Project Study

Part of the Degree Program

Master of Science

at the TUM School of Management

of the Technische Universität München

**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**

**A new cohort of investors** The world of financial services is shifting rapidly in a multitude of The demand for financial products like ETFs rose over the last few years (Garleanu & Pedersen 2019). Previously unthinkable events like the internet-borne, arranged short squeeze of the GameStop Inc. stock happened. Personal Finance influencers are publishing content on YouTube, Instagram and even TikTok. The securities markets experience a new cohort of retail investors, using their own tools and information sources these new investors use tools most of which rose to widespread usage in the last few years, all influenced by overarching trends like the personal finance and frugalism movement. Although there are common factors like the aforementioned trends, these tools significantly differ in their usage philosophy and business models. For example, Robinhood offers mobile brokerage and earns money by order-routing and earns varying fees for certain financial products. Wealth managers like Scalable Capital may get discounts for certain stocks or ETFs when buying in bulk. These individual interests may impose biases on the actions of their customers.

**Other sources of passive income** Apart from investing we also see a rise in interest for so-called “side hustles” and the desire to generate passive income from them. The internet is full of articles, courses and others promising to hold the idea to develop a passive income stream from some sort of online business. <Suspect survivorship bias>...

**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.

**Theoretical Background**

**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.

**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

**References**

Garleanu, N. and Pedersen, L.H. *Active and Passive Investing* (February 1, 2019). SSRN: [http://dx.doi.org/10.2139/ssrn.3253537](https://dx.doi.org/10.2139/ssrn.3253537)

Markowitz, H. *The Utility of Wealth*. Journal of Political Economy 60/2 (April 1952)   
https://doi.org/10.1086/257177

Markowitz, H. *Portfolio Selection.* The Journal of Finance 7/1 (March 1952) 77-91 https://doi.org/10.2307/2975974

Friedman, M. and Savage, L.J. *The Utility Analysis of Choices Involving Risk.* Journal of Political Economy. 56/4 (August 1948) https://doi.org/10.1086/256692

Shefrin, H. And Statman, M. *Behavioral Portfolio Theory.* Journal of financial and quantitative analysis 35/2 (June 2000), 127-151. https://www.jstor.org/stable/2676187

Das, S. Markowitz, H. Scheid, J. And Statman, M. Portfolio Optimization with Mental Accounts. Journal of financial and quantitative analysis. 45/2 (April 2010) doi:10.1017/S0022109010000141