



Blessing or Curse? The Influence of Neobrokers on the Investment Behavior of Young Investors

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Abstract

My thesis addresses the topic related to the impact of neobrokers on the investment behavior of investors. I deal with the questions of which target groups are particularly attracted by neobrokers, for which investment strategies neobrokers are primarily used, and to what extent the design of the neobroker applications plays a significant role in the investment decisions of its users. Based on my online-based questionnaire, it can be determined that neobroker customers are predominantly younger and willing to take more risk compared to customers of branch or direct banks. Moreover, neobrokers are used for short-term investments and not for retirement planning. Here, the design of neobroker applications has a decisive influence on the trading behavior of its users. Not only is the risk of shares assessed differently due to the representations of the stock prices within the neobroker applications but buys as well as sells are carried out more frequently using neobrokers than in comparison to traditional broker providers. Ultimately, I also show that a learning section including a knowledge check of the newly acquired financial expertise within the neobroker applications is perceived as helpful by its users as it is for customers of traditional financial service providers.

Keywords: Neobroker; Trading; Fintech; Attention-grabbing.

1. Introduction

Since the early days of stock markets, mankind has repeatedly had to deal with stock market crashes. Such crises began as early as 1637 in form of the tulip bubble, better known as *Tulipmania* (Garber, 1990). This first speculative bubble was followed by several others, such as the *Twin Crises* of 1720 (Bruner & Miller, 2020) or the *Black Thursday / Black Tuesday* in 1929 (White, 1990). Probably the most famous crash of modern times was, until recently, the *Global Financial Crisis* in 2008, which was triggered by the collapse of the housing bubble (Friedman & Friedman, 2009; Holt, 2009). However, the latest crash at the beginning of 2020 was not due to an economic bubble, but to a global pandemic initiated by the coronavirus, which had an immense impact on the entire world. The peculiarity of this shock compared to all the previous ones is that it resulted from public health concerns rather than economic conditions (Albuquerque, Koskinen, Yang, & Zhang, 2020) and caused financial markets around the world to take rapid and very large falls. But it was not only those markets that had to contend with the pandemic. People, too, have been marked by restrictions and new challenges that entailed changes in

lifestyles and behaviors. On the one hand, vacations had to be canceled, public life had to be scaled back and individuals spent more time at home. On the other hand, however, these restrictions helped savers to have more time and, above all, money at their disposal. This situation was directly reflected in the stock market. Benefiting from the sharp drop in stock market prices, a persistently low interest rate policy, and a lack of alternative options, the German stock market, for example, experienced a real upswing. According to a study by the Deutsches Aktieninstitut (Balonier, Di Dio, & Fey, 2021), around 2.7 million more people in Germany saved in shares, equity funds, or equity-based ETFs in the Corona year 2020 compared to the previous year, bringing the total number of citizens participating in the stock market to almost 12.4 million. But it was not only the stock market that has experienced this veritable boom since the pandemic. So-called neobrokers are gaining in popularity, too, especially among the younger generation. This phenomenon is primarily due to the simplicity of the most mobile applications and the ability to gain low-threshold access to trading financial products for little to no cost (Barber, Huang, Odean, & Schwarz, 2020). The media attention, through oc-

casions such as the short squeeze of GameStop Corporation, promotes the ever-growing demand of neobrokers as well. Internet forums such as the subreddit r/Wallstreetbets are attracting more and more young people, who also want to participate in the stock market and benefit from it. Here, the primary objective is not to invest for the long term, but rather to make quick profits, which entail a high level of risk. Neobrokers offer such high-risk investments as trading warrants or cryptocurrencies, which makes them one of the most significant places to go for exactly these risk-taking and inexperienced investors. The reduced and clear design of the neobroker applications makes trading even more fun, which significantly lowers the barrier of investing. The advent of commission-free trading apps has massively expanded the possibilities of investing and changed its nature as a result (Chaudhry & Kulkarni, 2021).

The playful approach to trading financial products begs the question of what influence neobrokers have on the investment behavior of young investors in particular, and whether this influence should be seen as an advantage or a disadvantage. The purpose of my following thesis is to answer this specific question based on an online questionnaire. With this in mind, the central question motivating my thesis can be broken down into three further sub-questions, all of which are addressed in the following chapters:

1. Which target groups are addressed by neobrokers and what are the decisive reasons for this?
2. For which investment strategies are neobrokers used by their customers and what are the reasons for doing so?
3. Do the neobroker applications and their appearance have an impact on the investment behavior of investors?

These sub-questions form the general framework for the forthcoming elaboration of my thesis. To help me answer them, my paper is divided into six distinct sections. In the first part, I define the terms relevant for the study and present the existing theoretical knowledge related to the topic of neobrokers. This theory then allows me to derive the underlying hypotheses in the next chapter. These hypotheses deal with the influence of neobrokers on the trading behavior of investors and draw first conclusions on whether this influence is to be evaluated positively or negatively. In the following part, I take a closer look at the methodological approach of my thesis. I clearly explain the research environment, the study participants, and the measures related to the survey carried out. Building on this methodological aspect, I then draw conclusions in the succeeding chapter. Here, I present the results of my study and review the hypotheses that were previously formulated to show the extent to which they can be confirmed or not. These findings subsequently enable me to introduce the following discussion. In this chapter, I review both the positive results of the qualitative study as well as the limitations and methodological criticism. Due to these limitations, I additionally address future improvements and suggestions in the concluding part of the penultimate chapter. In the final section of my thesis, I once again present the

key messages and provide an outlook for the future where further research will be necessary.

2. Theoretical Foundation

In the following chapter, I summarize the results of my literature review. I start the section with a brief overview of the development of neobrokers and an introduction to the main terminologies about this subject. Subsequently, I present the theoretical background regarding the previously outlined objectives and thus attempt to answer the research questions based on theoretically developed hypotheses, which I derive in the following chapter. Answering these questions allows me to justify my study described below and achieve the goals I have set.

The existing theory, which I examine in the following sections, is primarily concerned with the issues surrounding Fin-Tech and, in particular, neobrokers. With a pragmatic view of the research objectives, I then discuss the psychological influences of neobrokers on investors based on the existing literature. These influences are represented by topics such as gamification or attention-grabbing. Having found the theoretical path to the research objectives of my thesis, I proceed with my analysis of the most important concepts in the field of neobrokers and their influences on investors. Finally, I summarize the analyses I conducted to provide a systematic review of the literature available and identify research gaps. From this, I can derive the guiding hypotheses for my thesis, presented in chapter 3.

2.1. Development of Neobrokers

Before the development of the internet, investors had to conduct their transactions with their brokers by phone, which was very time-consuming and costly. This changed rapidly with the advent of new technologies and the introduction of the World Wide Web. As personal computers and laptops began to proliferate in the mid to late 1990s, the modern investor, as well as online trading with notably lower commission rates, arose (Barber & Odean, 2001). In response to the lowered costs of brokers like E*Trade and Ameritrade, Charles Schwab Corporation, the trade volume leader at the time with 5.6 million active customer accounts, offered a flat-rate online trading commission. The idea was to create an incentive to trade online with reduced services instead of by phone or in person (Melnick, Nayyar, Pinedo, & Se-shadri, 2000). The urge for online trading continued to grow and commission cuts persisted over the years, making competition even more intense. The first neobroker founded in 2013, Robinhood, shook up the entire market with its strategy and changed it once again. As the first broker to offer commission-free trading via a mobile and gamified app, Robinhood transformed the entire investment landscape, becoming a pioneer in the field (Barber et al., 2020). The goal of this neobroker was to provide access to financial markets for everyone through its zero-cost strategy and user-friendly

design. With its anti-Wall Street movement, the online discount broker tried to democratize online trading for the public, as they were left out from traditional brokers due to low and unattractive profit margins. The concept was well-received by the public, giving Robinhood 13 million users by 2020 and a market valuation of \$11.2 billion (Tan, 2021). This success prompted other imitators to follow suit. In Germany, providers such as Trade Republic or Scalable Capital have also picked up on this growing trend and are attracting more customers to their business model, each with their own little special features such as copy trading or the purchase of cryptocurrencies.

In my thesis, I mainly focus on two neobrokers. First, I select Robinhood because it is the largest neobroker on the market and thus has the largest share of the existing literature. Second, I choose the German neobroker Trade Republic as most of the participants in my study are based in Germany and a connection can be established between them and the broker.

2.2. Definition of Terms

To gain a better understanding of the subject matter of my thesis, a detailed overview of the most important terminology is required. These technical terms are closely related to the topic and help clarify my underlying questions. I list and define these central concepts in the following subsections.

2.2.1. FinTech

There are several approaches by various authors to define the term FinTech (Zavolokina, Dolata, & Schwabe, 2016). In general, FinTech is an abbreviation and is composed of the terms *financial* and *technology*. According to Gomer, Koch, and Siering (2017), FinTech generally describes the combination of modern, primarily internet-related technologies and well-established businesses in the financial sector. A slightly different approach defines FinTech as an interdisciplinary topic that combines financial, technology, and innovation management. In concrete terms, FinTech applies to all innovative ideas which enhance financial service processes through suggesting technology solutions for various business situations, where the ideas may also lead to the creation of new business models as well as new companies (Leong, 2018).

2.2.2. Neobroker

There is no single valid definition for the term neobroker. It is possible, though, to derive characteristics of neobrokers that distinguish them from classic banks or other online brokers. Neobrokers are generally a new breed of online brokers from the FinTech scene aiming to put pressure on traditional brokers, especially with low-cost smartphone trading. To achieve this, neobrokers significantly narrow the trading spectrum and scope of services, unlike traditional banks, to focus on specific areas such as low cost (Fischer, Hübner, & Bulis, 2020).

2.3. Related Literature

Retail trading is on the rise, which has led to an increase in research interest in recent years. Especially when many small investors can join forces to decisively influence the stock market, particularly in short term, there is a great desire to find explanations for such incidents (Barber, Odean, & Zhu, 2009). Previous research has already focused on the reasons for the occurrence of such phenomena. These theories are of great importance for my study. To analyze the influence of neobrokers on the trading behavior of young investors, I first have to explain the psychological concepts responsible for this. Two of them are particularly important here: Attention-Grabbing and Gamification. In the following two sections, I will discuss these two concepts in more detail to provide a general understanding of these terms.

2.3.1. Attention-Grabbing

Attention is a scarce cognitive resource because each individual's attention is limited (Dukas, 2004). To take advantage of this limited attention, various methods can be used to influence a person's decision in a way that benefits oneself. These kinds of findings are also known from the FinTech scene, as one can benefit from the use of various attention-grabbing methods here as well. For example, Barber and Odean (2008) find that stocks that attract the attention of retail investors, either because they are mentioned in the media or because the stocks exhibit obvious fluctuations in price or trading volume, tend to be purchased preferentially. Here, the literature makes it clear that this primarily affects inexperienced investors. These investors have not yet developed clear criteria by which they base their trading decisions. Thus, they are more influenced by biases (Greenwood & Nagel, 2009) and attention-grabbing (Seasholes & Wu, 2007) that lead them to chase returns. The frequency of Google searches can also be used as an additional indicator of investor attention. On this basis, it can be shown that an increased search volume, also due to attention-grabbing, can predict a short-term increase in stock prices (Da, Engelberg, & Gao, 2011).

This begs the question of how exactly FinTech companies, most notably online brokers, are influencing the investor's attention. On the one hand, brokers such as Robinhood, for example, attempt to target the investor via push notifications in a way that involuntarily diverts attention, regardless of the investor's goals, intentions, or awareness (Theeuwes, 2010). On the other hand, the same broker offers, among other things, a *Top Mover* list, which includes 20 stocks with the highest and lowest daily returns (ten each). These shares have experienced the highest price changes in percentage terms from the previous day compared to all others. With the help of such lists, the broker manages to draw the attention of its investors to the listed companies (Stein, 2020).

2.3.2. Gamification

Gamification is a widely used method to nudge people's perceptions, attitudes, or even behavior in an intentional di-

rection, to enhance their productivity and engagement. *Deterding, Dixon, Khaled, and Nacke (2011)* describe gamification as the integration of video game elements to improve customer experience and engagement in non-game systems. A shorter, general definition describes gamification as “the use of game design elements in non-game contexts” (*Deterding et al., 2011, p. 9*). The goal of gamification is not to give rewards for one-time actions, but to improve the user experience to a point where a proper mix of frustration and pride keeps the customer voluntarily engaged for a long time. A good implementation of gamification requires a deep understanding of proper graphical and emotional representation (*Sironi, 2016*).

Gamification can therefore be an attractive method for FinTech companies to influence individuals and their investment behavior. The use of gamification is no longer a novelty for neobrokers either. Trading apps like Robinhood or Trade Republic pay special attention to the simple and straightforward design of their applications, as well as a slick user interface, to make trading easy and playful. The low to no costs and the nearly immediate opening of an account further strengthen the playful environment. These neobrokers make no secret of this fact, as Trade Republic makes clear in an advertising slogan. Trading is described as so simple that even while commuting on the bus, you can quickly and easily trade complex financial products (*van der Heide & Želinský, 2021*). Another example of gamification in neobroker applications is the use of waitlists. Robinhood offers its users the opportunity to move up these lists by actively using the app or inviting friends to get faster access to new products and is currently promoting its latest feature, crypto wallets, with such a campaign (*Robinhood, 2021b*). Swiping within the neobroker applications to confirm purchases is a further implementation of gamification. This gesture is a ubiquitous movement especially among the younger generation who navigate their mobile life through swipe gestures (*Tan, 2021*). In addition, Robinhood takes advantage of partly visual features as found in mobile games. Once you deposit your first \$10 or refer a friend, you will receive a free share by playing a scratch game. Additionally, a confetti animation appears when you have executed a trade or convinced a friend to use the app as well.

Again, users are rewarded for recommending the application to friends, not with free shares, but with a certain amount of money that both parties receive when the friend makes his first trade (*Trade Republic, 2021*).

However, this playful design of neobrokers, also caused by the GameStop incident, meets with much criticism and draws consequences. The problem lies mainly in the fact that people enjoy playing games and continue to do so despite negative experiences to improve themselves constantly (*Sironi, 2016*). Stubborn failure, though, can have devastating effects when it comes to the real world outside of video games. Free investment apps, which make it easier than ever to invest on the go, are no help in getting away from losses that are not just financial in nature.

2.4. Results of Previous Research and Research Gaps

In the previous sections, I introduced and explained the general theories that are relevant in the context of neobrokers. In the following subchapters, I revisit these concepts and present their implications and influences on the investor based on existing research. From this presentation, research gaps emerge, which I will identify in the final part of the section, highlighting the relevance of my thesis.

2.4.1. Attention-Grabbing

Retail traders do not trade based on statistics or fundamentals and valuations, as shown in several studies (*Barber & Odean, 2008; de Long, Shleifer, Summers, & Waldmann, 1989*), but respond to noises or different signals about financial markets and prices of financial products that catch their attention. Those noise traders engage in trading for non-informative reasons and therefore have no informational advantages (*Foucault, Sraer, & Thesmar, 2011*). It is precisely these investors that neobrokers are targeting with their attention-grabbing strategies. Neobrokers encourage their customers to actively trade financial products through the above-mentioned Top Mover lists, the significantly reduced and simplified design, and thanks to push notifications with great success. It is no surprise that users of Robinhood trade nine times more stocks than users of comparable brokers like E-Trade and even 40 times more than customers of Charles Schwab. However, since it is not just the attention of an individual that is influenced, but the attention of the entire user base, the likelihood of herding events within these neobrokers increases clearly (*Barber et al., 2020*). This raises the question of what exactly motivates this bulk of investors to decide for or against a particular investment.

An explanation for this phenomenon within Robinhood can be provided by the psychological technique known as Fear-of-Missing-Out (FoMO). Almost every investor now uses digital communication channels to make their investment decisions. Being disconnected from the internet can cause investors to fear missing out on important information, so-called I-FoMO (*Shiva, Narula, & Shahi, 2020*). This fear, however, can also lead to overinvestment. Especially when the market changes rapidly and investors are afraid of missing an opportunity, the fear of unrealized gains becomes greater than the fear of losses. I-FoMO is fueled in particular by the presentation of Top Mover lists at neobrokers like Robinhood, which can trigger the constant feeling of missing a special chance for the investor who wants to quickly jump on the departing train before it is too late (*Maciejewski & Lesznik, 2020*).

Another reason for the use of attention-grabbing methods by neobrokers is the concept of myopic loss aversion (MLA). For the individual, MLA implies having to accept a loss is worse than realizing a gain, which in absolute terms is equal to the same amount. This indicates a greater perception of losses by an individual than gains, especially when suffering from a narrow time frame, leading to a negative reaction to information about frequent price changes of an asset since the overall picture is not taken into account

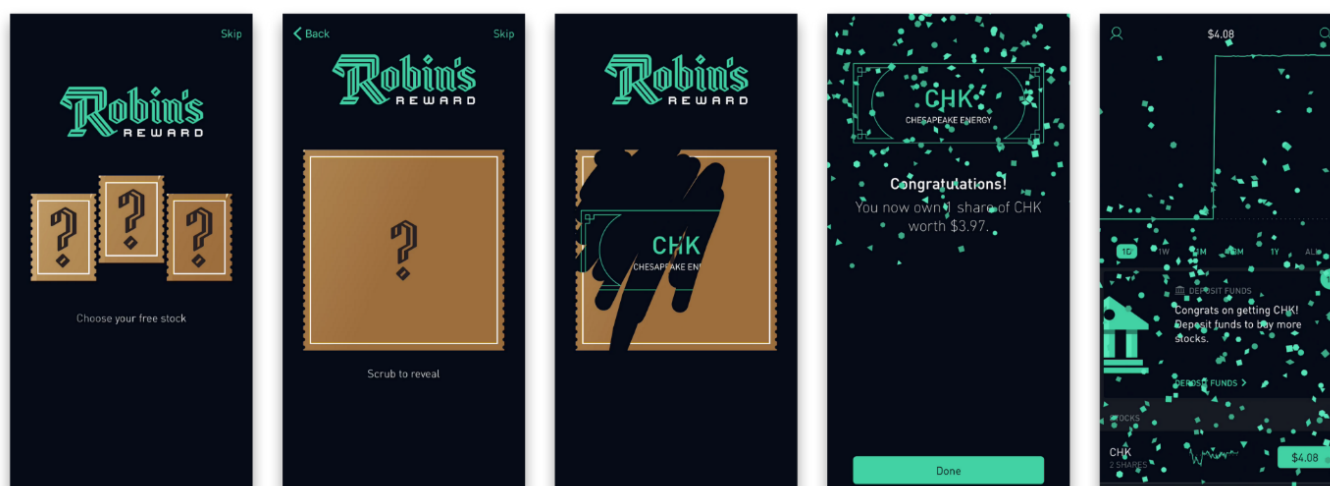


Figure 1: Lottery Scratch Card Interface and Confetti Rain (Hobson, 2018).

This figure presents the scratch card game found in the neobroker Robinhood, in which users are rewarded with a random share in a certain price segment. After receiving the share, the user is also visually rewarded with a shower of confetti.

(Iqbal, Islam, List, & Nguyen, 2021). Investors in this case are too focused on short-term events and lose sight of long-term successes, which can lead to rash selling of their positions if a short-term price drop is imminent (Thaler, Tversky, Kahneman, & Schwartz, 1997). Neobrokers such as Trade Republic are designed to primarily draw the attention of users to the daily price fluctuations of their positions so that they react in case of negative movements in stock prices due to MLA to avoid short-term losses. As a result, the investor interacts more frequently with the application (Barber et al., 2020) from which neobrokers benefit.

2.4.2. Gamification

As described in the previous chapter, online brokers and especially neobrokers use gamification to encourage their users to interact with the application. This gamified experience tempts investors to make rash and impulsive decisions within the neobroker applications. Trading in stocks is more and more perceived as an occupation for spending time by retail investors. Once trading is seen as entertainment and a substitute for boring activities, the number of transactions will steadily increase, as was evident during the Covid-19 crisis (Barber et al., 2020). This is supported by the entire philosophy of neobrokers like Robinhood as well as the increasing individual indebtedness, achieved with easier access to credit (Bernards, 2019), which can also be used for the increasing risky behavior of investors and gambling on the stock market.

The playful nature of investment applications tempts users to make impulsive decisions without concretely informing themselves about their investment choices in advance. However, these decisions do not remain an isolated case and thus the playful and unique affair may turn into a potential addiction (van der Heide & Želinský, 2021) to interact with the broker on an increasingly frequent basis. A reduced and

sleek design, as found in neobroker applications like Robinhood, has a big impact here. Kranz, Teschner, and Weinhardt (2015) show in their studies that such a reduced design not only has a playful influence but also encourages the user to trade. At the same time, they find that increasing the amount of information presented to the user reduces his or her trading behavior (Kranz et al., 2015; Teschner, Kranz, & Weinhardt, 2015). For this reason, the presentation of the application of neobrokers is deliberately chosen to be as minimal and simplified as possible, in order not to overwhelm the investor with a flood of information. In addition, this user interface, including the choice of its eye-catching colors as found in the Robinhood application, offers the possibility to attract especially younger and inexperienced investors, who are more easily influenced by gamification methods.

The swipe gestures already mentioned also encourage users to interact. The familiar and everyday movements of the mobile world greatly reduce the barriers to trading and thus encourage purchases and sales (Tan, 2021). But it is not just the swipe gestures that motivate users to engage with the application, but also the way stock prices are displayed over time in form of price charts. The charts show the share prices at a certain time utilizing a gray line that appears when the user moves his fingers over the display. These small movements are directly associated with stock price fluctuations (Ash, Anderson, Gordon, & Langley, 2018), meaning that active body movements can also trigger I-FoMO. The interactions reduce the inhibition to place a buy order when rising prices are anticipated due to your movements. The same applies to the intention to sell shares when short-term falling prices are indicated (Tan, 2021).

2.4.3. Research Gap

In the following section, I will highlight the gaps in the literature on neobrokers and the topics that have not yet been

sufficiently addressed. Neobrokers in general is still a very under-researched field, resulting in a lack of widely applicable literature on these new types of brokers.

As I indicated in section 2.1 *Development of Neobrokers*, most of the literature on retail investor trading behavior is concerned with Robinhood rather than with the general topic of neobrokers. While Robinhood and its users can be used as a representative example of this new generation of brokers, it constitutes only a small fraction of the overall neobroker environment. Therefore, it is necessary to extend the existing literature on Robinhood and leverage its general applicability to the entire field of neobrokers. I do not focus on a specific neobroker or certain investors in my study but use the general term to get a broader picture. Likewise, as already pointed out in the literature review, I use the two brokers Robinhood and Trade Republic as representatives for neobrokers, in general, to get a broader overview of these providers of trading applications and not to focus too much on one particular broker.

Another gap in the literature arises from focusing purely on the U.S. market. For example, since Robinhood is not available outside of the United States, there is no information on the European neobroker market. While it can be assumed that the impact of this neobroker can be applied to other cultures and countries, no studies are addressing this issue yet. This gap is dealt with in my thesis, as the participants of the study are mainly from German-speaking countries. Hereby, the already researched influence of Robinhood on the American market can be extended by the influence of general neobrokers on additional markets.

Moreover, the existing literature primarily highlights attention-grabbing and game-based methods to explain short-term and impulsive buying and selling decisions in neobroker applications. Young and inexperienced traders, who are easily influenced and make their decisions based on such influencing methods, are always referred to. However, little attention is paid to whether and to what extent these investors also use neobrokers for long-term and future-oriented investments. The result for this can only be surmised, which is why I pursue the question as part of my online questionnaire.

As a final consideration, and as a consequence of the general lack of literature available, the poorly treated field of neobroker application design must be addressed. Although there are a few studies on the effects of attention-grabbing elements, for example, these are only available to a limited extent and refer exclusively to Robinhood and its users. In this case, it is also important to take a closer look at the topic of the user interface and validate the influence of its specific design.

3. Hypothesis Development

In the previous subsections, existing empirical results and theories regarding the influence of neobrokers, in particular Robinhood, on the behavior and decisions of retail investors have been discussed. They form the basis for the hypotheses

of my thesis, which build on the questions already addressed in chapter 1. *Introduction*. In the following subsection, I formulate and explain the various hypotheses in more detail to be able to answer those questions based on my survey.

The hypotheses are divided into three different areas. The first area will deal with the question of which target groups are addressed by neobrokers and what the decisive reasons for this are. The second part will focus on the question for which investment strategies neobrokers are generally used. It is important to clarify what kind of investment horizon the users of these applications are aiming for and how far they pursue their strategies. The last section delves deeper into the neobroker applications and deals with the question of to what extent neobrokers have an influence on the investment behavior of their users. Here, the focus is on the appearance of the applications and their general user interface.

3.1. Target Group

Trading has become extremely easy for customers thanks to neobrokers and their applications. It often takes only a few clicks and swipes to execute a trade. Furthermore, the low to non-existent costs touted by neobroker providers can seem very enticing to most of society. Robinhood says of itself they are “on a mission to democratize finance for all” (Robinhood, 2021a) and the financial system should be structured so that it works for everyone. Neobrokers advertise their intention to provide access to the stock market for the public and allow profiting from it. Nevertheless, as the previous literature shows, not all people feel the same way about the strategies and methods of neobrokers. This raises the question of who exactly the brokers want to address and entice with their approaches.

Neobrokers need to gain the trust of potential customers and thus familiarize them with their applications because both familiarity and trust influence customers' interactions with the provider (Gefen, 2000). In general, trust can affect people's judgments and beliefs, guiding their behavior in a particular direction (Schunk, 2012). Trust is one of the key factors to win customers for the own e-banking website or application (Yousafzai, Pallister, & Foxall, 2003) and has a positive social influence on online transaction intentions (Wu & Chen, 2005).

For this reason, my first hypothesis also relates to the topic of trust. The higher the trust potential customers have in neobroker applications, the better their attitude towards them and the more likely they are to use them. Formally, my first hypothesis is as follows:

H1: Trust positively influences the attitude towards neobrokers.

Since trust plays an important role on the internet and in the financial sector, it is even more important for neobrokers to appear as trustworthy providers of financial services. In doing so, most of the neobrokers take a very similar approach to gain people's trust. The goal of these newly established brokers is to develop an application that is easy to

use, does not confuse, and looks familiar. Most neobrokers offer their trading services in form of a mobile application. This application is usually designed in a simple and sleek way, so it does not contain unnecessary information or distractions. This is particularly appealing to the younger generation. These so-called millennials have grown up in the age of the internet and digital revolutions. They are comfortable in a connected and globalized world and keep up with new technologies, which is why they have also acquired the nickname *digital natives*. However, they are not only familiar with the growing field of technologies but also want to gain more first-hand knowledge about financial management (Thompson & Blomquist, 2017). To this end, neobrokers offer just the right combination of new technology and financing, which may explain the rapidly growing number of especially young members. In addition, young investors no longer have confidence in traditional financial institutions. According to Thompson and Blomquist (2017), more than half of the millennials believe their financial advisor is only interested in their own profit and not the client's.

But it is not only young investors who are targeted by neobrokers. New investors who want to gain their first experience with financial investments are also addressed by them. Neobrokers charge little to no transaction fees and offer a clean and simple interface, leaving newcomers unencumbered by fees or complex features, making it very appealing for them to gain their first experience on the stock market here. This lack of trading barriers is also in line with Robinhood's previously mentioned mission of empowering everyone to participate in the stock market.

Relating these findings in turn to the neobroker landscape as a whole, this means that neobrokers preferentially target young and inexperienced people, or, as it is formally expressed:

H2: Young and/or inexperienced investors are especially addressed by neobrokers.

3.2. Investment Strategy

As highlighted in the previous section, the new generation of investors is focusing on different viewpoints and goals than their predecessors, which is also evident away from the financial markets. Among the most common answers to the question about the life goals of this young and inexperienced generation are things like having a dream job or traveling around the world instead of getting married and starting a family, which were the goals of the previous generation. Thus, it is not surprising that millennials' money is meant to serve short-term goals rather than long-term intentions (Thompson & Blomquist, 2017). This phenomenon can also be found in their investment behavior. As described in section 3.1 *Target Group*, neobrokers are the preferred choice for millennials when it comes to investing money. Here, Robinhood serves as a good point of comparison. Most of its users are referred to as retail investors. These investors hardly act according to a defined strategy but are guided by external influences and their own preferences (Barber & Odean, 2008).

Again, the preferences are short-term targets, which can be identified by the high number of trades within the Neobroker application. Robinhood customers trade unusually often compared to users of traditional online brokers: nine times as much as users of E*Trade and 40 times as much as customers of Charles Schwab (Barber et al., 2020). This very high number of trades indicates that these are speculative investments with a short holding period and no intention for long-term investments. Investing is considered part of the overall entertainment, which it is meant to serve in the near future. In addition, other external influences reinforce this amusing aspect. Retail investors, who make up the majority of neobroker users, follow financial information and instructions provided by social media and other channels, which results in day-trading behavior based on betting on riskier options or flipping stocks. This again is supported by the business model of neobrokers, which favor the multitude of short-term investments by convenience and low trading costs (Tan, 2021).

From the information collected above, it can be concluded that users of neobrokers have deliberately chosen them for short-term investments. The low barriers for trading make quick buying and selling decisions very attractive. Based on these assumptions, the following two hypotheses can be derived for my thesis:

H3: Neobrokers are used for short-term investments.

H4: Neobrokers are not used for one's own retirement planning.

3.3. Influence on Investment Behavior

In the theoretical foundation of my thesis, I have presented two psychological concepts that can have a significant influence on the investor. Both gamification and attention-grabbing can nudge one's decisions in a certain direction. These two concepts can give investors the feeling of making decisions based on sufficient information, which leads to an increased number of trades. However, this overestimation of the quality of information generally leads to a suboptimal investment strategy (Odean, 1998). To convey this image of qualitative information, neobrokers use various methods, as described in 2.4.1 *Attention-Grabbing* and 2.4.2 *Gamification*.

Not only has the reduced and sleek design played an important role here, as it is often quoted in the previous literature, but also the well-thought-out structure and presentation of the individual information that make a significant contribution. When it comes to FinTech companies, it is not just about the lowest fees, but also about a flawless platform infrastructure making it as easy as possible for the user to interact with the application and thereby generate more transactions (Ash et al., 2018). The simplified trading on neobroker applications such as Robinhood encourages investors to increase their number of investments (Barber & Odean, 2008), while the deliberate presentation of various pieces of information can also trigger specific individual interactions.

For example, Trade Republic takes advantage of MLA in its representation of stock prices, as it is not possible for the user to choose an annual stock chart as the default representation instead of the daily chart, which is subject to much greater fluctuations. There is no possibility to set this default setting to a longer period like the yearly development. When opening the neobroker application, the investor first sees the daily price trend and can thus deviate from his long-term target based on this daily presentation. Since there may be major fluctuations during the day, even if the price-performance is stable or positive over the years, the daily chart may suggest to the investor that the investment is likely to have a negative outcome. The possibility of a short-term price drop always creates the risk of selling a long-term position due to loss aversion. Part of the reason for this is the general tendency for people to give more weight to negative events than to events with a positive impact. For decision-making, potential costs, especially if they are coupled with losses, have a much greater influence than the possibility of realizing profits (Kahneman & Tversky, 1979). In addition, there are game-based elements that are frequently used in neobroker applications. Whether it is scratching cards to get a free share, interacting with stock charts, or even refer-a-friend campaigns to get additional rewards.

In summary, neobrokers can determine which actions are simplified and promoted for their users and which are made significantly more difficult due to their deliberately reduced design (Chaudhry & Kulkarni, 2021). Based on this theoretical foundation, the following hypothesis can be derived for my thesis:

H5: The design of neobrokers has an impact on investors' investment behavior.

The retail investors' behavior is altered in several ways. On the one hand, the low barriers, as well as the playful and simple design, entice users of neobroker applications to make riskier investments without having to think too much about it. This allows young and inexperienced investors to consciously apply risky strategies, even if they are rarely successful (Chaudhry & Kulkarni, 2021). At the same time, due to the very low or non-existent costs, this democratization of stock trading leads to significantly more trades being executed on those platforms than on comparable online brokers (Barber et al., 2020). These two phenomena lead to the following hypotheses:

H6: Neobroker customers take greater risks than customers of traditional banks.

H7: Neobroker customers trade financial products more frequently than customers of traditional banks.

Investors themselves consciously decide to become customers of neobroker applications. While for many users it is the only way to participate in the stock market without incurring additional costs, traditional online brokers have already followed suit and offer low-cost trading. Thus, the

look and layout of the applications appears to be one of the most important factors for using these new brokers. Above all, the sleek design and the significantly reduced presentation of information is one of the main selling points of neobrokers. This chosen interface is in strong contrast to traditional brokers. Robinhood, for example, provides its clients with only five charting indicators, while TD Ameritrade users have access to 489 (Barber et al., 2020). Customers of Neobroker applications do not want to be overwhelmed with a flood of data and deliberately opt for the reduced presentation of information. It can be concluded that users of neobrokers appreciate not only the appealing design but also the reduced information presentation and do not want to gain more knowledge about their investments within the application. Formally speaking, this means:

H8: The reduced and simple design of the application is more important for neobroker customers than for customers of traditional banks.

H9: Neobroker customers do not want more information within the application compared to customers of traditional banks.

4. Methodology

A methodological approach is required to answer the fundamental questions of my thesis and test the hypotheses derived from the previously mentioned literature. The main objective is to reach a large, diverse number of respondents in a pre-defined time frame to be able to derive generally valid conclusions on the subject of neobrokers. For this purpose, a quantitative approach in the form of an online-based questionnaire is the most effective, as it allows me to quickly and inexpensively acquire a variety of participants for my study, whose responses were immediately digitally saved (Diekmann, 2020). By using this approach and employing statistical analysis, it is possible to quantify the data and obtain the general picture (MacDonald & Headlam, 2008) I am aiming for. This allows me to deductively test my already derived hypotheses.

In the following sections, I describe the individual steps of the methodology and explain how the data was obtained. Subsequently, the results relevant for the verification of my hypotheses can be presented based on this data.

4.1. Questionnaire Structure

As previously stated, I utilize a self-generated online questionnaire as part of my thesis to obtain the most diverse and generic data collection possible. This questionnaire is created by using Google Forms and distributed to the participants via an online link. Employing a sequential, comparative literature analysis, the instrumentalization of the survey items and response categories is developed, repeatedly modified, and adapted. My questionnaire is divided into three different thematic blocks. First, eight general demographic questions are asked about the participants, such as their age,

gender, or even their financial knowledge, which is tested by using three questions specifically developed by Lusardi and Mitchell (2011) to measure the financial literacy score. The second part of the survey then focuses on the participants' general interactions with financial institutions. Here, questions are posed on existing experience in trading with financial products, as well as risk tolerance and preferences about the use of online offers from financial service providers. The last part of my questionnaire is related to the main topic of my thesis. In this section, I ask questions about the perception of neobrokers and what influences certain design elements within these applications have on the participants. It is important to mention here that the online questionnaire is published in two different versions, which differ from each other in this section due to a single figure. The first version of the questionnaire displays the daily development of a share price of a given company on a certain day, whereas the second version reflects the annual development of this price. The daily chart shows a declining share price, while the annual one reveals a significant increase in the share performance at the same point in time. Both versions of the online questionnaire are randomly distributed to the respondents to ensure that a representative analysis is still possible. The surveys are additionally written in both English and German to overcome possible language barriers. In total, the two questionnaire versions consist of 37 tick-box questions, a mix of single-choice, multiple-choice, and scaled questions, which can be answered in about ten minutes. The check-all-that-apply (CATA) questions are particularly suitable for a complete description of the most important features of a sample to establish comparability (Jaeger et al., 2015), which is why they are used primarily in the third section of the surveys to contrast the respondents' perceptions of and desires for neobrokers with their actual characteristics. For most items, it is also possible to check a box labeled *Prefer not to say*, if the question cannot be answered, as well as a field titled *Other*, if the respondent wishes to provide additional information.

The following table provides an overview of the questions from my survey, which can be used for verifying each hypothesis. However, not all questions are used for testing, but a selection of the most appropriate for the respective hypothesis is made in order not to go beyond the scope of my thesis.

4.2. Sample Used

To fill one of the research gaps already mentioned, my study needs to obtain participants outside of America. In addition, these respondents should not all belong to a specific target group, but rather represent a field of participants that is as heterogeneous as possible. It is therefore very important to distribute the online questionnaire to the greatest extent feasible. I share the survey with acquaintances and peers, as well as in various forums and online groups which are not directly related to financial subjects to accomplish my goal. In this way, I can collect a total of 251 responses for my questionnaire within two months, starting at the end of July 2021. Among these responses, only two participants complete the

English-language questionnaire, while the remaining participants use the German version. The link through which the respondents fill out my online survey happens to lead to either the daily or the annual chart version of the questionnaire. As a result, 119 responses to the daily and 132 responses to the annual version are obtained. However, not all of these 251 responses can be utilized due to some exclusion criteria. Firstly, all surveys that are not filled out completely are removed. In addition, responses that state the neutral category *Prefer not to say* exclusively or almost always are eliminated as well. The deliberate selection of the same answer over and over, also known as *straightlining*, is considered an indicator of poor response quality (Schonlau & Toepoel, 2015). Here it becomes clear that the survey is not answered conscientiously and carefully, but only clicked through quickly by the participant. Finally, a consistency check is performed to delete any answers that are intentionally given incorrectly or without reference to the study. Thus, after all, adjustment steps have been performed, 224 responses remain. Due to the small number of responses that had to be eliminated, the questionnaire is not adapted during the study. In the following figure, all steps are shown again, including the number of adjusted responses for each step.

Of the remaining 224 responses, 107 participants replied to the daily chart version, and the remaining 117 to the annual version. As a result, 12 questionnaires of the daily version and 15 surveys of the annual version had to be removed from the data set.

4.3. Data Preparation

In the following section, I will go into more detail about the preparation of the data, which is the basis for my qualitative analysis in the first place. To analyze the results of the online questionnaire, it is necessary to properly sort and format the responses received from Google Forms. After completing the survey editing period, I download the bundled raw data in an .xlsx format for subsequent post-processing in Microsoft Excel. For the evaluation of this amount of data, it is essential to use a suitable computer program as a working aid. Here, I decide on the widely used program system IBM SPSS Statistics, or SPSS for short, because of its ability to cover all the necessary functions for my analyses, its user-friendly and graphical interface as well as its particularly wide dissemination in both scientific and practical settings.

The processing of the raw data is done in several steps, which I perform with the help of the software application Microsoft Excel. First, the CATA questions have to be restructured in a way that they can be evaluated for the analysis. Thus, all CATA questions are reformulated as multiple binary variables, also called dummy variables. For example, *Where have you already purchased financial products?* becomes the three binary questions of whether the respondents have already purchased financial products from a local branch bank, a direct bank, or a neobroker. This results in a variable count of 92 at the beginning, which all are imported into SPSS and used for the analysis. In the next step, the binary questions are recoded such that *yes* becomes 1 and *no* becomes 0. The

Table 1: Testing Hypotheses by using Questionnaire.

This table presents all possible questions of my online survey that can be used for the verification of the respective hypotheses. From these questions, all those that are most suitable for testing these hypotheses are selected.

Hypothesis	Questions that can be used to answer the hypothesis
H1	Questions 17-19 & Question 29
H2	Question 3 & Questions 7-14 & Questions 17-19
H3	Question 16 & Questions 17-19 & Question 24 & Questions 26-27
H4	Question 16 & Questions 17-19 & Questions 26-27
H5	Questions 30-36
H6	Questions 17-19 & Questions 20-21 & Question 25
H7	Questions 15-16 & Questions 17-19 & Question 24
H8	Questions 17-19 & Question 22 & Question 28
H9	Questions 17-19 & Questions 37-38

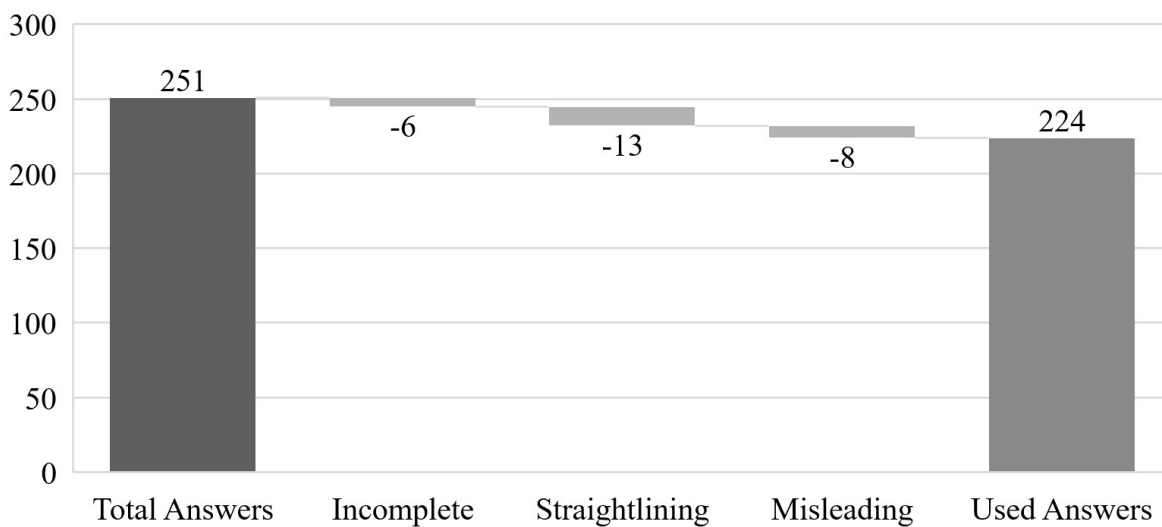


Figure 2: Presentation of Answers used from Online Survey.

This figure presents the number of respondents who participated in my survey. After the three revision steps (removing the incomplete, straightlining, and misleading responses), the remaining number of responses used for the evaluation of my thesis is also shown at the end.

same conversion from string variables to numerical variables is also performed for the remaining questions. With the interval scales used in the online questionnaire, recoding of the data obtained is not required because they already reflect scales with sections of the same size. The nominal scales used for my survey, on the other hand, also require a recording of the responses, with the statement *Prefer not to say* being coded as -99 to subsequently exclude it from the analysis. The free text fields would have also been coded in a meaningful way during the preparation, but after eliminating all questions that were not to be used, no answers to the free text fields remained. In a final step, all derived binary questions of a CATA question are combined into a variable set to evaluate some of the hypotheses.

4.4. Evaluation Methods

The evaluation begins with a descriptive presentation of the sociographic characteristics, which are illustrated using frequency distributions. The most important factors here are gender, age, education, employment status, income, and financial literacy.

The remaining questions are employed to test the hypotheses formulated in my thesis, using a combination of univariate and multivariate analyses (Everitt, 2010). Univariate analyses are performed to test the hypotheses three and four as they are accurately captured from the questionnaire. In this way, it is possible to create frequency distribution tables representing the breakdown of the responses. To show the relationship between two variables, multivariate analyses are performed. With this analytical method, it is possible to create cross-tabulations and perform regression analyses, thus mapping the correlations between the variables of interest.

Two variants of regression analyses are particularly suitable for testing my hypotheses. Binary logistic regression is used in all cases where the dependent variable has a binary nature. The groups are usually indexed with 0 and 1 in these scenarios. The following applies to the probabilities of these binary cases: $P(Y = 0) = 1 - P(Y = 1)$. Compared to the linear regression, the logistic regression function has an S-shaped course and can be interpreted as a distribution function similar to the normal distribution. For all other cases, where the dependent variable does not correspond to a binary variable, regression is performed using the Ordinary Least Squares (OLS) method. This method searches for those values of the parameters for which the sum of squared residuals becomes minimal. This gives the regression line an optimal fit to the observed values. (Backhaus, Erichson, Plinke, & Weiber, 2016)

It should be noted once again that the two versions of the online questionnaire are evaluated collectively. Only when testing the fifth hypothesis both versions are considered separately to highlight any differences in responses to questions 30 and 31 between the two versions.

5. Results

In the following sections, I present the results obtained from the analysis of my online questionnaire. The chapter is divided into four parts. First, the descriptive statistics are evaluated and presented. Subsequently, my established hypotheses are tested based on univariate and multivariate analyses. Building on these findings, the final section of this chapter contains a discussion of the results.

5.1. Descriptive Statistics

At the beginning of the descriptive statistics, I first highlight the sociological factors. As already described in section 4.2 *Sample Used*, the total data set for my analysis consists of 224 responses after adjustments. Out of these evaluated participants, 55.8 percent are male, and 44.2 percent are female. The majority of the respondents are between 25 and 34 years old (51.3 percent), closely followed by 18- to 24-year-olds, who account for 38.4 percent. The remaining participants are divided between under 18 years old (0.4 percent), 35 to 44 years old, 45 to 54 years old (2.7 percent each), and over 55 years old (4.5 percent). In terms of educational attainment, the majority of the respondents have a bachelor's degree (52.7 percent), followed by high school diplomas and master's degrees. Only one respondent did not want to comment on this question (0.4 Percent). 57.1 percent of the participants are still studying, while 35.7 percent are already employed full-time. Part-time employment (4.0 percent), self-employment (2.2 percent), and unemployment (0.9 percent) make up the minority. On average, the household income of the participants is between € 10,000 and € 50,000 (33.0 percent), closely followed by below € 10,000 (28.6 percent) and € 50,000 to € 100,000 (22.8 percent). Out of the 224 participants, 18 (8.0 percent) did not want to

comment on this question. Regarding the financial literacy of the survey participants, the absolute majority (77.2 percent) is educated, as they answered all 3 questions about their financial literacy correctly. Only 15.2 percent of the respondents had less than 3 questions correct, whereas 7.6 percent did not even try to answer the questions in the first place.

Looking at the two survey versions separately, no major differences are observed concerning the sociological factors. In the daily chart version, the percentage of male respondents is slightly lower compared to the second version (52.3 percent vs. 59.0 percent). This difference between the two versions increases slightly when the age of the respondents is considered. In each case, roughly 45 percent of participants in the first version are either between 18 and 24 years old or between 25 and 34 years old, while 57.3 percent of those in the second version are in the 25 and 34 age group, followed by 18 to 24 years with 31.6 percent. As far as the education factor is concerned, hardly any difference can be detected between the two versions. Both reflect the overall result of the entire data set. In the daily chart version, almost two out of three participants are still students, whereas, in the annual chart version, only one out of two is. The household income of the respondents of the first version is evenly distributed as well. 31.8 percent of the respondents report having an estimated annual household income of less than € 10,000, 30.8 percent choose the answer between € 10,000 and € 50,000, succeeded by between € 50,000 and € 100,000 with 21.5 percent. The data set of the second version provides similar results. Here, 35.0 percent of the respondents report having an annual household income between € 10,000 and € 50,000, followed by below € 10,000 (25.6 percent) and between € 50,000 and € 100,000 (23.9 percent). The two groups also perform comparably in terms of financial education. 76.6 percent and 77.8 percent of respondents in the first and second versions can correctly answer all three questions related to the financial literacy score.

As shown above, no serious differences can be found between the data set of the first and the second version. Due to the quite similar field of participants of both versions, the data sets can on the one hand be considered and put together as a whole, and on the other hand also be separated and compared with each other, as it is necessary for testing the fifth hypothesis. In the following sections, the underlying hypotheses of my thesis will be examined and tested based on the data set.

5.2. Univariate Analysis

Univariate analysis is suitable for testing the third and fourth hypotheses. This allows the generation of frequency distribution tables for verification of the two hypotheses after the responses to all CATA questions have been defined into sets of variables. To validate these two assumptions, the participants of my questionnaire are asked for which scenarios and investment strategies they would consider a branch bank, a direct bank, or a neobroker. A total of 204 responses (91.1 percent) can be collected to the question of whether the

Table 2: Separate Descriptive Statistics for both Versions.

The following table presents the descriptive representation of the respondents divided by the questionnaire version that was answered. It shows separately the number and percentage distribution of respondents according to their gender, age, education, employment status, income, and financial literacy score. Both versions combined result in the total descriptive evaluation of the online questionnaire. All 224 responses are shown below.

		Daily chart version		Annual chart version	
		Total	Percent	Total	Percent
Gender	Female	51	47.7	48	41.0
	Male	56	52.3	69	59.0
Age	Under 18 years old	1	0.9	-	-
	18-24 years old	49	45.8	37	31.6
	25-34 years old	48	44.9	67	57.3
	35-44 years old	2	1.9	4	3.4
	45-54 years old	2	1.9	4	3.4
	over 55 years old	5	4.7	5	4.3
Education	Secondary School Diploma	2	1.9	3	2.6
	High School Diploma	21	19.6	28	23.9
	Bachelor's Degree	59	55.1	59	50.4
	Master's Degree	22	20.6	21	17.9
	Trade School Diploma	2	1.9	6	5.1
	Prefer not to say	1	0.9	-	-
Employment	Student	70	65.4	58	49.6
	Employed full-time	34	31.8	46	39.3
	Employed part-time	1	0.9	8	6.8
	Self-employed	2	1.9	3	2.6
	Unemployed	-	-	2	1.7
	Income	Below € 10,000	34	31.8	30
€ 10,000 - € 50,000		33	30.8	41	35.0
€ 50,000 - € 100,000		23	21.5	28	23.9
€ 100,000 - € 150,000		7	6.5	6	5.1
Over € 150,000		2	1.9	2	1.7
Prefer not to say		8	7.5	10	8.5
Score	0	9	8.4	8	6.8
	1	4	3.7	7	6.0
	2	12	11.2	11	9.4
	3	82	76.6	91	77.8

respondent would prefer a branch or direct bank over neobrokers. A clear trend can be identified here: compared to neobrokers, branch and direct banks are favored especially for long-term investments. 168 participants vote for long-term investments for their own wealth accumulation (82.4 percent of respondents), 157 participants for long-term investments for their own retirement provision (77.0 percent), and 117 participants for setting up savings plans (57.4 percent). Only a small percentage of respondents prefer branch

and direct banks over neobrokers for short-term or speculative investments (9.3 percent and 5.9 percent, respectively). Looking at the answers to the question in which scenarios the respondents would prefer neobrokers, very similar results are obtained. Among the total 202 responses (90.2 percent) to this question, the selection options are dominated by short-term (87.6 percent of responses) and speculative investments (78.2 percent). Only 17.8 percent and 12.4 percent of respondents, respectively, opt for long-term invest-

ments for asset accumulation or for their own retirement provision, which represents the lowest proportion of participants. Unfortunately, the two hypotheses cannot be tested for statistical significance due to lack of information, which is why only the descriptive analysis is available for the evaluation. However, the descriptive results indicate that both hypotheses can be confirmed. On the one hand, neobrokers are preferred for short-term investments and, on the other hand, they are not used for retirement planning, not even for long-term asset accumulation, by the participants.

5.3. Multivariate Analysis

Regression analysis is chosen as a suitable method for testing the remaining hypotheses to show dependencies between several variables. Ordinary Least Squares regression cannot be applied to examine the first and second hypothesis since the dependent variable under investigation, in this case, the possible intention to use a neobroker for purchasing financial products, has only two manifestations: *yes* or *no*.

To further investigate the impact of trust in neobrokers on this particular variable (see H1), I perform a binary logistic regression using SPSS. For this analysis, 183 responses can be utilized because 41 respondents do not want to provide any information for either of the two related questions. Using the *Omnibus Test of Model Coefficient*, which compares the current model with the baseline model, it can be shown that the current model with the inclusion of the independent variable *trust in neobrokers* is a better fit than the baseline model without any independent variables, as the *p-value* of 0.000 is below the typical rejection threshold of 0.05 (O'Keefe, 2007). The new model explains 48.3 percent (*Nagelkerke R²*) of the variance in the variable *possible intention to use a neobroker* and correctly classifies 83.6 percent of the cases. If the respondent indicates trusting a neobroker, it is 23.342 (*odds ratio*) times more likely that the participant can imagine using a neobroker compared to those who do not trust a neobroker at all. Applying binary logistic regression, the first hypothesis, which states that trust positively influences the attitude towards neobrokers, can thus be confirmed.

Using the second binary logistic regression, I test the next hypothesis, which deals with the target groups especially addressed by neobrokers (see H2). To evaluate whether inexperienced investors are approached by neobrokers apart from younger ones, the independent variables *financial literacy*, as well as *investment experience*, are evaluated in addition to *age*. For this purpose, I can draw on 223 responses for my analysis. Including the independent variables, the new model is found to have a better fit than the initial one, as the *p-value* of 0.000 is once again below the typical rejection threshold of 0.05. The new model can explain 21.5 percent (*Nagelkerke R²*) of the variance of the dependent variable. Since this time, I include more than one categorical predictor in the new model, I can additionally output the *Hosmer-Lemeshow-Test*. This test indicates how much the observed and predicted cases differ from each other. It is important to note that the significance should not be less than 0.05, as

this would imply a poor fit (Hosmer, Lemeshow, & Sturdivant, 2013). The *p-value* here is 0.704, indicating a good fit of the model. Overall, 68.6 percent of the cases can be classified. As the respondents' age increases, the likelihood that they can imagine using a neobroker changes by 0.580 (*odds ratio*). In other words, the probability of not using a neobroker is 1.724 times, or 72.4 percent, higher with increasing age, which confirms the first part of my second hypothesis. However, this cannot be determined for both the *financial literacy score* and the *investment experience*. For example, a respondent who had prior investment experience is 3.738 (*odds ratio*) times more likely to imagine using a neobroker than an inexperienced participant of my study. In addition, the higher the score of those respondents, the more likely they are to use a neobroker (*odds ratio* = 1.419). This last result, in turn, is not statistically significant (*p-value* = 0.054). The second hypothesis can therefore only be partially confirmed: younger investors are more likely to be addressed by neobrokers, which is not the case for respondents with little financial experience.

For testing the fifth hypothesis, the entire data set is first split into its two different versions and considered separately. In doing so, I want to find out whether the design of neobrokers influences the investment behavior by using two different illustrations within the questionnaire. With the help of these presentations of the same stock, once as a daily chart version and once as an annual chart version, the perceived risk of an investment for the subject is queried. The average associated risk for the first version is 3.58 (1 corresponds to *low risk*, 5 to *very risky*), with 4 being the most selected risk level with 41.1 percent of responses. The same stock is rated as less risky in the second version with a mean risk score of 2.94. This time, risk level 2 is the most frequently selected with 35.0 percent. Also, when asked to what extent the respondents would consider trading this stock, 44.9 percent of participants in the first version indicate, that the stock is too risky and only 30.8 percent show interest in trading the stock. In contrast, 51.3 percent of respondents from the second version are interested in trading the stock and only 8.5 percent consider it too risky. For testing the hypothesis, all participants are additionally asked how they would react to an advertisement of popular stocks, as found in many neobrokers. For this evaluation, the data set is once again considered as a whole, with 5 participants not wanting to give an answer. Based on the presentation alone, 35.7 percent would decide to take a closer look at the listed companies, 22.8 percent would follow the price performance of the respective stock to find a good entry position, and just under 30 percent of the respondents would completely ignore the presentation. Conversely, it means that more than two-thirds of the respondents would look more deeply into the listed stocks and 46 participants would even consider trading them. When asked how the participants would react to an Invite-your-Friends campaign, 38.0 percent of the 204 respondents would at least show it to their friends, if not try to convince them to make a trade. However, it is worth mentioning that 34.4 percent would completely ignore the campaign.

Table 3: Frequency Distribution Tables & Bar Charts for Testing H3 & H4.

This table presents the descriptive distribution of the given answers according to the questions: *In which of the following scenarios would you prefer a branch or direct bank over a neobroker?* and *Which of these scenarios would you consider a neobroker for?*. In total, 204 responses can be used for the CATIA question regarding the preferences for branch and direct banks and 202 responses for the preferences for neobrokers.

	Branch or Direct Bank		Neobroker	
	Total	Percent of Cases	Total	Percent of Cases
Short-term Investment	19	9.3	177	87.6
Speculative Investment	12	5.9	158	78.2
Long-term Investment for Asset Accumulation	168	82.4	36	17.8
Stock Portfolio without Diversification	63	30.9	67	33.2
Long-term Investment for Retirement	157	77.0	25	12.4
Monitoring of Share Prices	27	13.2	101	50.0
Savings Plans	117	57.4	41	20.3
ETFs	71	34.8	86	42.6

Table 4: Binary Logistic Regression for Testing H1.

This table shows the results of the binary logistic regression used to test the first hypothesis. Here, I examine the influence of trust in neobrokers (independent variable) on the possible intention to use a neobroker to purchase financial products (dependent variable). 183 responses are available for this analysis. *, **, and *** represent significance below the 10%, 5%, and 1% level, respectively.

		Results
P-Value	Omnibus Tests	0.000
R ²	Nagelkerke	0.483
Overall	Classification Outcome	0.836
Odds Ratio	Trustworthy	23.342***

Dependent Variable: Imagine Neobroker

Independent Variable: Trustworthy

To perform a statistically significant evaluation, I run an OLS regression in addition to the descriptive presentation. The regression is based on the *risk score* of the stock as the dependent variable and the *survey version* as the independent variable achieving an *adjusted R²* value of 8.7 percent and a *p-value* of 0.000. The estimated average increase in risk score

when looking at the daily chart version of the stock price is 0.605 points (*unstandardized beta*), or 12.1 percent. Based on the linear regression, a statistically relevant influence of the design of and representations provided by neobrokers on the investment behavior can be identified, which confirms the fifth hypothesis of my thesis.

Table 5: Binary Logistic Regression for Testing H2.

This table shows the results of the binary logistic regression used to test the second hypothesis. Here, I examine the influence of financial literacy, investment experience, and age (independent variables) on the possible intention to use a neobroker to purchase financial products (dependent variable). 223 responses are available for this analysis. *, **, and *** represent significance below the 10%, 5%, and 1% level, respectively.

		Results
P-Value	Omnibus Tests	0.000
R ²	Nagelkerke	0.215
P-Value	Hosmer-Lemeshow-Test	0.704
Overall	Classification Outcome	0.686
Odds Ratio	Age	0.580***
	Financial Literacy Score	1.419*
	Investment Experience	3.738***

Dependent Variable: Imagine Neobroker

Independent Variables: Age, Financial Literacy Score, Investment Experience

Table 6: Comparison of two Versions of Questionnaire for Testing H5.

This table shows the descriptive results of the risk assessment on a scale of 1 to 5, with 1 representing *low risk* and 5 representing *very risky*, and the influence on the respondents' decision, depending on which version of the questionnaire they answered. In particular, the second question asks the respondents to what extent they would consider trading the above-mentioned stock in the questionnaire.

		Daily Version		Yearly Version	
		Total	Percent of Cases	Total	Percent of Cases
Risk Score	1	1	0.9	4	3.4
	2	14	13.1	41	35.0
	3	31	29.0	29	24.8
	4	44	41.1	40	34.2
	5	17	15.9	3	2.6
Influence Decision	Thinking about buying	6	5.6	15	12.8
	Thinking about selling	8	7.5	17	14.5
	Interested in stock	33	30.8	60	51.3
	Too risky	48	44.9	10	8.5
	Ignoring	12	11.2	15	12.8

The set of variables created for the CATA question regarding the current use of financial service providers is utilized for the first time to test the sixth and seventh hypotheses. Using this set of variables, it is possible to create cross-tabulations, with which a correlation between the CATA question and the respective variables under consideration can be examined.

164 responses are available to me for the analysis of the

sixth hypothesis. Looking at the risk that the respondent is willing to take for the chance of higher profits, it is clear that neobroker customers would, on average, take a significantly higher risk than customers of traditional banks. While respondents who are at least a customer of a branch bank give an average risk score of 2.8 out of 5 (2.7 if they are solely customers of branch banks), customers of neobrokers give an

Table 7: Responses to *Popular Stocks* and *Invite your Friends* Representations.

This table shows the descriptive results to the questions on how people would react to the presentation of *Popular Stocks* on the one hand and to the *Invite your Friends* campaign on the other hand. In total, all 224 responses can be used for the breakdown.

		Total	Percent of Cases
Popular Stocks	Investigating in Stock	80	35.7
	Quick Investment	2	0.9
	Happy because of Presentation	22	9.8
	Investigating Chart	51	22.8
	Ignoring	64	28.6
	Prefer not to say	5	2.2
Friends Invite	Showing Friends	60	26.8
	Convince Friends	25	11.2
	Interesting	62	27.7
	Ignoring	77	34.4

Table 8: OLS Regression for Testing H5.

This table shows the results of the OLS regression used to test the fifth hypothesis. Here, I examine the influence of the survey version (independent variable) on the respondents' risk assessment for the same stock (dependent variable) presented differently in both versions. 224 responses are available for this analysis. *, **, and *** represent significance below the 10%, 5%, and 1% level, respectively.

	Results
Adjusted R ²	0.087
P-Value	0.000
Unstandardized Beta	0.605***

Dependent Variable: Risk Score

Independent Variable: Survey Version

average score of 3.4. By comparison, the average risk score for direct bank customers is 3.1, or 3.0 if the respondents have an account exclusively with that provider. In addition, 47 percent of the respondents, who are at least customers of a neobroker, report a score of 4 or higher, compared to only 30 percent of branch bank customers and 32.7 percent of direct bank customers.

Following the cross-tabulation, I run an OLS regression to test the sixth hypothesis. Only those participants who selected at least one response option on the CATA question will be considered to obtain a meaningful result (164 respondents). For the OLS regression, the dummy variable *UNeobroker*, representing *current user of a neobroker*, is chosen as the reference category to illustrate the relation with the other dummy variables. The *adjusted R²* value of 8.7 percent, which can be extracted from the model summary, is considered respectable, as humans are much more difficult to predict than physical processes (Roslan & Shafri, 2018). Furthermore, based on the *p-value* of 0.001, which again is

below the typical rejection threshold of 0.05, it can be concluded a significant impact of the choice of a financial service provider on the risk tolerance of the respondents. Compared with the reference category *UNeobroker*, the subjects' willingness to take risk decreases by -0.748 (*unstandardized beta*) if they use a branch bank, corresponding to 14.96 percent, or by 9.7 percent (*unstandardized beta* = -0.485) if they use a direct bank exclusively as their financial service provider. If the respondent is a customer at multiple financial service providers but not at a neobroker, risk tolerance decreases by 14.96 percent (*unstandardized beta* = -0.748), as well. In addition, the tendency to take risks decreases by 0.045 (*unstandardized beta*), representing 0.9 percent, if the participant is a user of several financial service providers, including a neobroker. However, this result is not significant (*p-value* = 0.844). Conversely, it can be said that risk-taking is highest among participants who are exclusively users of neobrokers. Based on these results, my sixth hypothesis, stating that neobroker customers are willing to take more risk compared to

users of traditional banks, can be confirmed.

The number of responses for testing the seventh hypothesis is additionally reduced by four participants who, compared to the previous ones, did not want to answer the question about how often they trade in financial products. The remaining responses indicate that on average customers of branch banks buy or sell financial products once in six months, customers of direct banks once in three months, and users of neobrokers even once a month. Looking again at only those participants who are exclusively customers of one type of broker, the results are as follows: on average, branch bank customers trade less than once in six months, direct bank customers range between once in three and once in six months but tend towards the former, and neobroker users trade once in three months.

Running an OLS regression with the same selected observation group and dummy variables as in the OLS regression before, a correlation of trading frequency with using a neobroker is also observed. An *adjusted R²* value of 27.1 percent and a *p-value* of 0.000 form the basis for the following analysis. Both when using a branch bank (*unstandardized beta* = 1.691) or a direct bank (*unstandardized beta* = 0.352), the period for trading frequency increases compared to users of neobrokers, although the result related to direct banks is not statistically significant (*p-value* = 0.354). The time interval between trades also increases if the respondent is a customer of both a branch bank and a direct bank, but not a user of a neobroker (*unstandardized beta* = 0.920). However, this result is not statistically significant as well due to the *p-value* of 0.077. If the respondent is not exclusively a customer of a branch or direct bank, but also a user of a neobroker, the trading frequency decreases (*unstandardized beta* = -0.964). Based on the previous results, I can only speculate that the frequent trading and interaction is carried out with neobrokers and the long-term investing with few transactions is done using the traditional brokers. Nevertheless, it can be concluded that customers of neobrokers have a shorter investment horizon compared to customers of traditional banks, thus confirming the seventh hypothesis of my thesis.

The eighth hypothesis indicates that neobroker customers want the reduced and simple design compared to customers of traditional banks. To verify this assumption, I first look at the evaluation of the 22nd and 28th CATA questions of my survey. I consider two groups here: first, all respondents who report being a customer of neobrokers (68 respondents), and second, all who are customers of other banks but not of neobrokers (96 respondents). *Fast buying and selling options* (53 percent of responses from all neobroker customers), *intuitive handling* (51 percent), as well as a *user-friendly application environment*, and *low costs* (38 percent each) are particularly important to neobroker customers when using financial institutions' online services. However, the *appealing design* of an application only ranks in a divided fifth place with 29 percent of the mentions. Looking at respondents who are not customers of neobrokers but of other broker providers, similar results can be obtained. *Intuitive handling* (56 per-

cent), *data security* (49 percent), and a *user-friendly application environment* (46 percent) are the most important aspects for non-neobroker customers. *Appealing design*, on the other hand, ranks seventh at 20 percent, one position behind the responses of neobroker customers. When asked what aspects participants associate with neobrokers, *appealing design* again finishes in a split fifth (neobroker customers) and seventh place (non-neobroker customers).

The evaluation of the descriptive analysis does not enable me to already draw a statistically relevant conclusion about my previously stated hypothesis. Therefore, I conduct a binary logistic regression using *user neobroker* as the dependent variable to test the influence of whether the appealing design of a financial service provider's application is one of the most important features for a neobroker customer. Consequently, I consider all responses for the analysis. Based on the *p-value* of 0.077, it can be concluded that the new model with the inclusion of the independent variable is not an improvement over the baseline model. The new model has a poor fit between model and data (*Nagelkerke R²* = 0.020), indicating low explanatory power, and can correctly classify 69.6 percent of the cases. If the design of a financial service provider's application is important to the respondent, the probability that the participant is a neobroker user increases by a factor of 1.825 (*odds ratio*), or 82.5 percent. However, this result is not statistically significant (*p-value* = 0.074). As a consequence, based on the obtained results, I cannot confirm the eighth hypothesis in a statistically significant way.

For the ninth hypothesis to be tested, it is important to consider only those participants of my study who are active customers of at least one type of financial service provider. Therefore, the 164 responses already mentioned remain for consideration again. Since the ninth hypothesis is about the assumption that neobroker customers do not want to be provided with further information within the application compared to customers of traditional brokers, I evaluate the last two questions of my survey at this point. In response to the first question about how helpful the respondents find a learning section based on a representation in my survey on a scale from 1 *not helpful* to 5 *very helpful*, the mean scores of 4.26 (customers of branch banks only), 3.98 (customers of direct banks only), and 4.24 (customers of neobrokers only) are obtained. If the respondent is a customer of both a branch bank and a direct bank, but not of a neobroker, the mean score for the helpfulness of a learning section is exactly 4. The average score of 3.98 is achieved if the respondent is not only a customer of a neobroker but also of another provider of financial services. The following mean values result from the question of whether it would be useful to test the previously acquired knowledge in the form of a quiz: 3.72 (customers of branch banks only), 3.66 (customers of direct banks only), 4.08 (customers of neobrokers only), 3.46 (customers of branch and direct banks, but not of neobrokers) and 3.86 (customers of neobrokers and other providers of financial products). Based on the descriptive analysis, the hypothesis presented above cannot be confirmed. Additional information and knowledge checks seem to be just as desirable for neobroker customers

Table 9: Willingness to take Risk.

This table shows the descriptive results to the question of how much risk the respective respondent is willing to take if there is a chance of higher profits. The results are first divided into respondents who are at least customers of a financial service provider and then those who are exclusively customers of a financial service provider. The risk is rated on a scale of 1 to 5, with 5 representing high risk.

		Willingness to take Risk					
		1	2	3	4	5	Mean
At least Customer of	Branch Bank	4	26	19	20	1	2.8
	Direct Bank	2	22	40	26	5	3.1
	Neobroker	0	13	23	23	9	3.4
Exclusively Customer of	Branch Bank	3	15	12	9	0	2.7
	Direct Bank	1	10	24	8	1	3.0
	Neobroker	0	4	10	7	4	3.4

Table 10: OLS Regression for Testing H6.

This table shows the results of the OLS regression used to test the sixth hypothesis. Here, I examine the impact of using different financial service providers (independent variables) on respondents' willingness to take risk for the chance of higher profits (dependent variable). 164 responses are available for this analysis. *, **, and *** represent significance below the 10%, 5%, and 1% level, respectively.

		Results
Adjusted R ²		0.087
P-Value		0.001
Unstandardized Beta	UBranchBank	-0.748***
	UDirectBank	-0.485**
	UNoNeobroker	-0.748**
	UNeobrokerPlus	-0.045

Dependent Variable: Willingness to take Risk

Independent Variables: UBranchBank, UDirectBank, UNoNeobroker, UNeobrokerPlus

Reference Category: UNeobroker

Table 11: Investment Frequency of Respondents (at least one Financial Service Provider).

This table shows the descriptive results for the question of how often the respective respondent trades in financial products. The results are related to all those respondents who are at least customers of one financial service provider.

	How often do you buy or sell financial products?							
	Almost Daily	2-3 times a week	Once a week	Once a month	Once in 3 months	Once in 6 months	Less than once in 6 months	Never
Branch Bank	1	2	3	19	1	6	17	17
Direct Bank	1	3	9	39	8	10	18	7
Neo-broker	1	3	9	33	7	4	9	2

as for customers of traditional banks.

In addition to the analysis presented above, I also run

two OLS regressions to obtain statistically relevant results.

The dummy variable *UNeobroker* is again chosen as the ref-

Table 12: Investment Frequency of Respondents (exactly one Financial Service Provider).

This table shows the descriptive results for the question of how often the respective respondent trades in financial products. The results are related to all those respondents who are customers of exactly one financial service provider.

	How often do you buy or sell financial products?							
	Almost Daily	2-3 times a week	Once a week	Once a month	Once in 3 months	Once in 6 months	Less than once in 6 months	Never
Branch Bank	0	0	1	5	0	3	12	14
Direct Bank	0	0	1	17	7	4	11	4
Neo-broker	0	0	1	12	5	0	5	2

Table 13: OLS Regression for Testing H7.

This table shows the results of the OLS regression used to test the seventh hypothesis. Here, I examine the impact of using different financial service providers (independent variables) on the frequency of trading financial products of the respondents (dependent variable). 160 responses are available for this analysis. *, **, and *** represent significance below the 10%, 5%, and 1% level, respectively.

		Results
Adjusted R ²		0.271
P-Value		0.000
Unstandardized Beta	UBranchBank	1.691***
	UDirectBank	0.352
	UNoNeobroker	0.920*
	UNeobrokerPlus	-0.964**

Dependent Variable: HowOftenBuyOrSell
 Independent Variables: UBranchBank, UDirectBank, UNoNeobroker, UNeobrokerPlus
 Reference Category: UNeobroker

reference category for the independent variables and both the learning section and quiz scores are used as dependent variables according to the OLS regression. Adjusted R² values of 0.001 and -0.006, respectively, and p-values of 0.378 and 0.544 indicate no significant relationship between customers of different financial service providers and the usefulness of a learning section or a quiz. If the participant is exclusively a customer of a branch bank (learning section: unstandardized beta = -0.104, p-value = 0.681; quiz: unstandardized beta = -0.362, p-value = 0.250), of a direct bank (learning section: unstandardized beta = -0.383, p-value = 0.121; quiz: unstandardized beta = -0.421, p-value = 0.172), or of both (learning section: unstandardized beta = -0.360, p-value = 0.285; quiz: unstandardized beta = -0.618, p-value = 0.141), the respondents' perceived usefulness of a learning section or a quiz decreases relative to neobroker customers. Likewise, the perceived usefulness of both options decreases if the respondent is a customer not only of a neobroker but of additional banks as well (learning section: unstandardized beta = -0.383, p-

value = 0.122; quiz: unstandardized beta = -0.220, p-value = 0.477). However, since all obtained results are above the typical rejection threshold of 0.05, they are all not statistically significant and are therefore neglected. In other words, no significant difference in the evaluation of the learning section and the quiz questions between the users of neobrokers and the customers of traditional banks can be observed. From the lack of significant results, I cannot conclude that additional information and also knowledge checks are less desirable for neobroker users than for customers of other broker types. In consequence, the ninth hypothesis cannot be confirmed.

6. Discussion

In the following sections, I review the positive and negative results of my study. Afterward, I discuss the limitations and the methodological criticism before I present the possibilities for further improvements in the last subsection of this chapter.

Table 14: Descriptive Presentation of Evaluation of 22nd and 28th Question.

This table shows the descriptive results to the CATA questions, which aspects are important to the respondents regarding an application of a financial service provider, and which aspects they associate with neobrokers. The results are divided into two groups. One group reflects the responses of neobroker customers, which is the case for 68 people, and the other group includes the responses of participants who are not neobroker users, which is the case for 96 people.

	What is important in an application?		What are aspects of Neobroker?	
	Number of Neobroker User (N = 68)	Number of Non-Neobroker User (N = 96)	Number of Neobroker User (N = 68)	Number of Non-Neobroker (N = 96)
Intuitive	35	54	50	48
Design	20	19	50	37
Pictures	14	21	29	32
Fast	36	35	62	76
User-friendly	26	44	44	36
Short Loading	9	12	40	46
Digital	9	4	53	66
Safety	20	47	10	10
Costs	26	30	59	57
Consultation	3	10	1	4
Easy Account opening	3	4	54	45
Personal	1	5	1	3

Table 15: Binary Logistic Regression for Testing H8.

This table shows the results of the binary logistic regression used to test the eighth hypothesis. Here, I examine the influence of the importance of the design to the respondent (independent variable) on the use of a neobroker (dependent variable). 224 responses are available for this analysis. *, **, and *** represent significance below the 10%, 5%, and 1% level, respectively.

		Result
P-Value	Omnibus Tests	0.077
R ²	Nagelkerke	0.020
Overall	Classification Outcome	0.696
Odds Ratio	Important Design	1.825*

Dependent Variable: User Neobroker

Independent Variables: Important Design

Table 16: Usefulness of Learning Section and Quiz within Neobrokers.

This table shows the descriptive results on the questions to what extent learning sections and a query of what has been learned in the form of a quiz are considered useful by the respondents, divided into the different user groups of different financial service providers. Usefulness is rated on a scale from 1 *not helpful* to 5 *very helpful*.

	Number of Responses									
	Usefulness of Learning Section					Usefulness of Quiz				
	1	2	3	4	5	1	2	3	4	5
UBranchBank	0	3	2	16	18	2	4	7	16	10
UDirectBank	2	2	5	21	14	5	4	5	17	13
UNeobroker	0	0	3	10	12	2	0	2	11	10
UNoNeobroker	1	1	0	6	5	2	2	1	4	4
UNeobrokerPlus	1	5	4	17	16	2	5	6	14	16

Table 17: OLS Regression for Testing H9.

This table shows the results of the OLS regression used to test the ninth hypothesis. Here, I examine the impact of using different financial service providers (independent variables) on the perception of the usefulness of both a learning section and a knowledge query in form of a quiz (dependent variables). 164 responses are available for this analysis. *, **, and *** represent significance below the 10%, 5%, and 1% level, respectively.

		Learning Section	Quiz
		Results	Results
Adjusted R ²		0.001	-0.006
P-Value		0.378	0.544
Unstandardized Beta	UBranchBank	-0.104	-0.362
	UDirectBank	-0.383	-0.421
	UNoNeobroker	-0.360	-0.618
	UNeobrokerPlus	-0.383	-0.220

Dependent Variable: HowOftenBuyOrSell

Independent Variables: UBranchBank, UDirectBank, UNoNeobroker, UNeobrokerPlus

Reference Category: UNeobroker

6.1. Summary of Results

Based on my online questionnaire and the following analysis, most of my hypotheses already derived from the existing literature regarding neobrokers can be confirmed. To begin with, it can be observed that trust in the new generation of online brokers has a positive impact on the acceptance of neobrokers. Respondents who have trust in neobrokers are 23.342 times more likely to imagine using a neobroker than participants who do not. The assumption that neobrokers have particularly targeted the younger generation is also

confirmed, as the probability of not using a neobroker increases by 72.4 percent with rising age. No statistically significant results, though, can be obtained about people with a low level of financial education as a target group for neobrokers. Therefore, no conclusions can be drawn in this regard. Neobrokers are primarily used for short-term and speculative investments, as the data obtained from my survey suggest based on descriptive statistics. Long-term asset accumulation for one’s own retirement provision is not a priority. Unfortunately, these results can only be presented descriptively and

cannot be tested for significance due to a lack of data. It is precisely this type of investment behavior that neobrokers are targeting. By means of their design and the presentation of information, such as stock charts as a daily version by default, neobrokers aim to influence the trading behavior of their users. Based on my results, I can confirm this assumption. A different presentation of the same stock (daily vs. annual chart) leads to an increase in the perceived risk of 12.1 percent, which in turn triggers an adjustment of the respondents' investment behavior. In addition, the outcome of the questionnaire indicates that customers of neobrokers are willing to take a significantly higher risk (between 9.7 percent and 14.96 percent) compared to customers of other financial service providers, as they assume the chance of higher profits. It can also be shown that these neobroker customers have a shorter investment horizon and thus trade financial products more frequently compared to non-neobroker customers. On average, they engage in trading at least once every three months (if not monthly), while customers of branch banks become active once every six months.

However, two of my hypotheses derived from the existing theory cannot be confirmed due to a lack of statistical significance. On the one hand, no significant correlation can be found between neobroker customers and their desire for a reduced and simple design of an application. On the other hand, no significant relationship between neobroker customers and the perceived usefulness of learning sections as well as knowledge checks can be elaborated. These knowledge transfers seem to be just as intentional for users of neobrokers as for customers from other broker providers.

6.2. Limitations and Methodological Criticism

In this section, I address the limitations of my thesis and critically examine the methodology I conducted. The first factor to mention is the limited number of participants due to a tight time frame for the development of my study. A larger field of participants would allow me to make more general statements than it can be made with my 224 responses available. In addition, a longer period of time could also enable a stronger international orientation of the sample beyond the German-speaking region. In context of my thesis, only two participants out of the entire sample used the English-language version of the online questionnaire, representing less than 1 percent of the total responses collected. Furthermore, the age groups *18 to 24 years* and *25 to 34 years* dominate among the participants (just under 90 percent). This can also be attributed to the short processing period, as no additional time was available to expand the subject group to include, for example, older participants. Finally, it is also critical to see that every tenth answer is not suitable for the evaluation, as these were either incomplete, filled in with meaningless answers, or clicked through quickly. Although these answers were removed, it cannot be ruled out that non-seriously completed questionnaires still remain in the evaluation. This is supported above all by the existing anonymity of a quantitative study like mine. No questionnaire can be traced back to the person who filled it out, which lowers the

inhibition threshold for a quick click-through or giving wrong answers.

Another limitation of my thesis is the structure of the online questionnaire itself. Due to an inaccurate construction of the 26th and 27th questions, I cannot test the third and fourth hypotheses regarding statistical significance, but only to evaluate them based on descriptive data. This could have been avoided if the related questions had been asked differently, so that reference could be made to the respective respondents. Unfortunately, however, since the questionnaire was created before the exact hypotheses were generated, this could not be avoided.

These limitations are primarily a matter of quantitative research per se. In principle, rather general findings are obtained, and complex problems and their causes are not comprehensively recorded. Topics such as a respondent's willingness to take risk has several influencing factors and requires consideration of the individuality of each person. However, these factors cannot be adequately captured using a standardized questionnaire with predetermined choices.

6.3. Possibilities for Improvements

Some of the limitations I mentioned in the previous section can be improved or even eliminated for further studies, starting with the online-based questionnaire. To exclude any responses that were simply clicked through quickly, it is beneficial to record the respondents' processing time. In this way, all questionnaires answered too quickly can be excluded with the help of a minimum processing time that would be necessary for a serious answering of the survey. The use of filter questions can also help exclude such non-serious responses to the questionnaire. Questions such as *Please select option b)* can be used to exclude all respondents who answered the filter question incorrectly due to a quick click-through or careless completion. A longer processing period can also be useful in both gathering a larger sample size for the study and paying more attention to the diversification of respondents to get the most heterogeneous field of participants possible. Likewise, it is advisable to know exactly all the hypotheses before creating the questionnaire. This enables designing the survey precisely according to the requirements necessary for testing the hypotheses.

To minimize the general limitations of a quantitative study, it is advisable to use a mixture of quantitative and qualitative research instruments for further studies. Hereby, the advantages of both study elements can be combined, and thus the respective weaknesses are reduced or eliminated. However, the use of such a mixed research method is also associated with disadvantages, since this research design entails, among other things, a considerable amount of additional work (additional costs, the time factor, etc.), which can hardly be managed by a single researcher and therefore requires a research group (Johnson & Onwuegbuzie, 2004).

7. Conclusion

As already presented in chapter 2.1 *Development of Neobrokers*, the publicly proclaimed goal of neobrokers, especially that of the two considered within my study, is to democratize access to stock markets and make trading available for everyone. One of the ways this is achieved is by providing mobile trading applications that feature a sleek and appealing design. In addition, other factors such as low to no trading costs and easy opening of one's own account within the brokers support the declared goal of attracting as many new, especially young customers as possible. This allows users of neobrokers to profit from the stock market even with small capital and they are not deterred by high hurdles, as it is the case with larger and long-established brokers.

I claim that gamified elements and reduced information within the neobroker applications intentionally entice their own, mostly young customers to participate more actively and frequently in the stock market, even tempting them to make imprudent and risky investments. This is where representations such as the Top Mover lists, the standardized displays of daily charts, or even the game-like interactions of the users within the application come into play. This playful and influencing approach of neobrokers not only tempts further interactions with the broker itself but can also have disastrous consequences, as the example of a 20-year-old who became overindebted through highly speculative investments and later committed suicide (van der Heide & Želinský, 2021) shows. According to my study, the dangerous nature of neobrokers can be confirmed by the fact that they are preferred for speculative purposes and not for long-term investments which would help to avoid high market fluctuations, such as those currently triggered by the Corona pandemic.

From these results, no clear statement can be made as to whether neobrokers are a blessing or a curse for individual users. Rather, they are a mixture of both in this respect. On the one hand, neobrokers provide the opportunity for anyone, rich or poor, young or old, experienced or inexperienced, to participate in the stock market without major hurdles and thus the chance to also benefit from the general upswing of market economies over the years. On the other hand, however, neobrokers do not act out of pure charity, as the late medieval heroic figure from literature, Robin Hood, once did. Rather, they aim to entice their users to interact more frequently with the stock markets within their applications, as they receive a percentage of every transaction. It does not matter whether the investment is successful or not, as long as buying and selling is done a lot and often, from which, as shown in my study, a danger for the user is generated.

Due to major events such as the aforementioned short squeeze of GameStop Corporation, the negative aspects of neobrokers are increasingly becoming a main focus of the media and society. This raises the question of how neobrokers can continue to grow while reducing the negative influences on the curse side. Based on my study, I propose to not only utilize the already established gamified approach of the neo-

broker applications for influencing the trading behavior of its users, but also to make a beneficial implementation at the same time. I argue that new ideas such as integrating a learning section and playfully testing the newly acquired knowledge are not rejected by neobroker customers, as the literature suggests, but are found to be as useful as by customers of well-established brokers with long-term investment goals. By adding an educational aspect to the offering, the mostly young investors can delve deeper into the important topic of investing themselves and thus make their own decisions based on their recently gained in-depth knowledge.

The topic of neobrokers, in general, is still an under-researched field. Although some studies have already dealt with the broker Robinhood, it is difficult to draw general conclusions from them, as this broker is only available in the American market and thus covers just a small part of the entire neobroker market. Looking to the future and more general statements, further studies are therefore required in this regard, also to strengthen the recommendations I have made concerning a learning section. The topic of *educational mediation within neobroker applications* needs to be explored in more detail before a meaningful and universally valid suggestion can be made. For this purpose, it is important to have a larger share of neobroker customers in the field of participants to be able to reflect their actual interests and opinions. Furthermore, in my study, I did not question the individual motivations for respective decisions. Since my survey instrument is a predefined, online-based questionnaire, only the given answers are analyzed and not elaborated in depth. As a result, important information, for example why neobrokers are not used for one's own retirement planning, is lost. I leave such a more detailed evaluation of individual motivations to future research.

Neobrokers are becoming increasingly popular and provide general access to the stock markets. This can boost the global economy and offer everyone the chance to benefit from it. However, all that glitters is not gold. As recent events have shown, a merger of numerous retail investors through the same broker can not only drive-up stock prices but also pose great danger. It is the responsibility of neobrokers to educate and warn their customers about these precise risks. After all, financial education and conscious investing are of tremendous importance, not only to help neobroker customers succeed in the stock market, but also to save users' lives by preventing them from getting into serious trouble.

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