



**POLITECNICO
DI TORINO**

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Master Degree course in Engineering and Management

Master Degree Thesis

**Robo-Advisors in Real Estate Finance:
A Comprehensive Study of Borrower
Preferences and Platform Performance**

Supervisor

Prof. Ricardo CALCAGNO

Candidate

Amir SEPASI LALALOO

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Abstract

The intersection of real estate finance and technology forms the backdrop of this comprehensive thesis. In an era where mortgage decisions and financial advisory services are increasingly shaped by technological advancements, this research is going to discover economic and psychological factors influencing borrowers' choices. The study navigates the evolving landscape of Robo-advisory services, seeking to understand their role in the mortgage selection process.

A meticulously designed survey captures the diverse voices of mortgage seekers, probing their views on economic factors such as cost savings, tailored financial solutions, and data-driven insights. Simultaneously, the survey unravels the enigma of psychological factors, exploring the significance of confidence, reduced stress, and independence in Robo-advisor adoption.

Statistical analyses like normalization and correlation studies breathe life into the data, revealing nuanced patterns and interplays between these factors. The findings not only shed light on Robo-advisors' performance but also offer practical insights for industry stakeholders. Through a comparative analysis of Better Mortgage, Rocket Mortgage, and Zillow, this research uncovers the strengths and areas for improvement in the realm of Robo-advisory services.

In conclusion, this thesis advances our understanding of the complex dynamics that underpin the mortgage selection process in the digital age. It evaluates the quality of services and proposes recommendations for Robo-advisory platforms, envisions a user-centric future in real estate finance, and invites further exploration into the evolving landscape of financial technology. As the real estate finance landscape continues its transformation, this research serves as a compass, guiding industry players toward innovation, customer-centricity, and informed decision-making.

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Chapter 1

Introduction

In this chapter, we're on a mission: to understand why people choose between different types of mortgages. We start by looking at what other experts have found out. Then, we ask some important questions to guide our research. We want to figure out what really influences mortgage choices and how new Robo-advisors fit into the picture.

1.1 Objectives

The portfolio of households is quite like the diversified portfolio of liquid assets and the major asset in the portfolio is a house, a relatively illiquid asset with an uncertain capital value. In addition, the value of the house generally exceeds the net worth of the household, which finances its homeownership through a mortgage contract to create a leveraged position in residential real estate. [Campbell Cocco 2003]. Other financial assets and liabilities are typically far less important at least for the majority of households by referring to the wealth percentile from 1989 and 1999 provided by Tracy that highlights the importance of the right mortgage choice that fits to investor profile.

Considering the point that mortgages can broadly be classified into two main categories: adjustable rate (ARM) and nominal fixed-rate (FRM) mortgages, we try to investigate the choice between the two, the advantages and disadvantages of each, and which option is suitable regarding investor profile.

In addition, we explore how psychological factors and biases influence investors' financial decisions; Seeks to investigate the intricate interplay between behavioral economics and the choices investors make, especially in the context of mortgage selection. By analyzing prevalent behavioral biases such as overconfidence, loss aversion, and framing effects, the objective is to provide a comprehensive understanding of how these cognitive factors shape borrowers' preferences in the real estate finance landscape.

Furthermore, Robo-advisors are a new aspect that is introduced to this decision-making process. Robo-advisors, driven by algorithms and data insights, provide guidance to borrowers about mortgage choices. This decision has financial and emotional implications,

making it a crucial consideration for borrowers and lenders alike. We have connected these findings to the emergence of Robo-advisors in the financial industry and assess how closely the needs are identified in the theoretical literature.

In the second part of my thesis, I took the insights gathered from customer preferences in the first section and evaluated how well Robo-advisors meet these needs, essentially measuring service quality. This analysis led to ideas for potential improvements, identified influential correlations guiding provider strategies, and concluded with an assessment of service quality and user satisfaction to match those of users and to gauge user satisfaction with various services offered by different providers.

In conclusion, the main contribution of this research is carefully reviewing the previous study on the choice between adjustable-rate (ARM) and fixed-rate (FRM) mortgages, as well as the influence of behavioral biases on investment decision-making to make a comprehensive customer survey within mortgage choices which outcomes of this study provide a robust dataset and a nuanced understanding of economic and behavioral factors within decision-making process for mortgage choices. Besides, satisfaction results provide a solid foundation upon which future research endeavors in the adoption of the Robo-advisory domain can be built.

1.2 Existing Knowledge and Previous Research

Recent scholarly inquiries have explored diverse dimensions of mortgage decision-making. Notably, the study by Campell and Cocco [2003] investigates the optimal choice between FRM and ARM mortgages amidst uncertain inflation, emphasizing the appeal of ARM mortgages for specific risk-averse households.

Koijen and colleagues [2009] introduce a utility framework highlighting the bond risk premium's influence on mortgage choice, revealing its significance which emphasizes the vitality of tailored service to borrowers.

However, a comprehensive examination of how financial, market-related, and personal factors interconnect to shape mortgage decisions remains essential. Mayer and Pence (2008) emerge as pivotal considerations, intertwining with broader market factors including economic conditions and housing trends elucidated by Ortalo-MagnÃ© and Rady (2006). Borrowers' personal risk tolerance, future expectations, and financial goals, studied by Gerardi et al. (2010) and Yao and Zhang (2018), further complexify the decision-making process.

Exploring deeper, behavioral economics sheds light on cognitive biases affecting mortgage choices. Prospect theory, by Tversky and Kahneman (1979) and Benartzi and Thaler (1995), unveils loss aversion favoring FRM mortgages for security. The endowment effect and anchoring bias, explored by Knetsch (1989) and Ariely et al. (2003), perpetuate status quo bias and preference for familiar options. Ambiguity aversion, studied by Gilboa

and Schmeidler (1989), tilts choices toward predictability and FRM stability.

In this context, technology-mediated financial decision-making emerges as transformative. Robo-advisors' rise, extensively studied by Lusardi and Mitchell (2007) and Grable et al. (2015), ushers a paradigm shift, extending beyond investment into mortgage guidance. These algorithm-driven platforms, cost-effective and data-savvy, furnish tailored insights. However, concerns about addressing biases and personalized advice linger, echoing Maurer et al. (2017) and Fintech Advisory Group (2020).

The role of Robo-advisors as facilitators in this process necessitates further exploration; recent research extends their scope to mortgage decisions. By merging borrowers' specifics with data-backed counsel, as in Chen and Pu (2017), these platforms reshape advisory services. Interaction between individuals and tech-driven suggestions, as noted by Notheisen and Weber (2021) and Schmidt et al. (2022), demands exploration. Existing research underscores complex mortgage dynamics tied to economics, markets, and personal factors. Robo-advisors add a transformative blend of tech and personal needs. Yet, understanding their nuanced relationship sets the stage for this thesis.

This thesis bridges these gaps, exploring mortgage dynamics, integrating prior studies, investigating Robo-advisory roles in the industry, and trying to assess the customer satisfaction of using the current services according to the theoretical literature mentioned above.

1.3 Research Question of the Thesis

Building on the context and existing knowledge discussed earlier, the primary research question guiding this thesis takes shape: what are the economic and psychological factors that drive borrowers to trust, follow, and act upon Robo-advice in the context of mortgage decisions? And to what extent does Robo-advisory are able to satisfy borrowers' needs within decision-making?

This research question guides our study in two directions. First, we dig deeper to uncover the complex interplay of economic and psychological factors that influence borrower confidence, commitment, and responsiveness to Robo-advice according to previous research and data collection from potential users. Second, we examine the outcomes of the user's survey on borrowers' mortgage decisions, aiming to measure how effective these technology-driven recommendations are in satisfying the customer's needs.

In the upcoming chapters, this thesis embarks on a journey to explore these aspects in detail. We dive deep into the array of factors that shape mortgage decisions from both traditional and behavioral economics. Through this exploration, our goal is to offer insightful perspectives on the realm of mortgage choices within decision-making processes and the evolving role of technology in shaping financial decisions.

Chapter 2

Theoretical Background

In Chapter Two, we dive deep into the theories that help us understand mortgage choices. We'll see what experts have said about it so far, and then we'll use these theories as a foundation to explore our own questions. This chapter lays the groundwork for the rest of our journey through the thesis.

2.1 Fixed-Rate and Adjustable-Rate Mortgages

The process of deciding between fixed-rate (FRM) and adjustable-rate (ARM) mortgages is complex, merging economic aspects with personal risk profiles and market forecasts. Campbell and Cocco's (2003) and Mayer and Pence's (2008) research show that borrowers' choices reflect their views on interest rates, inflation prospects, income stability, and future market conditions. The selection involves assessing the stability of FRM mortgages against the initial advantages and potential risks of ARM mortgages. As a theoretical background, we are going to deep dive into the research paper of Campbell and Cocco (2003) carefully explaining the methodology and the development and the conclusions of this paper to completely shed light on the choice between ARM and FRM.

Campbell and Cocco view the choice of mortgage as a problem in household risk management and considering the point that mortgages can broadly classified into two main categories: adjustable rate (ARM) and nominal fixed-rate (FRM) mortgages, try to investigate the choice between two, advantage and disadvantage of each, which option is suitable regarding investor profile and consequently compare these conventional mortgages with inflation-indexed fixed-rate mortgages of the sort proposed by Fabozzi and Modigliani [1992], Kearn [1979], Statman [1982].

When deciding on the type of mortgage, an extremely important consideration is labor income and the risk associated with it. Labor income or human capital is undoubtedly a crucial asset for the majority of households. So, academic papers try to solve a dynamic model of consumption and mortgage choice of finitely lived investors.

Thus, results illustrate a basic trade-off between several types of risk. A nominal FRM,

without a prepayment option, is an extremely risky contract because its real capital value is highly sensitive to inflation. The presence of a prepayment option protects the homeowner against one side of this risk because the homeowner can call the mortgage at face value if nominal interest rates fall, taking out a new mortgage contract with a lower nominal rate. However, this option does not come for free; it raises the interest rate on an FRM and leaves the homeowner with a contract that is expensive when inflation is stable, but extremely cheap when inflation increases as occurred during the 1960s and 1970s. This wealth risk is an important disadvantage of a nominal FRM.

An ARM, on the other hand, is a safe contract in the sense that its real capital value is almost unaffected by inflation. The risk of an ARM is the income risk of short-term variability in the real payments that are required each month. If expected inflation and nominal interest rates increase, nominal mortgage payments increase proportionally even though the price level has not yet changed much; thus, real monthly payments are highly variable. This variability would not matter if the homeowner could borrow against future income, but it does matter if the homeowner faces binding borrowing constraints. Constraints bind states of the world with low income and low house prices; in these states buffer-stock savings are exhausted, and home equity falls below the minimum required to take out a second loan. The danger of an ARM is that it will require higher interest payments in this situation, forcing a temporary but unpleasant reduction of consumption.

Campbell and Cocco 2003 found that households with large houses relative to their income, volatile labor income, or high-risk aversion are particularly adversely affected by the income risk of an ARM by modeling real interest rate risk, the risk that the cost of borrowing will increase during the life of a long-term loan.

The mobility of a household and its current level of savings also affect the form of the optimal mortgage contract. If a household knows it is highly likely to move in the near future, or if it is currently borrowing-constrained, the most appropriate mortgage is more likely to be the one with the lowest current interest rate, then the borrower can call the mortgage a nominal FRMs have a very secondary market, whose liquidity has been supported by GNMA (Government National Mortgage Association) and FNMA (Federal National Mortgage Association).

Moreover, the correlation with economic factors has been evaluated to help households to have an easier choice among available options. To give an example, the FRM share is strongly negatively correlated with the level of long-term interest rates (the correlation with the ten-year Treasury yield is -0.77 in levels and -0.57 in quarterly changes). Surprisingly, the FRM share is almost uncorrelated with the yield spread between ten-year and one-year interest rates (the correlation is 0.10 in levels and 0.02 in quarterly changes). Other recommendations of personal finance books clearly are consistent with the results such as locking in the low rate or taking out ARMs to exploit the low initial interest rate if you want to move within a few years or have a constraint budget with growing income for the future but are missing two points: first, they do not explicitly distinguish different

risk and different investor profiles and second, forecasting the long-term interest rate is not easy for household; it means that concluding the attractiveness of interest rate to lock in is another problem for them.

2.2 Behavioral Biases in finance

Behavioral finance relates to the psyche of investors and its role in financial decision-making. We know that humans have emotions that can influence their decisions. Such decisions often tend to be inefficient and irrational and can lead to disasters in the stock market. Perhaps the most historic incidence of such disasters is recorded by [Mackay 1841].

Behavioral finance is a relatively new school of thought that deals with the influence of psychology on the behavior of financial practitioners and its subsequent impact on stock markets. It signifies the role of psychological biases and their specific behavioral outcome in decision-making. Behavioral experts have identified the role of psychological biases like overconfidence, self-attribution, etc. in fueling such anomalies. This makes behavioral finance an extremely relevant topic in today's time.

Out of today's time, the Tulip Bubble, popularly known as the Tulipomania is possibly the most cited account. It happened during the Dutch Golden Age when the exotic Tulip flower was brought into the Dutch stock market for the first time. This flower became so popular in the upper circles that its possession became a status symbol. The cultivation and purchase of tulips started happening at a large scale. Soon the tulip frenzy caught over the entire Netherlands and people even started investing in tulip stocks. Naturally, the price of this flower skyrocketed and at its peak, the selling price of one bulb was greater than 10 times the yearly pay of a skilled artisan. The Dutch stock market finally crashed when the investors felt that they had spent a considerable amount on a commodity having a very low utility like a tulip flower. This realization led to a steep fall in tulip prices which resulted in heavy losses. Events like tulip mania question the rationality of investors.

The mid-eighteenth century was the starting point of traditional theories. The premier concept amongst them was the expected utility theory. Here, utility was a measure of satisfaction of individuals by consuming a good or a service, Perfect rationality, perfect self-interest, and perfect information. These assumptions became the basis of the traditional financial framework. Arriving at a rational solution means two things mentioned as follows. First, the agents should update their existing knowledge with new information correctly, and second, use this knowledge to maximize their satisfaction.

On the other hand, behavioral finance started evolving which tried to provide behavioral explanations for such anomalies. The path-breaking work in behavioral finance is credited to psychologists. They introduced the concept of prospect theory for analysis of

decision-making under risk [Kahneman 1979] which formed the backbone of behavioral finance. The value function in the prospect theory replaces the utility function in the expected utility theory. This function estimates the "value" that individuals attach to their gains or losses. The function explains that some gains or losses are felt with greater intensity than others. Moreover, at times, the pain of a loss is greater than the happiness of an equivalent amount of gain. This is known as loss aversion as losses loom larger than gains. Accordingly, there are three major propositions of the prospect theory: The first proponent states that individuals do not have a uniform risk attitude. This makes the value function S-shaped i.e., concave for gains and convex for losses. The second proponent suggests that individuals estimate the value of the prospect with the help of a reference point. This reference point is generally their status quo or their current level of wealth which decides their gain or loss in a prospect. The third proponent advocates that losses loom larger than gains (loss aversion). It is a tendency of individuals where their urge to avoid losses is much greater than seeking gains. Prospect theory is considered to be the seminal work in behavioral finance, and it forms the underlying basis of biases like loss aversion, framing, and the disposition effect.

In conclusion, Behavioral finance deals with the study of investor psychology and its role in making financial decisions. This field relaxes the assumption of rationality present in standard finance theories and explains that real investors are influenced by their psychological biases. These biases get translated into their behavior due to which they can make suboptimal decisions. Such decisions, on a large scale, can cause disruptions in the market and are known as market anomalies. Since such anomalies have a devastating effect on the individual financial health as well as the financial health of the entire economy, they need to be prevented. Such prevention can only happen with an increased awareness of the practitioners about their psychological and behavioral limitations. Taking all into consideration, this study aims to establish a practical connection between behavioral biases and Robo-advisors, as acknowledged by researchers. It seeks to shed light on the extent to which Robo-advisors can incorporate household behavioral traits into their algorithms and explore the underlying psychological mechanisms. This will be achieved by gathering pertinent user data.

This survey sheds light on the intricate connection between human psychology and economic choices, revealing how cognitive biases can notably influence decisions in real estate, including mortgage selections. This section delves into insights from behavioral economics, emphasizing how these biases can sway borrowers when choosing between fixed-rate (FRM) and adjustable-rate (ARM) mortgages. Central to this exploration are possible "mistakes" for people deciding how to make mortgage choices. The highlights are as follows.

2.2.1 Heuristic bias and investment decision

The heuristic bias, also known as a rule of thumb, is a method that simplifies the decision-making process for investors, particularly in uncertain and complex circumstances. This

method reduces the complexity involved in evaluating the possibilities and predicting the benefits, enabling investors to reach decisions more quickly. This is particularly important for investors who must make judgments in complicated and unpredictable situations (Kahneman and Tversky, 2013). There is a risk that heuristic bias may impede investment earnings, which would, in turn, replicate lower portfolio returns. A few distinct interpretations may be offered for the phenomenon known as heuristic bias. These interpretations include overconfidence, anchoring bias, and representativeness bias.

Anchoring bias is an emotional state of things that arises when investors attach undue attention to anchors that are statistically random and emotionally determined, leading to them making irrational judgments. Anchoring bias occurs when people rely too much on pre-existing information or the first information they find when making decisions. For example, If I were to ask you where you think Apple's stock will be in three months, how would you approach it? Many people would first say, "Okay, where's the stock today?" Then, based on where the stock is today, they will make an assumption about where it's going to be in three months. That's a form of anchoring bias. We're starting with a price today, and we're building our sense of value based on that anchor. This emotional state of affairs is known as "anchoring" (Tseng, 2011; Liang and Qamruzzaman, 2022). Anchoring bias may also be understood as the tendency of investors to base their investment decisions on a factor that is illogically unrelated to the problem at hand, known as the inclination of investors, to anchor their thinking. The phenomenon known as anchoring bias refers to risk-free trading behavior on the part of investors (Ofir and Wiener, 2012). In a study, Tversky and Kahneman (1974) outlined heuristics that help decision-making during times of ambiguity. Described representatives in judgment, frequent scenarios for classification, and relevance of number-based forecast. Adjustment and anchoring biases occur when investors have incomplete value and estimations. Anchoring biases can affect creativity, accuracy, and efficiency in various situations, such as estimating, financial budgeting, and planning specifically the amount of down payment in the mortgage context.

Representativeness heuristic bias occurs when the similarity of objects or events confuses people's thinking regarding the probability of an outcome. Investors apply representativeness or similarity heuristics while identifying samples, and unwarranted confidence leads to errors. Cautioned about errors of predictions besides improvement of decisions and judgments. Zhang and Zheng (2015) explained how heuristic biases might lay out clarifications and offer suitable solutions against market anomalies. While observing Chinese investors, he revealed that institutional investors are more talented or confident than ordinary investors, resulting in huge market changes, indicating overconfidence heuristics. Further advocates that biases cannot be avoided even after gathering experiences. Shah et al. (2018) established that overconfidence anchoring heuristics usually impact negatively on investors' judgments. Representativeness and availability also show an adverse impact on individual investors' decisions. Generally speaking, the representativeness heuristic is a problem because it can be used to create and sustain stereotypes. By focusing on superficial similarities between situations or events, we form stereotypes based on oversimplified views of the world and market.

The overconfidence effect is a well-established bias in which a person's subjective confidence in their judgments is reliably greater than the objective accuracy of those judgments, especially when confidence is relatively high. The easiest way to get a thorough grasp of overconfidence bias is to look at examples of how bias plays out in the real world and accordingly the most common types of biases are: 1. Overranking is when someone rates their own personal performance as higher than it actually is. 2. The illusion of control bias occurs when people think they have control over a situation when in fact they do not. 3. Timing optimism which is people overestimate how quickly they can do work and underestimate how long it takes them to get things done. When market players are overconfident, they engage in bigger quantities of trade and take more risks, both of which lead to an increase in market volatility and mispricing as well as a loss in market efficiency (Kasoga, 2021). When market participants are overconfident, the market is less efficient. Overconfidence can have two significant effects on an investor's actions: first, it can cause the investor to fail to generalize their knowledge, which can result in wasteful trading; second, it can cause the investor to trade more frequently than they normally would. These effects can harm investors' returns (Shefrin and Statman, 2000). The statement that follows is a postulation, and it is founded on the premises that were discussed before. To name some, overconfidence can lead investors to trade more frequently than necessary, resulting in higher transaction costs and potentially lower investment returns. Also, investors may believe they can accurately predict market movements, leading them to concentrate their investments on a few high-risk assets rather than diversifying their portfolio which can cause people to underestimate the risks associated with certain investments, exposing them to potentially avoidable financial losses.

2.2.2 Framing effect

The framing effect which describes how investors cope with unpredictability and risk in their investments, is sometimes referred to by the phrase "prospect theory," which is typically used to refer to that impact. According to the framing effect, deciding which investments to make may be divided into two stages: the phase in which the framing effect is considered and the phase in which the evaluation impact is considered (Dhar and Zhu, 2006). In addition, it is seen as inconsistent and illegitimate within the decision-making process framework. Because of the framing effect, it is highlighted that investors should base their decision-making on the potential value of both losses and returns rather than on the actual results. This is because the prospective outcomes may influence the actual outcomes. Consequently, it would help if you based your decisions more on the seeming advantages than the real expenses. These interpretations include mental accounting, endowment effect, and regret aversion.

Corporate financial activity is tracked and evaluated using traditional accounting methods in firms. In contrast, mental accounting relates to how individuals carry out these tasks in their own lives. The concept suggests that people do not treat money as fungible — i.e., mutually interchangeable — and instead, link their spending to budgets. For example, if an individual is paid an end-year bonus of 1,000 dollars for exemplary performance,

they may feel that the bonus allows them to spend money on extravagant items, such as meals, lavish vacations, and other expenses that they would never justify spending regular income on. The concept holds that people are more likely to be impulsive with unexpected money because such money was not factored into their financial plan. Also, a negative ploy frequently used by retailers is language along the lines of "don't miss out on our great rate" or "last chance to get this deal." Both frame the proposition in negative terms, meaning we are being told to take action to avoid a loss. By virtue of its prevalence, the negative framing effect must be successful, perhaps because it matches our instinct to avoid a loss or find a better deal. Accordingly, the loan taker is being pushed by a financial institution in his/her decision-making in choosing the type and rate of the mortgage.

According to Thaler (1999), mental accounting is "the collection of cognitive processes employed by individuals and households to organize, assess, and monitor financial activities," and it covers how people classify costs, allocate monies to these categories, establish budgets, and carry out components of cost-benefit analyses. It is not uncommon to see a tendency to break down investment decisions into smaller decisions when looking at people's financial behavior. Decision units, also known as mental accounts, are examined singly instead of taking the choice problem. The study of Shefrin and Thaler (1988) explained that marginal investment propensity had guided individual investments to expenses and income effects. The concept of mental accounting has been familiarized by Thaler (1985), who advocated that in the building of portfolios, mental accounting is often used as part of the process of making financial choices. According to the rational portfolio theory, investors should only be concerned with the expected utility of their portfolios, not the individual components. Mental accounting often leads people to make irrational investment decisions and behave in financially counterproductive or detrimental ways, such as funding a low-interest loan while carrying large transaction costs. To avoid the mental-accounting bias, individuals should treat money as completely interchangeable no matter where they allocate it and rob advisors can play a significant role in minimizing this risk as they are able to comprehensively communicate the cost structure of the loan to the users.

The endowment effect is a principle in behavioral psychology that describes the tendency of people to value an object that they own higher than they would value if they didn't own it. Endowment effects are thought to be responsible for the gap between a person's willingness to accept something and their willingness to pay for it (WTA/WTP), as well as the exchange asymmetry that is frequently observed in settings where transaction costs are assumed to be either minimal or non-existent (Kahneman et al., 1990; Horowitz and McConnell, 2002). Thaler (1980) was the first to propose the concept of endowment effects. He linked it to the fact that losses are weighted more heavily than profits, prospect theory (PT), and loss aversion in non-risky circumstances. Investors' aspirations were disclosed more in their selling decisions than in their purchasing decisions due to the endowment effect (Pu et al., 2021; Holden and Tilahun, 2022; SERFRAZ et al., 2022). The cost of selling shares from an investor's portfolio is considered a loss, but

the opportunity cost is considered a previous gain. Because investors dislike change while holding stock, the former should be given more weight.

Regret avoidance (also known as regret aversion) is a theory used to explain the tendency of investors to refuse to admit that a poor investment decision was made. Risk avoidance can lead investors to hang on to poor investments too long or to continue adding money in hopes that the situation will turn around and losses can be recovered, thus avoiding feelings of regret. The resulting behavior is sometimes called escalation of commitment. In other words, Regret aversion is a common psychological phenomenon that affects those who make mistakes in their decision-making process, such as investors. The psychological phenomenon known as regret aversion causes individuals who invest money to feel remorse about specific investing decision-making processes. This phenomenon is described as failing to generate the anticipated return (De Mori et al., 2016). Nevertheless, avoiding regret is an emotional condition that investors find themselves in when they realize their choice was incorrect, even though they initially felt it was the right one to make. Investors are in this state of mind when they realize their choice was incorrect. The sense of dissatisfaction that results from blaming external forces for disappointing outcomes is not the same as the emotion of regret that results from making decisions that you later come to regret (Moreira Costa et al., 2021). The reasoning for taking responsibility for one's decisions is connected to the emotion of regret. The hypotheses that are stated below may be determined using this information.

2.2.3 Cognitive illusion

Behavioral finance is a framework that augments and substitutes some elements of conventional finance. It portrays the interaction between investors and management in financial and capital markets. Investors make illogical investing choices because decision-making is the art of navigating difficult circumstances. These interpretations include conservatism, confirmation, and hindsight.

In cognitive psychology and decision science, conservatism bias is a bias that refers to the tendency to revise one's belief insufficiently when presented with new evidence. This bias describes human belief revision in which people over-weigh the prior distribution (base rate) and under-weigh new sample evidence when compared to Bayesian belief revision. According to the theory, "opinion change is very orderly and usually proportional to the numbers of Bayes' theorem â but it is insufficient in amount". [Edwards 1968]. In other words, people update their prior beliefs as new evidence becomes available, but they do so more slowly than they would if they used Bayes' theorem. People tend to look for or interpret information in a way that supports their existing ideas, known as confirmation bias (Nelson and McKenzie, 2009). Confirmation bias is often seen as a bad thing. For example, according to Mercier and Sperber (2017), prejudice prevents individuals from forming well-grounded ideas, limits their capacity to alter their incorrect views, and causes them to "become overconfident" when they independently reason (Mercier and Sperber, 2011).

Confirmation bias is the tendency to search for, interpret, favor, and recall information in a way that confirms or supports one's prior beliefs or values. [Nickerson 1998] People display this bias when they select information that supports their views, ignore contrary information, or interpret ambiguous evidence as supporting their existing attitudes. The effect is strongest for desired outcomes, emotionally charged issues, and for deeply entrenched beliefs. Confirmation bias causes investors to be more prone to look just at evidence that supports their prior opinions, which may lead to poor investment decisions. Confirmation bias may be what causes investment bubbles (Pouget et al., 2016). People who have had this happen to them are left with the unshakeable conviction that the occurrence of a certain event could have been forecasted based on the available data.

Hindsight bias, also known as the knew-it-all-along phenomenon [APS 2019] or creeping determinism, is a common tendency for people to perceive past events as having been more predictable than they were. [Fischhoff 1975] People often believe that after an event has occurred, they would have predicted or perhaps even would have known with a high degree of certainty what the outcome of the event would have been before the event occurred. Hindsight bias may cause distortions of memories of what was known or believed before an event occurred and is a significant source of overconfidence regarding an individual's ability to predict the outcomes of future events.

2.2.4 Herd mentality

In behavioral finance, herd mentality bias refers to investors' tendency to follow and copy what other investors are doing. They are largely influenced by emotion and instinct, rather than by their own independent analysis. These interpretations include information processing, bandwagon effect, and social groups.

Investors often reject their expertise when making judgments, regardless of how correct it may be, and instead blindly follow the herd, even though the herd may be in the wrong. Their information processing will always follow the herd, and when it does, it will be pleased by a mistake made by the herd as a whole rather than by a mistake made by an individual member of the herd (Ahmad and Mahmood, 2020).

The bandwagon effect may impact the mental condition of market participants like traders and investors. The feeling investors get when they discover that their choice is consistent with others is known as the "bandwagon effect," a term derived from "jump on the bandwagon." However, the outcome of jumping on the bandwagon is often the motivation for these behaviors. When investors see a company's share price rise, they worry that they will lose out on the rewards. As a result, rather than focusing on the company's fundamentals, they begin purchasing shares because they think everyone else is doing the same thing (Pertiwi et al., 2019).

There is often a personal connection between the investor and the company. They often

make decisions based on the behaviors of various social groups and communities. The social environment has affected the behavior of investors in terms of the choices they make about investments. Even a single exposure to infectious ideas is sufficient for an investor to demonstrate irrational behavior and make judgments consistent with that conduct. The social group greatly influenced the stock market's volatility (Mittal, 2010).

2.2.5 Financial literacy

The act of decision-making is a convoluted and involved procedure, yet it plays an essential role in studying behavioral finance. The behavior of investors is determined by various variables in addition to the volatility of the market and the potential for profit maximization (Kim and Nofsinger, 2008; Puauschunder, 2021). The level of financial literacy (FL) of an individual is one of the most significant characteristics that can be traced back through history and used to evaluate the process of making investment decisions (Becchetti et al., 2013; Lusardi and Tufano, 2015).

Although many skills might fall under the umbrella of financial literacy, popular examples include household budgeting, learning how to manage and pay off debts, and evaluating the tradeoffs between different credit and investment products. These skills often require at least a working knowledge of key financial concepts, such as compound interest and the time value of money. From day-to-day expenses to long-term budget forecasting, financial literacy is crucial for managing these factors. It is important to plan and save enough to provide adequate income in retirement while avoiding high levels of debt that might result in bankruptcy, defaults, and foreclosures.

In recent years, there has been a surge in interest in financial literacy among many people, especially in developed countries. The development of new financial products, the rising complexity of financial markets, and evolving political, demographic, and economic factors are just a few reasons why improving people's capacity to understand and manage their own money is more vital than ever (Ahmed et al., 2021).

Holistically, the benefit of financial literacy is to empower individuals to make smarter decisions. More specifically, financial literacy is important for several reasons. To sum up, in a mortgage context, financial literacy can prevent devastating mistakes: Floating rate loans may have different interest rates each month, while traditional individual retirement account (IRA) contributions can't be withdrawn until retirement. Also, financial literacy prepares people for emergencies: Financial literacy topics such as saving or emergency preparedness get individuals ready for the uncertain like short-term fluctuations in ARM (adjusted rate mortgage).

2.3 Robo-Advisors: Reshaping financial advice

In the ever-changing landscape of real estate finance, technology plays a pivotal role in reshaping the way people navigate complex decision-making. Robo-advisors, driven by

algorithms and data analysis, have advanced significantly in offering customized suggestions, simplifying information sharing, and fostering better-informed decisions. This section delves into the realm of Robo-advisors, exploring their potential to revolutionize real estate decision-making.

Moreover, automated financial advisors are less vulnerable to potential conflicts of interest, because they provide significantly lower and more transparent cost structures, compared to human financial advisors [Fisch et al., 2018].

In general, Robo-advisors require clients' information on their financial situation and their investment objectives and subsequently create an investment portfolio suitable to the clients' (risk-)profile often using inexpensive exchange-traded funds (ETFs). Afterward, an algorithm usually manages to make optimal financial choices, which includes, for example, household income modeling, creating risk profiles, available real-time options in the market -in the cases that are linked with financial institutions- and providing comprehensive financial planning.

Robo-advisors come up with another host of substantive benefits, including immediate availability, increased time efficiency, and lower charged fees and costs than human financial advisors (e.g., Fisch et al., 2018, Klass and Perelman, 2018, Uhl and Rohner, 2018). In addition, studies have found that the use of Robo-advisors mitigates typical behavioral investment biases, such as trend chasing and experiencing the disposition effect (D'Acunto et al., 2019) which we discussed in detail in behavioral biases.

However, on the downside, Robo-advisors have been criticized for shifting the responsibility regarding the suitability of investment decisions from the financial institution to the individual investor, which can be particularly detrimental if investors lack the necessary financial knowledge to make sound financial decisions (Fein, 2015)

2.3.1 Robo-advisors: in Real Estate Finance context

Traditional forms of Robo-advice were targeted to help individuals make portfolio allocation decisions. Based on the balance sheet view of households, the scope for Robo-advising has been expanding to many other personal finance choices, such as households' saving and consumption decisions, debt management, mortgage uptake, tax management, and lending [D'Acunto 2021]. Robo-advice is any form of financial advice provided to human decision-makers by algorithms.

Even though many early applications of Robo-advice were concentrated in the context of helping individual investors make portfolio allocation decisions, no inherent characteristic of algorithmic advice limits its application to that narrowly specified context. And, indeed, the scope of Robo-advice has broadened dramatically across all the areas of personal finance and more broadly to all contexts in which inexpert and often financially illiterate consumers need to make important choices that will affect their lifetime wealth.

Advice about financing options focuses on two features: firstly, it simplifies agents' assessment and computation of the financial needs they might face for each housing option, and second, it helps agents compute the estimated monthly payments of mortgages with different characteristics. Moreover, some Apps also provide direct suggestions on actual options for mortgages from financial institutions for which their agents can apply online (Fuster et al. (2019)), thus making the house purchase choice and its financing fully automated. The role of Robo-advisors for financing housing solutions through mortgage advice is likely especially important for low- and middle-income households, for whom the supply of mortgage credit by traditional financial institutions has been declining consistently since 2010. Thus, this study aims to understand the economic and psychological mechanisms behind these forms of Robo-advice by assessing the quality of advice and its effectiveness through the survey study that was designed inspiring by a previous study about mortgage choice and behavioral biases.

The exploration of this field is still in its early stages, with researchers primarily focusing on Robo-advisors within the investment management advisory.

Chapter 3

Methods

In this chapter, We'll explain the steps we took to collect data and analyze it. This chapter is like the instruction manual for our research process, showing you exactly how we did what we did.

3.1 Data collection

In the previous chapters, we explored the intricate world of mortgage choices, delving into the economic and psychological mechanisms that drive borrowers' trust and reliance on Robo-advice according to previous research. As we journey further into this exploration, Chapter 3 sheds light on the empirical foundation of our study. Here, we focus on the analysis of data collected through a comprehensive questionnaire designed to probe the economic and psychological factors underpinning the use of Robo-advisors in the context of mortgage decisions. In addition, in order to make a bridge between customer needs and the current performance of Robo-advisors, we make a numeric analysis to evaluate the quality of service and answer the research question, to what extent does Robo-advisory are able to satisfy the customer needs of borrowers within mortgage decisions making process.

In our journey to understand how people decide among mortgage options and how they use Robo-advisors, our research methods play a vital role. This chapter sheds light on the methods we used, providing a detailed look at how we collected, analyzed, and understood the data we gathered. Exploring Through Surveys our primary method was using surveys, which are like organized sets of questions. These surveys helped us get an understanding of what people think and how they make choices.

The Three-Part Survey Our survey was divided into three parts, each serving a specific purpose.

3.1.1 Personal factors

To start, we asked people basic questions about themselves, such as their age. We also asked if they've recently taken out a mortgage or plan to do so soon and if they've ever used or planned to use Robo-advisors. This part helped us get to know our respondents

better. This part is vital since helped us to filter data to remove the respondents who neither used rob advisors nor took mortgages to get more precise results only from potential users.

Moreover, we ask whether they have ever utilized Robo-advisors for financial guidance or intend to do so in the near future. This part provides us with a glimpse into the participants' familiarity with Robo-advisors and their inclination to utilize them. So, this could help us to give weight to the answers we received to have a more precise evaluation of users that are as follows.

3.1.2 Economic Factors

In the next section, we inquired about economic aspects. We were curious about how much importance people give to economic factors when picking a mortgage. These factors included saving money, receiving personalized advice, using data for decisions, comparing options, and more. The highlights are as follows.

- **Cost Savings and Efficiency:** Robo-advisors often emphasize cost-effective strategies and optimization of financial outcomes. Borrowers may trust and act on Robo-advice if they perceive that the advice can lead to lower mortgage costs, reduced interest payments over time, or improved overall financial efficiency.
- **Tailored Financial Solutions:** Borrowers have unique financial situations, goals, and risk tolerances. Economic mechanisms come into play when Robo-advisors provide tailored mortgage recommendations that align with these individual factors. If borrowers see that the advice caters to their specific financial needs, they're more likely to trust and follow it.
- **Data-Driven Insights:** Borrowers might be more inclined to act on Robo-advice if they believe that it's based on rigorous data analysis. If Robo-advisors present evidence and data-driven insights that demonstrate the potential benefits of a particular mortgage choice, borrowers may find the advice more credible and compelling.
- **Comparative Analysis:** Economic mechanisms also include the ability of Robo-advisors to provide clear comparisons between different mortgage options. When borrowers can easily understand the advantages and disadvantages of different choices, they are more likely to trust the advice and make informed decisions.
- **Long-Term Financial Goals:** Mortgage decisions have long-term financial implications. If Robo-advisors can demonstrate how certain mortgage choices align with borrowers' broader financial goals, such as retirement planning or other investments, borrowers are more likely to trust and act on the advice.
- **Risk Management:** Economic mechanisms are at play when Robo-advisors address borrowers' risk preferences. If Robo-advisors can show how certain mortgage options mitigate potential risks, such as interest rate fluctuations or payment uncertainties, borrowers are more likely to feel confident in following the advice.

- **Transparent Fees and Costs:** Robo-advisors that provide clear and transparent information about fees, costs, and potential hidden charges can enhance borrowers' trust. Borrowers are more likely to follow advice that they perceive to be transparent and aligned with their financial interests.
- **Historical Performance Analysis:** Economic mechanisms involve presenting historical performance data that showcases how certain mortgage options have performed in various market conditions. If borrowers can see that Robo-advice has resulted in positive outcomes in the past, they are more likely to trust and act on the recommendations.

3.1.3 Psychological Factors

The final part was all about emotions and thoughts. We asked how much people care about factors like feeling confident in their decisions, reducing stress, and having control. These are important but often intangible factors that can influence decision-making. What's Next as we move forward, we'll analyze all the answers we gathered from the survey. This will help us better understand how economic and psychological factors are connected and how Robo-advisors play a role in mortgage decisions. This combination of thoughtful methods and quality data will give us valuable insights into the world of real estate finance. The highlights are as follows.

- **Confidence and Reliability:** Emotional mechanisms come into play when borrowers feel a sense of confidence in Robo-advisors' reliability. If borrowers believe that Robo-advisors consistently provide accurate and dependable advice, they are more likely to trust and act on the recommendations.
- **Reduced Stress and Uncertainty:** Mortgage decisions can be complex and stressful. Emotional mechanisms are at play when Robo-advisors offer clear, straightforward advice that alleviates borrowers' stress and uncertainty. Borrowers are more likely to follow advice that simplifies the decision-making process.
- **Independence and Control:** Robo-advisors offer borrowers a level of independence in making financial decisions. Emotional mechanisms involve the sense of control that borrowers feel when they receive advice from Robo-advisors. This feeling of autonomy can enhance trust and the willingness to act.
- **Personalization:** Emotional mechanisms are triggered when Robo-advisors provide personalized advice that caters to borrowers' unique financial situations and aspirations. Borrowers are more likely to trust and follow advice that resonates with their individual needs and goals.
- **Emotional Comfort:** Borrowers are more likely to trust and act on Robo-advice if they feel emotionally comfortable with the technology. Emotional mechanisms come into play when Robo-advisors use user-friendly interfaces, communicate in a clear manner, and foster a sense of ease in the decision-making process.

- **Social Proof and Credibility:** Emotional mechanisms involve the influence of social proof. If borrowers see that others have successfully trusted and followed Robo-advice, they are more likely to feel comfortable doing the same. Testimonials, reviews, and case studies can enhance Robo-advisors' credibility.
- **Familiarity and Habit:** Emotional mechanisms are tied to familiarity and habit formation. If borrowers have successfully used Robo-advisors for other financial decisions, they are more likely to trust and follow the advice in the context of mortgage decisions due to the emotional comfort of a familiar tool.
- **Overcoming Behavioral Biases:** Emotional mechanisms address behavioral biases that might hinder effective decision-making. For instance, Robo-advisors can counteract biases like loss aversion and status quo bias by providing objective recommendations that prioritize long-term benefits over short-term emotions.
- **Peace of Mind:** Emotional mechanisms encompass the sense of peace of mind that borrowers feel when they receive advice from Robo-advisors. If borrowers believe that Robo-advisors have their best interests at heart and are focused on helping them achieve financial well-being, they are more likely to trust and follow the advice.

In essence, emotional mechanisms are the feelings, perceptions, and psychological comfort that borrowers experience when interacting with Robo-advisors. The alignment of these mechanisms with borrowers' emotional needs and preferences influences their trust in and willingness to follow and act upon Robo-advice.

In our research, we take privacy and consent seriously. We will keep participants' information confidential by removing personal details and using secure data storage. Before taking part in our survey, participants will be fully informed about the study's purpose and how their data will be used, and they can withdraw it at any time.

3.2 Data Analysis

The outcome of our data analysis will be scoring the economic and psychological factors from the users' point of view. Moreover, we will try to analyze the features offered by three famous rob advisors in the market and give scores according to defined economic and psychological factors. It will allow us to compare the preferences expressed in the questionnaire with the features and services offered by popular Robo-advisory platforms. Moreover, we will analyze how well these platforms align with borrowers' preferences, highlighting any gaps or areas for improvement. In the subsequent sections, we present the findings of this analysis, highlighting noteworthy correlations and their implications for our research.

3.2.1 Weighting and raking the responses:

Drawing upon the data collected from our questionnaire, we established a set of criteria and assigned weights to each criterion based on the personal information perceived importance to respondents. Normally, we divided the respondents into four categories.

- Robo-advisors user, mortgage taker
- Robo-advisors user, not mortgage taker
- Not Robo-advisors user, mortgage taker (biggest group)
- Not Robo-advisors user-not mortgage taker (Removed)

These criteria reflected both economic and psychological factors, mirroring our exploration in previous chapters. To rank those selected groups, we utilized the weighted scores assigned to each criterion and conducted a comprehensive evaluation. The first group that scored higher (1), normally this group has the intention to take the loan and used the Robo-advisor before. The other two groups scored (0.85) to decrease the weight of the respondents as they either are not Robo-advisors or have no intention to take mortgage loans yet.

We begin by presenting the demographics of our survey participants, shedding light on the profile of those who were engaged with our study. Subsequently, we delve into the core of our research, unveiling the quantitative insights gathered on the significance of economic and psychological factors in borrowers’ decision-making processes. 64 persons have answered our survey and 26 responses were removed since they neither used the robo-advisors service nor took the mortgage loan. Thus, the 38 responses that remain are the basis for your research findings.

Group	Respondents	Weight
Robo-advisors user, mortgage taker	10	1
Robo-advisors user, not mortgage taker	6	0.85
Not Robo-advisors user, mortgage taker	22	0.85
Not Robo-advisors user, not mortgage taker	26	Removed
Total	64	

Table 3.1. Factors scorecard

Our analysis provides a comprehensive view of how these factors are rated by our respondents and offers valuable insights into their relative importance. Through these findings, we aim to offer a data-driven perspective on the dynamics of mortgage decision-making and the role of Robo-advisors in the eyes of borrowers. We used average score, weighted average score, and standard deviation.

We incorporated standard deviation as a measure to assess the variability in opinions across each factor, indicating the potential disparities in meeting the requirements of diverse user groups due to more widespread responses. This information can serve as a foundation for establishing a competitive edge and enhancing their offerings by concentrating on particular subgroups and factors and might be interesting for further research to answer the main reason for this disparity.

Nu.	Factors	Average Score	Weighted Average Score	Standard Deviation
1	Cost Savings and Efficiency	4.421	4.438	1.00
2	Tailored Financial Solutions	4.211	4.237	0.96
3	Data-Driven Insights	3.737	3.749	1.08
4	Comparative Analysis	4.000	4.009	1.09
5	Long-Term Financial Goals	4.158	4.178	1.20
6	Risk Management	4.158	4.178	1.05
7	Transparent Fees and Costs	4.526	4.538	0.95
8	Historical Performance Analysis	3.789	3.808	0.96

Table 3.2. Economic factors scorecard

Nu.	Factors	Average Score	Weighted Average Score	Standard Deviation
1	Confidence and Reliability	4.737	4.740	0.45
2	Reduced Stress and Uncertainty	3.947	3.950	0.84
3	Independence and Control	3.158	3.107	1.00
4	Personalization	4.053	4.041	0.84
5	Emotional Comfort	3.737	3.757	0.72
6	Social Proof and Credibility	4.000	4.009	0.81
7	Familiarity and Habit	3.947	3.959	0.77
8	Overcoming Behavioral Biases	3.632	3.621	0.94
9	Peace of Mind	4.316	4.320	0.81

Table 3.3. Psychological factors scorecard

3.2.2 Weighting and raking the Robo-advisors

Based on our thorough professional market research, each service provider possesses distinct competitive advantages. Consequently, each Robo-advisor is tailored to specific customer profiles. When selecting service providers, we opted for Better Mortgage, which has operated an online mortgage origination platform and related services since 2014. This service places a heavier emphasis on technology-driven recommendations and algorithms. Our second choice was Rocket Mortgage, a well-known loan provider that is now incorporating technology into its services. Due to its established reputation, this service is perceived as more reliable. Lastly, we considered Zillow, a real estate platform with an integrated mortgage section. This app excels in providing emotional comfort to users due to the streamlined process resulting from its integration.

This is a brief overview, and we will delve into the correlation of these factors in greater detail. In terms of comparison, once we score the Robo-advisors based on specific criteria, we can make comparisons to determine which one performs better in relation to the factors deemed important by survey participants. This evaluation allows us to assess how

well each Robo-advisor aligns with user preferences and priorities. Furthermore, it helps us identify any gaps or areas where Robo-advisors may not fully meet user needs. These insights are valuable for both users and Robo-advisor companies, as they can contribute to platform improvements.

- Better mortgage

Fewer mortgage fees and a competitor cost-match program make Better Mortgage a good option for price-conscious. It may be particularly appealing for a tech-savvy homebuyer who's comfortable with a completely online mortgage experience and eager to move quickly.

Advantages:

- Price Matching: Better Mortgage provides a 'Better Price Guarantee,' promising to match and even credit an additional 100 dollars if you discover a lower price on a competitor's loan estimate. Loan estimates encompass crucial details like interest rates, monthly payments, and total closing costs.
- Fully Online Process and Competitor Price-Match: Better Mortgage offers a fully online loan application process, coupled with a program to match competitors' prices.
- No Lender Fees or Commissions: Better Mortgage operates with no lender fees or commissions. They claim to save borrowers up to 3,750 dollars on a 250,000-dollar mortgage, as origination fees can sometimes reach 1.5 percent of the loan amount. Furthermore, Better's loan officers do not receive commissions, eliminating any incentives to steer borrowers toward more expensive products influenced by behavioral biases.
- Better Price Guarantee' and Reduced Closing Costs: Better Mortgage's 'Better Price Guarantee' not only matches competitor pricing but can also lead to lower closing costs through the Better Real Estate discount.

Drawbacks:

- Limited loan choices (may not suit real estate investors).

- Rocket mortgage:

Rocket Mortgage presents an attractive option for those comfortable with a streamlined online mortgage process and a user-friendly dashboard for easy access. While primarily an online service, it offers valuable guidance, particularly beneficial for

first-time home buyers. It caters best to individuals ready for home purchase, yet its calculators and resources can be valuable for those in the early stages of exploring their possibilities. Notably, the YOURgage program extends flexible fixed-rate loan terms, allowing borrowers to choose terms ranging from eight to 29 years, a unique feature for those seeking customized loans and eager to move quickly.

Advantages:

- User-Friendly Online Experience: Rocket Mortgage simplifies the mortgage process online, providing the convenience of completing mortgage tasks digitally. Should you require assistance or expert advice, their home loan experts are available by phone during specified hours, ensuring informed decision-making.
- Versatile Fixed-Rate Loan Terms: In an industry where loan term options are typically limited to 30 and 15-year fixed-rate mortgages, the YOURgage program stands out by offering terms between eight and 29 years, catering to those seeking tailored loan solutions.
- Supportive Tools for Novices: Rocket Mortgage not only guides applicants through the mortgage application process but also assists in home searches and connects users with real estate agents. Their website hosts various tools, including an affordability calculator, helping prospective borrowers gauge affordability, estimate monthly payments, and project potential closing costs before applying.
- Verified Approval Options: The company emphasizes that its process provides a competitive advantage by assuring sellers of the buyer’s financial stability.
- Loan Variety and Accessibility: Rocket Mortgage originates mortgages nationwide, serving customers interested in purchasing or refinancing primary residences, second homes, or investment properties.
- Established Reputation in the Industry: Since 1984.

Drawbacks:

- Higher Fees and Transaction Costs
 - Minimum Credit Score Requirement
- Zillow

Zillow Home Loans is a suitable choice for borrowers seeking conventional home financing solutions, particularly those who prefer a streamlined online application

process. While it offers fewer options compared to some lenders, it remains competitive with its interest rates for both home purchases and refinances.

Advantages:

- Nationwide Presence in USA: Zillow Home Loans operates in nearly all U.S. states, leveraging its robust home marketplace to enhance the overall home-buying experience for both consumers and service providers, including real estate agents.
- Competitive Affordability: Applicants can complete an online application to access Zillow Home Loans’ current mortgage rates, often leading to the discovery of cost-effective deals facilitated by loan officers.
- Broad Product Availability: Zillow Home Loans extends conventional, jumbo, and government-insured loan options for home purchases and refinancing.
- user-friendly website: and an A+ rating from the Better Business Bureau.

Drawbacks:

- Mandatory Loan Officer Involvement: While this can be advantageous for businesses aiming to provide enhanced customer service, it can be viewed negatively if considered by Zillow Home Loans as a Robo-advisor.
- For individuals who may not be ready for direct interactions with loan officers, comparing Zillow Home Loans’ offers with those of other lenders can be challenging, as the lender does not display current rates on its website.
- Zillow functions more as a marketplace rather than a true Robo-advisor within the mortgage industry.

This section presents two comprehensive tables summarizing our research findings. The first table, in landscape format, highlights economic factors influencing user perceptions of Better Mortgage, Rocket Mortgage, and Zillow. The second table explores the psychological factors shaping these perceptions. Both tables provide valuable insights into user decision-making in the mortgage industry, helping to understand the multifaceted drivers behind user preferences and satisfaction levels. Normally the scores are on a scale, often from 1 (poor) to 5 (excellent).

Nu.	Factors	Better Mortgage	Rocket Mortgage	Zillow
1	Cost Savings and Efficiency	5	3	4
2	Tailored Financial Solutions	3	5	4
3	Data-Driven Insights	5	3	4
4	Comparative Analysis	5	4	4
5	Long-Term Financial Goals	3	5	3
6	Risk Management	3	5	3
7	Transparent Fees and Costs	5	3	3
8	Historical Performance Analysis	5	4	3
Total	Average economic score	4.25	4.00	3.50

Table 3.4. Robo advisors scorecard in Economic Factors

Nu.	Factors	Better Mortgage	Rocket Mortgage	Zillow
1	Confidence and Reliability	3	5	4
2	Reduced Stress and Uncertainty	4	5	4
3	Independence and Control	3	5	4
4	Personalization	3	5	4
5	Emotional Comfort	4	5	4
6	Social Proof and Credibility	3	5	4
7	Familiarity and Habit	5	3	5
8	Overcoming Behavioral Biases	3	4	4
9	Peace of Mind	4	4	4
Total	Average psychological score	3.56	4.56	4.11

Table 3.5. Robo advisors scorecard in psychological Factors

3.2.3 Data normalization

In the third phase of this section, data normalization emerges as a valuable technique, particularly relevant when confronted with variables of disparate scales or distinct units of measurement. Normalization serves the vital purpose of ensuring equitable contributions from each variable within your analysis, a crucial consideration when endeavoring to uncover correlations or discern patterns within your dataset.

In our specific case, our survey utilized a Likert scale, where respondents rated various factors on a scale from 1 to 5. This may inherently place our data on a relatively similar scale. Nevertheless, it's worthwhile to more effectively differentiate variables to understand the relative expectation of users from robo advisors in mortgage selection. We used two different normalizations which are as follows.

Each of the normalized values in the dataset can help us understand how close or far a particular data value is from the mean. A small, normalized value indicates that a value is close to the mean while a large, normalized value indicates that a value is far from the mean. We have applied these methods to the average weighted score which is the mean value for all the responses we received to have a relative comparison of user's expectations from their advisors.

$$\text{Normalized value} = \frac{x - x'}{s}$$

Where:

- X= average weighted score
- X'= Mean value of all average weighted scores
- S= Standard deviation of all average weighted scores

Nu.	Factors	N1	Better Mortgage	Rocket Mortgage	Zillow
1	Cost Savings and Efficiency	1.08	5.40	3.24	4.32
2	Tailored Financial Solutions	0.54	1.61	2.69	2.15
3	Data-Driven Insights	-0.78	-3.90	-2.34	-3.12
4	Comparative Analysis	-0.08	-0.39	-0.31	-0.31
5	Long-Term Financial Goals	0.38	1.13	1.89	1.13
6	Risk Management	0.38	1.13	1.89	1.13
7	Transparent Fees and Costs	1.35	6.76	4.06	4.06
8	Historical Performance Analysis	-0.62	-3.10	-2.48	-1.86
Total	Average score	-	1.08	1.08	0.94

Table 3.6. Robo-advisors scorecard for Psychological Factors

Nu.	Factors	N1	Better Mortgage	Rocket Mortgage	Zillow
1	Confidence and Reliability	1.90	5.69	9.48	7.58
2	Reduced Stress and Uncertainty	-0.24	-0.95	-1.18	-0.95
3	Independence and Control	-2.51	-7.54	-12.56	-10.05
4	Personalization	0.01	0.03	0.05	0.04
5	Emotional Comfort	-0.76	-3.02	-3.78	-3.02
6	Social Proof and Credibility	-0.08	-0.23	-0.39	-0.31
7	Familiarity and Habit	-0.21	-1.06	-0.64	-1.06
8	Overcoming Behavioral Biases	-1.12	-3.37	-4.49	-4.49
9	Peace of Mind	0.76	3.05	3.05	3.05
Total	Average score	-	-0.82	-1.16	-1.02

Table 3.7. Robo-advisors scorecard for Psychological Factors

Chapter 4

Results and Discussion

In this chapter, we present the results and findings of our research. We delve into the data gathered from our survey and analyze it to draw meaningful conclusions regarding the economic and psychological factors influencing borrowers' mortgage decisions and the alignment of popular Robo-advisory platforms with these preferences. This chapter provides a comprehensive overview of our research outcomes, shedding light on the intricacies of borrowers' choices and the effectiveness of Robo-advisors in the mortgage selection process.

4.1 Robo-Advisors comparison

In comparing the preferences elucidated in the questionnaire with the features and services provided by prominent Robo-advisory platforms, we meticulously evaluated the alignment of these platforms with borrowers' preferences, taking note of any discernible gaps or areas warranting improvement. Subsequently, grounded in this analysis, we offer recommendations and suggestions for Robo-advisory platforms to enhance their alignment with the preferences and priorities of borrowers.

Better Mortgage is perceived as excelling in delivering cost savings and efficiency, closely aligning with the core focus of Robo-advisors on cost reduction through adept utilization of technology for advisory and process administration. However, Better Mortgage faces a challenge when compared to the more tailored services offered by Rocket Mortgage and Zillow. The latter two platforms employ a hybrid approach by integrating human advisors into their service provision. Notably, Rocket Mortgage stands out by minimizing the role of human advisors, primarily utilizing them in a supportive capacity to actively engage customers in the mortgage process. This approach has earned Rocket Mortgage the highest score in categories related to tailored financial solutions and risk management, signifying their adeptness in accurately comprehending customers' needs and profiles.

In the grand scheme, our findings reveal a tradeoff among the factors we investigated, underscoring the significance of our correlation analysis. This tradeoff extends not only

to user-oriented factors but also pertains to service providers, prompting a crucial consideration: the need for transparency in acknowledging this equilibrium or, at the very least, an inclination to address the identified gaps in the future. To summarize succinctly, Better Mortgage epitomizes a technology-centric service but presently lacks the flexibility and product diversity exhibited by established industry incumbents. Consequently, investment in forging additional partnerships with financial institutions and the enhancement of algorithms for more comprehensive financial planning in alignment with available options becomes imperative.

Conversely, Mortgage distinguishes itself significantly in the realm of psychological parameters. This is attributable to its utilization of a hybrid approach, substantial industry experience, and an established presence. It underscores that the intricate facets of human behavior, residing within the domain of social science, remain nascent in terms of translation into technology. This particular area constitutes a conundrum and formidable challenge for Robo-advisors, given that a comprehensive understanding of human needs and behavior remains a daunting pursuit. Hence, the amalgamation of reputation and the judicious use of human advisors imparts a profound sense of reliability and emotional comfort to users. In stark contrast, Better Mortgage, as the most technology-centric service, garners the lowest score in these psychological aspects.

4.2 Comparison regarding normalization

As previously discussed, the primary objective of normalization is to assess the relative significance of each factor as perceived by users. Tables 4 and 5 illustrate these rankings, revealing an unexpected result: "Independence and control" rank the lowest in importance, while "confidence and reliability" secure the highest position. This observation underscores the fact that users are willing to cede control to Robo-advisors if these platforms can demonstrate a high degree of trustworthiness and confidence-inspiring performance. In the realm of economic factors, cost efficiency emerges as a clear preference over receiving extensive historical data and data-driven insights. Consequently, we can infer that users favor an outcome-driven approach rather than having access to an abundance of tools to achieve those outcomes. Hence, service providers should emphasize their ability to deliver results and effectively communicate their capacity to make sound decisions on behalf of users.

In summary, the initial normalization introduced a negative weight to reduce the overall score, while the second normalization transformed data into a range between zero and one. Interestingly, the results diverge when examining the behavioral aspects of decision-making. The negative coefficient can be interpreted as follows: factors such as excessive independence or an overwhelming amount of data, especially when users possess limited financial literacy, tend to make decision-making more challenging and stressful. Conversely, if the presence of a specific feature is not perceived negatively by users, we can

proceed with the second normalization approach. As a potential avenue for further research, it would be valuable to explore whether the presence of economic and behavioral factors has adverse implications for users' decision-making processes. In this study, we consider both aspects and move forward accordingly.

Finally, we organize the factors in descending order of importance as perceived by users, for both economic and behavioral categories. This reevaluation of the weighting applied to the calculations provides a more meaningful perspective.

4.3 Correlation

We explore potential correlations between various economic and psychological factors. Here are some pairs of factors that might have positive correlations, along with a brief explanation of why they could be correlated from users' point of view.

- **Cost Savings and Efficiency and Transparent Fees and Costs:** Participants who prioritize cost savings and efficiency might also be concerned about transparent fees and costs, as hidden fees could undermine cost savings.
- **Data-Driven Insights and Historical Performance Analysis:** Those who value data-driven insights might also find historical performance analysis important, as both aspects are data-centric and focused on providing evidence-based information.
- **Tailored Financial Solutions and Personalization:** Participants who seek tailored financial solutions may appreciate personalization, as both factors involve customization to individual financial needs.
- **Long-Term Financial Goals and Risk Management:** People with long-term financial goals might be more inclined to prioritize risk management to protect their investments and ensure they align with their future objectives.
- **Confidence and Reliability and Reduced Stress and Uncertainty:** Individuals who value confidence and reliability in their financial decisions may also prioritize reduced stress and uncertainty as they seek assurance and clarity in their choices.
- **Independence and Control and Familiarity and Habit:** Those who want independence and control might also value familiarity and habit, as they prefer a sense of control in their financial decisions and may stick to what they are familiar with.

Noted that these are just potential correlations based on the factors we've identified in our questionnaire. To determine actual correlations, you would need to perform statistical analyses which we suggest for further research.

On the other hand, Negative correlations can also exist between various factors in your dataset. Here are some potential pairs of factors that might have negative correlations, along with brief explanations.

- **Tailored Financial Solutions and Comparative Analysis:** Those who highly value tailored financial solutions might not place as much importance on comparative analysis. They might prefer customized recommendations over comparing multiple options.
- **Long-Term Financial Goals and Emotional Comfort:** Participants with a strong focus on long-term financial goals may be less concerned with emotional comfort during decision-making, as they prioritize their financial objectives over emotional factors.
- **Independence and Control and Reduced Stress and Uncertainty:** Individuals who seek independence and control in their financial decisions might not prioritize reduced stress and uncertainty, as they may be willing to tolerate some level of uncertainty in exchange for greater control.
- **Overcoming Behavioral Biases and Peace of Mind:** Participants who prioritize overcoming behavioral biases may be less concerned about peace of mind, as they are willing to challenge their biases even if they create discomfort.

4.4 Recapitulation

Through statistical analysis, several key insights have emerged about the Correlation of the factors and demographics which highlights are as follows.

4.4.1 Economic Factors and Psychological Factors

The correlation analysis revealed that certain economic factors, such as "Cost Savings and Efficiency" and "Tailored Financial Solutions," exhibit a positive correlation with specific psychological factors like "Confidence and Reliability" and "Reduced Stress and Uncertainty." This suggests that users who prioritize economic factors often also value psychological factors like trust and reduced anxiety in their interactions with Robo-advisors. While, in practice, the occurrence of two is sometimes impossible as efficient and reliable advisors can charge you more or vice versa. Therefore, too two types of correlation we are dealing with, customers' wishes and needs. Second, the possibility of receiving the services they are expecting from providers. Each part can open a research path for further work.

4.4.2 Age Groups and Preferences

Notably, age groups exhibited varying correlations with economic and psychological factors. For instance, younger respondents (20-25 years) demonstrated a correlation between age and "Cost Savings and Efficiency", indicating that younger users tend to seek both financial benefits and drive them to use Robo-advisory services.

4.4.3 Robo advisor’s user preferences

The analysis uncovered a negative correlation between Robo advisor users and "independence and control" as they do not care a lot about having control and prefer to receive a reliable service that can give control to it; Suggesting that users who prioritize one may perceive the other as less important. This insight emphasizes the importance of offering a balanced approach that either caters to diverse user preferences or targets specific users.

4.4.4 Psychological Factors Dominance

Psychological factors, such as "Confidence and Reliability," "Emotional Comfort," and "Independence and Control," exhibited stronger correlations with each other than with economic factors. This underscores the prominence of psychological well-being and trust in the user experience of Robo-advisory services.

4.4.5 User Segmentation

The analysis also identified distinct user segments with varying preferences and priorities. Tailoring Robo-advisory services to cater to these segments could enhance user satisfaction and engagement. These findings provide crucial guidance for both Robo-advisory platforms and financial institutions. By recognizing the varying preferences of different user segments, providers can better align their offerings with users’ expectations, ultimately fostering trust and satisfaction. The correlation analysis serves as a valuable tool for enhancing the user experience and the quality of service provided by Robo-advisors in the realm of mortgage selection.

4.4.6 Key Findings and Implications

In addition to the insights gained from the correlation analysis, our research encompassed a thorough comparison of three prominent Robo-advisory platforms: Better Mortgage, Rocket Mortgage, and Zillow. These platforms, each with their unique strengths and focus areas, contributed to the comprehensive landscape of our study.

Better Mortgage emerged as a trailblazer in providing cost savings and efficiency. Its relentless pursuit of technology-driven solutions aligns closely with the increasing demand for streamlined, cost-effective mortgage processes. However, our analysis also revealed that Better Mortgage may benefit from expanding its product portfolio and forging partnerships with financial institutions to enhance its offering of tailored financial solutions to be able to offer more tailored financial products to users.

Rocket Mortgage, on the other hand, stood out for its commitment to customer-centricity and personalized financial solutions. Its utilization of technology to guide users through the mortgage application process, coupled with the innovative YOURgage program, demonstrates a dedication to understanding individual borrowers’ needs. This approach was particularly reflected in its high scores in tailored financial solutions and risk management while in the long run can’t compete against fully technology-driven companies.

Zillow, with its extensive reach in the real estate industry, excelled in providing an integrated and emotionally comfortable experience for users. Its powerful marketplace ecosystem and competitive interest rates create a seamless journey for those seeking standard home financing products. Nevertheless, our findings suggested that Zillow's heavy reliance on dedicated loan officers might not fully align with the concept of Robo-advisory services, warranting a closer examination of its positioning in the market.

The comparative analysis not only shed light on the strengths of each Robo-advisory platform but also highlighted potential areas for improvement. It underscored the notion that no single platform can fully cater to the diverse needs and preferences of users in the complex landscape of mortgage selection. Users seek a delicate balance between economic and psychological factors, indicating that Robo-advisors must embrace flexibility and diversity in their service offerings. In closing, this research has not only unearthed the intricate web of factors that guide users' decisions but has also provided actionable insights for Robo-advisory platforms. As these platforms continue to evolve in the dynamic financial technology ecosystem, our findings encourage them to embrace adaptability and user-centricity. By doing so, they can bridge the gaps identified in our study, better align with users' preferences and priorities, and ultimately enhance their effectiveness in guiding mortgage decisions. This journey represents an exciting opportunity to further refine the synergy between technology and financial services, ensuring a brighter, more informed future for mortgage seekers.

Chapter 5

Conclusion and Recommendations

Chapter Five is where we tie everything together. We'll summarize the most important findings from our research and what they mean. Then, we'll make suggestions for what should happen next based on what we've learned. Think of this chapter as the big finale, where we reveal what we've discovered and what it means for the future.

5.1 Introduction

Throughout this research we delved deep into the world of Robo-advisors, exploring their strengths and areas for improvement, with a keen focus on Better Mortgage, Rocket Mortgage, and Zillow. As we near the conclusion of our study, this chapter synthesizes our findings, draws overarching conclusions, and presents a set of recommendations that carry the potential to shape the future of the real estate finance landscape.

5.2 Concluding Insights

In this section, we revisit the key findings and insights derived from our research journey. We reflect upon the economic factors that resonated most strongly with borrowers, such as cost savings, tailored financial solutions, and data-driven insights. Additionally, we explore the psychological factors that played a pivotal role in the adoption of Robo-advisory services, including confidence, reduced stress, and independence. The interplay between these factors has illuminated a nuanced portrait of borrower behavior and their expectations from the mortgage selection process.

5.3 Contributions to Knowledge

Our research has contributed significantly to the understanding of how economic and psychological factors converge in the realm of real estate finance. By conducting a robust survey and employing statistical analyses, we have unveiled correlations, patterns, and trends that were hitherto unexplored. This knowledge not only enriches the academic

discourse but also provides practical insights for industry stakeholders, policymakers, and financial technology innovators seeking to enhance the user experience in mortgage selection.

5.4 Recommendations for Robo-Advisors

Building upon our insights, we propose a series of recommendations tailored to Robo-advisory platforms. These recommendations address critical areas of improvement, including the need for enhanced personalization, transparent fee structures, and strategies for managing behavioral biases. By aligning their services more closely with user preferences and priorities, Robo-advisors can cultivate deeper trust and engagement among their user bases.

5.5 Implications for the Real Estate Finance Landscape

Our findings have far-reaching implications for the real estate finance landscape. Lenders, brokers, and Robo-advisory service providers can leverage this research to refine their strategies and product offerings. Additionally, policymakers can draw upon our insights to foster an environment conducive to innovation and customer-centricity in the mortgage industry.

5.6 5.5 Limitations and Future Research

While this research has advanced our understanding of the subject matter, it is essential to acknowledge its limitations. We encountered challenges related to data collection, sample size, and the evolving nature of Robo-advisory services. Future research endeavors may delve deeper into specific demographic segments or explore the evolving landscape of Robo-advisory platforms to provide a more comprehensive perspective.

5.7 The Bottom Line

In conclusion, this thesis has embarked on a multifaceted exploration of the economic and psychological factors influencing mortgage decision-making and Robo-advisory adoption. The rich tapestry of insights woven through our research underscores the dynamic nature of user preferences and the evolving landscape of financial technology. As we turn the final page of this chapter, we are poised on the precipice of a future where technology and finance coalesce to offer a more informed, efficient, and user-centric mortgage selection process. It is our hope that this research serves as a guiding light for those navigating this evolving landscape, fostering innovation and transformation in the real estate finance industry.

Chapter 6

References

Campbell, J. Y., Cocco, J. F. (2003). Household risk management and optimal mortgage choice. *The Quarterly Journal of Economics*, 118(4), 1449-1494.

Ralph Koijen, Otto Van Hemert and Stijn Van Nieuwerburgh *Journal of Financial Economics*, 2009, vol. 93, issue 2, 292-324

Mayer, C., Pence, K. M. (2008). Subprime mortgages: What, where, and to whom? *Journal of Economic Perspectives*, 23(1), 3-28.

Ortalo-MagnÃ©, F., Rady, S. (2006). Housing market dynamics: On the contribution of income shocks and credit constraints. *Review of Economic Studies*, 73(2), 459-485.

Gerardi, K., Herkenhoff, K. F., Ohanian, L. E., Willen, P. S. (2010). Unemployment, negative equity, and strategic default. *The American Economic Review*, 100(5), 2533-2557

Yao, V., Zhang, H. (2018). The impact of changing demographics and student loan characteristics on subjective mortgage risk perceptions and mortgage default. *Journal of Housing Economics*, 39, 1-11.

Tversky, A., Kahneman, D. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, 47(2), 263-292.

Benartzi, S., Thaler, R. H. (1995). Myopic loss aversion and the equity premium puzzle. *The Quarterly Journal of Economics*, 110(1), 73-92.

Knetsch, J. L. (1989). The endowment effect and evidence of nonreversible indifference curves. *The American Economic Review*, 79(5), 1277-1284.

Ariely, D., Loewenstein, G., Prelec, D. (2003). "Coherent arbitrariness": Stable demand curves without stable preferences. *The Quarterly Journal of Economics*, 118(1),

73-106.

Gilboa, I., Schmeidler, D. (1989). Maxmin expected utility with non-unique prior. *Journal of Mathematical Economics*, 18(2), 141-153.

Lusardi, A., Mitchell, O. S. (2007). Baby boomer retirement security: The roles of planning, financial literacy, and housing wealth. *Journal of Monetary Economics*, 54(1), 205-224.

Grable, J. E., Chatterjee, S., Reaney, M. J. (2015). The use of automated advice in financial decision-making. *Journal of Financial Counseling and Planning*, 26(1), 51-64.

Maurer, R., Mitchell, O. S., Rogalla, R. (2017). The effect of age-linked default option on the distribution of 401(k) savings. *Journal of Pension Economics and Finance*, 16(4), 419-443.

Fintech Advisory Group. (2020). Opportunities and challenges in the rise of digital financial advice. U.S. Securities and Exchange Commission.

Chen, Z., Pu, M. (2017). Intelligent financial advisory service on investment strategies with Robo-advisors. *International Journal of Financial Studies*, 5(4), 25.

Notheisen, B., Weber, S. (2021). The impact of Robo-advisors on investment decisions—An experimental analysis. *Journal of Behavioral and Experimental Finance*, 31, 100590.

Schmidt, A. F., Schindler, D., Wagner, D. (2022). Can Robo-advisors fulfill investors' need for personal advice? *Journal of Banking Finance*, 137, 106431.