not be relevant.

In addition to the established methods of measuring FL, some studies have presented additional sections to FL surveys. Lusardi & Tufano (2015) studied the effects of debt literacy (DL) and financial experiences on over-indebtedness of the US consumers. They designed three survey questions to measure the DL specifically: one regarding the interest rate compounding, one asking the respondent to estimate how many years it would take to pay off credit card debt when making minimum payments equal to the interest payments on the outstanding debt, and one for testing the understanding of time value of money and ability to compare payment methods (Lusardi & Tufano, 2015). These questions have been further used by van Ooijen & van Rooi (2016) who found that the Dutch consumers find the debt-related issues harder to understand compared to the other financial affairs. They also used the commonly used FL questions by Lusardi & Mitchell (2011) in addition to the DL questions. Disney & Gathergood (2013) mixed the question sets and used two questions from the FL set and one from the DL set when studying the effect of FL on consumer credit portfolios. Kalmi & Ruuskanen (2016) designed questions also measuring the insurance knowledge and

used those besides the OECD questions when studying the FL in Finland. This thesis takes a similar approach as Disney & Gathergood (2013) and van Ooijen & van Rooi (2016) by using a combination of FL and DL questions.

2.3 Financial literary and behaviour in the mortgage market

As mentioned, FL has proven to increase the wealth accumulation, pension preparedness and overall financial well-being of individuals (Lusardi & Mitchell, 2007, 2011, 2014; Behrman et al., 2012). In addition to pension preparedness and investment decisions, FL also has a role in the mortgage market behaviour.

The evidence on FL and mortgage market behaviour indicates that illiterate borrowers are more likely to make suboptimal mortgage decisions. Agarwal, Ben-David & Yao (2017) found that the less financially savvy mortgage borrowers select systematically the wrong mortgage products. Bajo & Barbi (2018) present how a very small proportion of Italian mortgage borrowers having fixed-rate mortgages have used the profitable opportunity to refinance their mortgages. They suggest that the FL has a role in this suboptimal behaviour since the suboptimal behaviour was associated with the less educated, poor, immigrants, women, and borrowers living in the less developed areas of Italy. However, they did not evaluate the FL with specific questions. Lusardi & Tufano (2015) study the DL of the US consumers and found that the less literate borrowers end up paying higher interest rates and fees on their mortgages, and Disney & Gathergood (2013) had similar evidence from the UK consumer credit market.

There is some empirical evidence on the effect of FL on consumer credit portfolios. Both Disney & Gathergood (2013) and Lusardi and Tufano (2015) suggest that illiterate borrowers hold larger and riskier credit portfolios. Disney & Gathergood (2013) studied a large sample of UK households and found that the less financially savvy consumers held more and higher cost consumer credit than the more sophisticated individuals. Lusardi and Tufano (2015) found that the DL and financial experiences influence the over-indebtedness of US households.

Finally, the previous empirical studies suggest that financially illiterate consumers would need specific guidance on debt-related issues. Disney & Gathergood (2013) reveal that financially illiterate borrowers lack the ability to interpret the credit terms and they are less likely to search for information on financial affairs through reading the financial pages in the press. What is interesting, those individuals are typically self-aware of their inability to interpret the costs of debt. (Disney & Gathergood, 2013) Guiso, Pozzi, Tsoy, Gambacorta & Mistrulli (2022) further analysed the cost of banks' steering in mortgage markets and found that the illiterate households are more vulnerable to steering. However, they suggest that financially illiterate households are not capable of making optimal mortgage choices and thus need some guidance for their decision-making. Thus, restricted steering could result in welfare losses among naive households (Guiso et al.,

2022). Even if the less savvy households would need the guidance, the more literate borrowers have been found to consult a larger number of information sources when selecting a mortgage product (van Ooijen & van Rooi, 2016). However, the evidence from Finland is in a slight contradiction to the findings of van Ooijen & van Rooi (2016) from the Netherlands, because Kalmi & Ruuskanen (2006) suggest that the Finnish consumers rely on the advice from friends and family rather than professionals. Further, only half of the Finnish consumers compare financial products and insurances when making a purchase decision. (Kalmi & Ruuskanen, 2016)

2.4 Selecting a mortgage product & loan provider

The mortgage product selection can have significant effects on household welfare. However, the optimal choice is dependent on the borrower's personal factors. Campbell & Cocco (2003) create a theoretical framework for optimal mortgage choice between adjustable-rate mortgage (ARM) and fixed-rate mortgage (FRM). Generally, they suggest that households with lower loan-to-value (LTV) ratios, houses cheaper compared to their income, stable income, and a higher probability of moving soon should consider ARMs and thus expose themselves to the risk of rising interest rates. Similarly, the borrowers with high LTV ratios, unstable income, no moving plans, and a high level of risk aversion should favour FRMs to be certain about their future mortgage repayments. Another theoretical paper by Piskorski and Tchistyi (2010) discusses the optimal mortgage contract under stochastic income growth and real estate prices. Their findings are very similar to Cambell and Cocco (2003): the borrowers with low income, low credit scores and low down payments made (i.e., high LTV ratios) living in locations with higher expected house price growth would gain the most from the optimal selection of mortgage with scheduled interest rate increases.

The previous empirical evidence on the effect of individual borrower characteristics on mortgage selection is mixed. Most of the academic research available focuses on the selection between FRMs and ARMs in the US mortgage market. Vickery (2007) suggests that the selection between FRM and ARM is highly price sensitive, because it is determined by the spread between FRM and ARM rates and is not significantly dependent on the personal characteristics of the borrower. Similarly, Coulibaly and Li (2009) confirm that pricing is an important factor affecting the selection between FRM and ARM, but they also suggest that the borrower characteristics, like income volatility, moving probability, and risk aversion largely influence the choice between mortgages. Fortowsky, LaCour-Little, Rosenblatt and Yao (2011) also discuss the effect of mobility expectations on mortgage choice. They found that the borrowers assessing their probability of moving in the future high prefer the ARMs or hybrid mortgages over the FRMs to avoid the costs of terminating the mortgage during the fixed-rate period.

The number of studies from the European mortgage markets is quite small, but the evidence is similar to the US. Ehrmann and Ziegelmeyer (2013) found that households with high income volatility, high level of risk aversion, high LTV ratios and long mortgage maturities are more willing to select FRMs in the Euro area. Similarly, Cocco's (2013) evidence from the UK suggests that the households with stable income and high income growth expectations benefit from having alternative mortgage products (AMPs) with more complex structures and low initial mortgage payments. Dungey, Doko Tchatoka, Wells and Yanotti (2015) present some evidence from Australian markets where the variable-rate mortgages (VRMs) are quite similar to the Finnish mortgages having variable rates. Their findings are very similar to the other studies: households' income, wealth, risk-aversion, and mobility expectations have a role in mortgage selection. They also conclude that the less experienced and financially illiterate borrowers are less likely to select VRMs over less risky but more costly options. However, these propositions could be questioned since the FL was not measured with an FL survey, and the conclusion was drawn based on the age, gender, and wealth of the borrowers.

Perry & Lee (2012) add another viewpoint on the mortgage selection process: they suggest that the home purchase process strains consumers' cognitive resources and thus results in suboptimal financing selections. Their two experiments showed how participants in the online house shopping simulation used less time to select the mortgage product and ended up selecting higher-risk adjustable-rate mortgages. Furthermore, they suggest that the house purchase and mortgage selection should be separated to improve consumers' selections. Considering the possible relationship between the FL and cognitive abilities highlighted by Lusardi & Mitchell (2014) and Lusardi & Tufano (2015) these findings could be possibly used to partially explain the suboptimal mortgage decisions of illiterate borrowers. However, the relationship between FL and cognitive abilities is complex. Some FL surveys aim to control the cognitive ability (see eg. Lusardi & Mitchell, 2011), but still, the literacy questions fail to make a clear distinction between financial knowledge and pure cognitive ability (Lusardi & Mitchell, 2014). Thus, the current literature available still struggles to identify the underlying causal relationships reliably.

All in all, it is quite complex to make clear interpretations about the mortgage selection based on international studies because the mortgage products and home buying processes are not homogeneous across countries. This recalls the need for further studies also in the Finnish context, where the mortgage products differ from the ones available in many other developed countries and the housing legislation is quite unique.

2.5 Finnish mortgage market

Homeownership and mortgages play a significant role in the Finnish households' wealth and financial wellbeing. Hyytinen, Johansson & Määttänen (2006) present that the residential assets correspond to over 60% of the total gross assets of more than 80% of Finnish homeowners. In international comparison, the wealth of Finnish homeowners is highly centralized in owner-occupied dwellings (Hyytinen, 2006; Cambell & Cocco, 2003). Thus, it is obvious that the optimal mortgage choice is especially important for the financial well-being of Finnish consumers.

Debt-to-income ratios (DTI) of Finnish mortgage lenders have been increasing during the last few years. In 2020, 28% of the new mortgages were granted for the borrowers having DTI over 450% and 21% for the borrowers having DTI over 500%. In 2018, the numbers were 22% and 16%, respectively. The debt-to-income ratio is calculated as the household total debt divided by the yearly gross income. (Voutilainen & Putkuri, 2021). However, compared to the other Nordic countries, Finnish households have less debt relative to their disposable income, and only marginally more compared to the euro area average (Koskivuo & Kostiainen, 2022). One explanation for the high DTIs could be the rapid increase in real estate prices during the last few years. Danske Bank A/S (2022a) presents that 68% of the Finnish adults not living in owner-occupied dwellings feel like they can't afford to buy an apartment or real estate from a location meeting their needs. The survey also reveals how 35% of the young families living in the Helsinki metropolitan area are considering moving to other locations with lower real estate prices.

Finnish mortgage products differ substantially from the mortgage products in the US and other euro area countries, making it hard to apply previous studies' interpretations in the Finnish context (Hyytinen et al., 2006). While under 20% of the mortgages in the Euro area have a variable rate, in Finland the proportion of variable-rate mortgages exceeds 95%. Even if the Finnish households are more likely to utilize other kinds of hedging products, like the interest rate caps or collars, they are still more vulnerable to the rising interest rates than the other Euro area households. (Koskivuo & Kostiainen, 2022). The largest mortgage lender in Finland, the OP Financial Group (2022b) reports that 41% of the new mortgages and about 30% of their whole mortgage portfolio is hedged against rising interest rates.

Most Finnish mortgages have maturities between 20 and 25 years (about 43%) or between 25 and 30 years (about 25%). Even if the maturities of the Finnish mortgages have been increasing significantly, the proportion of mortgages with maturities exceeding 30 years is still quite low (about 5%). (Bank of Finland, 2022a)

At the end of 2021, the nominal amount of Finnish households' mortgage debt was 107,6 billion euros. The Finnish mortgage market is remarkably centralized. At the end of 2021, 79% of the household mortgages were issued by the three largest operators: the OP Financial Group held a mortgage portfolio worth 41 462 billion euros (39% market share), Nordea 31 755 billion euros (30%), and

Danske Bank 10 515 billion euros (10%). (Bank of Finland, 2022b) However, home buyers still have quite a lot of options available. The Finnish Financial Supervisory Authority currently has 175 individual supervised deposit banks or financing institutions, most of them being small individual member cooperative banks, local cooperative banks or savings banks being part of central bodies or cooperatives (Financial Supervisory Authority, 2022).

3 DATA & METHODOLOGY

3.1 Research Approach

This collection of empirical data for this thesis is conducted in May 2022 using an online survey. To examine the relationship between FL and mortgage lender selection, the study includes two sections: one to measure the FL of mortgage borrowers and another one to investigate the mortgage lender selection. This study measures the FL with three commonly used FL questions designed by Lusardi & Mitchell (2011) and two DL questions designed by Lusardi & Tufano (2015).

After measuring the financial and DL of the Finnish mortgage borrowers, the survey asks if the respondent put mortgage application out for tender, how important he/she felt that the various points of the loan offer were on a scale of 1-5, and which lender did he/she eventually select. Finally, the respondents are asked questions regarding their demographic and socio-economic background.

The survey is conducted online following the guidelines of OECD (2018). The language of the survey is Finnish. The Finnish mortgage borrowers having a new home loan taken within the previous two years are proposed to respond to the survey. The Cambri customer research tool[2] sends the survey to registered panellists meeting the requirement for a recent mortgage, and the respondents receive nominal compensation for answering the questionnaire. All the respondents are asked to consider the most recent mortgage they took out for buying their own home. Thus, the investment housing loans/mortgages and renovation loans are out of the scope of the study. The final sample included 267 respondents, and the average response time was 4 minutes 34 seconds.

3.2 Data

3.2.1 Measuring financial literacy

Lusardi & Mitchell (2011) suggest that the FL measures should fulfil the following requirements:

i) Simplicity: Questions measure the understanding of basic financial concepts;
ii) Relevance: Questions should relate to the day-to-day financial decisions over the individual's life cycle and measure the understanding of general concepts instead of context-specific knowledge;

[2] For further information, see cambri.io.

iii) Brevity: The number of questions should be kept at a minimum since very few surveys can devote much time to FL questions;
iv) Capacity to differentiate: Questions should be able to differentiate between the financial knowledge levels.

Following these principles, this thesis uses three FL questions designed by Lusardi & Mitchell (2011). These questions have been used in some previous studies on FL, too, for example by Lusardi & Mitchell (2014); van Ooijen & van Rooi (2016); Klapper et al. (2015) and Lusardi & Tufano (2015).

The questions measure understanding of interest compounding (question 1); understanding of inflation (question 2); and understanding of risk diversification (question 3). To make these questions clearer for the Finnish respondents, some additional remarks regarding the Finnish taxation were added to questions 1 and 2 and euros were used as the currency instead of the US dollars. The final questions used were (right answers bolded):

1. *Suppose you had 100 € in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow? Imagine there is no need to pay tax on the interest paid on the account.*
   i) More than 102 €
   ii) Exactly 102 €
   iii) Less than 102 €
   iv) Do not know

2. *Imagine that the interest rate on your savings account was 1% per year and there is no need to pay tax on the interest paid on the account. Inflation was 2 % per year. After 1 year, how much would you be able to buy with the money in this account?*
   i) More than today
   ii) Exactly the same
   iii) Less than today
   iv) Do not know

3. *Please tell whether you think this statement is true or false. 'Buying a single company's stock usually provides a safer return than a stock mutual fund'.*
   i) True
   ii) False
   iii) Do not know

To better measure the understanding of the debt-related issues, two additional questions on DL are added to the survey. The questions are from the DL questions set designed by Lusardi & Tufano (2015). The questions measure the understanding of debt contracts, capability to compare payment methods and understanding of the time value of money. The first question included in the

original DL questions set by Lusardi & Tufano (2015) is not used, because question 1 already measures the understanding of interest compounding. Hence, the questions 4 and 5 were:

4. *Imagine that you owe 3,000 € on your credit card. You pay a minimum payment of 30 € each month. At an Annual Percentage Rate of 12% (or 1% per month), how many years would it take to eliminate your credit card debt if you made no additional new charges?*
   - *i) Less than 5 years*
   - *ii) Between 5 and 10 years*
   - *iii) Between 10 and 15 years*
   - ***iv) Never, you will continue to be in debt***
   - *v) Do not know*

5. *You purchase an appliance which costs 1,000 €. To pay for this appliance, you are given the following two options: (a) pay 12 monthly instalments of 100 € each; (b) borrow at a 20% annual interest rate and pay back 1,200 € a year from now. Which is the more advantageous offer, in other words, which one will cost less?*
   - *i) Option a*
   - ***ii) Option b***
   - *iii) They are the same*
   - *iv) Do not know*

Original questions in Finnish are reported in Appendix 1.

The FL score used in the estimated limited dependent variables models is calculated as the sum of correct answers given by the respondent. Thus, the FL score gets a value between 0 and 5. Out of 267 respondents, 23 (8,6%) did not give any correct answers, 58 (21,7 %) gave one correct answer, 63 (23,6 %) gave two correct answers, 71 (26,6 %) gave three correct answers, 50 (18,7 %) gave four correct answers and only two respondents (0,7 %) got all the five questions right.

In addition to the FL questions, the respondents are asked additional background and demographic questions to get the data for the additional variables used in the empirical analysis. The respondents are asked their age, gender, education level, annual gross income, net wealth, and the amount of the last mortgage loan they took out. To make both answering and data preparation easier, the options are grouped as follows. *Age* variable gets values 1 = 16-17, 2 = 18-24, 3 = 25-34, 4 = 35-44, 5 = 45-54, 6 = 55-64, 7 = 65-74 years old and 8 = over 75 years old. *Gender* variable gets values 0 meaning male and 1 meaning female. *Education* variable gets values 1 = primary school, 2 = secondary school (high school), 3 = undergraduate, 4 = graduate and 5 = licentiate or doctoral degree. *Income* variable measuring net wealth gets values 1 = 0 - 9 999 €, 2 = 10 000 - 19 999 €, 3 = 20 000 - 29 999 €, 4 = 30 000 - 39 999 €, 5 = 40 000 - 49 999 €, 6 = 50 000 - 74 999 €, 7 = 75 000 - 99 999 €, 8 = 100 000 € or more. *Wealth* variable gets values 1 = under 0 €, 2 = 0 - 9 999 €, 3 = 10 000 - 24 999 €, 4 = 25 000 - 49 999 €, 5 = 50 000 - 74 999 €, 6 = 75 000 - 99 999 €, 7 = 100 000 - 249 999 €, 8 = 250 000 - 500 000 € and 9 = 500 000 € or more.

LoanAmount variable gets values 1 = 0 - 49 999 €, 2 = 50 000 - 99 999 €, 3 = 100 000 - 149 999 €, 4 = 150 000 - 199 999 €, 5 = 200 000 - 299 999 €, 6 = 300 000 - 399 999 €, 7 = 400 000 - 499 999 € and 8 = 500 000 € or more. Respondents are also asked for the number of their underaged children living in the same household, household size, employment status and the demographic location of their apartment or property bought with the latest mortgage (Helsinki metropolitan area, other centre of growth or migration loss area). However, these variables are not used in the logistic regressions.

Table 1 presents the shares of correct answers to FL questions and the average FL scores among the demographic groups. The findings are quite similar to previous studies. As Kalmi & Ruuskanen (2016) also found, especially the young, low-income, and less educated respondents seem to have difficulties with financial knowledge. Also, the finding on women's lower literacy is aligned with the previous studies based on the Finnish (Kalmi & Ruuskanen, 2016) and international data (Klapper et al., 2015; Lusardi & Mitchell, 2011; Lusardi & Tufano, 2015). Comparing the shares of correct answers for each question is a bit complicated, because the survey at hand is conducted online, and for example, Kalmi & Ruuskanen (2016) used a face-to-face interview. In addition, the target group of this study is not a representative sample of all Finnish citizens, which makes the comparison to Kalmi & Ruuskanen (2016) not relevant. However, one interesting finding from the answers to question 2 could be highlighted: even in the rapid inflation environment of spring 2022, only 60% of the respondents understand the concept of inflation and real interest rate. According to Klapper et al. (2015) and Lusardi & Mitchell (2011), inflation is better understood in economies experiencing high inflation rates. Therefore, the lower share of correct answers compared to the findings of Kalmi & Ruuskanen (2016) (60% in 2022 and 77% in 2016) is quite surprising.

The low number of respondents giving correct answers to questions 4 and 5 measuring debt-related knowledge supports the former evidence of van Ooijen & van Rooi (2016). Debt-related questions seem to be harder for the respondents, even if they are holding a mortgage loan. Especially difficult is question 5 related to the time value of money and payment options: only 17 % of the respondents give the correct answer. Once again, this finding could be used to highlight the complexity of debt-related issues and the importance of proper guidance and clear communication during mortgage selection processes.

Table 1: Summary statistics for responses to financial literacy questions

	Correct answers to FL questions					Literacy score Lit_i	
	Q1	*Q2*	*Q3*	*Q4*	*Q5*	*Mean*	*SD*
Total sample (n = 267)	70 %	60 %	56 %	24 %	17 %	2.27	1.26
Male (n= 137)	73 %	58 %	59 %	29 %	21 %	2.41	1.28
Female (n =130)	66 %	62 %	53 %	19 %	12 %	2.13	1.22
18 – 34 years old (n = 112)	66 %	45 %	48 %	19 %	22 %	2.00	1.22
35 – 54 years old (n = 123)	73 %	70 %	64 %	28 %	15 %	2.50	1.27
Over 55 years old (n = 32)	69 %	78 %	53 %	28 %	6 %	2.34	1.18
Higher education (n = 171)	71 %	61 %	57 %	29 %	16 %	2.33	1.28
No higher education (n = 96)	68 %	59 %	55 %	16 %	19 %	2.17	1.20
Income under 30.000 € (n = 60)	58 %	50 %	45 %	12 %	20 %	1.85	1.12
Income 30.000 – 50.000 € (n = 125)	72 %	63 %	58 %	24 %	15 %	2.33	1.22
Income over 50.000 € (n = 82)	74 %	63 %	61 %	34 %	17 %	2.50	1.34

Notes: This table presents the shares of correct answers to FL questions Q1 – Q5, the mean values of FL score (Lit_i) and the standard deviations of FL scores. Q1 measures the understanding of interest compounding, Q2 inflation, Q3 risk diversification, Q4 minimum payments and Q5 the time value of money. FL score Lit_i is calculated as the number of correct answers given to questions Q1 – Q5.

Table 2 presents the correlations between the FL scores, respondents' ages, education levels, income, net wealth, and the loan amounts of the last mortgage. The evidence supports the former findings of Behrman et al. (2012) and Lusardi & Mitchell (2011) suggesting that education or any other demographic variable would not be a good proxy for FL. FL seems to be slightly positively correlated with all the variables included in the analysis, excluding gender. Female mortgage borrowers seem to be less financially literate. Especially interesting is the very low ($\rho = 0.09$) and statistically insignificant correlation between FL and education level. Correlations also confirm the expectations that wealthier individuals have higher incomes and take out larger mortgages. Furthermore, education is positively correlated with both income and wealth, and finally, younger homebuyers tend to have higher loan amounts. The lack of strong correlations between the variables allows all the variables to be included in the logit models without multicollinearity issues.

Table 2: Correlations

	Lit	*Income*	*Wealth*	*Education*	*Gender*	*Age*	*LoanAmount*
Lit	1.000***	0.162***	0.163***	0.085	-0.111*	0.194***	0.092
Income		1.000***	0.480***	0.271***	-0.199***	0.109*	0.407***
Wealth			1.000***	0.257***	-0.143**	0.272***	0.138**
Education				1.000***	0.057	-0.051	0.269***
Gender					1.000***	-0.007	-0.057
Age						1.000***	-0.144**
LoanAmount							1.000***

Notes: This table presents the Pearson correlation coefficients between the variables *Lit, Income, Wealth, Education, Gender, Age* and *LoanAmount*, where *Lit* is the FL score calculated as the number of correct answers to FL questions, *Income* is the respondent's annual gross income, *Wealth* net wealth, *Education* education level, *Gender* gender coded as 0 = male and 1 = female, *Age* age group, and *LoanAmount* the loan capital respondent borrower last time he/she took out a home loan. Statistical significance levels are noted as (***) = 0.01, (**) = 0.05 and (*) = 0.10.

3.2.2 Mortgage lender selection

The second section of the survey investigates the determinants of mortgage lender selection. To answer the research question 1. "*Does FL have a role in putting mortgage application out for tender?"* all the respondents are asked if they compared more than one loan offers when selecting their latest home loan. The variable *Tend* gets a value of 0 (didn't put the mortgage application out for tender) or 1 (put the mortgage application out for tender). 211 (79 %) out of 267 respondents report putting their mortgage applications out for tender and 56 (21 %) have answered to not compare multiple banks' loan offers.

To answer the research question 2. "*Does FL explain which mortgage lender borrowers have selected?"* respondents are asked which bank they eventually selected. The *Bank* variable got values 1 = OP Financial Group, 2 = Nordea Bank, 3 = Danske Bank, 4 = S-pankki, 5 = Savings Bank (Säästöpankki), and 6 = other (includes Handelsbanken, POP Bank (POP Pankki), Ålandsbanken, Aktia, Suomen Hypoteekkiyhdistys and all other lenders). Other banks are grouped due to the high centralization of the Finnish mortgage market and the low number of respondents having a mortgage in other banks than the OP Financial Group, Nordea Bank, Danske Bank, S-Pankki or Savings Banks. The sample of 267 respondents is distributed among the banks as follows: 105 respondents (39,3%) selected the OP Financial Group, 70 (26,4%) Nordea Bank, 19 (7,1%) Danske Bank, 19 (7,1%) S-Pankki, 18 (6,7%) Savings Bank and the remaining 36 (13,4%) some other bank with lower market share.

Finally, to answer the research question 3. "*Does FL affect the perceived importance of different mortgage offer features?"* respondents are asked to evaluate how important they considered the various features of mortgage offers and other banking services to be while selecting their latest home loan. The answer is given on a scale of 1 to 5 where 1 is "not important at all" and 5 is "very important". All the 26 variables are described in the following Table 3 presenting the descriptive statistics.

Table 3: Descriptive statistics, perceived importance of loan offer features

k	*Mean*	*SD*	*Min*	*Median*	*Max*
Margin	3.87	1.02	1.00	4.00	5.00
Service charge	3.35	1.07	1.00	3.00	5.00
Loan period	3.60	1.06	1.00	4.00	5.00
Monthly payment	3.40	1.13	1.00	4.00	5.00
APR	4.09	0.96	1.00	4.00	5.00
Interest rate hedge options	3.47	1.18	1.00	4.00	5.00
Interest rate hedge price	3.51	1.17	1.00	4.00	5.00
Loan cover options	3.40	1.10	1.00	3.00	5.00
Loan cover price	3.44	1.13	1.00	4.00	5.00
Payment plan flexibility	3.81	0.94	1.00	4.00	5.00
Collaterals needed	3.60	1.04	1.00	4.00	5.00
Additional collateral price	3.42	1.15	1.00	4.00	5.00
Min. down payment	3.35	1.11	1.00	3.00	5.00
Sustainable product	3.46	1.08	1.00	4.00	5.00
Service quality	3.86	0.99	1.00	4.00	5.00
Service speed	3.81	1.00	1.00	4.00	5.00
Brand	3.60	1.08	1.00	4.00	5.00
Own experiences	3.82	1.00	1.00	4.00	5.00
Word of mouth	3.31	1.15	1.00	3.00	5.00
Domesticity	3.67	1.08	1.00	4.00	5.00
Insurance benefits	3.28	1.18	1.00	3.00	5.00
Daily banking services	3.56	1.04	1.00	4.00	5.00
Daily banking services' price	3.71	1.03	1.00	4.00	5.00
Investing services	3.16	1.17	1.00	3.00	5.00
Investing services' price	3.26	1.16	1.00	3.00	5.00
Other monetary benefits	3.46	1.14	1.00	4.00	5.00

Notes: This table presents the descriptive statistics of Imp_k measuring the perceived importance of loan offer features k. The respondents were asked to evaluate how important they considered various features of mortgage offers and other banking services to be while selecting their latest home loan. The answer was given on a scale of 1 to 5 where 1 is "not important at all" and 5 is "very important".

Finnish mortgage borrowers seem to be quite rational when selecting between loan offers: the annual percentage rate of charge (APR) is considered to be the most influential mortgage offer feature in the lender selection (see Table 3). The loan margin, payment plan flexibility, service quality and service speed are also appreciated. Surprisingly, the service charge was not considered to be very influential, which indicates that borrowers are able to evaluate the total cost of the loan with APR. The customer's own previous experiences are considered to influence the mortgage selection more than the recommendations of others (variable is named *wom*, meaning word-of-mouth). The relatively low perceived importance of additional mortgage hedging products like loan cover and interest rate hedges could indicate that the mortgage lender selection is based on the other features of the loan, and after that, the decision whether to take any mortgage protection products is made.

Table 4: Perceived importance of loan offer features by respondent's FL score

k	$Lit_i = 0$ (n = 23)	$Lit_i = 1$ (n = 58)	$Lit_i = 2$ (n = 63)	$Lit_i = 3$ (n = 71)	$Lit_i \geq 4$ (n = 52)
Margin	3.74	3.69	3.60	3.90	4.39
	(1.05)	(1.05)	(1.13)	(1.02)	(0.63)
Service charge	3.44	3.50	3.40	3.38	3.04
	(0.99)	(1.08)	(1.13)	(1.05)	(1.01)
Loan period	3.83	3.62	3.57	3.70	3.29
	(0.94)	(0.89)	(1.06)	(1.10)	(1.19)
Monthly payment	3.74	3.74	3.37	3.39	2.92
	(0.96)	(0.85)	(1.13)	(1.10)	(1.34)
APR	4.09	3.72	4.10	4.21	4.33
	(1.00)	(1.06)	(0.91)	(0.89)	(0.90)
Interest rate hedge options	3.78	3.64	3.86	3.31	2.89
	(1.00)	(1.04)	(1.19)	(1.15)	(1.20)
Interest rate hedge price	3.65	3.67	3.79	3.37	3.12
	(1.02)	(1.08)	(1.14)	(1.21)	(1.23)
Loan cover options	3.57	3.69	3.75	3.21	2.85
	(0.95)	(0.96)	(1.12)	(1.08)	(1.07)
Loan cover price	3.87	3.64	3.76	3.25	2.90
	(0.92)	(1.02)	(1.09)	(1.12)	(1.15)
Payment plan flexibility	3.61	4.07	3.87	3.75	3.62
	(0.99)	(0.86)	(0.94)	(0.94)	(0.97)
Collaterals needed	3.48	3.62	3.75	3.59	3.44
	(0.99)	(1.07)	(1.05)	(1.09)	(0.94)
Additional collateral price	3.87	3.76	3.48	3.35	2.89
	(0.87)	(0.94)	(1.08)	(1.22)	(1.28)
Min. down payment	3.83	3.64	3.54	3.34	2.62
	(0.98)	(1.00)	(1.15)	(1.04)	(0.99)
Sustainable product	3.83	3.71	3.64	3.21	3.15
	(0.89)	(0.88)	(1.13)	(1.10)	(1.14)
Service quality	3.74	3.88	3.98	3.83	3.79
	(0.86)	(1.09)	(0.96)	(1.01)	(0.96)
Service speed	3.74	3.86	4.06	3.75	3.56
	(0.96)	(1.07)	(0.91)	(1.00)	(1.02)
Brand	3.96	3.90	3.52	3.61	3.17
	(0.93)	(1.00)	(1.05)	(1.13)	(1.06)
Own experiences	3.91	3.87	3.91	3.92	3.54
	(0.85)	(1.05)	(1.00)	(0.98)	(1.02)
Word of mouth	3.87	3.55	3.48	3.30	2.62
	(0.87)	(1.10)	(1.09)	(1.09)	(1.21)
Domesticity	3.83	3.79	3.73	3.73	3.31
	(0.78)	(1.05)	(1.07)	(1.11)	(1.16)
Insurance benefits	3.48	3.57	3.59	3.14	2.69
	(0.85)	(1.12)	(1.12)	(1.23)	(1.15)
Daily banking services	3.74	3.69	3.60	3.75	3.12
	(0.75)	(1.03)	(1.17)	(0.92)	(1.06)
Daily banking services' price	3.87	3.91	3.79	3.72	3.33
	(0.92)	(1.00)	(1.08)	(0.94)	(1.12)
Investing services	3.65	3.55	3.22	2.99	2.65
	(1.03)	(0.99)	(1.18)	(1.15)	(1.19)
Investing services' price	3.61	3.67	3.25	3.13	2.83
	(0.94)	(1.00)	(1.14)	(1.23)	(1.18)
Other monetary benefits	4.09	3.86	3.44	3.41	2.83
	(0.73)	(1.00)	(1.13)	(1.15)	(1.14)

Notes: This table presents the mean values and standard deviations (reported in parenthesis) of Imp_k measuring the perceived importance of various loan offer features k among respondents having varying FL scores (*Lit)*. The respondents were asked to evaluate how important they considered the various features of mortgage offers and other banking services to be while selecting their latest home loan. The answer was given on a scale of 1 to 5 where 1 is "not important at all" and 5 is "very important". FL score Lit_i is calculated as the number of correct answers given to questions Q1 – Q5. FL scores 4 and 5 are presented as one group due to the low number of respondents (2) having all 5 questions right.

Table 4 breaks the mean values of Imp_k, the perceived importance of loan offer feature k, down into subgroups based on the level of FL. The financially literate customers seem to be more price-sensitive compared to those less financially savvy: the perceived importance margin and APR increase with the level of FL. Similarly, the less sophisticated customers weigh more on the long loan maturity and the monthly payment, indicating that they are more interested in the monthly cash flow than the true expenses of the mortgage. This finding is quite aligned e.g. with the recent survey results of Danske Bank A/S (2022c). However, literate customers seem to emphasize other conditions of the loan over the monthly payment. The perceived importance of (monetary) benefits such as bonuses or other loyal customer benefits seems to decrease when FL increases.

Table 4 also indicates that the financially literate borrowers seem to be less interested in additional mortgage protection products such as interest rate hedges and loan protection insurances when comparing loan offers. This finding could be related to the decreased need and interest on hedging products (i.e., better payment ability, higher income, and higher wealth) of financially literate customers. However, the survey question asks how much hedging product options affected the mortgage lender selection, so the result can't be interpreted as an indication that financially literate customers do not want or need mortgage protection products.

What is interesting, financially literate customers emphasize the availability and price of investing services less than less savvy customers. Former studies of Behrman et al. (2012) and Lusardi & Mitchell (2007; 2011; 2014) present quite robust evidence that financially literate individuals are more likely to prepare for the future by saving and investing regularly, so straightforward conclusions about financially literate borrowers' decreased interest in investing services cannot quite be done. Rather, it could be assumed that financially literate borrowers do not select their mortgage lender based on the investing services provided and thus are more willing to use different service providers as a mortgage lender, investment service provider and possibly provider of other financial services. Less financially literate customers, on the other hand, seem to appreciate the convenience of concentrating financial services on one institution. Similar phenomena can also be observed in the case of insurance benefits.

Considering the findings of Kalmi & Ruuskanen (2016) and van Ooijen & van Rooi (2016) on information sources used when selecting a financial product, the findings are not very surprising. The financially literate respondents report that the experiences and suggestions of friends and acquaintances were not very influential on their mortgage lender selection, while the less literate respondents relied more on the advice of those. Possibly, financially literate customers have consulted a greater number and more relevant information sources as van Ooijen & van Rooi (2016) found the literate Dutch lenders have done.

3.3 Model specification

To investigate the role of FL on loan provider selection, this thesis presents the empirical results from the logit regression models explaining the probability of putting the mortgage application out for tender, the bank selected and finally, how important did the borrower consider the various loan offer features when selecting his/her latest home loan supplier. All the regression models are estimated with the R program using the method of maximum likelihood.

To explain the probability of the individual *i* putting the mortgage application out for tender $P(Tend)_i$, the following logit model is estimated:

$$P(Tend)_i = \frac{1}{1 + e^{-(\mu + \alpha Lit_i + \beta X_i + u_i)}} \quad (1)$$

where $P(Tend)_i$ is the probability of individual *i* putting the mortgage application out for tender, Lit_i refers to the literacy score and X_i to the vector of other explanatory variables (*Income, Wealth, Education, Gender, Age* and *LoanAmount).*

After estimating how the FL score affects the probability of putting a mortgage application out for tender, a multinomial logit model is used to analyse if the FL affects the selection of any specific lender. The model is specified as

$$\pi_{ij} = \frac{e^{\mu_j + \alpha_j Lit_i + \beta_j X_i}}{\sum_{j=1}^{n} e^{\mu_j + \alpha_j Lit_i + \beta_j X_i}} \quad (2)$$

where π_{ij} is the probability of individual *i* selecting bank *j*, *n* is the number of banks, and all the other notations are the same as for the Equation (1).

As the OP Financial Group was selected by the major part of the respondents, it was selected as the reference category and its intercept value was fixed at zero. The estimation results can thus be interpreted as an answer to the question "How does the variable X affect the probability of selecting bank *j* instead of the OP Financial Group?"

According to Long (1997), multinomial logit models assume the Independence of Irrelevant Alternatives (IIA) which means that the odds ratio between any two alternatives is not affected by any other option available. If the IIA was rejected, the model would produce biased predicted probabilities (Long, 1997, p. 185-186). The Hausman-McFadden test is used to test for the IIA assumption, and the null hypothesis of IIA is not rejected in the analysis.

Further, this thesis uses the ordered logit model to explain how the FL affects the perceived importance of various loan offer features. The model is specified as

$$P(Imp_{ik} = l) = F(\mu_l - \alpha_k Lit_i - \beta_k X_i) - F(\mu_{l-1} - \alpha_k Lit_i - \beta_k X_i) \quad (3)$$

where

$$F(z) = \frac{e^z}{1 - e^z} \tag{4}$$

Imp_{ik} is the perceived importance of loan offer feature k for individual i, l response option between 1 and 5, and all the other notations are the same as for the previous equations.

At the final step of empirical analyses, this thesis presents a multinomial logit model to explain how the perceived importance of monetary and non-monetary loan offer features affects the probability of selecting a certain mortgage lender. The model is specified as

$$\pi_{ij} = \frac{e^{\mu_j + \alpha_j Monetary_i + \beta_j NonMonetary_i}}{\sum_{j=1}^{n} e^{\mu_j + \alpha_j Monetary_i + \beta_j NonMonetary_i}} \tag{5}$$

where π_{ij} is the probability of individual i selecting bank j, n is the number of banks, $Monetary_i$ is a vector including variables for perceived importance of monetary attributes Annual Percentage Rate (Imp_{iAPR}), insurance benefits ($Imp_{iInsurance}$) and other monetary benefits (Imp_{iOther}), $NonMonetary_i$ is a vector including variables for perceived importance of non-monetary attributes service quality ($Imp_{iSQuality}$), service speed ($Imp_{iSSpeed}$) and word-of-mouth (Imp_{iWOM}) for individual i. As in the case of the model presented in Equation 2, the OP Financial Group is used as the reference level. Once again, the Hausman-McFadden test is used to test for the IIA assumption. To reveal the possible differences in lender selection determinants between borrowers having varying FL, the estimation is done for the full sample, the literate borrowers' subsample, and the non-literate borrowers' subsample. Respondents are divided into the subsamples based on the FL score: those having an FL score of 3 or greater are included in the literate sample (n = 123) and those having an FL score 2 or lower in the non-literate sample (n = 144).

The goodness of fit of every limited dependent variable model presented is evaluated with Pseudo-R^2, also known as the McFadden-R^2. Pseudo-R^2 is defined as

$$\text{Pseudo} - R^2 = 1 - \frac{LLF}{LLF_0} \tag{6}$$

where LLF is the maximised value of the log-likelihood function for the unrestricted model and LLF_0 is the corresponding value for the restricted model where all the slope parameters are set to zero (Brooks, 2019, p. 525). As Brooks (2019, p. 525) presents, a higher Pseudo-R^2 value indicates a better fit, but the measure does not have any intuitive interpretation.

4 EMPIRICAL RESULTS & DISCUSSION

4.1 Putting mortgage application out for tender

Table 5 presents the results from logit model estimations to explain if respondent *i* compared the loan offers from more than one bank when selecting his/her latest mortgage. The logit model is estimated first without the FL variable, and after that, the FL score is added to the model. The parameter estimates, standard deviations, and marginal effects of the model without the FL score are presented in Panel A of Table 5. The high and statistically significant intercept indicates how most mortgage lenders are probable to compare loan offers from more than one bank. When comes to the explanatory variables, it seems like the age and loan amount are the only statistically significant variables explaining the probability of putting a mortgage application out for tender. The effect of the loan amount is as expected: a higher loan amount probably increases the borrower's incentive to compare the loan offers and find the best possible deal. The highly significant and negative parameter estimate of *Age* variable indicates that more ageing borrowers are less likely to put their mortgage applications out for tender. The marginal effect indicates that one step up in the age groups seems to decrease the probability of comparison by about 7 %.

Panel B of Table 5 presents the parameter estimates, standard deviations, and marginal effects for the logit model (Eq. 1) including the FL as an explanatory variable. Even though adding the FL variable seems to increase the explanatory power of the model, the results do not differ very much from the observations for the model not including the FL score: intercept stays high and statistically significant, and *Age* and *LoanAmount* are still the only statistically significant explanatory variables. The negative parameter estimate of the FL score is quite surprising, considering that for example OECD (2016, 2018) uses the comparison of financial products as a measure of financially savvy behaviour. However, the FL score coefficients are not statistically significant, indicating that FL would not have a very meaningful effect on the probability of putting mortgage applications out for tender. Panel C of Table 5 presents the estimated logit model including only the FL variable. The results support the observation that the probability of putting the mortgage application out for tender cannot quite be explained with FL: the goodness of fit of the model falls significantly, and the parameter estimate for the FL variable is close to zero.

We could assume that if the borrower did not compare the loan offer to any other offers, the accepted offer was from the customer's previous bank. Thus, the finding on the effect of age on the probability of comparing multiple lenders' offers supports the assumption that older customers are more likely to be loyal to the bank whose customers they have already been previously. This can be seen

from the effects of the age variable on the perceived importance of own previous experiences, bank brand/image and service quality discussed later in section 4.3.

As age seems to be explaining a major part of the variation in the probability of putting the mortgage application out for tender, estimating the model for a subgroup of younger lenders becomes quite relevant. Presumably younger borrowers aren't yet as attached to any specific bank. Table 6 presents the logit model coefficients and marginal effects estimated using the subgroup consisting of borrowers under 35 years old.[3] The results are quite interesting. A very high and statistically significant intercept tells how younger borrowers are likely to put their mortgage applications out for tender. Income seems to become statistically significant, indicating that high-income borrowers are more likely to put their mortgage applications out for tender. The negative parameter estimate for the *Gender* variable indicated how female borrowers are less likely to compare more than one loan offer.

What is especially interesting, the logit model fitted for the subgroup including young borrowers indicates that financially literate borrowers are less likely to put their mortgage applications out for tender. There are a couple of possible explanations for this unexpected observation. First, young borrowers are possibly buying their first residential property or apartment. Thus, there might be so-called ASP[4] borrowers among these 11 respondents not comparing offers from more than one bank. ASP savers/borrowers might be more loyal to the bank whose customers they have been during the ASP saving period, and thus more probable to take the loan from their current bank. Goal-oriented ASP saving is a good example of long-term financial planning and financially savvy behaviour, which OECD (2016, 2018) uses as an indication of FL. Secondly, the period of 2020 – 2022 has been quite exceptional in the Finnish mortgage market. During the late 2020 and 2021 mortgage application processes of Finnish banks were congested, and larger family apartments were sold exceptionally quickly. Thus, to be able to buy the wanted property, some borrowers were forced to accept the offer from the first mortgage lender offering service. Presumably, family apartments in Helsinki metropolitan area were especially asked by the young white-collar employees. However, the finding is statistically significant only at a 10 % level and the sample of young borrowers included only 112 respondents where only 11 did not put their mortgage applications out for tender. Given that the results differ quite a lot between the whole sample and the young borrower sample and generally comparing financial products is considered as a signal of FL (OECD, 2016, 2018), it is hard to make robust conclusions on the effect of FL on putting mortgage application out for tender. For having more robust results, further studies with a

[3] More accurately, the subgroup consists of respondents being under 35 years old while responding the survey. All the respondents have taken a loan during the last two years, but the accurate loan disbursement dates weren't asked.

[4] ASP (asuntosäästöpalkkio) is a system based on Finnish law. Finnish state supports young people in purchasing their first owner-occupied apartment with a government interest subsidy and a government guarantee free of charge, for example. Having ASP benefits requires borrower to save 10 % down payment into a specific ASP account. (Finnish State Treasury, 2022)

larger sample and controls over ASP lending, first-home buyers and apartment specifications could be needed.

Table 5: Logit model estimation results

Panel A: Without the FL variable									
	μ	*Lit*	*Income*	*Wealth*	*Education*	*Gender*	*Age*	*LoanAmount*	Pseudo-R^2
Coefficients	1.916** (0.837)	-	0.016 (0.117)	0.022 (0.089)	0.287 (0.186)	-0.253 (0.332)	-0.490*** (0.129)	0.225* (0.130)	0.117
Marginal effects	0.277	-	0.002	0.003	0.042	-0.037	-0.071	0.033	
Panel B: With the FL variable									
	μ	*Lit*	*Income*	*Wealth*	*Education*	*Gender*	*Age*	*LoanAmount*	Pseudo-R^2
Coefficients	2.133** (0.859)	-0.197 (1.400)	0.032 (0.119)	0.020 (0.089)	0.323* (0.190)	-0.330 (0.340)	-0.467*** (0.130)	0.237* (0.131)	0.124
Marginal effects	0.304	-0.028	0.005	0.003	0.046	-0.047	-0.067	0.034	
Panel C: FL variable only									
	μ	*Lit*							Pseudo-R^2
Coefficients	1.728*** (0.333)	-0.171 (0.122)	-	-	-	-	-	-	0.007
Marginal effects	0.284	-0.028	-	-	-	-	-	-	

Notes: This table presents the parameter estimates and marginal effects of the logit model (Eq. 1) explaining the probability of individual *i* putting the mortgage application out for tender. Standard deviations of parameter estimates are reported in the parenthesis under the parameter estimate values. Statistical significance levels are noted as (***) = 0.01, (**) = 0.05 and (*) = 0.10. The goodness of fit measure Pseudo $-R^2$ is calculated as $1-\frac{LLF}{LLF_0}$, where LLF stands for the maximised value of the log-likelihood function for the model and LLF_0 for the log-likelihood function for the restricted model. *Lit* is the FL score calculated as the number of correct answers to FL questions, *Income* is the respondent's annual gross income, *Wealth* net wealth, *Education* education level, *Gender* gender coded as 0 = male and 1 = female, *Age* age group, and *LoanAmount* the loan capital respondent borrower last time he/she took out a home loan.

Table 6: Logit model estimation results for respondents under 35 years old

	μ	*Lit*	*Income*	*Wealth*	*Education*	*Gender*	*Age*	*LoanAmount*	Pseudo-R^2
Coefficients	7.555*** (3.449)	-0.674* (0.349)	0.616* (0.375)	0.088 (0.258)	0.125 (0.441)	-1.542* (0.874)	-1.789 (1.161)	-0.249* (0.314)	0.271
Marginal effects	0.535	-0.047	0.043	0.006	0.009	-0.107	-0.124	-0.017	

Notes: This table presents the parameter estimates and marginal effects of the logit model (Eq. 1) estimated using a subgroup including respondents under 35 years old. Standard deviations of parameter estimates are reported in the parenthesis under the parameter estimate values. Statistical significance levels are noted as (***) = 0.01, (**) = 0.05 and (*) = 0.10. The goodness of fit measure Pseudo $-R^2$ is calculated as $1-\frac{LLF}{LLF_0}$, where LLF stands for the maximised value of the log-likelihood function for the model and LLF_0 for the log-likelihood function for the restricted model. *Lit* is the FL score calculated as the number of correct answers to FL questions, *Income* is the respondent's annual gross income, *Wealth* net wealth, *Education* education level, *Gender* gender coded as 0 = male and 1 = female, *Age* age group, and *LoanAmount* the loan capital respondent borrower last time he/she took out a home loan.

4.2 Selected lender

The effects of the borrower characteristics on the bank selection are identified with the multinomial logit model presented in equation 2. This stage of the empirical analysis should reveal the determinants that affect the probability to select some other than the reference bank, i.e., the OP Financial Group as the mortgage bank. Hence, the empirical results should be interpreted as the effects of each of the explanatory variables regarding the probability to select bank *j* instead of the OP Financial Group.

Table 7 presents the parameter estimates and standard deviations, and table 8 presents the marginal effects of the estimated model. Panel A of both tables once again presents the model estimated without the FL score. Higher income seems to be connected to an increased probability to choose the Nordea Bank, Danske Bank and Other smaller bank instead of the OP Financial Group. On the other hand, higher wealth seems to be connected to a decreased probability, or lower wealth to an increased probability of selecting the Savings Bank. The low-educated borrowers seem to be more likely to select the S-Pankki over the OP Financial Group, but the gender, age, and what is interesting, applied loan amount seems to not have a statistically significant effect on the bank selection probability.

Panel B of both tables 7 and 8 present the results for the model including the FL score as an explanatory variable to the model. Higher FL seems to be connected to a decreased probability of selecting the Nordea Bank, Danske Bank, S-Pankki, and Savings bank but an increased probability of selecting other smaller banks over the OP Financial Group. However, the coefficient is statistically significant only in the case of Nordea Bank. The marginal effects reveal that a one-point higher FL score decreases the probability of selecting the Nordea Bank over the OP Financial Group by 5,1 %. The interpretations on income's effect on the probability of selecting the Nordea Bank, Danske Bank or other smaller bank, wealth's effect on the probability of selecting Savings Bank and education's effect on selecting S-Pankki over the OP Financial Group remain unchanged.

Focusing only on the multinomial logit model results, it is quite hard to draw any definite conclusions on the underlying reasons why the borrowers with varying FL scores, income, wealth, and education levels select certain banks. Possibly, the perceived importance of various loan offer features discussed in the next section could be used to explore the underlying reasons for the bank selection.[5] However, the credit policies of banks are probably affecting the probability of borrowers with varying income and net wealth ending as customers of certain banks and similarly are nearly impossible to compare in detail due to the sensi-

[5] For example, table 8 reveals how the less literate borrowers give more weight on low monthly payment when selecting a mortgage and thus could be more willing to favour banks offering longer maturities for home loans.

tivity of that information. Banks also often have campaigns, benefits and marketing directed to certain customer segments, which might affect the possibility of ending up as that bank's customer. For example, Danske Bank has recently offered quite significant benefits for the highly educated AKAVA members (Danske Bank A/S, 2022b).

Table 7: Multinomial logit model estimation results for bank selection

Panel A: Without the FL variable								
j	μ	Lit	$Income$	$Wealth$	$Education$	$Gender$	Age	$LoanAmoun$
Nordea Bank	-1.744**	-	0.288**	-0.112	0.185	0.012	0.087	-0.127
	(0.804)		(0.122)	(0.091)	(0.179)	(0.324)	(0.127)	(0.119)
Danske Bank	-5.210***	-	0.482**	-0.066	0.232	0.486	0.247	-0.164
	(1.542)		(0.198)	(0.146)	(0.298)	(0.535)	(0.215)	(0.183)
S-Pankki	-0.896	-	0.092	0.043	-0.503*	0.358	0.048	-0.156
	(1.189)		(0.187)	(0.139)	(0.288)	(0.523)	(0.184)	(0.205)
Savings Bank	-1.693	-	0.037	-0.645***	0.312	-0.052	0.288	0.026
	(1.353)		(0.214)	(0.192)	(0.316)	(0.556)	(0.221)	(0.212)
Other	-2.377**	-	0.409***	-0.039	0.072	0.291	-0.051	-0.205
	(1.015)		(0.150)	(0.113)	(0.220)	(0.406)	(0.161)	(0.148)
Pseudo-$R^2 = 0.0535$								
Panel B: With the FL variable								
j	μ	Lit	$Income$	$Wealth$	$Education$	$Gender$	Age	$LoanAmoun$
Nordea Bank	-1.478*	-0.290**	0.302**	-0.106	0.204	-0.051	0.143	-0.112
	(0.816)	(0.133)	(0.123)	(0.092)	(0.181)	(0.328)	(0.130)	(0.120)
Danske Bank	-5.001***	-0.217	0.495**	-0.061	0.256	0.425	0.284	-0.156
	(1.551)	(0.206)	(0.198)	(0.145)	(0.300)	(0.539)	(0.218)	(0.185)
S-Pankki	-0.661	-0.211	0.101	0.045	-0.483*	0.299	0.080	-0.141
	(1.209)	(0.217)	(0.188)	(0.140)	(0.288)	(0.529)	(0.186)	(0.205)
Savings Bank	-1.339	-0.371	0.063	-0.661***	0.317	-0.120	0.367	0.062
	(1.372)	(0.237)	(0.214)	(0.196)	(0.316)	(0.562)	(0.228)	(0.217)
Other	-2.453**	0.109	0.408***	-0.045	0.048	0.314	-0.080	-0.203
	(1.032)	(0.170)	(0.152)	(0.113)	(0.222)	(0.410)	(0.166)	(0.147)
Pseudo-$R^2 = 0.0648$								

Notes: This table presents the parameter estimates of the multinomial logit model (Eq. 2) explaining the probability of individual *i* selecting bank *j*. Standard deviations of parameter estimates are reported in the parenthesis under the estimates. Statistical significance levels are noted as (***) = 0.01, (**) = 0.05 and (*) = 0.10. The goodness of fit measure Pseudo $-R^2$ is calculated as $1 - \frac{LLF}{LLF_0}$, where LLF stands for the maximised value of the log-likelihood function for the model and LLF_0 for the log-likelihood function for the restricted model. The Independence of Irrelevant Alternatives (IIA) assumption was tested with the Hausman-McFadden test. *Lit* is the FL score calculated as the number of correct answers to FL questions, *Income* is the respondent's annual gross income, *Wealth* net wealth, *Education* education level, *Gender* gender coded as 0 = male and 1 = female, *Age* age group, and *LoanAmount* the loan capital respondent borrower last time he/she took out a home loan.

Table 8: Multinomial logit model marginal effects for bank selection

Panel A: Without the FL variable							
j	*Lit*	*Income*	*Wealth*	*Education*	*Gender*	*Age*	*LoanAmoun*
Nordea Bank	-	0.032	-0.013	0.036	-0.023	0.011	-0.012
Danske Bank	-	0.020	0.000	0.011	0.025	0.013	-0.005
S-Pankki	-	-0.005	0.007	-0.036	0.017	0.000	-0.005
Savings Bank	-	-0.006	-0.024	0.010	-0.006	0.010	0.004
Other	-	0.032	0.003	0.002	0.027	-0.014	-0.017
Panel B: With the FL variable							
	Lit	*Income*	*Wealth*	*Education*	*Gender*	*Age*	*LoanAmoun*
Nordea Bank	-0.051	0.034	-0.012	0.040	-0.034	0.021	-0.010
Danske Bank	-0.007	0.020	0.000	0.013	0.023	0.014	-0.005
S-Pankki	-0.007	-0.005	0.007	-0.036	0.015	0.001	-0.004
Savings Bank	-0.010	-0.005	-0.023	0.010	-0.007	0.012	0.005
Other	0.029	0.031	0.002	-0.002	0.033	-0.020	-0.017

Notes: This table presents the marginal effects of the multinomial logit model (Eq. 2) explaining the probability of individual *i* selecting bank *j*. *Lit* is the FL score calculated as the number of correct answers to FL questions, *Income* is the respondent's annual gross income, *Wealth* net wealth, *Education* education level, *Gender* gender coded as 0 = male and 1 = female, *Age* age group, and *LoanAmount* the loan capital respondent borrower last time he/she took out a home loan.

4.3 Perceived importance of loan offer features

After studying if the FL affects the probability of putting the mortgage application out for tender and which bank the customer eventually selects, the thesis explores how FL affects how important the customers perceive certain loan offer features and loan conditions when selecting between the mortgage possibilities. Table 9 presents the estimation results from the ordered logit models specified in equations 3 and 4.

Considering the findings of Lusardi & Tufano (2015) and Disney & Gathergood (2013) indicating that illiterate borrowers pay higher interests and fees, the findings of this thesis are not very surprising. High FL seems to significantly predict the higher perceived importance of margin and the true cost of the loan (annual percentage rate APR). Similarly, high FL predicts lower perceived importance of service charge. This supports the previous finding on financial literate customers comparing the loan offers based on their true total cost rather than a single fee. Age also seems to be related to the higher perceived importance of APR. Higher loan amount seems to be connected to the increased perceived importance of margin and loan period, which is quite expected. A higher loan amount increases the motivation to find the lowest possible margin, and long maturity could keep the monthly outgoing cash flow affordable when holding a large mortgage. Even if FL isn't found to be statistically significant when explaining the importance of loan period, it becomes in the case of monthly payment:

financially illiterate borrowers give weight to the low monthly payment. This indicates that financially illiterate borrowers might not be able to evaluate other loan conditions and thus end up evaluating offers based on the simplest possible number on the offer sheet – how much money will they pay monthly. As FL decreases the perceived importance of monthly payment, so does higher income. Naturally, high-income borrowers can eliminate debt with higher monthly instalments and thus do not weigh the low monthly payment as much when selecting between loan offers. Even if the descriptive statistics presented in table 3 indicate that payment plan flexibility is highly influential on mortgage lender selection, the ordered logit model does not quite explain which borrower characteristics could be used to predict the values of $Imp_{payment\ plan\ flexibility}$ reliably.

When comes to the collateral and downpayment-related conditions, higher FL predicts lower perceived importance of minimum down payment and additional collateral price. Also, high income seems to be connected to decreased importance of additional collaterals price, and wealth to the decreased importance of minimum down payment. Apparently, customers having high income and wealth do not struggle with the needed self-financing and collaterals, and thus do not need additional collaterals or guarantees. Financially literate customers could possibly be able to negotiate more advantageous conditions related to collaterals or other ways to arrange the needed collaterals without having to pay for additional guarantees.

As already concluded in section 3.2.2., additional hedging products or other additional financial services offered by the bank aren't as influential on lender selection as strictly loan-related conditions. Ordered logistic model estimation results show how most of the services and products not being strictly related to the loan conditions are gradually beginning to lose their importance in mortgage lender selection as the literacy score of the borrower increases. The phenomenon can be seen in all hedging products related questions: interest rate hedge options, interest rate hedge price, loan cover options and loan cover price. It is important to notice that this finding should not be interpreted as an indication of literate borrowers not being interested in hedging products. Rather, FL predicts a decreasing impact of these products on lender selection i.e., the lender is selected based on other criteria and buying/selecting hedging products is a separate decision. The perceived importance of sustainable loan product is found to decrease with higher FL and income. One possible explanation could be related to the yet low number of "green" mortgage products available in Finland, financially literate customers' understanding of possible problems related to "green money" and high-income customers' ability to receive offers with fair conditions anyway. Higher FL seems to also predict lower perceived importance of service quality, bank's brand/image, domesticity, own and others' previous experiences, insurance benefits, investing services, daily banking services and other monetary benefits.

Also, other borrower characteristics seem to be affecting the perceived importance of aspects not related to loan conditions. Older borrowers are found to

give more weight to service quality, service speed and the lender's brand/image. Apparently, more ageing customers experienced personal face-to-face service in the past value rapid, high-quality service more than younger borrowers who are familiar with digital banking services. Age also seems to be increasing the importance of borrower's own previous experiences, but similarly decreasing the importance of others' recommendations. As mentioned in section 4.1., ageing borrowers seem to be loyal to the banks they've had good experiences and to those who have served them well.

The observations on the perceived importance of investing services are certainly worthy of special mention. As Behrman et al. (2012) and Lusardi & Mitchell (2007; 2011; 2014) have shown, FL increases active saving, investing and pension preparedness. However, the ordered logit model shows how higher wealth predicts higher perceived importance of investing services on mortgage lender selection, but higher FL, income and age are predicting less weight on investing services when selecting the mortgage lender. Once again, the result should not be interpreted as an indication of high-income and financially literate borrowers not being interested in investing, but rather, as an indication that they do not select their mortgage based on the investing services offered by the bank granting the credit.

All in all, FL seems to have a quite significant impact on how important the different loan offer features are perceived to be when selecting a home loan. When explaining the perceived importance of loan offer features, in many cases the FL score seems to be the most significant of all the variables considered, both in magnitude and statistically. FL increases the weight given to the margin and especially the true cost of the loan, while financially illiterate customers seem to be more willing to compare offers based on the monthly payment. They are also more likely to give weight to financial services and benefits not related to the loan conditions, possibly appreciating the convenience and simplicity of having all the financial services from the same service provider. Similarly, more financially literate borrowers are more capable of comparing a wide range of financial service providers and thus could end up having different services from different banks. For example, a high-income, financially literate mortgage borrower could take out her mortgage from the bank that offers the best loan conditions, while keeping her investments with another and insurances with a third provider.

Table 9: Ordered logit model estimation results

k	μ_{12}	μ_{23}	μ_{34}	μ_{45}	Lit	$Income$	$Wealth$	$Education$	$Gender$	Age	$LoanAmount$
Margin	-1.094*	0.135	1.773***	3.457***	0.270***	0.096	0.076	0.070	0.106	0.127	0.147
	(0.648)	(0.585)	(0.586)	(0.614)	(0.093)	(0.087)	(0.065)	(0.126)	(0.233)	(0.093)	(0.088)
Service charge	-3.535***	-1.554***	-0.020	1.413***	-0.157*	-0.014	0.039	0.092	0.097	-0.090	0.006
	(0.642)	(0.571)	(0.561)	(0.571)	(0.092)	(0.084)	(0.064)	(0.12)	(0.228)	(0.092)	(0.084)
Loan period	-4.308***	-2.797***	-1.209**	0.384	-0.112	-0.029	-0.119*	-0.146	0.300	-0.043	0.146*
	(0.648)	(0.582)	(0.555)	(0.553)	(0.094)	(0.087)	(0.066)	(0.129)	(0.230)	(0.091)	(0.085)
Monthly payment	-4.310***	-2.69***	-1.074*	0.168	-0.300***	-0.143*	0.015	0.055	0.159	-0.115	0.061
	(0.638)	(0.581)	(0.558)	(0.559)	(0.094)	(0.082)	(0.062)	(0.125)	(0.227)	(0.091)	(0.085)
APR	-2.558***	-0.988	0.538	2.143***	0.203**	-0.135	0.066	0.064	0.129	0.259***	0.125
	(0.741)	(0.597)	(0.573)	(0.590)	(0.097)	(0.086)	(0.065)	(0.127)	(0.236)	(0.095)	(0.089)
Interest rate hedge options	-2.989***	-1.781***	-0.518	0.992*	-0.374***	0.034	-0.053	0.170	-0.045	0.084	-0.089
	(0.601)	(0.569)	(0.555)	(0.56)	(0.094)	(0.087)	(0.064)	(0.122)	(0.227)	(0.092)	(0.087)
Interest rate hedge price	-2.161***	-1.22**	0.245	1.676***	-0.273***	-0.004	-0.022	0.177	0.072	0.236***	-0.125
	(0.596)	(0.571)	(0.562)	(0.575)	(0.091)	(0.086)	(0.064)	(0.125)	(0.227)	(0.092)	(0.086)
Loan cover options	-3.696***	-2.280***	-0.767	0.917	-0.376***	0.000	-0.100	0.163	-0.097	0.105	-0.124
	(0.621)	(0.577)	(0.559)	(0.564)	(0.094)	(0.084)	(0.064)	(0.125)	(0.229)	(0.091)	(0.087)
Loan cover price	-3.363***	-2.286***	-0.768	0.953*	-0.396***	-0.034	-0.126*	0.130	0.018	0.162*	-0.035
	(0.613)	(0.582)	(0.561)	(0.568)	(0.094)	(0.085)	(0.065)	(0.128)	(0.229)	(0.092)	(0.087)
Payment plan flexibility	-4.22***	-2.393***	-0.672	1.125*	-0.147	0.077	-0.019	-0.104	0.388	0.091	-0.054
	(0.755)	(0.600)	(0.572)	(0.577)	(0.094)	(0.084)	(0.064)	(0.125)	(0.234)	(0.095)	(0.086)
Collaterals needed	-3.048***	-1.549***	0.128	1.663***	-0.049	0.035	-0.056	-0.012	0.383	0.030	0.095
	(0.644)	(0.576)	(0.566)	(0.577)	(0.091)	(0.084)	(0.065)	(0.125)	(0.230)	(0.094)	(0.083)
Additional collateral price	-3.447***	-2.241***	-0.841	0.745	-0.367***	-0.171**	0.013	0.084	0.145	0.058	0.068
	(0.613)	(0.574)	(0.556)	(0.563)	(0.093)	(0.084)	(0.065)	(0.125)	(0.227)	(0.091)	(0.086)
Min. down payment	-4.63***	-3.121***	-1.59***	0.186	-0.457***	0.045	-0.183***	0.140	-0.060	-0.078	-0.039
	(0.648)	(0.599)	(0.571)	(0.572)	(0.095)	(0.084)	(0.066)	(0.124)	(0.227)	(0.092)	(0.083)
Sustainable product	-3.504***	-2.554***	-0.806	0.940*	-0.302***	-0.188**	-0.012	-0.040	0.304	0.142	0.094
	(0.607)	(0.575)	(0.55)	(0.556)	(0.094)	(0.085)	(0.063)	(0.123)	(0.232)	(0.091)	(0.085)
Service quality	-2.76***	-1.588***	-0.093	1.748***	-0.068	0.022	0.007	-0.085	0.378	0.218**	0.002
	(0.661)	(0.598)	(0.58)	(0.59)	(0.093)	(0.085)	(0.063)	(0.123)	(0.234)	(0.094)	(0.087)
Service speed	-2.756***	-1.275**	0.186	2.009***	-0.194**	0.086	-0.029	-0.088	0.435*	0.218**	0.111
	(0.669)	(0.586)	(0.576)	(0.590)	(0.094)	(0.085)	(0.064)	(0.125)	(0.232)	(0.093)	(0.087)
Brand	-3.010***	-1.723***	-0.084	1.474***	-0.367***	-0.081	0.083	-0.071	0.097	0.190**	0.145
	(0.635)	(0.587)	(0.575)	(0.585)	(0.093)	(0.083)	(0.065)	(0.123)	(0.230)	(0.093)	(0.087)
Own experiences	-2.835***	-1.432**	0.119	1.903***	-0.210**	-0.076	0.089	0.048	0.191	0.296***	-0.025
	(0.67)	(0.589)	(0.572)	(0.585)	(0.093)	(0.085)	(0.065)	(0.123)	(0.233)	(0.096)	(0.086)

Table 9 (Cont.)

k	μ_{12}	μ_{23}	μ_{34}	μ_{45}	Lit	$Income$	$Wealth$	$Education$	$Gender$	Age	$LoanAmount$
Word of mouth	-3.914***	-2.774***	-1.412***	0.556	-0.394***	-0.149*	0.087	0.218*	0.230	-0.263***	0.006
	(0.626)	(0.593)	(0.575)	(0.580)	(0.095)	(0.086)	(0.064)	(0.126)	(0.231)	(0.094)	(0.086)
Domesticity	-3.962***	-2.415***	-0.876	0.466	-0.167*	-0.027	-0.039	-0.065	0.006	0.095	-0.027
	(0.648)	(0.574)	(0.552)	(0.552)	(0.091)	(0.082)	(0.061)	(0.122)	(0.230)	(0.09)	(0.087)
Insurance benefits	-3.509***	-2.597***	-1.129**	0.539	-0.313***	-0.212***	-0.005	-0.066	-0.043	0.048	0.156*
	(0.601)	(0.580)	(0.562)	(0.565)	(0.092)	(0.085)	(0.065)	(0.124)	(0.231)	(0.090)	(0.085)
Daily banking services	-3.645***	-2.665***	-0.976*	0.818	-0.216**	-0.091	0.050	-0.180	0.031	0.061	0.097
	(0.643)	(0.607)	(0.584)	(0.587)	(0.092)	(0.085)	(0.065)	(0.125)	(0.232)	(0.092)	(0.085)
Daily banking services' price	-3.165***	-2.109***	-0.483	1.244**	-0.277***	-0.079	0.030	0.064	0.238	0.072	0.117
	(0.638)	(0.589)	(0.564)	(0.572)	(0.094)	(0.084)	(0.065)	(0.123)	(0.23)	(0.092)	(0.085)
Investing services	-3.828***	-2.799***	-1.024*	0.401	-0.420***	-0.228***	0.163***	0.071	-0.220	-0.168*	0.082
	(0.622)	(0.596)	(0.575)	(0.581)	(0.095)	(0.087)	(0.065)	(0.126)	(0.230)	(0.093)	(0.086)
Investing services' price	-3.538***	-2.319***	-0.973*	0.757	-0.339***	-0.109	0.101	0.088	-0.227	-0.138	0.014
	(0.599)	(0.569)	(0.553)	(0.558)	(0.093)	(0.085)	(0.063)	(0.125)	(0.227)	(0.093)	(0.084)
Other monetary benefits	-4.134***	-3.034***	-1.725***	0.189	-0.473***	-0.159*	0.062	0.087	-0.202	-0.074	0.054
	(0.626)	(0.598)	(0.581)	(0.572)	(0.095)	(0.089)	(0.066)	(0.127)	(0.233)	(0.095)	(0.085)

Notes: This table presents the parameter estimates of the ordered logit model (Eq. 3 and 4) explaining Imp_k, the perceived importance loan offer feature k. Standard deviations of parameter estimates are reported in the parenthesis under the estimates. Statistical significance levels are noted as (***) = 0.01, (**) = 0.05 and (*) = 0.10. *Lit* is the FL score calculated as the number of correct answers to FL questions, *Income* is the respondent's annual gross income, *Wealth* net wealth, *Education* education level, *Gender* gender coded as 0 = male and 1 = female, *Age* age group, and *LoanAmount* the loan capital respondent borrower last time he/she took out a home loan.

4.4 Lender selection determinants

At the final stage of the empirical analyses, this thesis presents a multinomial logit model to explain how the perceived importance of monetary and non-monetary loan offer features affects the probability of selecting a certain mortgage lender. The model is estimated for the full sample, subsample including financially literate borrowers ($Lit_i \geq 3$) and subsample including illiterate borrowers ($Lit_i < 3$). The model thus reveals how monetary and non-monetary loan offer features affect the lender selection of the borrowers having varying FL levels in different ways. The reference level is once again the OP Financial Group, so the results should be interpreted as the variables' effect on the probability of selecting bank *j* instead of the OP Financial Group.

Table 10 presents the multinomial logit model estimation results and table 11 the marginal effects of the model. Panel A of both tables include the estimation for the full sample (n = 267). What is interesting, coefficients for the APR variable are not statistically significant in the case of any of the banks. Thus, the bank selection cannot be predicted based on the perceived importance of APR, even if it is found to be the most influential loan offer feature on lender selection (see section 3.2.2). This finding could be an indication that the pricing of loans in all banks included in the comparison is quite uniform. What comes to the findings on specific banks, the increased weight given on word-of-mouth information increases the predicted probability of selecting Danske Bank, and the weight given on service quality increases the predicted probability of selecting other (smaller) bank. In addition, those who perceive insurance benefits and other monetary benefits such as bonuses important seem to be less likely to select smaller banks. The model cannot quite explain which variables significantly affect the selection of Nordea Bank or S-Pankki. However, the models estimated for the subgroups offer more information.

Panel B of tables 10 and 11 presents the result of the subgroups including only the respondents having an FL score 3 or higher. The APR variable's non-significant parameter estimates once again indicate that the perceived importance of the APR can't predict which bank was selected. However, the mainly higher absolute values of the coefficients could be a supportive argument for the previous finding made in the previous section: APR is driving the mortgage lender choice more in the case of financially literate borrowers. As expected, the non-monetary attributes are mainly insignificant in the case of financially literate borrowers. The only exception is the service quality variable for other banks, which indicates that literate borrowers who value service quality are more likely to select a smaller bank. Seemingly, the literate borrowers giving weight to insurance benefits are more likely to select the OP Financial Group, because the parameter estimates for the insurance variable are negative in the case of all banks and statistically significant for S-Pankki, Savings Banks and other banks. The

finding is quite intuitive, considering that the OP Financial Group offers benefits if the customer is both their bank and insurance customer. (OP Financial Group, 2022c).

Panel C of tables 10 and 11 shows how the monetary attributes lose some of their explanatory power in the case of illiterate borrowers, i.e. those that have the FL score lower than 3. Even if the APR variable parameter estimates are still statistically insignificant, it can be observed that the absolute values of the coefficients are mainly lower than in the case of literate borrowers. The only statistically significant results on the role of monetary attributes is that the higher perceived importance of insurance benefits increases the predicted possibility of selecting the S-Pankki over the OP Financial Group. The marginal effects presented in table 11 show how a one percentage point higher perceived importance of insurance benefits increases the probability of selecting the S-pankki by 6,0 %. The finding is in contradiction to the case of literate borrowers. What is important to notice is that receiving the insurance benefits and discounts in the Lähitapiola[6] requires only the customer ownership in S-ryhmä, not having a loan in S-Pankki (S-ryhmä, 2022). The illiterate borrowers might not realize this, and hence, they could end up making even irrational decisions. What comes to the non-monetary attributes, among the illiterate borrowers valuation of the recommendations of others seems to imply that they are more likely to select Nordea over the OP Financial Group, and those valuing the service speed are less likely to select the S-Pankki.

It is worth to notice how the goodness-of-fit of the model increases when the sample is divided into subgroups. It could be concluded that the borrowers with high and low FL scores allow probably different attributes drive their mortgage lender selection. All in all, the results from multinomial logit models presented here support the previous findings of financially literate borrowers weighting monetary benefits more than illiterate ones when making mortgage choices. It also appears that the financially literate borrowers are better able to assess insurance benefits. The finding supports the evidence of Kalmi & Ruuskanen (2016), who found that the overall financial knowledge of Finnish consumers is highly correlated with insurance knowledge.

[6] Lähitapiola is an insurance company cooperating with S-Pankki (S-ryhmä, 2022).

Table 10: Multinomial logit model estimation results for bank selection determinants

Panel A: Full sample (n = 267)							
j	μ	Imp_{iAPR}	$Imp_{iInsurance}$	Imp_{iOther}	$Imp_{iServiceQuali}$	$Imp_{iServiceSpee}$	Imp_{iWOM}
Nordea Bank	-0.462	-0.055	-0.263	-0.009	-0.025	0.168	0.191
	(0.85)	(0.183)	(0.184)	(0.183)	(0.204)	(0.202)	(0.177)
Danske Bank	-2.678*	0.411	-0.161	-0.259	0.019	-0.300	0.504*
	(1.516)	(0.321)	(0.307)	(0.295)	(0.328)	(0.314)	(0.297)
S-Pankki	-1.972	0.223	0.103	0.315	-0.031	-0.415	-0.159
	(1.414)	(0.306)	(0.304)	(0.321)	(0.312)	(0.324)	(0.272)
Savings Bank	-5.363***	0.342	-0.315	-0.118	0.343	0.314	0.286
	(1.853)	(0.367)	(0.298)	(0.304)	(0.408)	(0.382)	(0.290)
Other	-0.003	-0.166	-0.470**	-0.413*	0.491*	-0.088	0.252
	(1.062)	(0.224)	(0.237)	(0.226)	(0.271)	(0.238)	(0.229)
Pseudo-$R^2 = 0.0457$							
Panel B: Literate sample (n = 123)							
j	μ	Imp_{iAPR}	$Imp_{iInsurance}$	Imp_{iOther}	$Imp_{iServiceQuali}$	$Imp_{iServiceSpee}$	Imp_{iWOM}
Nordea Bank	0.084	0.058	-0.410	-0.177	0.047	0.285	-0.094
	(1.296)	(0.299)	(0.298)	(0.281)	(0.381)	(0.353)	(0.26)
Danske Bank	-1.131	0.410	-0.534	-0.197	-0.334	-0.264	0.578
	(2.072)	(0.467)	(0.530)	(0.477)	(0.623)	(0.581)	(0.440)
S-Pankki	-5.750	0.977	-1.106**	0.770	-0.626	0.542	0.062
	(3.746)	(0.763)	(0.470)	(0.528)	(0.791)	(0.728)	(0.452)
Savings Bank	-8.089*	0.499	-0.834*	-0.847	0.321	1.492	0.415
	(4.236)	(0.740)	(0.504)	(0.523)	(0.945)	(0.957)	(0.522)
Other	0.167	-0.076	-0.748**	-0.438	0.896**	-0.428	0.240
	(1.525)	(0.349)	(0.362)	(0.347)	(0.452)	(0.403)	(0.333)
Pseudo-$R^2 = 0.1241$							
Panel C: Non-Literate sample (n = 144)							
j	μ	Imp_{iAPR}	$Imp_{iInsurance}$	Imp_{iOther}	$Imp_{iServiceQuali}$	$Imp_{iServiceSpee}$	Imp_{iWOM}
Nordea Bank	-1.454	-0.201	-0.103	0.159	-0.007	0.032	0.455*
	(1.237)	(0.263)	(0.263)	(0.271)	(0.259)	(0.276)	(0.268)
Danske Bank	-4.967**	0.502	0.226	-0.305	0.467	-0.343	0.308
	(2.315)	(0.480)	(0.450)	(0.418)	(0.482)	(0.437)	(0.395)
S-Pankki	-2.598	0.287	1.134**	-0.026	0.150	-1.041**	-0.275
	(2.077)	(0.438)	(0.464)	(0.492)	(0.379)	(0.444)	(0.36)
Savings Bank	-5.949***	0.405	0.198	0.460	0.329	-0.447	0.188
	(2.302)	(0.490)	(0.428)	(0.479)	(0.437)	(0.464)	(0.382)
Other	-0.624	-0.241	-0.322	-0.433	0.359	0.088	0.352
	(1.651)	(0.333)	(0.356)	(0.318)	(0.383)	(0.335)	(0.346)
Pseudo-$R^2 = 0.0820$							

Notes: This table presents the parameter estimates of the multinomial logit model (Eq. 5) explaining the probability of individual i selecting bank j. Standard deviations of parameter estimates are reported in the parenthesis under the estimates. Statistical significance levels are noted as (***) = 0.01, (**) = 0.05 and (*) = 0.10. The goodness of fit measure Pseudo $-R^2$ is calculated as $1 - \frac{LLF}{LLF_0}$, where LLF stands for the maximised value of the log-likelihood function for the model and LLF_0 for the log-likelihood function for the restricted model. The Independence of Irrelevant Alternatives (IIA) assumption was tested with the Hausman-McFadden test. Imp_{iAPR} is the perceived importance of Annual Percentage Rate, $Imp_{iInsurance}$ insurance benefits, Imp_{iOther} other monetary benefits, $Imp_{iSQuality}$ service quality, $Imp_{iSSpeed}$ service speed and Imp_{iWOM} recommendation of others (word-of-mouth) for individual i. The perceived importance of loan offer features is evaluated on a scale of 1-5. The literate sample includes respondents having an FL score of 3 or higher and non-Literate sample respondents having an FL score of 2 or less.

Table 11: Multinomial logit model marginal effects for bank selection determinants

Panel A: Full sample (n = 267)						
j	Imp_{iAPR}	$Imp_{iInsurance}$	Imp_{iOther}	$Imp_{iSQuality}$	$Imp_{iSSpeed}$	Imp_{iWOM}
Nordea Bank	-0.023	-0.031	0.013	-0.026	0.044	0.019
Danske Bank	0.026	-0.001	-0.014	-0.004	-0.021	0.026
S-Pankki	0.013	0.016	0.024	-0.007	-0.027	-0.018
Savings Bank	0.019	-0.010	-0.004	0.016	0.018	0.010
Other	-0.023	-0.038	-0.042	-0.011	-0.011	0.015
Panel B: Literate sample (n = 123)						
j	Imp_{iAPR}	$Imp_{iInsurance}$	Imp_{iOther}	$Imp_{iSQuality}$	$Imp_{iSSpeed}$	Imp_{iWOM}
Nordea Bank	-0.004	-0.029	-0.018	-0.017	0.066	-0.041
Danske Bank	0.019	-0.013	-0.005	-0.025	-0.018	0.030
S-Pankki	0.030	-0.027	0.029	-0.024	0.016	0.000
Savings Bank	0.008	-0.010	-0.014	0.004	0.029	0.007
Other	-0.021	-0.063	-0.046	0.113	-0.069	0.027
Panel C: Non-Literate sample (n = 144)						
j	Imp_{iAPR}	$Imp_{iInsurance}$	Imp_{iOther}	$Imp_{iSQuality}$	$Imp_{iSSpeed}$	Imp_{iWOM}
Nordea Bank	-0.058	-0.038	0.044	-0.032	0.037	0.078
Danske Bank	0.036	0.014	-0.022	0.026	-0.018	0.008
S-Pankki	0.016	0.060	-0.002	0.003	-0.051	-0.025
Savings Bank	0.029	0.012	0.032	0.016	-0.025	-0.000
Other	-0.025	-0.037	-0.047	0.028	0.019	0.017

Notes: This table presents the marginal effects of the multinomial logit model (Eq. 5) explaining the probability of individual i selecting bank j. Imp_{iAPR} is the perceived importance of Annual Percentage Rate, $Imp_{iInsurance}$ insurance benefits, Imp_{iOther} other monetary benefits, $Imp_{iSQuality}$ service quality, $Imp_{iSSpeed}$ service speed and Imp_{iWOM} recommendation of others (word-of-mouth) for individual i. The perceived importance of loan offer features is evaluated on a scale of 1-5. The literate sample includes respondents having an FL score of 3 or higher and non-Literate sample respondents having an FL score of 2 or less.

5 COMPARISON TO PREVIOUS RESULTS & SUGGESTIONS FOR THE FUTURE

As Kalmi & Ruuskanen (2016) have found, Finnish consumers' FL is quite good, especially in international comparison. However, the Finnish mortgage borrowers still have some issues regarding their understanding of financial affairs. This thesis supports the previous evidence on FL issues among young, female, and low-income consumers. Even though all the respondents that participated in the survey have already taken a home loan and made a purchase affecting their financial wellbeing significantly, these groups have serious issues in understanding the basic financial concepts. On average, borrowers having annual income under 30 000 € gave only 1.85 and borrowers under 35 years 2.00 correct answers on the 5 FL questions used in the data collection of this study. Considering that these respondents represent the most vulnerable mortgage borrowers, the first-home buyers and those having the weakest solvency, the finding is quite worrying and underscores the importance of clear communication and proper guidance during the mortgage origination process.

The empirical results also reveal that the finding of van Ooijen & van Rooij (2016) applies also to Finland: the debt-related issues are especially hard to understand for the consumers, even if they already had a home loan. The answers to the FL questions 4 and 5 revealed how the mortgage borrowers struggle to understand how monthly payment is constructed and in comparing the different payment options. Considering that the financially illiterate borrowers were found to evaluate the loan offers based on the monthly payment, possibly instead of APR or margin, they might end up selecting a loan offer and payment plan being not optimal in the long term. Long loan maturity could make even large mortgages seem affordable during the era of negative interest rates but might end up in a situation where the outstanding will be eliminated very slowly if at all during the first years of the loan maturity. Thus, using a variable annuity or equal payments payment plans and long loan maturities might cause unpleasant surprises for illiterate borrowers.

Another important finding of this thesis relates to the impact of services not strictly related to the loan conditions on mortgage lender selection. As the results from the multinomial logit models have shown, increased FL seems to turn attention away from add-on products and other financial services towards the loan conditions and especially the true cost of the loan. However, it should be kept in mind that this thesis does not indicate that the add-on products and other financial services like investing, or insurance services wouldn't be important for financially literate customers. These services being not strictly related to the loan conditions just do not guide the financially literate customers' selection between the mortgage offers of different banks. Intuitively, the financially less sophisticated borrowers seem to appreciate more the convenience of having all financial services from one service provider. Similarly, the financially literate

borrowers are more willing and capable to compare multiple services of various service providers. Here banks could see a great possibility of having a positive impact on illiterate borrowers' financial well-being. Discussing, and possibly covering, the risks related to the mortgage debt and guiding on regular long-term saving and investing besides the mortgage payments could help a less sophisticated borrower to make choices beneficial for his/her long-term financial well-being, even if the borrower was not willing or able to evaluate the benefits from insurances and investment options him/herself.

How could illiterate borrowers be helped to make better decisions? First of all, making an optimal mortgage selection requires that the borrower understands the true costs of the loan and that he/she is able to compare the loan offers with varying conditions. As Disney & Gathergood (2013) present, financially illiterate borrowers cannot interpret the credit terms. Thus, the true cost of the loan should be indicated clearly and comparably as the total euro amount paid and as the annual percentage rate (APR). Even if the Finnish banks are required to show this information on every loan offer (Consumer Protection Act 746/2010, 8 §)[7], it might not guarantee that every borrower is able to find this information clearly and easily and interpret the differences between offers.

The increased weight given to the monthly payments among financially illiterate customers also raises concern about whether those less savvy borrowers are able to interpret the different loan repayment plans and their effect on loan amortization. Especially the usage of the variable annuity and equal payments plans combined with long loan maturities could end up in a situation where the outstanding debt will be eliminated very slowly and the property selling price can hardly cover the remaining loan amount when moving. A clear presentation of the payment plan could help the borrower to understand how the monthly payment is divided into interest, amortization, and other expenses and how the debt will be eliminated during the upcoming years.

The empirical results of this thesis indicate that borrowers who value insurance benefits but have a low level of FL might end up doing irrational mortgage choices. Formerly, Kalmi & Ruuskanen (2016) have presented some empirical evidence that insurance knowledge is highly correlated with overall FL. To make optimal mortgage choices, borrowers should understand what the requirements are for obtaining insurance benefits or discounts. Financial institutions should be very clear in their communication about conditional offers and discounts, and not let the customer erroneously assumes that the discount is conditional on the purchase of a particular product or service. This applies both for the case of insurance benefits when taking out a loan and the lower margin or service fee when buying a certain add-on product like a mortgage protection product or investing service. Consumer Protection Act (851/2016) prohibits tie-in sales, but there are still quite a lot of decipherable practices in use.

[7] Kuluttajansuojalaki is usually translated as Consumer Protection Act.

As Perry & Lee (2012) denote, the home purchase process is seemingly cognitively demanding for most mortgage borrowers and thus trains the cognitive capability available for mortgage selection. Considering that the FL possibly has to do with cognitive ability (see eg. Lusardi & Mitchell, 2014 & Lusardi & Tufano, 2015), it could be beneficial for both the lender and borrower to be able to distinguish the mortgage selection and home purchase from one another. This could be done by comparing and selecting the mortgage solution and other financial services before the property or apartment purchase. Thus, the mortgage selection would not be done when the home purchase takes all the attention and thus the borrower could better evaluate the various loan offers and consider the risks related to the mortgage. It is delightful to see that nowadays all of the major lenders in Finland, i.e., the OP Financial Group, Nordea Bank and Danske Bank encourage their customers to send the loan application already before they know the exact apartment or property to be purchased (Danske Bank A/S, 2022d; OP Financial Group, 2022a; Nordea Bank Oyj, 2022).

6 CONCLUSIONS

This thesis investigates the effects of financial literacy (FL) on mortgage lender selection by estimating four different versions of limited dependent variable models. The data are collected with an online survey, which is answered by Finnish mortgage borrowers having a home loan taken out between May 2020 and May 2022. The previous literature on mortgage lender selection criteria is scarce, and especially the effect of financial literacy on the decision has remained nearly unresolved. Thus, this paper serves as an opening for the discussion on the topic.

The empirical results suggest that the Finnish mortgage borrowers have relatively high FL. However, major part of the respondents struggle with understanding the debt-related issues like the formation of the loan's monthly repayment and comparing payment options. The empirical evidence on the role of FL on the probability of putting the mortgage application out for tender is a bit diverse. The logit model estimated for the whole sample indicates that FL does not play a role, but the model estimated for young borrowers suggests that FL decreases the probability of putting mortgage application out for tender. However, there are some possible explanations for this unexpected finding on literate young borrowers not comparing loan offers of other banks than their own. Third, FL is found to decrease the weight given on factors unrelated to the terms of the loan when selecting a mortgage lender. Financially illiterate customers perceive for example other financial services, service quality and recommendations of others more important than their more financially savvy peers, possibly valuing the convenience of having all financial services from the same bank or financial institution. Similarly, literate borrowers are more willing to shop for the best deals for each product or service, even if it means selecting the services from different banks. Finally, the paper suggests that financially literate borrowers are better able to evaluate the monetary benefits such as insurance discounts or bonuses, while illiterate borrowers might make irrational decisions when they do not understand the requirements of having certain discounts.

Furthermore, this thesis presents suggestions on how the financially illiterate borrowers could be helped to make better mortgage decisions. It all comes down to clear communication: lenders should preferably discuss the mortgage risks and financial preparedness during the mortgage origination process, clearly present how the different payment plans and interest rates affect the loan amortization and monthly payment in different scenarios, and finally, clearly express the terms of the offer and the possible discounts. Even if the Consumer Protection Act (Kuluttajansuojalaki) regulates the loan offers and communication, financial institutions should still act responsibly and do more than just the bare minimum.

The study faces some limitations. For example, measuring FL with a five-question online survey may not give the most reliable picture of respondents' FL. Answering an online survey correctly could be harder than if the questions would be asked in a face-to-face interview. The respondents may have struggled

with reading comprehension or face distractions during the survey. Given that most academic studies on the topic follow the suggestion of OECD (2018) and use face-to-face interviews (see eg. Kalmi & Ruuskanen, 2016 and Klapper et al., 2015), the comparability of FL scores is limited. Monetary reward for registered panellists and a quite low number of respondents could also cause some bias in the representativeness of the sample. However, the online survey is conducted following the best practices suggested by OECD (2018) and the FL questions can diversify respondents quite well. Thus, the survey could be seen to do its job of measuring FL quite well. It should also be noticed that FL was measured 0-2 years after the actual loan disbursement. There lies a possibility that borrowers' knowledge of financial affairs has changed between the mortgage decision and FL measurement, thus causing some bias in the results. For example, the findings of Klapper et al. (2015) and Lusardi & Mitchell (2011) give reason to assume that the environment of rapid inflation and intensive news coverage on the topic in 2022 could have increased the respondents' understanding of inflation, thus increasing the measured FL scores. Fortunately, FL has been found to develop quite slowly (Fernandes et al., 2014).

Another possible limitation is related to the measurement of the perceived importance of loan offer features. A traditional discrete choice experiment is not quite able to identify how the respondents prioritize the loan offer features over each other. For example, Heo, Kim, Park & Back (2022) present how the best-worst-scaling method (BWS) is better able to identify the relative importance of Peer-to-Peer accommodation attributes. However, they also suggest that traditional discrete choice has its strengths when identifying differences between groups (Heo et al, 2022). Thus, the usage of the discrete choice method and limited dependent variables models to explore the effect of FL on mortgage lender selection still seems relevant. However, further studies with the BWS method could be beneficial to increase the understanding of the relative importance of loan offer features.

Finally, there is a possibility that the limited dependent variable models presented in this thesis do not include all the relevant variables explaining the perceived importance of loan offer features. For example, this study does not map the risk-aversion, income stability or moving expectations of the respondents, which have formerly been suggested to have an impact on the selection between fixed and variable rate mortgages (Cambell & Cocco, 2003; Coulibaly & Li, 2009; Ehrmann & Ziegelmeyer, 2013; Fortowsky et al., 2011). However, mortgage lender selection and selection between fixed and variable rate mortgage products could be seen as separate decisions. Since the previous literature on mortgage lender selection criteria is scarce and this thesis is the first study on the effect of FL on the selection, the relevant control variables remain to be iterated with further studies on the topic.

In addition to iterating the relevant control variables and identifying the perceived importance order of loan offer features with the BWS method, further studies could also cover the following unresolved issues. This paper finds that

the illiterate borrowers use monthly payment as the evaluation criteria of loan offers, but strictly speaking it does not examine if the borrowers understand the differences between payment plan options. Thus, future research could study if the borrowers understand how the widely used variable annuity, equal payments, and equal amortization loans work in different scenarios. Second, there are no previous studies discussing the selection between VRM and FRM in the Finnish context. Some further research on the relationship between FL and interest rate hedging decision would be needed to test if the theories of Cambell and Cocco (2003) and Piskorski and Tchistyi (2010) apply in the Finnish mortgage market.

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APPENDIX 1 Financial literacy questions in Finnish

1. *Kuvittele, että laitat 100 euroa säästötilille, jonka korko on vuodessa 2 %. Kuinka paljon tilillä on rahaa viiden vuoden kuluttua? Kuvittele, että talletusten tuotosta ei peritä veroa.*
   - ***i) Enemmän kuin 102 euroa***
   - *ii) Tarkalleen 102 euroa*
   - *iii) Vähemmän kuin 102 euroa*
   - *iv) En osaa sanoa*

2. *Kuvittele tilanne, jossa tilisi vuotuinen korko on 1 %, inflaatio on 2 % vuodessa ja tilin tuotosta ei tarvitse maksaa veroa. Pystytkö vuoden päästä ostamaan tilillä olevilla varoilla enemmän, vähemmän vai saman verran kuin tänään?*
   - *i) Enemmän kuin tänään*
   - *ii) Saman verran*
   - ***iii) Vähemmän kuin tänään***
   - *iv) En osaa sanoa*

3. *Onko esitetty väittämä mielestäsi tosi vai epätosi? "Yksittäisen yhtiön osake tarjoaa yleensä osakerahastoa varmemman tuoton."*
   - *i) Tosi*
   - ***ii) Epätosi***
   - *iii) En osaa sanoa*

4. *Kuvittele, että sinulla on 3000 euroa luottokorttivelkaa, jonka vuosikorko on 12 % (kuukausittainen korko 1 %). Maksat kuukausittain minimimaksuerän 30 euroa. Kuinka kauan sinulla kestäisi maksaa velka kokonaan loppuun, jos et tee ylimääräisiä lyhennyksiä tai uusia luottokorttiostoja?*
   - *i) Alle 5 vuotta*
   - *ii) 5–10 vuotta*
   - *iii) 10–15 vuotta*
   - ***iv) Et saa velkaa koskaan loppuunmaksetuksi***
   - *v) En osaa sanoa*

5. *Ostat 1000 € maksavan laitteen. Sinulle tarjotaan kaksi erilaista maksutapaa:*
   a) maksat 12 kuukausittaista 100 € maksuerää.
   b) lainaat summan 20 % vuosikorolla ja maksat 1200 € takaisin vuoden päästä.
   Kumpi vaihtoehdoista on houkuttelevampi, ts. kumpi maksaa vähemmän?
   - *i) Vaihtoehto a*
   - ***ii) Vaihtoehto b***
   - *iii) Vaihtoehdot ovat identtiset*
   - *iv) En osaa sanoa*