Project Study

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**Never Work again – Tools to financial freedom**

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**Abstract**

Lorem Ipsum Dolor sit amet….

**Glossary**

**Table 1**   
Financial Terms and Abbreviations

|  |  |
| --- | --- |
| Share / Stock |  |
| XTF |  |
| ETF |  |
| Index |  |
| Securities |  |
| Retail Investor |  |
| Short Squeeze |  |
| Efficient Frontier |  |
| Efficient Frontier Portfolio |  |
| Derivative |  |
| Future |  |
| Option |  |
| Institutional Investor |  |
| Robo-Advisor |  |
| Broker |  |
| Market Maker |  |
| Arbitrage |  |
| Sharpe Ratio |  |
| Sotino Ratio |  |
| Modern Portfolio Theory |  |
| Behavioral Portfolio Theory |  |

**Introduction**

The world of financial services is shifting rapidly. An ongoing period of low interest rates is rendering cash accounts and traditional life insurance products exceedingly unprofitable, threatening the retirement savings of many people. Various topics under the umbrella terms of ‘personal finance’ and ‘passive income’ are prominently featured in the media and an increasing number of FinTech startups is established, aspiring to disrupt the business models of established finance companies. Additionally, the cryptocurrency market, spearheaded by Bitcoin saw increasing adoption as an additional asset class over the last months. New brokerage firms like implement direct-commission-free trades on mobile phones and robo advisory firms advertise themselves as making private equity attainable for everyone. On top of that, we continue to see a rising number of ‘personal finance influencers’ publishing web content related to topics such as passive income, online entrepreneurship, ad revenue generation and especially stock and crypto trading.

Overall, people seek for new opportunities to manage and increase their personal wealth outside traditional finance media and products and face an ever increasing supply of next generation products and services. However, this massive amount of content does not automatically guarantee users to reach their financial goals and the new FinTech products, naturally, can not show a decades-long history of prosperity to potential customers. Additionally, given the social aspect of many digital products which new broker apps are, new techniques like mirror trading, discussion forums such as r/wallstreetbets, Elon Musk promoting stocks by posting memes on Twitter and die-hard bitcoin fans, an unusually high amount of emotionally driven invesments are occuring. We are neither claiming that the stock market has always been rational, nor that bad investment advice is an invention of the internet age, but generally speaking, the amount of people sharing their opinion on certain investments and the means available to do so probably increased with the internet and social media.

This work aspires to give an overview of new offerings in the financial services industry while examining their suitability for different customers. We examine web-based techniques to generate passive income their general practicability, as well as their user fit. Additionally, we aim to classify users and explore potential cognitive biases user could have, exemplifying the latter by generating both a best-fit and worst-fit investment advice for a given user, based on the notion that products may not be classified on a one-dimensional scale from ‘good’ to ‘bad’ but instead need to be dealt with by emphasizing their individual characteristics, which may make them suitable for some of the given users while being a high-risk endeavour for others. This is done by employing a multi-method approach consisting of static analysis, user questionnaires and other techniques.

**Theoretical Background**

**New cohorts of investors**

Retail investment surged over the last years, with the corona pandemic being an additional catalyst in 2020 <citation here>, but retail investors can not be considered one homogenous group. This is exemplified in the fact that both demand for rather long term financial products like ETFs rose significantly over the last few years (Garleanu & Pedersen 2019) but also events like the internet-borne, arranged short squeeze of the GameStop Inc. stock happened. Therefore, there are evidently different investment behaviours in retail investors. We aim to categorize these subtypes of retail investors and give insights into their personal investment objectives as well as their preferred securities and financial products as well as develop approaches and techniques to better match their goals and investments.

**Younger retail investors** are drawn to use mobile app brokers, consistent with the overall trend of smartphone-based access to digital products. Most of these mobile brokers came to existence over the last few years, with the most prominent one in the U.S. being Robinhood, in Germany TradeRepublic offers a comparable product. With the rise of such companies, the brokerage firm industry experienced a shift to no-direct-commission business models, meaning that users do not pay an explicit fee for every trade they perfrorm. This makes these brokers interesting for daytrading by retail investors, who up to then were usually disproportionally affected by fees, which reduced the incentive for active trading strategies. Furthermore, newly available offerings like fractional shares, that allow to invest with very small amounts are also appealing to younger customers, as their overall cash to invest is usually lower. However, as there is no such thing as a free lunch, the question where, if not from direct commissions, the revenue of these brokers comes from and how users may be exposed to side effects of such revenue sources.

**The number of ETF customers** increased massively since the 2008 financial crisis, alongside the overall rise of passive investment strategies. These investments are not integrally related to daytrading, which makes them attractive for a different type of retail investor, namely people who think relatively long-term. So-called Robo advisors usually offer ETF portfolios or other similar, highly diversified investment products which are then managed using an algorithm. The general approach is as following: A given user fills out a questionnaire during which they describe their financial situation e.g. savings, job situation, income etc. and then the user is assigned a risk classification and sold one of multiple portfolios. These usually consist of stock ETFs and bond ETFs, sometimes mixed with commodities or assets belonging to an individually set focus the user can proclaim. They market themselves as offering wealth management at relatively low fees and especially very low minimum investment amounts (0-10k€), compared to traditional private equity firms.[[1]](#footnote-2) The “robo part” is depicted as using sophisticated new technology like machine learning to optimize the customers’ portfolio. However, there is usually no fine-grained detailed information what *exactly* is being managed by an algorithm <citation>.

**Cartographing the brave new world of finance**

While all these new products position themselves as more customer friendly, attainable and technologically sophisticated than the traditional financial services industry, there are indicators of various caveats in these next-gen offerings and universal statements like the fact that capital markets are not known for their free giveaways still hold. For example, Fein (2015) found that the terms and conditions of a given set of robo advisory firms were not always in the best interest of the customer. Regarding brokerage, the practice of *Payment For Order Flow* (PFOF) received massive criticism after Robinhood and TradeRepublic, among others, temporarily halted only the buying of GameStop shares, while still allowing selling of these.[[2]](#footnote-3) Speculations about this being related to the businees practice that brokers route the orders of their customers to large hedge funds in exchange for commission arose shortly after. Additionally, as Battalio et al. stated in their 2013 work which was revised in 2015, PFOF can result in sub-par limit order execution from a retail investors point of view.

These statements exemplify the requirement for a further look into the business models of these new companies and how *exactly* they can help users achieve their financial goals and in which cases they may not be perfectly suitable.

**Inherent problems with the products themselves**

Apart from the aforementioned issues with internal workings of these products, there are also customer-facing aspects of tools that were identified as problematic. Firstly, it is well-understood that daytrading usually doesn’t pay off for most retail investors, as stated by Malinova et al. (2013) and Barber et al. (2013). Therefore, we consider the notion that users generally profit from high-speed, no-direct-commsion brokerage to be questionable, although the absence of directly attributable fees provides an advantage at first sight. In combination with the highly gamified experience of next-gen brokerage apps like Robinhood[[3]](#footnote-4), as pointed out by <citation>, the question arises whether, on average, these products actually provide users with the right toolkit to achieve their personal wealth goals.

**Other sources of passive income**

While investing generally outlines a path to passive income (e.g. living off growth and dividends), there are also other ways to achieve passive income, mostly based on creating and selling some sort of digital content on the internet. Advocated for by an ever-increasing number of ‘personal finance influencers’ publishing financial advice of, presumably, varying quality on social media and platforms such as Medium, Youtube, Blogs, Instagram and even TikTok[[4]](#footnote-5). These people usually promote a subset of methods like generating ad revenue through blogs or videos, selling courses or other digital goods and stock or cryptocurrency trading. Given the fact that these media channels target people who are not financial industry professionals or scholars, the question of both quality of the advice and to which degree these people monetize the advice itself, creating a closed system in doing so. Furthermore, it is possible that there is a certain degree of survivorship bias present in the group of personal finance influencers, e.g. the people who had success claim this to be the result of their specific actions while they may have just been lucky.

Accordingly, a systematic overview of these potential ways to passive income and financial freedom is required, enabling users’ decision making with a more empirical gauge.

**Biases and interest to manipulate user’s investment behaviour**

This work strives to categorize these various tools and approaches into clusters and point out potential biases attributable to them. We aim to provide a guideline on which offering could yield the most benefit to a given user, incorporating attributes such as existing financial education, wealth, investment goals, family situation and willingness to commit to lifestyle changes.

**Utility functions and personal finance**

There has been a lot of research regarding different types of utility functions indicating, among other things, that there is no one-fits-all utility function. To exemplify, Friedman and Savage proposed in their 1948 paper that curvity of an individual’s utility function may change with their personal wealth on the example of gambling and insurance. Although placing critique on Friedman and Savage’s 1948 work, Markowitz (1952a) also generally states a non-linear utility function of an individual, separated in concave and convex elements, with the concave parts being located in the extreme regions of wealth (e.g. rich and poor) and the convex part in between them. The implications for this work include that risk preferences may differ with given levels of wealth, therefore they need to be actively incorporated into a personal finance product or technique recommendation. Furthermore, the general notion that there’s no one-fits-all utility function spawns the requirement to carefully select a certain function to numerically display a suitable recommendation for a given user.

**Modern Portfolio Theory**

Investment recommendations to users imply the need for thought regarding portfolio composition theory. Most Portfolio selection efforts are based on the Mean-Variance or so-called modern portfolio theory proposed by Markowitz in another (b) 1952 work. It forms the basis of most later work in portfolio selection methodology and is built on the idea that an investment’s respective risk and return profile may not be viewed in isolation. Instead, a single investment’s impact on the overall portfolio is considered of interest. This forms the baseline idea for diversification and, in consequence, highly diversified ETFs. As in turn ETFs form the baseline for most robo-advisors, it is more relevant than ever for our given work. It is important to note that MPT is based on quantitative characteristics and assumes rational investor behaviour, similar to many other economic models. MPT generally considers investors to be risk-averse and defines the overall goal as maximizing returns for a given level of risk.

**Behavioural Portfolio Theory**

Extending on the then-available portfolio selection theory while adding a notion of not perfectly rational investors, Shefrin and Statman introduced behavioural portfolio theory (BPT) in their 2000 work. It incorporates, among other ideas, the prospect of investors having multiple so-called mental accounts. This depicts the idea that there are no unidimensional investment goals, but multiple, each with a different intrinsic desire for risk. The classic example (insert citation here) is the separation of retirement savings with low appetite for risk combined with a more aggressive sub-portfolio that provides the investor with an opportunity to acquire life-changing wealth through risky financial decisions. Therefore, a major difference to MPT is that investors do not have a uniform risk level preference in BPT. This is consistent with the observation made by Friedman and Savage in 1948, namely people buying both insurance and lottery tickets. For the given paper this implies that when recommending an investment strategy to a given user, in order to have the user stick with the approach over a long enough timeframe, it may be beneficial to deviate from numerically optimal portfolio allocation, adding a physical represenation of the user’s second mental account e.g. adding a more risky / experimental sub-portfolio which provides the possibility to reap vast returns.

**Combining both approaches**

MPT and BPT may seem contradictory to each other given the above initial descriptions, however, later work by Das et al. (2010) proved a mathematical way to set the problem statements of portfolio optimization with MPT and BPT equal. While the exact proof is omitted here, the notion that portfolio optimizations on both the more quantitative and “institutional” MPT and the more “personal” BPT are possible, implies for this work that achieving the personal finance goals of a given user by employing a baseline MPT approach for the general strategy, but overlaying it with measures from BPT in order to fine-tune the overall result according to individual goals may be possible.

**Cognitive Biases and their influence**

We have seen that is legitmate to both not only employ quantitative methodology for portfolio optimization but also to have varying risk preferences in different mental accounts e.g. dedicated sub-portfolios.

Therefore, as we declare the latter, combined with the general assumption of non-rational investor thinking, we need to highlight the importance of cognitive biases, as these are known to influence people’s behaviour in various aspects of life. <insert research on cog biases in investment here>

**Ambiguous Investment Products**

As stated, a broad range of new kinds of investment products appeared on the market over the last few years. These include mainly brokerage offerings but also a lot of so-called robo-advisors. The latter

Research

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1. Historically, “private equity-rich” meant a nine-digit net worth. [↑](#footnote-ref-2)
2. As opposed to a complete buy and sell trading freeze. [↑](#footnote-ref-3)
3. For example, virtual confetti is thrown after conducting trades. [↑](#footnote-ref-4)
4. If you feel old reading that, the authors are in their early 20s and do so as well. [↑](#footnote-ref-5)