Høgskulen på Vestlandet

MSB210 Masteroppgave

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Deltaker

Navn:	Even Bakke
Kandidatnr.:	409
HVL-id:	571797@hvl.no

Informasjon fra deltaker

Antall ord *:	19437

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Even Bakke & Eirik E. Solberg

Master of Science in Business

FØS/IØA/MSB

Dr. Atanu Kumar Nath

20.05.2022

Preface

This work marks the end of our Master of Science in Business at the Western University of Applied Sciences (Høgskulen på Vestlandet), at campus Sogndal. Although the first year of this master's degree was plagued by the pandemic Covid-19 and the national restrictions it mandated, our administration, professors and lectors ensured us a sufficient and proper introduction to the courses. While most other courses were limited to online lectures, we greatly appreciate your recognition of the importance of physical education early in a new degree. This along with the advised pairings for assignments sparked a good overall classroom environment which helped us throughout the different courses. By this, we learned each other's strengths and weaknesses which contributed to a better cooperation on papers and exam preparation sessions. Furthermore, the courses during the degree, gave us a great insight and understanding of the world of marketing and innovation through the work on practical implications and relevant issues. This is important knowledge that we will help us further on in our careers.

With this, we would like to express our appreciation to Ove Oklevik for orchestrating the degree as well as the many social events we had the pleasure of attending in difficult times. Additionally, we would like to direct a thank you to Torbjørn Årethun for your witty remarks and your appreciation to the Norwegian language. And thank you to Veronika Trengereid for great educational lectures. We would also like to extend a personal thank you to Tore Frimanslund for sharing his guidance, entrepreneurial mindset and inspiring both of us to pursue our own projects during the internship period in the spring of 2021. A big thank you goes out to our classmates that contributed to the social environment both in and outside of school.

We also wish to show our gratitude towards Dr. Parmita Saha and Dr. Atanu Nath for their effective distribution of knowledge and constructive feedback. This elevated our understanding of how to write articles to a new level, and combined with your efforts, resulted in one of our papers to be accepted and presented at MIC 2022, a memorable ending to our master's degree. Finally, a big thank you to Dr. Atanu Nath for all your help and for guiding us through this thesis especially.

Abstract

As the market of cryptocurrency rises, it is crucial to increase our knowledge and understanding as to why people choose to invest in this rather unknown and risk filled technology. Thus, uncovering reasons why investors engage in cryptocurrency, as well as categorizing their motives, perspectives and investment behaviour, and how external factors may affect these, is of relevance. Appropriately, this thesis combines literature on investment behaviour and gambling behaviour through a correlational analysis, to uncover linkages between the two in light of cryptocurrency investments. Accordingly, the central gambling motives defined by theory: *chance of winning, intellectual challenge, mood change, social rewards* and *the dream of hitting the jackpot*, was analysed from empirical data gathered from cryptocurrency investors. The results show that all of the central gambling motives correlated with one or more variables, indicating a presence of gambling behaviour in cryptocurrency investment behaviour. Limitations and further research: the weak dataset caused low reliability and generalisability to the findings, thus prompting the need for a larger sample size, along with analysing the relevancy of the variable age in further research.

Keywords: *Cryptocurrency (CC); gambling behaviour; investment behaviour; social media (SoMe); actuality.*

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Figures, models, and tables

1. Introduction

In the last decade we have witnessed the rise of a completely new market for investment opportunities; digital properties, and cryptocurrencies. Cryptocurrency (CC) is a term used to describe a digital currency that relies on cryptography to expedite and record transactions on databases of financial accounts, i.e., blockchain technology (Smith & Kumar, 2018). This means that unlike traditional currencies, e.g., the US Dollar or the Pound Sterling, CCs are a non-tangible and non-governmental form of assets. The technology also allows to eliminate the "middleman" of the traditional transactions today such as financial institution, meaning exchanges through CC requires no traditional bank account or credit card.

Although a small fraction of the world's businesses has allowed payments through CC, per early 2022, it is today mainly used as an investment option similar to stocks. In both cases dividend is reflected in the purchased stock/CC's price increase. Like the stock market, CC investments seem to have a rough correlation between risk and potential dividend. Unlike the stock market however, there are less barriers of entry, meaning new CCs can in theory be developed by anyone and pushed onto the market for trade immediately (White, 2014). Nevertheless, there are technological requirements behind inventing a new coin, but these are relatively low compared to the requirements of getting a traditionally company listed and eligible for stock trading.

1.1.   Purpose

The purpose of this study is to get a better understanding of CC-investors' motives and behaviours. This reasoning is not only relevant because of the increased interest and involvement surrounding CC and related financial investments, but also because of the differences between CC and regular investments. Stocks are primarily reflecting a company's current economic state, projected progress, and people's beliefs and expectations of that company respectively. However, there are exceptions, like the short squeeze of GameStop that occurred in early 2021. This was an orchestrated event where a large amount of people were advised through the online messaging board Reddit to purchase GameStop stocks. The company was identified to be heavily shorted by major investors and large hedge funds. Therefore, their goal was to increase the stock price as much as possible so that these major investors and hedge funds had to bail out and loose on their short positions all together, evidently increasing the stock price. However, CC is different due to its rather unknown

position and outlook. A CC's price is not directly reflective of its underlying technological progress, but currently consists of its demand alone, like the GameStop short squeeze. In general, the better the technology gets, the more people will buy it, and it is this increase in demand that effects the price of a CC. This however does have its complications, as its not only the progress of blockchain that increase the demand, but also many other factors such as targeted advertising and high-profile celebrities talking about CC in general or a specific coin. Therefore, a coin can increase its price drastically without any improvements in the blockchain technology, but purely because of market speculation. This has made CC a suitable realm for pump-and-dump schemes. The success-stories of those few investors who got into CC early and made a fortune of Bitcoin and Ethereum, is prominently being used as a marketing tool to build demand for CC, especially new and/or lesser-known coins. Considering that financial advice has become increasingly popular on mainstream social media (SoMe), e.g., Facebook, Instagram and TikTok, and combined with the low barrier of entry, makes this an important factor for the emerging market of CC investments.

The CC market today is filled with uncertainties. It is currently impossible to accurately predict which coin will dominate or if the continuous implementation of blockchain will have a successful outcome. Therefore, a CC investor's motives and behaviour is of upmost interest for this thesis. In order to do so, this thesis will compare CC investment motives and behaviour in light of relevant gambling theory that reflects typical gambling behaviour. We find gambling theory relevant for this thesis because of the uncertainty surrounding CC. Furthermore, this thesis' aim is to uncover similarities between the two.

A key factor in this study is the investments timeframe. In gambling, once a participant places a bet, he must wait until a specific moment or event has taken place before he can realise his wins or losses. Investors on the other hand, base their investments on their evaluated risk tolerance and projected potential dividend in accordance with the timeframe they are given or chooses. Because of its high risk and price volatility, CC seems like a strong candidate for long term investments, although the price volatility has made it suitable for investors who want to participate in spot-trading. Spot-trading is where investors places extremely short-term investments and waits until the market goes up. Once the dividend is positive, he realises his earnings without hesitation.

1.2.   Motivation

With CC having such a big impact and popularity in today's media and financial institutions despite the uncertainty revolving its future implementation and use, makes CC investments an important and highly interesting research topic. Considering this market is still continuously growing, it is within the academic nature to study this phenomenon. This study contributes to filling the research gap on the individual's motivation for investing in CC, as well as contributing to the field of investment behaviour in the emerging market of CC investments.

Although its use is fairly limited per early 2022, the announcement of the virtual world of META along with its huge potential as a currency, as well as the underlying blockchain technology's potential use in schools, universities, or governmental institutions (Ølnes et al., 2017) makes this even more relevant for academic research. Therefore, it is the job of academic curiosity to research this area as much as possible in order to try preventing future mistakes and enhance its potential.

1.3.   Prior research

The important question of *what motivates people to buy CC* has yet to find solid grounds in the literature. Because the market is currently speculative, the price of a coin heavily driven by its demand. Therefore, the main reason people buy CCs is because they believe others will purchase the same currency, i.e., market sentiment is a factor for the price volatility (Ahn & Kim, 2020). However, others believe that the CC will act as an alternative currency in the future to the one they already have, based on their admiration for the underlying blockchain technology (Presthus & O'Malley, 2017). Noteworthy, reason and motivation differ by their definition, and the field of investment behaviour is lagging on the aspect of CC investment motives.

Traditional investments have been interpreted through gambling theory in certain areas, e.g., Fellner and Sutter (2009) suggests a presence of gambler's fallacy among their subjects, which according to Clotfelter & Cook (1993) is the «belief that the probability of an event is lowered when that event has recently occurred, even though the event is objectively known to be independent from one trail to the next». However, investment literature in light of gambling theory lacks the segmentation into CC investors. Also, investment theory it has yet to implement fundamental models of gambling behaviour such as Binde (2013). It is therefore of interest to analyse the CC investors motives and behaviour through a model which describes the underlying motives of a gambler's mindset.

1.4. Research Question

Given the purpose of this thesis described above, a well formulated research question is necessary to confidently uncover whether similarities can be found between CC investment behaviour and gambling behaviour. Our goal is not to define CC investing as gambling, but rather to describe general CC investment behaviour. This thesis aims to contribute to the current literature on the subject through the eyes of gambling theory, and the research question reflects this. Thus, our research question is as follows:

Are there similarities between cryptocurrency investment behaviour and gambling behaviour?

Although the research question is stated as a closed question, it naturally implies a description of what these similarities are.

1.5. Method

To be able to collect and map out if CC investments have underlying signs of gambling behaviour, we conducted our research through a survey aimed at large online CC-based communities. Among these were Norway's biggest online community; *Kryptovaluta Norge* and the smaller *Kryptoforum – Lær og diskuter Kryptovaluta. Kryptovaluta Norge* has over 45,000 members and is actively discussing, encouraging, and promoting various CCs, both old and new every day. The survey was also published two international communities; *CryptoCurrency & Blockchain: Bitcoin | Altcoin | Trading | News | Analysis,* and *Bitcoin & Cryptocurrency Investing for Beginners.* From this data, a correlational analysis was performed, and the results discussed through reviewed literature.

We believe that the term gambling has a general negative stigma to it and is often associated with reckless and inappropriate behaviour. Due to our main research question containing the word "gambling", we excluded the term in questions in the survey. Although the questions in the survey are derived from gambling-, investment and consumer behaviour theory, our impression was that most of the respondents were unaware of this knowledge and will therefore answer to their best and honest ability.

1.6. The Thesis' Structure

The background knowledge described in chapter two consists of relevant descriptions of CC including what it is, how it works and the underlying blockchain technology that makes it unique. In addition, it describes the controversial topics surrounding CC as well as what this technology can do, which others cannot. Following up is a categorization of CC based on its market capitalisation (market cap) and its connections to other markets like currencies and gold.

The thesis' literature review is in chapter three. The literature relevant is gambling literature, specifically the five-dimensional model of Binde (2013) describing the motives behind gambling. The literature following this will be divided into sections based on the model for gambling motives and become the foundations for the thesis' hypotheses. Following this is how SoMe influences the CC investors decision making.

Chapter four is the thesis methodology and should give an enlightenment on why this paper and its research question required a quantitative study through a questionnaire survey, rather than qualitative. Following this is a description of the data gathering process and the complications it brought. Subsequently, a description of the analysis method and the tools used to compile, clean, and analyse the data. Lastly, an enlightenment surrounding the ethical considerations of this paper, and how we as researchers upheld a certain ethical standard. The result of the survey and the survey analysis will be presented in chapter five. It will include both demographics and significant correlations between the variables defined under chapter three.

The discussion of the results will happen in chapter six, where the findings from chapter six will be explained with connection to the relevant literature from chapter three, and the implications it has for the hypotheses. This is followed by the paper's limitations and suggestions for further research. Lastly a conclusion which acts as a summery for our findings and what this thesis brings, along with the conclusions of the hypotheses.

2. Background

Since this thesis revolves heavily around the subject of CC, there needs to be a description of what said subject is. This will provide a definition that will be present throughout the thesis and will lay a foundation to better understand the discussions regarding the subject later on.

2.1.   What is cryptocurrency?

CC in its singular meaning can be defined as a digital token, suited for use in a general or limited-purpose medium of exchange (Scott & Pernice, 2021). Today, there are thousands of different CCs varying in popularity and functions, but only a handful of them are deemed "successful". The large number of different CCs are tied to the low barriers of entry to the CC market. All of these however, are linked to, and through a CC system. These types of systems rely on cryptography to expedite and record transactions on databases of financial accounts, i.e., blockchain technology (Smith & Kumar, 2018). Most believe that the technology behind the coins have come to stay as Titov et al. (2021) through a statistical analysis found that the cryptosystem EOS, with its processing speed of 50,000 transactions per second, is able to meet most of the needs for money transferring in the current banking markets. Furthermore, they conclude their study with that an eventual implementation of such a system would increase overall practicality and convenience, as well as more efficient transaction times, payments, and the overall simplicity of these processes (Titov, et al., 2021). These factors are among the main reasons as to why Bitcoin (BTC) made its first market surge back in 2013 and made CC relevant to the investment sector. In recent years, BTC has seen several surges and downfalls, paving the way for the interests in other CCs, but also manifesting the volatility behind them (Baur & Dimpfl, 2018).

Various types of CCs are linked to a fiat currency. A country's currency can be fixed towards other countries currency exchange rate, e.g., the Danish Krone is pegged against Euro. In traditional currencies this practice is called fixed exchange rate and many cryptocurrencies' price is tied the same manor e.g., Tether, Binance, TrueUSD, TerraUSD, Dai, and USD Coin, are all fixed towards the US Dollar. Furthermore, some CCs are fixed towards markets outside the world of cryptography and traditional currencies like gold or other external values e.g., Digix Gold Token are fixed towards gold. These types of CC, both tied to traditional currencies and other external values, are called *stablecoins*. Because stablecoins are pegged to markets outside of the world of cryptography, they are viewed as

the least volatile of the bunch. The aim of stablecoins is to invest in other markets like gold or US dollar through a secure crypto system.

There is still a dispute to CC as a currency regarding its' utility, however based on cited literature above, there is little doubt that the underlying blockchain technology is of great future value for the society. Ølnes et al. (2017) conducted a study and presentation on how to implement this technology into the governmental sector and how it leads to increased innovation and the transformation of existing governmental processes for the better. The utility of the blockchain technology lies in its potential ability to securely store public documents, certificates, contracts and other legal documents, licenses etc. in a vastly superior organized system and rapid easy access to those who are granted it (Ølnes, 2016).

2.2.   Categories of Cryptocurrency

Seeing as the realm of CC is first and foremost an investment opportunity and primarily only used as such per mid-2022, we will for the sake of this thesis categorize the different CCs thereafter. To do so we are defining them in light of their respective market capitalization under *Small-Cap*, *Mid-Cap* and *Large-Cap*.

The categories above reflect the different groups determined by a fixed range of values of market capitalizations. Categorizing and referring to them as such is commonly used in regard to the stock market. In short, *cap* is an abbreviation of the term market capitalization which is a financial term used to describe the market value of all outstanding shares of a company at the current market price.

This definition is somewhat applicable to CC as well, but in order to correctly calculate its respective market cap you have to multiply its current price with its current circulating supply. Circulating supply represents how many of each respective CC is currently circulating in the market. This number is continuously changing depending on the coin. This is because some CCs have a fixed total amount e.g., Bitcoin (BTC) with its 21 million coins (although per Jan 2022 only 18,9 million coins have been mined and put into circulation), while some CCs have an unlimited cap with a continuous stream of new coins into the market e.g. Dogecoin.

Small-cap CCs are named because of their small market capitalisation (market cap). Although different market cap ceilings are defined under the small cap banner the one most commonly used 1 billion USD (Coinbase, 2022). The general purpose of the definition is to categorize the CCs with the lowest market caps. Intuitively, *Large-cap CCs* are the opposite

of small cap, reflecting the higher end of market caps. These are generally the most popularly traded coins such as Bitcoin, Ethereum and Dogecoin with market caps substantially higher. Compared to small cap's 1 billion USD, the required market cap for large-cap varies from definitions but most commonly used is 10 billion USD and upwards (Coinbase, 2022). *Mid-cap CC* are the currencies with market caps between the floor of the large-cap and the ceiling of the small cap meaning between 1 billion and 10 billion USD (Coinbase, 2022).

To best illustrate the differences between Large-Cap, Mid-Cap and Small-Cap you can think of Google, Nokia and penny stocks respectively in regular stocks. In the realm of cryptocurrency per early 2022 the categories are as follows:

Table 1. Cryptocurrency and market-cap categories

| Category	Small-Cap	Mid-Cap	Large-Cap
Market capitalization	< 1 Billion USD	>1 Billion USD and <10 Billion USD	> 10 Billion USD
Cryptocurrency	Klaytn (KLAY) KuCoin Tokens (KCS) BitTorrent-New (BTT) Aave (AAVE) Pax Dollar (USDP) Helium (HNT)	Polkadot (DOT) Wrapped Bitcoin (WBTC) TerraUSD (UST) Avalanche (AVAX) TRON (TRX) Litecoin (LTC) Shiba Inu(SHIB) Cronos (CRO) Polygon (MATIC)	Bitcoin (BTC) Ethereum (ETH) Tether (USDT) USD Coin (USDC) BNB (BNB) XRP (XRP) Binance USD (BUSD) Solana (SOL) Cardano (ADA) Dogecoin (DOGE)

3. Literature Review

The research question is derived based on investment behaviour, gambling behaviour and personal economy. It is therefore naturally required to have knowledge across these different fields of study. The following review is mainly amalgamated by articles on investment theory, gambling- and investment behaviour. The structure is roughly divided by the dimensions in Binde's five-dimensional model for gambling motives, as described below. Each dimension includes the articles found relevant to construct the hypotheses and describes the dimension in accordance with both gambling and investment theory. The contribution from Per Binde will act as a theoretical anchor point related to gambling literature. The reasoning behind this is that Binde's article consists of many previous relevant studies and different articles surrounding gambling, which lays the basis of his presented model of the five dimensions.

3.1. Gambling

Per Binde's work on identifying the gamblers mindset can be simplified in his model for gambling motives as shown in *Model 1* below (Binde, 2013). His model describes four optional motives for gambling: dream of hitting the jackpot, intellectual challenge, mood change and social reward. These are motives that is dependent on "personal dispositions and preferences" (Binde, 2013), while the core motive: chance of winning, is present in all forms of gambling.
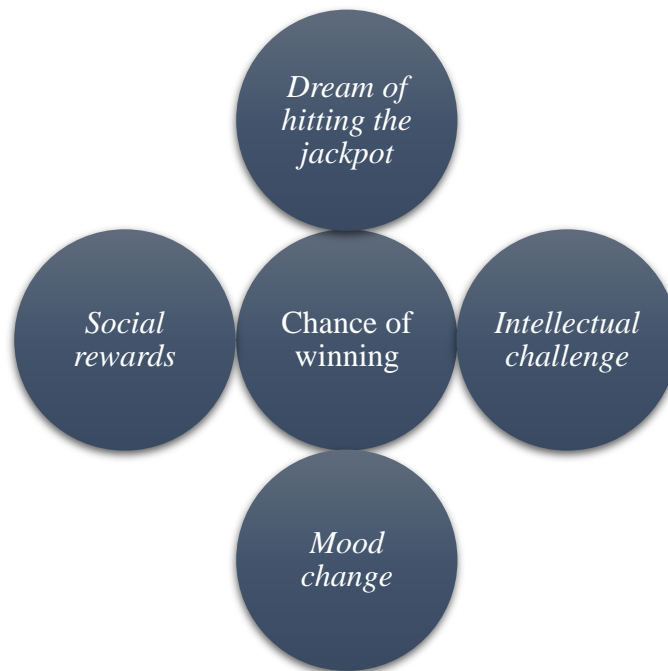
Model 1. Five motives for gambling. Source (Binde, 2013)

The optional motives are independent from one another and may vary in different situations. E.g., social rewards could describe playing blackjack with friends, intellectual challenge is often associated with skill-based games such as poker, mood changing games like bingo seeks to create optimism and hope, and dream of hitting the jackpot could explain people's participation in big game lottery. Although his work is in general focused on problem gambling, his model for describing the gamblers mindset is crucial for understanding not only how and why people gamble, but also their irrational behaviour as gamblers.

3.2.   Chance of Winning

Chance of winning needs to be present for people to conduct gambling behaviour and is therefore the core motive in the five-dimensional model (Binde, 2013). However, the core motive's application is present when looking at CC investments and is therefore of interest to understand. For clarification, chance of winning applied in investing, are viewed in this thesis as synonyms for chance of dividend. Naturally, the typical investor would not invest based on a portfolio seeking no dividend, which is equivalent with the CC investors attitude. The typical investor would evaluate the risk and projected dividend to make an investment

decision, an action coherent with a gambler. However, timeframe does play a crucial role when making an investment decision and does affect the investor's risk tolerance, and what type of information they rely on.

The nature of the motive however seems to be different between gambling forms. In many types of gambling the chance to win is often in favour of the casino who arranged the game, thus making the argument for the gambler's long-term irrationality. However, other games e.g., poker and blackjack, sees an even playing field, where the players are encouraged to evaluate the risk based on the information he has. This aspect of chance of winning is closest related to CC investment and is therefore of interest and relevance to further investigate.

The majority of poker players play based on some form of rationality. In other words, as the percentage lost increases, the number of days between games, total games, and total wagered decreases (LaPlante et al., 2009). Nevertheless, the players actions in the game itself seems contradictory to what mentioned above. Experienced poker players increase their aggressiveness and risk willingness after a big loss and decrease the same factors after a big win (Smith et al., 2009). The remembrance of big gains or losses has big implications on risk-evaluation for the experienced player in the short term. This attitude towards poker could be viewed as an underlying motive for investors seeking to invest when the market decreases.

In investment literature, like gambling, the risk an investor is willing to take is often driven by confidence in the information gathered, the size of the investment is also partly driven by factors other than pure logic. The much-cited theory of securities market under- and overreactions purposed by Daniel et al. (1998) suggests investors overreact on private information signals and underreact to public information signals. As the majority of the information surrounding CC is public, many of the SoMe posts surrounding the low-end CCs are portrayed like the information they share is secretive, yet ironically open for the public. Therefore, a worrying connection could be drawn that pump-and-dump schemes plays on investors investment overreaction to this new information. Identifying pump-and-dump schemes can be done by analysing the price volatility (Nghiem et al., 2021). Hamrick et al. (2021) examined the pump-and-dump ecosystems and identified two distinct approaches for pumping cryptocurrencies: transparent- and obscure pumps. Transparent pumps are when an actor is openly promoting a purchase of the cryptocurrency to increase its price, while obscure pumps is when they obscure their pump incentives to avoid detection. In contrary to Daniel et al. (1998), Hamrick et al. (2021) found open information to have a significantly impact on pump and dump investments, by making the signals so obvious, e.g., by revealing what time

to buy and what time to sell or virtual countdown clocks, transparent pumps are much more successful than obscure pumps.

Another relevent article to add is Stix (2021) who found that unlike common belief, distrust in banks and conventional currencies as drivers of CC investment are not significant and is overshadowed by expected dividends and the belief that CCs offers a better payment solution than conventional currencies. This study also shows a higher investment knowledge among CC owners than non-CC owners, and that the perception of high volatility of CCs mediates the demand of CC assets. Although CC owners have a higher investment knowledge than non-CC owners, the study does not explain a knowledge difference between CC investors and other investors.

A construct not included in Binde's five motives for gambling, yet seems to have an effect in CC investment, is timeframe. Naturally, gambling has a specific timeframe for payoff that is set outside of the gamblers control. He can choose how much to bet and must realise his loss or gains at a predetermined point in time. Investors on the other hand are different. They can choose at what point to realise their dividend, yet that point in time is often affected by market forces or investors decision before entering the market, e.g., short term or long-term investments. Timeframe therefore is a key factor for investment decisions as it changes the investor's risk tolerance.

In standard investments, a long-term investment allows for more aggressive risks, as the time of payoff may be decades in the future. Short-term investment strategies should be less aggressive and a more secure dividend. Therefore because of CCs' extreme price volatility it is not generally suited for short term investments. However, Kannadas (2021) concluded that both long- and short-term investment strategies equally have the likelihood of zero loss as top priority, i.e., safety of principal.

Time has also shown to be a relevant factor when explaining CCs volatility. Especially time varying volatility which is when the CC's volatility changes in specific periods of the year. Hafner (2020) used the CC's time varying volatility to determine the presence of bubbles in CCs. He found that bubble behaviour is present in different CCs, however the CC that shows the strongest bubble behaviour is Bitcoin, maybe because it's the best known and most talked about CC (Hafner, 2020). Whether or not CC is a bubble is not directly of interest to this thesis, however bubbles does bring forth interesting investment behaviour. Economic bubbles tend to draw in segments of the population that wouldn't normally engage in such activities, and therefore is inexperienced with the market outside of the bubble (Greenwood & Nagel, 2009). This suggests a causal effect for the variation in the CC investors. People who

have never invested in any form of stocks, bonds or securities are drawn to CC because of its high price volatility.

SoMe also effects CCs and CC investment behaviour as people are exposed and gain some insight in other people's economic ventures or knowledge. SoMe have given organisations and popular people like Tesla and its co-founder and CEO Elon Musk a way to affect the price of CCs (Tandon et al., 2021). The tweets of Elon Musk do seem to affect the short-term price of the currency in question, e.g., on the 25th of January 2022 he published a tweet stating that he would *eat a happy meal on tv if McDonalds accepts Dogecoin,* and the currency increased drastically by 6.5%. When Elon Musk tweeted «Release the Doge!» along with a meme from the movie The Godfather, Dogecoin jumped by 4%. With these examples in mind, it is clear that SoMe gives the power to influence CC to known people in society, and their SoMe influence does have a short-term effect given the nature of their post or message respectively.

The volatility of CCs may affect the potential CC investor, as he estimates what he would have gained on a specific period of a high rise. Investors prefer to view short historic periods of investment information (Fellner & Sutter, 2009). Additionally viewing short term performance to evaluate investment decisions leads to a higher investment volume (Borsboom et al., 2022). Fellner and Sutter (2009) also suggests a presence of gambler's fallacy, which according to Clotfelter & Cook (1993) is the «belief that the probability of an event is lowered when that event has recently occurred, even though the event is objectively known to be independent from one trail to the next». A typical example of this is in roulette. If the ball has landed on black the last three rounds, the gambler places his bet on red believing the that the false pattern cannot go on. If tied to CC investments, one could assume a possible causal effect that when the market goes down significantly, some investors may think it's going up at some point based purely on the CC's historical data.

Based on cited literature on chance of winning we hypothesise:

H1_0. Perceived chance of winning is not present among CC investors.

H1_1. Perceived chance of winning is present among CC investors.

3.3.   Intellectual Challenge

To explain how intellect impacts gambling behaviour, it is important to differentiate gambling activities into two categories: chance games and skill-based games. Chance games can be defined as uncontrollable games to which the gambler has no impact on the outcome of the

game, and activities that requires no knowledge or information surrounding it e.g., lottery, slot machines and bingo (Binde, 2013). Contrary to this, skill-based games vary in dependency of analysis, strategies and handicapping e.g., poker and horse betting. Handicapping is estimating a profitable outcome on two or more bets based on probabilities and odds (Binde, 2013). In horse racing specifically, handicapping requires information surrounding a lot of factors such as, the participants previous performances, track and weather conditions, and jockeys. In poker, one can study the opponents based of on previous behaviour and try to identify a pattern in their playstyle, thus giving the gambler a sense of an intellectual challenge when participating and succeeding in these types of gambling activities.

Looking at the intellectual challenge in light of investment behaviour and theory, we can find similarities between chance games and skill-based games and investing in funds managed by a third party and building your own stock-portfolio yourself. Although the risk is substantially higher when playing the lottery than investing in funds, it can be said that there are similarities between picking your own lottery numbers and selecting your own funds. However, it requires more effort, knowledge, and often a broader horizon of time in order for one to gain dividends from building your own investment portfolio. Generally speaking, a successful stock portfolio requires a deep understanding of the invested areas, and often in the surrounding areas that might impact said investments. Knowing what markets will be affected by situation x and furthermore which stocks will soar or plummet as a result of this gives the investor the stimuli of intellectual challenge. In most communities, a successful stockbroker who has been consistently successful in his investments is social recognized as an intellectual individual and is given a social acknowledgement, whereas lottery winners are considered lucky.

Csikszentmihalyi & Bennett (1971) proposed that an individual state of *play* is when the person's ability matches the requirement for action in his surroundings. This state is when the individual is experiencing joy and fun. There is little doubt that individuals in some gambling forms, e.g., roulette and slot machines experience the state of *play,* and gambling is therefore conducted to change the gamblers current mood (Binde, 2013). When the individual's ability is higher than those of what the surroundings require, then play converges into boredom (Csikszentmihalyi & Bennett, 1971). This ties intellectual challenge towards mood change as well, suggesting a relationship between the two variables.

However, when it comes to successful cryptocurrency investors, the social recognition seems to be somewhat of a split between being an intellectual and a lucky individual. This can

perhaps be explained due to the boom of cryptocurrency and the general public's lack of knowledge of the technology behind it.

Based on the cited literature on intellectual challenge we hypothesise:

H2_0. Intellectual challenge is not an investment motive among CC investors.

H2_1. Intellectual challenge is an investment motive among CC investors.

3.4. Mood Change

Gambling often has other motives not based on economic gains, as different states of mood can be a predictable factor for gambling. More notably, mood states and language usage shown in the gamblers SoMe platform has been a significant factor for the gamblers risk tolerance (Otto & Eichstaedt, 2018). Literature suggests that mood determines a lot of factors when investing. Most academics' focus is concentrated on market sentiment, i.e., investors' behaviour and overall attitude towards the market, and the effects that this has on the investors and the market, as much of the following literature shows. Although market sentiment in CC markets cannot be denied, in order to connect the mood change motive of gambling theory with CC investments, it is wise to look at the investor's mood and mood theory in general.

Regarding investments, mood does not only affect the investors' stock purchases but also have a significant effect on the market itself. Investors' general mood, fear and policy uncertainty has a spillover effect on the stock market, along with media hype and the current pandemic (Zargar & Kumar, 2021). Also, the social mood levels of highly followed SoMe accounts does have a significant effect on the stock market (Nofer & Hinz, 2015). These effects could explain the observed SoMe influence on CC investments, e.g., Elon Musk's tweets regarding different CCs, and the increased price of said CC.

However, SoMe is not the only factor for mood effects on the stock market, as market segmentation in general is a factor for market fluctuations. During times with high market sentiment, investors have shown evidence of decreasing their demand for safe investments and increase demand for quality when experiencing low market sentiment (Baker & Wurgler, 2012). Based on this, Ying et al. (2020) concluded that Fridays tend to have a higher returns on liquid stocks than Mondays, because of investors higher mood on Fridays than Mondays. This connection between investment theory and psychology is of interest to this thesis as it determines a connection between mood and what type of investments are applicable for the given mood.

To seek a state of *play*, could be viewed as a motive for CC investments in general but perhaps most noteworthy to small cap CC (Csikszentmihalyi & Bennett, 1971). Small cap investors may seek a mood change towards something riskier and more fun as he uses his current abilities to invest in the coins he believes will gain dividend. This could be associated with CC investments made from hobby or pure excitement rather than seeking dividend purely for dividend.

A study by Cox et al. (2020) researched the investment behaviour of Dutch investors and found that 4.4% of Dutch investors show sign of compulsive gambling. Their contribution highlighted that some investors traded for fun and exitement, feelings that could be assosiated with the state of *play*. Although *play* behaviour did not have any significant connection to compulsive gambling, however it does bring forth a connection between the state of *play* and investment. Based on cited literature we hypothesise:

H3_0. Mood change is not an investment motive among CC investors.

H3_1. Mood change is an investment motive among CC investors.

3.5.   Social Rewards

Social dimensions and rewards are an important factor when it comes to gambling behaviour, and although gambling is a solitary activity for most, studies shows that the social aspect of it makes people gamble more and differently than they otherwise would if they were alone. In his article, Binde (2013) highlights three specific social rewards related to gambling; communion, competition and ostentation.

Communion can be displayed through people getting together in socializing environments to gamble. Whether it is elderly people playing bingo, or a group of friends rejoicing together at the casino or the racetrack, gambling brings people together and for many, this is the main reason they like to gamble (O'brian et al., 2004).

When it comes to competition, poker is the biggest contributor to this aspect of social rewards. Poker tournaments are being arranged and held between friends, in neighbourhoods, and at regional, national, and even international levels. At the higher levels, the competitions are so professionally arranged and held in grand locals and convention centres that it attracts people as spectators to watch their peers play, making it a meeting point and desired social events for fellow enthusiasts. Outside of poker, the competition aspect can be individually motivated depending on the gambler's own mindset, e.g., picking the right numbers over other gamblers at the roulette table can stimulate the competition within one.

Ostentation, defined as the pretentious or showy display of wealth and luxury, designed to impress is also a present factor when identifying social rewards from gambling (Binde, 2013). Ostentation related to gambling moves beyond just a display of wealth and luxury, but also includes flaring of knowledge and "skill" in an attempt to gain social recognition and status (Binde, 2013). Along with literature on intellectual challenge stated earlier, this suggests a connection between social rewards and intellectual challenge.

In general consumer behaviour theory, social scientists have identified that group memberships is a direct determinant of their behaviour, and across the consumer behaviour literature, it is evident that consumers are more susceptible to group influences when it comes to their purchasing decisions (Fernandes & Panda, 2019). As stated by Fernandes and Panda (2019) "Social influence is vital in the choice of products, as consumers tend to conform to group behaviour".

Bearden and Etzel (1982) states that since 1942 and onwards, people tend to behave in accordance with a frame of reference produced by the groups they belong to. This correlates well with Binde (2013)'s views on gambling theory, and it is also found together with investment theory and behaviour. In the past decade, society have changed their economic behaviour, going from a complete reliance on the financial system as the main source of information to becoming more self-reliance and conduct more self-investments (Klein & Shtudiner, 2015). Although Klein and Shtudiner (2015) used the words self-reliance and self-investments, this doesn't necessarily mean that people do all their research and investment decisions on their own, but rather choose themselves where to obtain this. Going back on consumer theory, people tend to group up, or surround themselves with people who have or share information that coincides with their own views and interests. With the help of SoMe and internet, joining a group or forum related to one's investment interests on Facebook or other websites are becoming more and more popular. This type of grouping of likeminded people increases the shared trust between themselves which is a key factor moving forward. Klein and Shtudiner (2015) further states that trust outweighs risk and that trust highly influences not only the individual's willingness to invest, but also invest in more riskier decisions. Furthermore (König, 2014) concluded an empirical study focusing on social influence on investment decisions with that the phenomenon of social influence is more present and higher weighted during economic downturns, leading mutual fund managers to rely more on his or her peers' decisions during these times than normal.

Copying investments from the SoMe groups or forums you're a member of gives the investor a sense of communion, and that you're in this together with someone else. This also

proves to be present in Hensley (2021)'s study of online sense of community. Going back on the last two factors on social rewards related to gambling behaviour, we believe that the same grounds for communion and ostentation is present and no different when it comes to CC investment behaviour instead of gambling behaviour.

Based on the cited literature on social rewards we hypothesise:

H4_0. Social reward is not an investment motive among CC investors.

H4_1. Social reward is an investment motive among CC investors.

3.6.   Dream of Hitting the Jackpot

The gambling motive: dream of hitting the jackpot, can be viewed in CC investments as synonym for *experiencing the ride.* This means to participate/invest early in a CC that then later significantly increases its price. This motive is highly dependent on the coin's volatility, and it is therefore of importance to review the current literature that combines the economic aspect and investors FOMO.

Baur and Dimpfl (2018) researched the underlying asymmetrical volatility of CC. They found that CCs tend to be more volatile in response to positive shock, which implies an asymmetric effect to what is seen in the stock market. They proposed an explanation where uninformed investors buy coins in greater quantities due to their fear of missing out (FOMO). This implies that because CC is a new and not yet fully understood market, the price of one coin over time will have greater oscillations, due to investors fear of not "experiencing the ride" that Bitcoin and Ethereum had. Among our research, this was one of few papers that showed the CC investors' mindset's effect on the price, and therefore compliments the importance of our research topic.

Blalock et.al (2007) researched why the market segment that creates the most income for lottery companies was people below the line of poverty. They found that desperation was a prominent factor for the purchase of these lottery tickets, and that the ambition of escaping the line of poverty increased lottery ticket purchases. This is reflected in Binde (2013) who describes long investments in lottery tickets as irrational and fuelled by the idea that they just have to win big once. The fact that the lottery tickets revenue comes from a market segment that is below the line of poverty is both unsettling and worrying for the community. In connection to investment literature, the idea that it only has to happen once could be closely associated with FOMO.

FOMO as a concept is reasonably researched, however this thesis focuses on Hodkinson (2019) as his contribution to the term includes external initiated FOMO appeals. External initiated FOMO appeals in the context CC investments allows us to reflect on how e.g., SoMe or investment stories impact the decision-making process on buying said coin. Although Hodkinson (2019) focused on general FOMO in SoMe, both social and market context, his results show that use of SoMe reduced self-esteem and increased FOMO. Regarding the success of transparent pump-and-dump schemes in contrary to the more obscure (Hamrick et al., 2021), the connection between FOMO and SoMe advertisements and low knowledge of the field could be a possible explanation for the investor's mindset. Another explanation could be that people want to experience the pump and try to sell the coin before the dump in FOMO.

As investors often desires to earn more dividend quickly and avoid any future loss, it creates a herding behaviour in FOMO (Gupta & Shrivastava, 2021). In context of this thesis, CC investors could review the gaining popularity of CC investing, and as their friends and peers start investing in CC, the group in question could engage in herding behaviour of said CC in FOMO. Loss aversion also has a positive effect on FOMO and investment decisions, as with herding behaviour, it implies greed into the investment (Gupta & Shrivastava, 2021). This entails that through the eyes of the investor, the negative effect of an investment is weighted heavier than the positive regarding investment. Therefore, investors with loss aversion tend to sell stocks that have attained a higher value in fear that the price may go down and hold on to the stocks that have decreased in value (Gupta & Shrivastava, 2021). Although herding behaviour caused by FOMO may be a factor in CC investments, the high price volatility may increase the uncertainty of the presence of short-term loss aversion.

Based on the cited literature on FOMO, we can hypothesize:

H5_0. The dream of hitting the jackpot is not an investment motive among CC investors.

H5_1. The dream of hitting the jackpot is an investment motive among CC investors.

3.7.   SoMe influence and Access

In 2022, SoMe has become a dominating marketing tool, and if used correctly it can provide endless of opportunities for individual users or organisations (Ouvrein et al., 2021). With the increasing popularity of SoMe platforms e.g., Facebook, Instagram, Reddit, YouTube, Snapchat and TikTok, individual users are able to share their knowledge and experience

across borders, continents and almost the whole wide world. Popular content creators, mainstream celebrities, and other people of interest on these platforms are considered a SoMe influencer (SMI). Due to the reach of this technology, SoMe has become the main way organisations reach their marketing goals, whether it is increasing their brand awareness, attracting new customers, changing existing attitudes towards the brand or to increase overall purchase intent (Ananda et al., 2016). Today, brands and organisations are using SMIs to market their products or services for them. This type of marketing is called "SoMe influencer marketing" and advertisements through this is either very cost efficient or can cost up to millions of dollars, depending on the size of the SMIs follower base.

This type of advertisement has also reached the financial sector with the emerge of "easy to use" investment platforms and applications such as eToro, Robinhood and Coinbase. In practise, an ad or a sponsored video will typically revolve around the content creators "personal favourited" stocks or CC as well as an offer of a free stock or sign-up bonus to the respective platform or application. Robinhood gained its success by making trading and investing easier and more accessible by removing barriers, removing fees, as well as making it even easier to open and maintain an account using just your mobile device (Pasztor, 2021). Being able to trade and invest using only your mobile device has appealed to a younger audience and Robinhood has been credited with introducing a whole new demographic to the world of investing (Pasztor, 2021).

The GameStop short squeeze in January 2021 is a perfect example to best illustrate the collective power of SoMe influence has on individual stocks. The GameStop short squeeze was orchestrated by an online investment community through the popular online messaging board Reddit, encouraging their large follower base of 2.2 million users to buy GameStop shares to squeeze out the large hedge-funds who shorted the same stock.

The CC investors demographic is an important subject to this thesis. A recent study conducted in Japan by Fujiki (2021) concludes that the typical Japanese CC investor is more likely to be young and male compared to a non-CC investor. It is reasonable assume that this description is coherent with the demographics in financial and CC based threads on Reddit and Facebook. The study shows that CC investors with significant experience has a higher level of financial literacy and overall technological understanding, as their spending habits consists of more cash less payments (Fujiki, 2021). Trust in the cryptography and perceived usefulness of the technology increases intention to use CC, as perceived risks decrease the intention use (Mendoza-Tello et al., 2019).

In general, gender does affect the investors decision making. A study conducted by Marinelli et al. (2017) researched the differences between male and female investing. Male investors are more likely to take risks to achieve a higher payoff, while women are more likely to rely on optimism and self-confidence (Marinelli et al., 2017). Furthermore, women tend to rely professional advice more often than men, although the majority of investors in today's media tend to view CC with some doubt. It is interesting to see how SMIs and overall SoMe influence is affecting either gender in their investment behaviour.

3.1. SoMe analytics

As stated previously, SoMe has an immense reach in form of potential recipients for either messages, advertisements, or analytics. The process of obtaining analytics via SoMe consists of four steps: data discovery, collection, preparation, and analysis (Stieglitz et al., 2018). Collecting data using SoMe and the internet has both advantages and challenges. Advantages include increased access and distribution speed to numerous potential respondents, respondents' openness, and full participation as well as simplicity and cost reduction related to its conduction (Rhodes et al., 2003). Related challenges identified to be issues surrounding sampling and its representativeness, competition for the potential respondent's attention. Additionally, limitations tied to the digital divide, meaning the divide consisting of those who have to internet and those who don't, and literacy must be taken into account when analysing the data (Rhodes et al., 2003).

3.2. Summary

The relevant literature is based of the five-dimensional model for gambling motives proposed by Binde (2013). *Chance of winning* reflects the investment timeframe, suggesting that gamblers with longer investment timeframe are willing to take more risk. It also describes the relevant literature of the information surrounding the investment as well as market speculation and segmentation. *Intellectual challenge* describes the general intellectual stimuli, and its associations to the state of play, and how it effects people's mood. *Mood change* reflects the literature surrounding how investor's mood affects the market, how intellectual challenges may increase the mood in a positive direction through state of play, and how investors in the past have invested only for fun and excitement suggesting the presence of compulsive gambling. The literature on *social rewards* describes the sense of communion participation a CC community may give, as well as new social groups, ostentation, and their character being

defined by their social groups. The reviewed literature ties *dream of hitting the jackpot* with ambition and FOMO. It describes herding behaviour because of FOMO, and how pump and dump schemes may abuse this. Aside from Binde's model, the last two points of our literature review has focused on how SoMe can affect the CC investor and the CC market. Relevant literature on using SoMe analytics has also been presented, describing its limitations and applications.

Table 2. Conceptualisation of the variables

Variables	*Questionnaire items*	*References*
Chance of winning	1, 2, 3, 4, 5	(Fellner & Sutter, 2009), (Clotfelter & Cook, 1993), (Tandon et al., 2021), (Kannadas, 2021), (Binde, 2013)
Intellectual challenge	6, 7, 8, 9	(Binde, 2013), (Csikszentmihalyi & Bennett, 1971)
Mood Change	10, 11, 12, 13	(Csikszentmihalyi & Bennett, 1971), (Cox, Kamolsareeratana, & Kouwenberg , 2020), (Baker & Wurgler, 2012), (Nofer & Hinz, 2015).
Social Rewards	14, 15, 16, 17	(Cox, Kamolsareeratana, & Kouwenberg , 2020), (Nofer & Hinz, 2015),
Dream of Hitting the Jackpot	18, 19, 20, 21	(Gupta & Shrivastava, 2021), (Hodkinson, 2019), (Hamrick, et al., 2021).

4. Methodology

This chapter will grant insight into our research process and how we collected and analysed the data. Firstly, a discussion of the research question's suitableness to the research method we used and the limitations it brings. Then we will go in depth of how we gathered our data from surveys and the obstacles we had to face doing so. Onwards, an explanation of the relevant models and the software programs used for data gathering and data analysis. Afterwards, a description of the Pearson's correlational coefficient used for analysing the dataset. At the end of this chapter, we are highlighting some points of ethical considerations and their relevance towards this thesis.

4.1. Rationale for methodological choices

The purpose of this paper is to determine whether or not there are similarities between CC investors' behaviour and gambling behaviour. This will be done through the series of hypotheses formulated based on the reviewed literature above. Data to answer these hypotheses could be collected through the use of two different methods of research: a quantitative or a qualitative research method. A quantitative research method gathers its data through observations, experiments and/or surveys with answers holding a numeric value. This allows the researchers to mathematically analyse the data so that the results can be expressed through numbers and graphs with statistical significance. On the contrary, a qualitative research method consists of data gathering through interviews, statements, and personal observation. These results are expressed through words, concepts or theories.

To be able to discuss the suitable research approach the research question has to be stated once more: *Are there similarities between cryptocurrency investment behaviour and gambling behaviour?* The question implies an investigation of similarities between two behaviours, therefore the question naturally aims to identify what similarities are present between gambling and CC investment. The factors this thesis is investigating has been defined in the reviewed literature. A method in which one can quantitative compare the two is therefore of high relevance. This entails that a quantitative research method would be best suited to answer the research question.

In addition to this, a qualitative study would most likely require locating and interviewing CC investors, which would be very time consuming. On the contrary, a quantitative research method is more suited to test or confirm theories and assumptions, as

well as attribute to establishing generalisable findings regarding a certain topic. Additionally, the process of gathering data from respondents through a quantitative research method done over the internet provides a larger reach and scope of respondents, compared to physical handouts or participations. Collecting data using SoMe and the internet has both advantages and challenges. As reviewed in chapter three, these advantages include increased access and distribution speed to numerous potential respondents, respondents' openness, and full participation as well as simplicity and cost reduction related to its conduction (Rhodes et al., 2003). Related challenges identified to be issues surrounding sampling and its representativeness, competition for the potential respondent's attention.

4.2.　　Data gathering, collection and sampling

To gain a better understanding whether or not CC investment behaviour had similarities to gambling behaviour a survey of motives, choice of coins, investment horizons and risk assessment was conducted. The survey was constructed on SurveyXact, a sufficient software for developing questionnaire-based surveys. SurveyXact is user-friendly data gathering software tool, which allows for survey distribution from the researchers to the respondents via URL links. For this thesis, the option to publish the survey in different groups at the same time and with easy access for respondents was crucial for the data gathering process. The data were collected between 21st of March and 23rd of April 2022. Initially, the survey was primarily aimed at crypto investors in Norway through two popular online communities "Kryptovaluta Norge" and "Kryptoforum – Lær og diskuter kryptovaluta", in which both are heavily administrated Facebook groups. These two communities had a member count of over 51,000 members combined, actively discussing CC at the time the data gathering was conducted. These groups are predominantly focused on the CC market and through discussions and posts they are keeping their members updated on the current CC movements and news. Because of the moderation, a confirmation from the group administrators or moderators dependent on the group management, in order to publish the survey. This is partly because a statistical survey was considered a "grey area" in many the groups' rules created by the administration. Additionally, external URL links has to be screened for acceptance, due to the threat for viruses and scams. However, the screening and acceptance process proved to be troublesome as many of the group administrators or moderators were not willing to respond when contacted. Nevertheless, those who replied were generally positive to the study and allowed the survey to be published as long as the comment section was disabled.

Since the research problem didn't impose a limit such as nationality, a decision was made to broaden the scope and try to gain international respondents as well. The survey was then distributed online through several other internationally Facebook groups. These groups were "Bitcoin & Cryptocurrency Investing for Beginners" with >83 000 members, and "CryptoCurrency & Blockchain: Bitcoin | Altcoin | Trading | News | Analysis" with >114 000 members.

Although the survey was submitted and distributed across four different Facebook groups, with a combined total of over 245,000 members, the collection of data on this topic proved to be more challenging than initially thought. Bear in mind that although the potential amount of people who could hypothetically have seen the survey is extremely high compared to the actual participants, it is important to know how the Facebook distribution algorithm works and the amount of spam, scam referral-links etc gets posted in these groups daily. The Facebook algorithm is based on the amount of likes and comments a post gets. Thus, the more interactions a post gets, the more users will have it appear in their newsfeed. Since there was no prior engagement regarding this thesis, nor established personal reputation in these groups, the amount of likes and comments on the posts containing the survey experienced were rather low. The low amount of interactions resulted in a generally low visibility to the audience, causing a low response rate on the survey. In an attempt to increase the number of respondents, the survey was active for participation for a longer period than originally planned, while continuously trying to gain access to other groups without success. Due to time restraints the data analysis had to begin on the 23rd of March. With this in mind, the data extracted from SurveyXact showed 97 complete responses and 29 incomplete, which was not ideal. After cleaning the dataset, the total amount of eligible respondents was N = 95. The questionnaires removed was either marked incomplete, marked complete but missing a lot of answers or under the age of 18. With the unrealistic assumption that the survey reached every group member possible, our average response rate is less than 0,04 percent.

A sample size of 95 is considered a small sample size and will in most cases degrade the reliability of the research's outcome. In relation to this thesis, there are multiple factors defined in the literary review, and a smaller sample size increases the margin of error regarding any findings of correlation between them. A smaller sample size also increases the risk that the participants do not accurately reflect the general public's actions, views, or motives, and that the variation of the sample could be causing a false result. In other words, the lack of statistical power of the survey increases the likelihood of our significant findings

(*p < 0,05*) not to be generalisable. This needs to be taken into consideration during the whole thesis and is discussed further during the section of the thesis containing its limitations.

As in every social economic study, uncovering the demographics of the respondents is key for analysing patterns. Since current research tend to view CC investments as male dominant, demographics of CC investments gathered from this data collection could enhance the current understanding behind CC investments. The survey addressed demographics including age, gender, level of education as well as employment. It was decided to include level of education under demographics by sorting the participants based on their education being either, primary school/secondary school, high school, bachelor, and master's or PhD. This was done to see if education played a significant role in their investment behaviour based on the seemingly "advanced technologically nature" of crypto.

Furthermore, questions addressing which type of CCs they have invested in (small-cap, mid-cap or large-cap) in addition to their risk assessments and investments horizons. These combined with their demographic makes it possible to see whether or not gambling behaviour is present through their answers on a series of statements related to motives, behaviour, and their personal view on CC. This series consists of 21 statements answered on a Likert scale from 1-7 with 1 representing the answer "strongly disagree" and 7 being "strongly agree" respectively.

4.3. Tools and Choice of Analysis

Due to the difficulty of obtaining a big enough sample size, it proved to be unreasonable to perform an analysis through regression and factor analysis. Comparative analysis was also excluded due to the data not meeting the required threshold. One reason for this was again the low response rate of the survey, as dividing the dataset into more groups would lead to fewer respondents in each group. After trial and error through different types of analysis methods, we had to choose the remaining method that gave the most accurate results in order to best answer the research question, which was a correlational analysis with Pearson's Correlation Matrix. This matrix is a statistical analysing method determining the correlation measure that allows us to view the relationship between two or more variables or factors.

In order to fully comprehend the matrix, there needs to be an understanding of the underlying value that compiles it; The Pearson correlation coefficient (Pearson's *r*). Pearson's *r* is a useful measure that enables researchers to analyse the relationship between two variables. More specifically, it provides an understanding of the strength of the linear

relationships between two variables (Sedgwick, 2012). The coefficient ranges from -1 to 1 indicating a negative or positive relationship respectively. A Pearson's *r* of 0 shows no relationship between two variables. To verify the Pearson's *r*, a test of significance should take place, where the following null hypothesis must be tested: *There is no correlation between the two variables*. Pearson's r is simple, but the most used correlation coefficient. Mathematically Pearson's r is calculated by dividing the values covariance by their standard deviation:

$$r = \frac{cov(X,Y)}{\sigma_X \sigma_Y} = \frac{\frac{1}{n}\sum_{i=1}^{n}(X_i - \bar{X})(Y_i - \bar{Y})}{\left(\sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(X_i - \bar{X})^2}\right)\left(\sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(Y_i - \bar{Y})^2}\right)}$$

Covariance [*cov(X, Y)*] like correlation is a measure of the linear relationship between two variables and its direction. Standard deviation [σ] measures the average deviation from the mean. Noteworthy, dividing the two scale dependent variables with each other, makes the Pearson's *r* scale independent.

The Pearson correlation matrix is a way to illustrate correlation between several variables in one model. By having all the variables on the X- and Y-axis, it is possible to view how one value on the X-axis correlates with another on the Y-axis, illustrated in table 3 in chapter five. The tool used for analysis is IBM's data analysis software SPSS Statistics (SPSS), which is specifically designed for analysing and managing social science data. However, the demographic illustrations in this thesis is created using Microsoft Excel with the same dataset, as its easier to illustrate demographics through diagrams in this program.

4.4.   Ethical considerations

When conducting research, regardless of the topic or the outcome, it is every researcher's responsibility to do so ethically. In order to avoid the temptation of manipulating the research to fit your narrative, conflicts of interests or disclosing private information, which are all common pitfalls when conducting research. Diener and Crandall (1980) presented various ethical concerns to be aware of within the three main areas of research: (1) relationship between society and science, (2) professional issues, and (3) treatment of research participants. The relationship between society and science is often what dictates which topics and problems gets financially funded for further research, simply put, the society's view on

said topic's actuality and importance outweighs other factors. Professional issues are mainly research misconduct, which is a term for fabricating, falsifying, and/or plagiarizing the proposing, preforming, reviewing, or reporting of research results. On top of this, it is important to tread carefully when it comes to the treatment of your research participants. It is extremely important that the participants are aware of where their information will be used or posted if there is even the slightest chance of anyone being able to identify them based on their given information. Doing so without the participants consent is illegal.

Since our research consists of uncovering individuals' demographics, perspective on CC, their thought process behind investing and their economic situation overall, a decision was made to keep the survey 100% anonymous and the use of its data with utmost confidentiality and for this thesis only. Before starting the survey, the potential respondents are informed of the anonymity and use of its data, the survey then proceeds to ask whether or not they wish to continue in light of this information. By informing about the data usage as well as allowing the participants to choose freely if they want to participate or not, an informed consent is gained from the respondents. This is crucial for researchers in order to be able to analyse the data in good faith.

There is an age limit of 18 years old to invest in CC through banks and other investment platforms. Although there are ways around this by e.g., having your parents or older relatives invest for you, due to the official age restriction on the matter, respondents below 18 years of age was excluded from the analysis.

5. Analysis and results

In this chapter we will describe how the correlation analysis was conducted in SPSS, and the results it gave. However, the interpretation and discussion of the results in light of relevant theory will take place in chapter six.

5.1.   Correlation analysis

In order to conduct the correlation analysis there was a need to replace the missing values in some of the respondents' data entries. This was identified using the *frequencies* function in SPSS. After identifying the missing answers, which were few, a function in SPSS was used to replace the missing values with the series mean, which resulted in a consistent number of responses per question. However, replacing missing values with the series mean can, in some circumstances, be unadvisable. This is dependent on the spread of the answers and the scale its measured. If measured on a scale from 1 to 1.000, and most respondents answer under 100 while some answer close to 1.000, the series mean could be unrepresentative of what an actual respondent would answer. However, in this thesis' dataset, the missing answers were on a Likert scale from 1 to 7, where the series mean reasonably reflects the missing answers.

Because this is a correlational study, it proved to be more reasonable to combine different questions into categories. Therefore question 1, 2 and 3 in the main survey became investment horizon. This is because the questions, though listed under chance of winning, reflects its time frame aspects. Furthermore, question 4, 5 and 20 became risk tolerance, because they represent the respondents' view and attitude towards the risk involved in CC investments. Although question 20 is originally viewed under the dream of hitting the jackpot, it represents the risk tolerance involved with the investments and therefore had to be included as such. Question 6, 7, 8 and 9 became intellectual challenge, as reflected in the reviewed literature and the five-dimensional model of gambling motives by Binde (2013). Likewise, question 10, 11, 12 and 13 became mood change, whilst question 14, 15, 16 and 17 became social rewards. Question 18, 19 and 21 has been rephrased as ambition, hence the dream of hitting the jackpot does not perfectly reflect the potential mindset of a CC investor as much as it does a typical gambler.

The new variables were computed in SPSS by summarising the new variables' questions and dividing them by the number of questions within that specific variable. Because some of the questions in the same new variable was phrased in different direction, we had to reverse the respondents' answers, so that strongly agree became strongly disagree, agree

became disagree and so forth. The new variables then served as input for the Pearson correlation matrix.

5.2.   Results

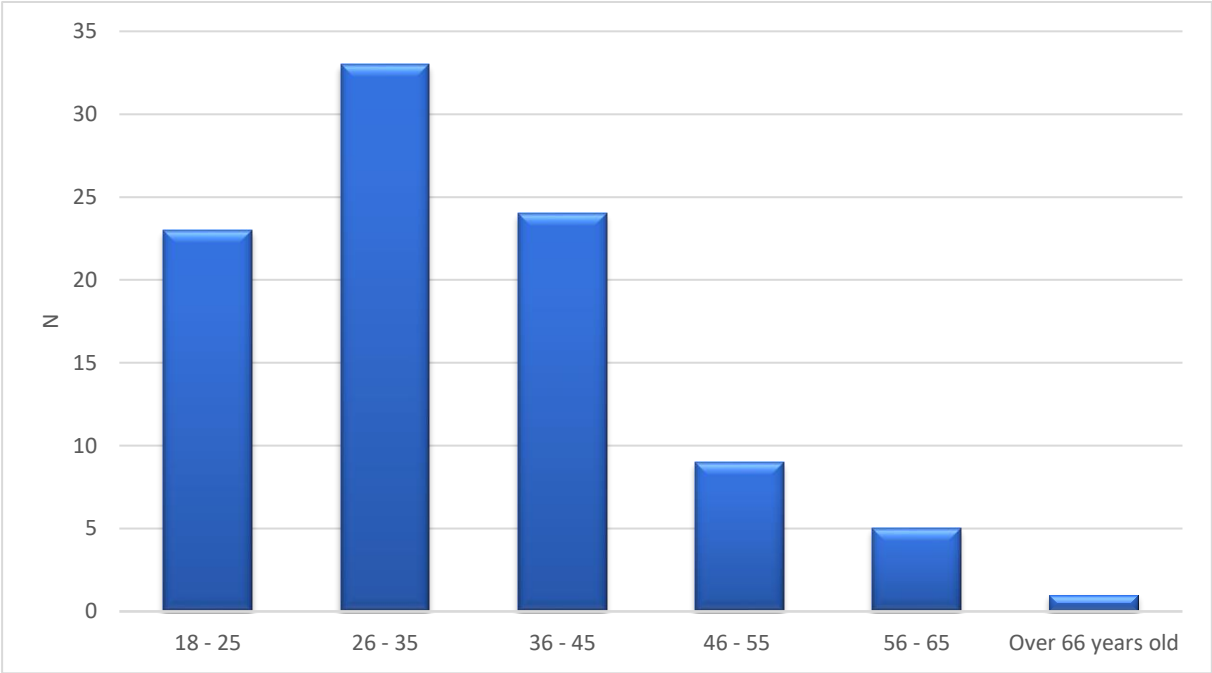After cleaning and analysing the data through SPSS the following demographical results was found.

Figure 1. Demographics - Age

In the demographic segment Age, a total of 84% percent of the respondents were below the age of 45 where 35% of these were within the age group 26-35, 25% within the age group 36-45 and 24% within the age group 18-25. Respondents over 45 years came to a total of 15 respondents where nine were within the age group 46-55, five within the age group 56-65 and one within the age group 66+.
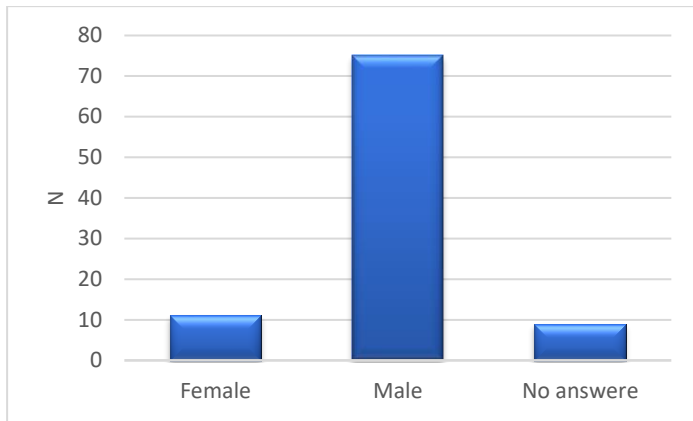
Figure 2. Demographics – Gender

The demographic segment Gender had four options; "Male" "Female" "Other" and "I choose not to answer". Out of the 95 data entries, 78,9% of the respondents were male, 11,6% female and 9,5% chose not to disclose this information.
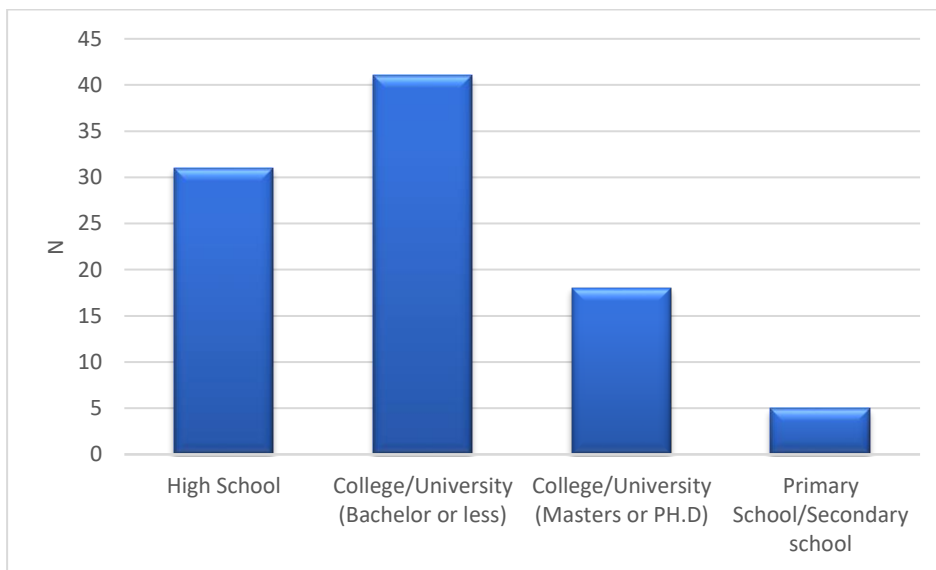

Figure 3. Demographics – Education

Out of the 95 data entries, the segment Level of Education shows that 43,2% of the respondents has a bachelor's degree, 32,6% of the respondents has a High School diploma as their highest level of education, 18,9% of the respondents has a master's degree and 5,3% of the respondents answered Primary/Secondary school (10years of school).
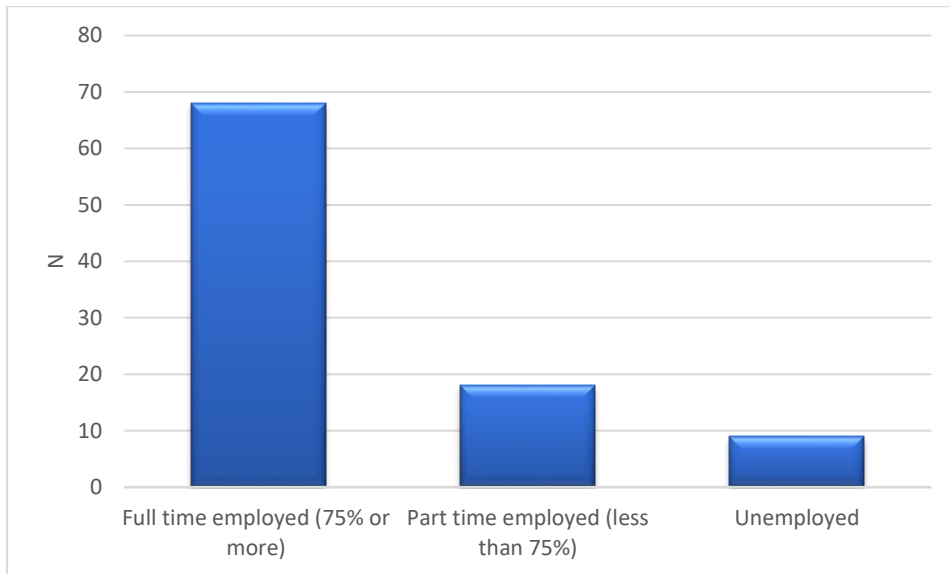
Figure 4. Demographics - Employment

Lastly, the segment Employment tells us that 71,6% of the respondents are full time employed, 18,9% part time employed and 9,5% are unemployed.
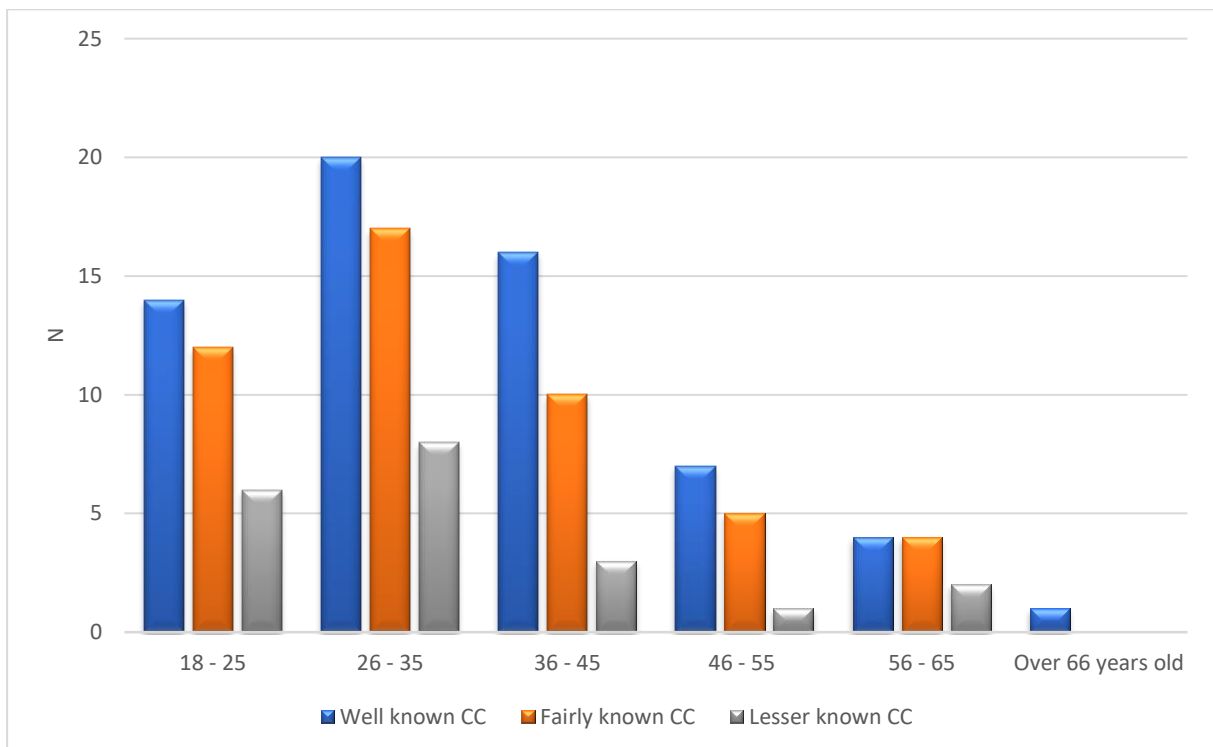
Figure 5. Age distribution and CC category

Looking at the age distribution on the different invested CC has a fairly reasonable spread and does not propose any relevance for the discussion.

Looking at the demographics it is clear that the majority of our respondents can be defined as employed individuals of 45 years of age or younger, predominantly male with a level of education of a bachelor's degree or higher.

Table 3. Pearson's Correlation Matrix

Correlations

		investment_horizon	risk_tolerance	social_rewards	Intellectual_Challenge	Mood_Change	Ambition
investment_horizon	Pearson Correlation	1	,279**	,162	,309**	,244*	,251*
	Sig. (2-tailed)		,006	,117	,002	,017	,014
	N	95	95	95	95	95	95
risk_tolerance	Pearson Correlation	,279**	1	,135	,371**	,244*	,225*
	Sig. (2-tailed)	,006		,191	<,001	,017	,028
	N	95	95	95	95	95	95
social_rewards	Pearson Correlation	,162	,135	1	,204*	,249*	,183
	Sig. (2-tailed)	,117	,191		,048	,015	,076
	N	95	95	95	95	95	95
Intellectual_Challenge	Pearson Correlation	,309**	,371**	,204*	1	,177	,144
	Sig. (2-tailed)	,002	<,001	,048		,086	,163
	N	95	95	95	95	95	95
Mood_Change	Pearson Correlation	,244*	,244*	,249*	,177	1	,182
	Sig. (2-tailed)	,017	,017	,015	,086		,078
	N	95	95	95	95	95	95
Ambition	Pearson Correlation	,251*	,225*	,183	,144	,182	1
	Sig. (2-tailed)	,014	,028	,076	,163	,078	
	N	95	95	95	95	95	95

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Numbers adjacent (**) reflects the two variables that correlates with each other on a 99% confidence interval meaning there is only allowed 1% chance of errors in the result. Numbers adjacent with (*) is on the 95% confidence interval allowing 5% chance of errors in the results. This means that we can be 99% or 95% sure that we don't make a type one error when rejecting the null hypothesis: there is no correlation between the variables. Results from both intervals show significant values and proves a statistical connection between the variables. This allowed us to go forward with the analysis of the different correlations and interpret the meaning behind them.
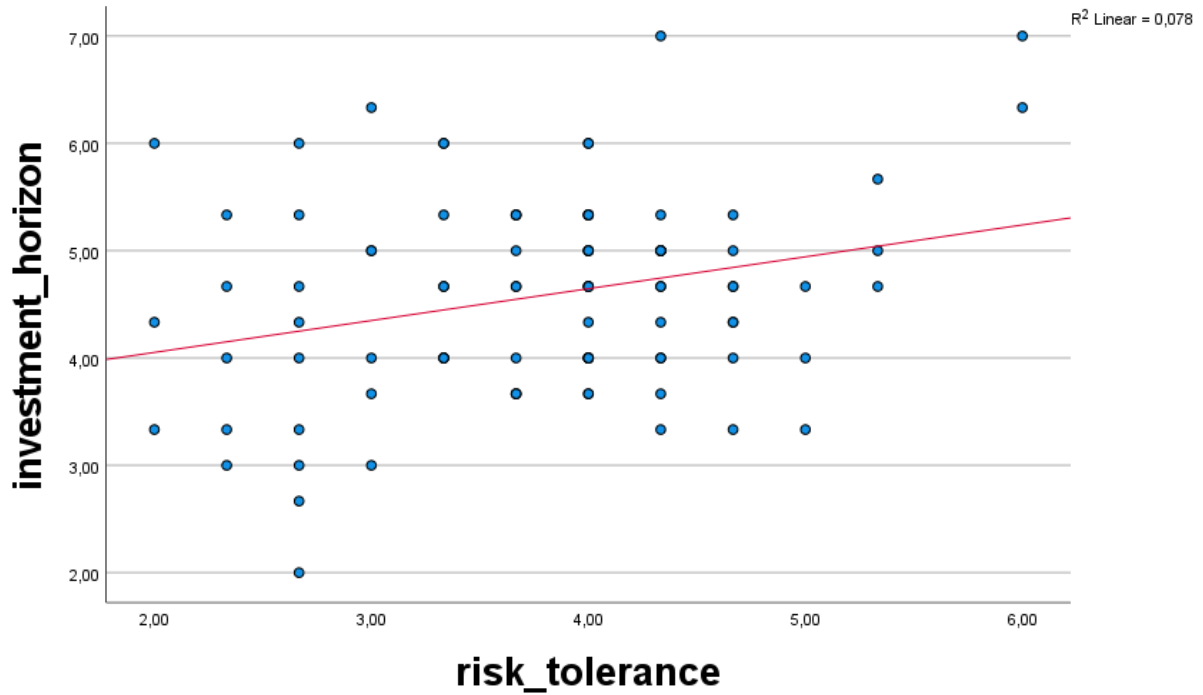
Figure 6. Investment horizon and risk tolerance scatterplot

Investment horizon and risk tolerance scatterplot shows a linear correlation (R = 0,279) at (p < .01) significance level. (R^2 = 0,078), thus the regression line explains 7,8% of the variance between the two variables.
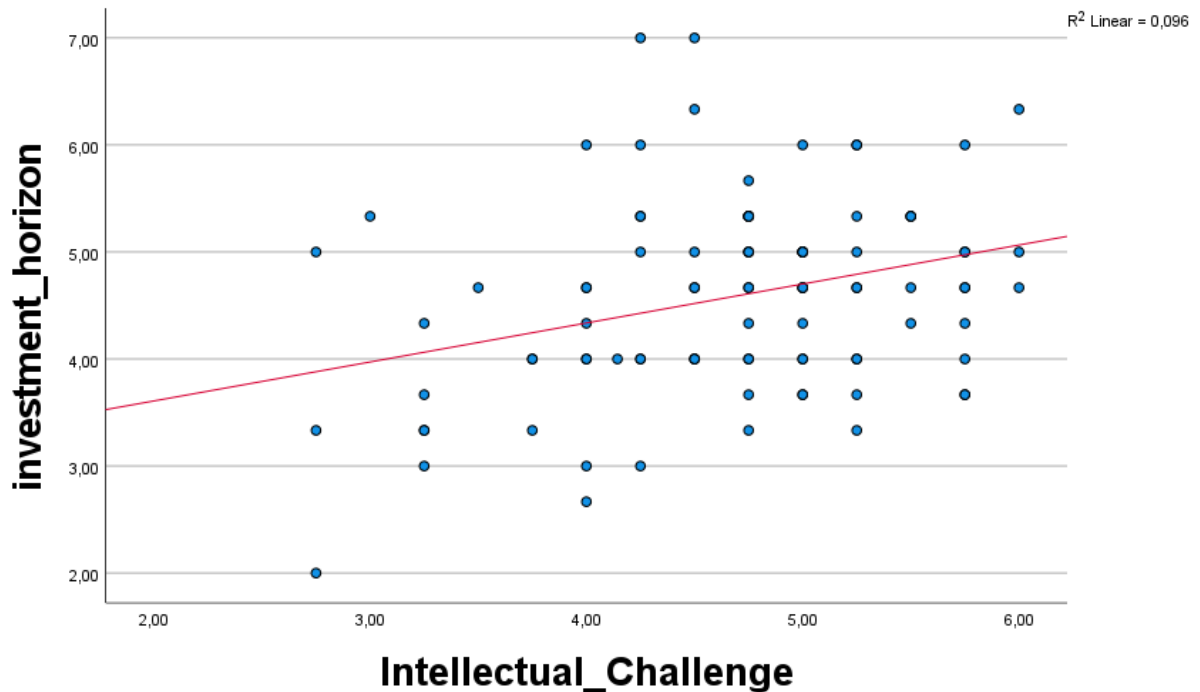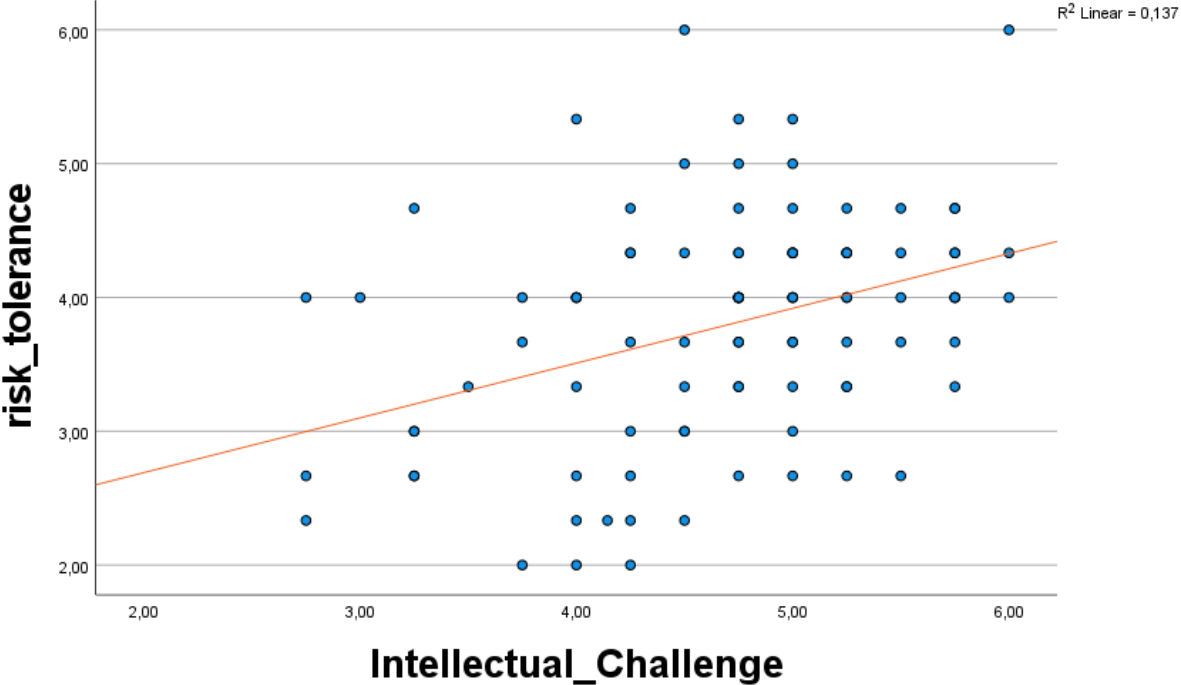

Figure 7. Investment horizon and intellectual challenge scatterplot

Likewise, investment horizon and intellectual challenge scatterplot shows a positive linear correlation (R = 0.309) at (p < 0.01) significance level. (R2 = 0.096), thus the regression line explains 9,6% of the variance between the two variables.


Figure 8. Risk tolerance and intellectual challenge scatterplot

Risk tolerance and intellectual challenge has a positive linear correlation (R = 0,371) at (p < 0,01) significance level. (R^2 = 0,137), thus the regression line explains 13,7% of the variance between the two variables.
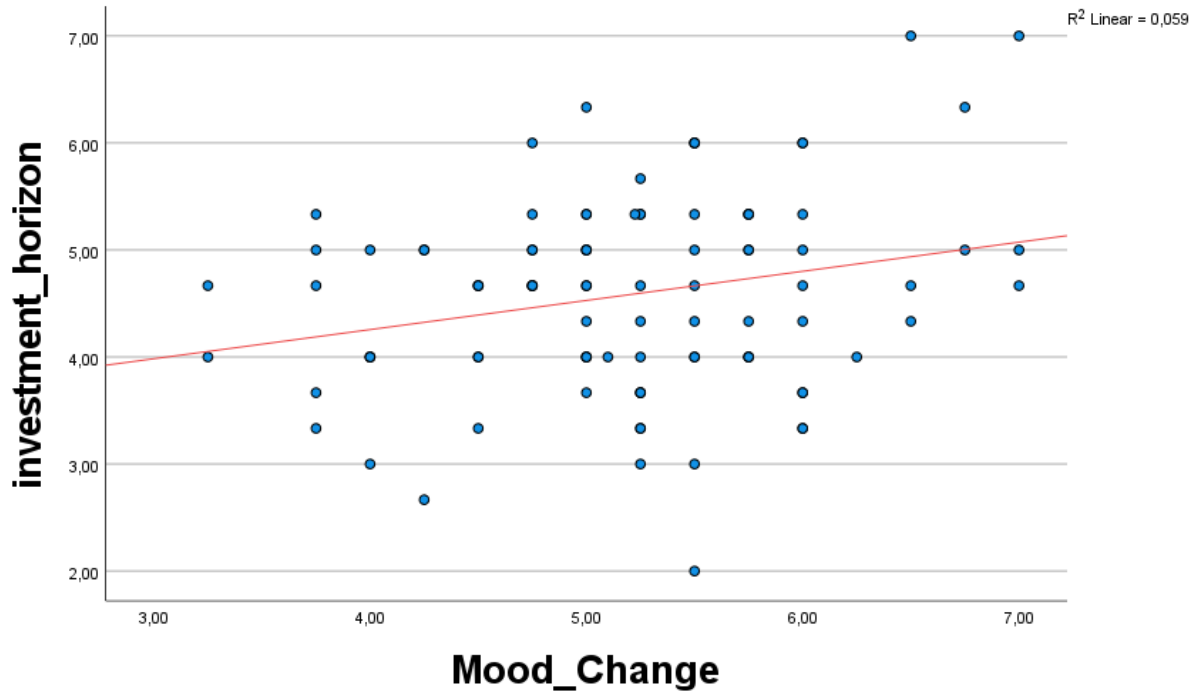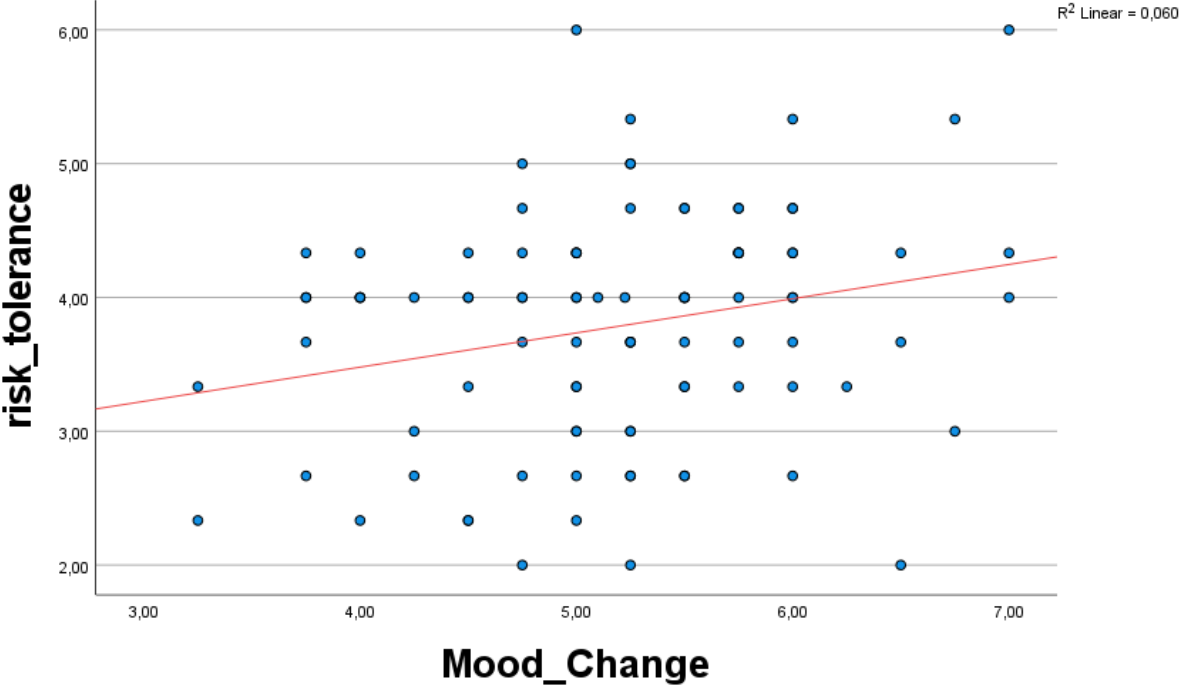
Figure 9. Investment horizon and mood change scatterplot

Investment horizon and mood change scatterplot shows linear positive correlation (R = 2,44) at (p < 0,05) significance level. (R^2 = 0,059), thus the regression line explains 5,9% of the variance between the two variables.
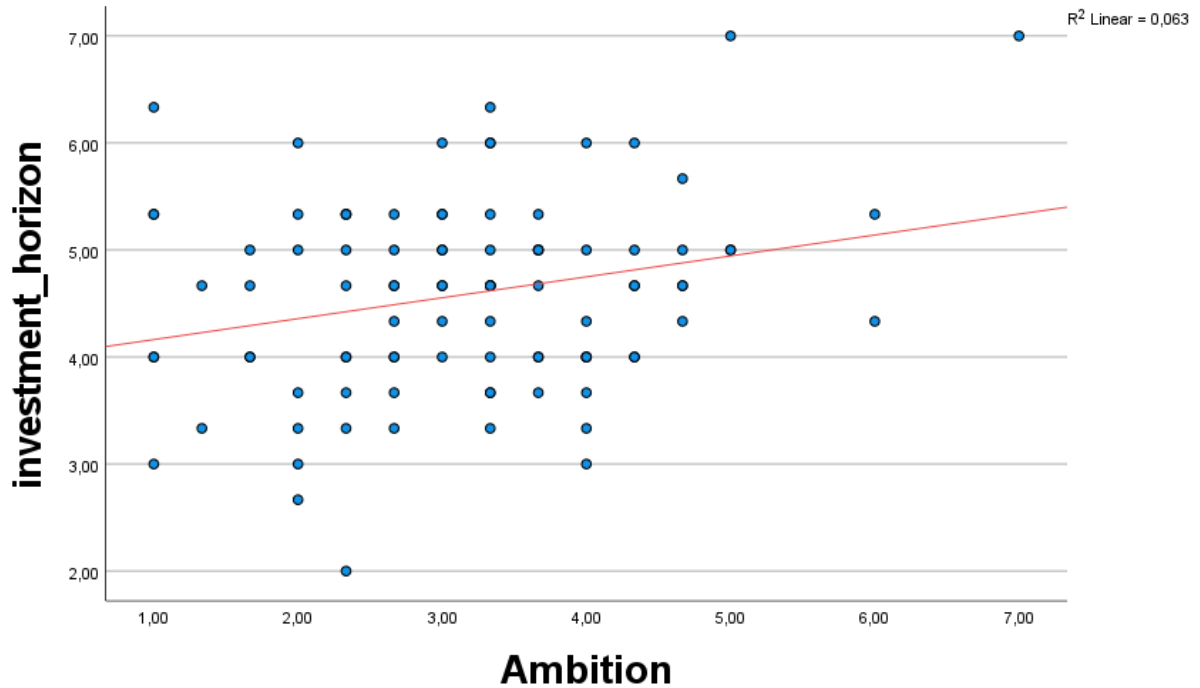
Figure 10. Investment horizon and ambition scatterplot

Investment horizon and ambition scatterplot shows a linear positive correlation (R = 2,51) at (p < 0,05) significance level. (R^2 = 0,063), thus the regression line explains 6,3% of the variance between the two variables.

Figure 11. Risk tolerance and mood change scatterplot

Risk tolerance and mood change scatterplot shows a linear positive correlation (R = 2,44) at (p < 0,05) significance level. (R2 = 0,060), thus the regression line explains 6,0% of the variance between the two variables.

Figure 12. Risk tolerance and ambition scatterplot

Risk tolerance and ambition scatterplot shows a linear positive correlation (R = 0,225) at (p < 0,05) significance level. (R^2 = 0,051), thus the regression line explains 5,1% of the variance between the two variables.

Figure 13. Social rewards and intellectual challenge scatterplot

Social rewards and intellectual challenge scatterplot show a linear positive correlation (R = 0,204) at (p < 0,05) significance level. ($R^2 = 0,041$), thus the regression line explains 4,1% of the variance between the two variables.
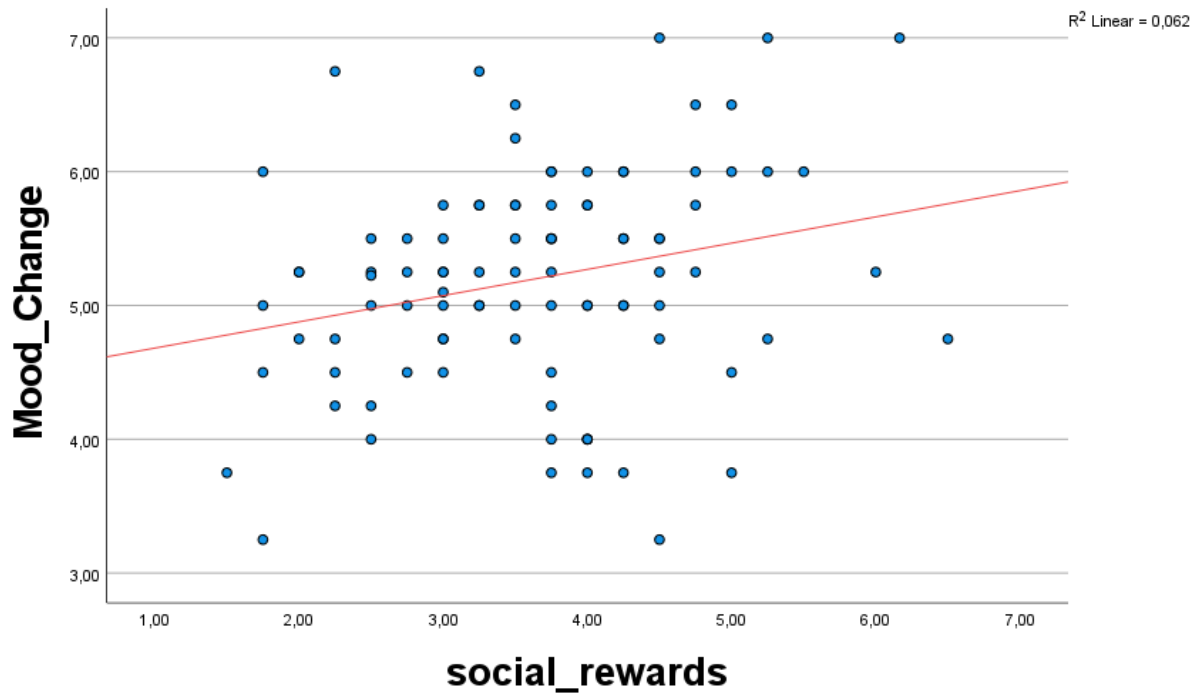
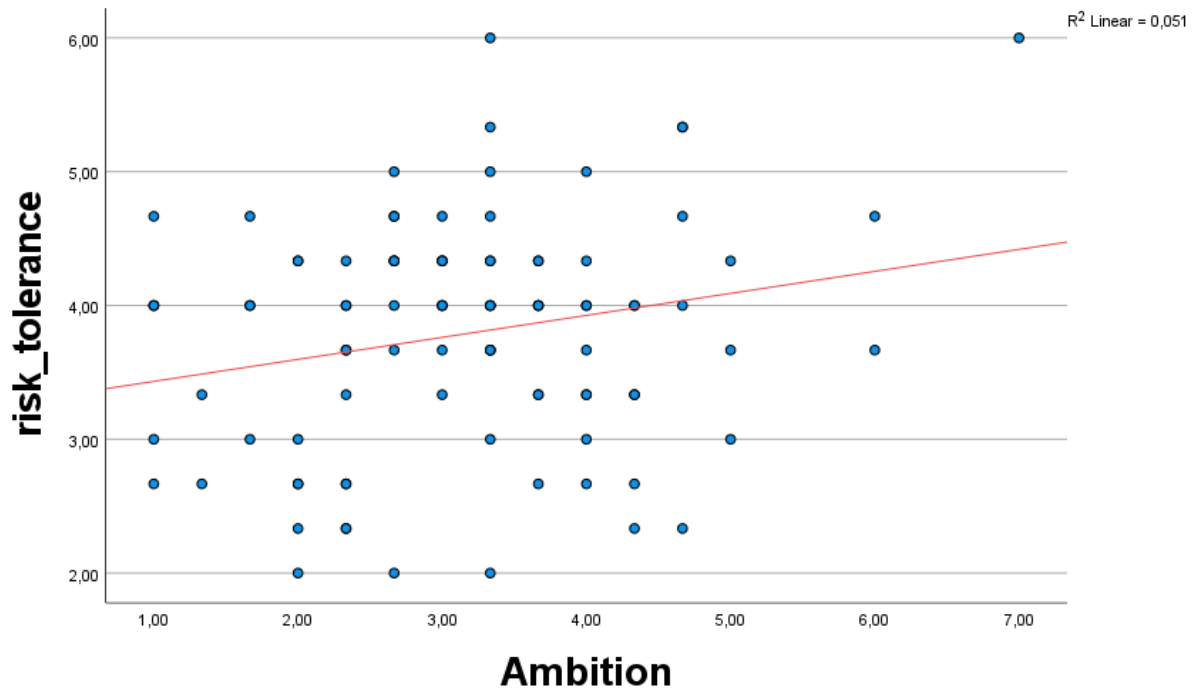**Figure 14.** Mood change and social rewards scatterplot

Mood change and social rewards scatterplot shows a linear positive correlation (R = 2,49) at (p < 0,05) significance level. (R^2 = 0,062), thus the regression line explains 6,2% of the variance between the two variables.

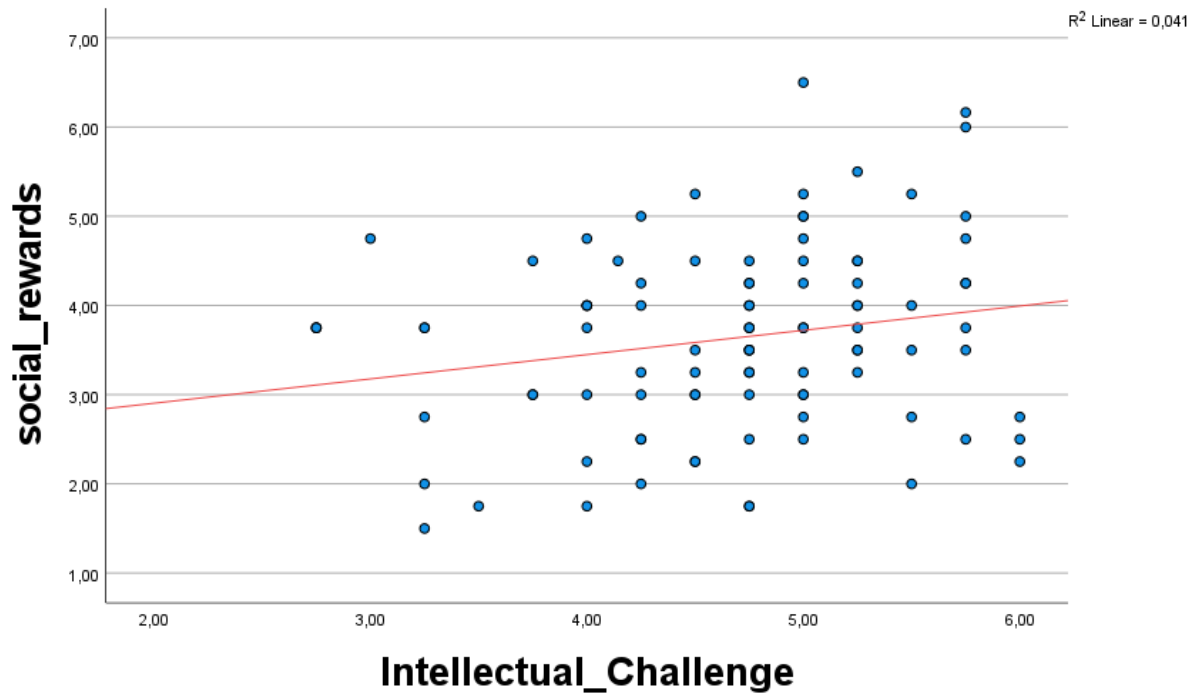All the correlation variables can be described as weak correlation as they are all below R = 0,4 with the strongest of them being the correlation between risk tolerance and intellectual challenge at R = 0,371. However, all the presented correlations are significant at *p < .01* or *p < .05*.

6. Discussion

The purpose of this thesis is to explore any linkage between CC investment behaviour and gambling behaviour and investigate this research gap. Within the research field of CC there are prior research related to its origin, function, potential use, and its future, but few have researched the different variables that affect the decision to invest in this rather unknown type of currency, even less have drawn the comparison of behavioural similarities to other known fields of studies. This thesis offers an insight into the different perspectives, aspirations and motives people generally have when conducting either gambling or CC investing. Furthermore, the thesis investigates whether or not there are similarities between the two. From analysing the data, we found no connections between certain demographics and their investment choices. Even so, due to challenges and limitations during the methodology, these potential findings are distinguished from our research question regardless. Onwards, only results from analysed data that directly affects our research question will be discussed further in light of the relevant literature reviewed during chapter three.

The preliminary research of this thesis determined that Binde (2013) recognized the most typical and essential behavioural patterns and motives within the spectrum of gambling. This article consists of prior relevant research within the different dimensions in the realm of gambling, put into a model depicting five motivational aspects. This model is our theoretical anchor point for the sections associated with gambling in this thesis. Furthermore, we found that prior research on CC as an investment option lacked defining motives and behavioural patterns that is typical of a CC investor. In an attempt to uncover this, it was decided to gather data from CC investors and analyse them in light of gambling theory. The grounds for doing so is due to the current rather unknown and risk filled state of CC in today's market. In addition to this, CC is heavily influenced by the marketing power of SoMe subduing the masses to attempt to recreate the few success stories of early CC investors. This thesis answers the research question "*Are there similarities between cryptocurrency investment behaviour and gambling behaviour?*" by using the empirical data in the correlation matrix in order to answer the five hypotheses presented. According to the five-dimensional model of Binde (2013), in order to successfully claim that there are similarities between CC investors and gamblers, H1 has to be proven true, along with one of the other hypotheses. This is because H2-H5 reflects the optional gambling motives, in which only one has to be present.

Without going in depth about the demographic results, our analysis of the empirical data shows that the typical CC investor can be defined as an employed predominantly male

individual of 45 years of age or younger, with a level of education consisting of a bachelor's degree or higher. Based on the prior research done by Fujiki (2021), this checks out to be consistent with our findings and helps to support the validity of our respondents. After further analysis of the dataset, the Pearson correlation matrix gave us three points of significant correlation between variables at p < .01 significance and six significant correlations on the p < .05 significance. Per the results from the correlation matrix, it is clear that the typical CC investor's actions, motives and perspectives show a significant correlation between intellectual challenge and investment horizon, intellectual challenge and risk tolerance as well as investment horizon and risk tolerance. These three findings, although they are significant and possess the strongest values of correlations on a 99% confidence interval, we deem themselves alone not to be enough to draw similarities between a CC investor and a gambler. The correlation of risk tolerance and investment horizon does not come as a surprise for us considering general investment theory highlights that risk is determined by the investment horizon, meaning, the longer the horizon, the higher risk one is willing to take. It is however important to notice the correlation which intellection challenge has on investment horizon and risk tolerance as this plays an important role going forward in the discussion. These two correlations may contribute to describe the underlying risk CC investors are willing to take depending on the investment timeframe, which matches regular investment behaviour. The findings suggest that the general view is that those who believe CC is a long-term investment does so because of its high risk. It also means that those who believe CC is less than long term, i.e., mid-term, or short-term, reduces their risk tolerance accordingly. This also suggest that the underlying investment knowledge is coherent with that of Stix (2021) where it states that CC owners possess a higher level of investment knowledge compared to non-CC owners. Also, bear in mind that this correlation is of high significance $(p < .01)$, however it does not explain a sufficient share of the variance $(R^2 = 0,078)$. Therefore, the correlation is present, however it does not explain everything.

Furthermore, the effect of intellectual challenge on these correlations can be explained by several factors tied to the relevant literature. Although no one can predict the future with one hundred percent certainty, there are a lot of people who thrive on knowing enough information to try and successfully do so. Like the traditional stock market, the CC market is affected by the same or perhaps even more variables deciding why investors choose to buy or sell the respective stock/coin ultimately deciding the prices, e.g., FOMO and herding behaviour (Hodkinson, 2019; Gupta & Shrivastava, 2021). In gambling theory, Binde (2013) highlights the different amount of risk-taking a gambler is willing to do in chance games

compared to skill games. This is backed up by the typical gambler's perception that knowledge of the game is directly affecting the outcome or potential winnings. This perception is based off of certain games allowing the gambler to be "in charge" of directions the game takes, or decisions such choosing their own cards and actions during an active game session in skill games. Hence, if the gambler is perceiving him/herself as knowledgeable in the certain game, he or she is therefore more willing to bet on himself/herself. By doing so, the gambler takes more risk compared to when participating in chance games where the outcome is mathematically generated by an equation. Successfully winning on skill games contributes to an intellectual stimulus for a typical gambler. On the investment side of things however, this is normal behaviour among investors, although this specific correlation is not necessarily isolated to CC investors alone. This combined with their views on risk tolerance versus investment horizon is noteworthy going forward. This means that their perception of risk tolerance based on their knowledge and investment horizon is shared with CC and regular investors. Furthermore, there are signs that indicate a social acknowledgement tied to a successful CC investor within the respective communities. A fair assumption is that this acknowledgement acts as an incentive for individuals to put in the effort to acquire deep knowledge about trends, the specific technology behind certain coins, and the market in general. This assumption is backed up by the significant correlation of intellectual challenge and social rewards which plays an important role in strengthening the grounds for rejecting the null hypothesis for H2, reflecting that intellectual challenge is an investment motive among CC investors.

Social rewards is an important factor in gambling literature, and was found to correlating significant with several variables in this thesis' survey as well. The findings on the correlation between social rewards and intellectual challenge is suggesting a presence of ostentation within CC investors. As described by Binde (2013) the ostentation aspect of social rewards regards the display of wealth and flaring of both knowledge and skill. Social rewards related to CC investment covers everything from sense of communion to ostentation. In addition, the results from the remaining questions related to social rewards proved to be accurate with our experiences during the relatively short period of time in these CC communities. There was high levels of enthusiasm and engagement from the members regarding several topics, but it is however, important to keep in mind that the main deciding factor behind a CC's price is its demand. Therefore, a perceived "helpful" member might have a personal economic gain from advising and encouraging other members to invest into a specific coin, drawing similarities to pump-and-dump schemes (Daniel et al., 1998; Hamrick,

et al., 2021). This type of behaviour was more present in the international Facebook groups we collected data from, perhaps due to their large member count and the possibility of being able to "hide in the masses". Whereas in the Facebook groups for Norwegian members only you would most likely be more visible and held accountable if you were to attempt such tactics.

Social rewards also correlated with mood change, meaning that the more they seek social rewards, the higher their search is for a mood change. Suggesting that people who engage in CC investments tend to show they are making decisions aided by their current mood. Our questions related to mood change was primarily surrounding the premise of what type of actions the respondent were most likely to do when they were bored. Based on this, our respondents were more likely to engage in discussions in their respective communities surrounding CC when bored. This suggests that CC investors participate in online discussions and forums to feel part of a community, as reflected by the findings of Hensley (2021). Engaging in discussions typically leads to more involvement overall and a result of this might be the temptation to invest based on others advice, gain more friends or acquaintances, or stimulate the sense of communion and feel you're a part of something bigger. This also effects one's mood. These are important motives in the realm of gambling as well. According to the Binde (2013), social rewards are the main reason as to why many people participate in gambling. Social events such as bingo for elderly, or a setting such as visiting a casino with a group of friends or participating or spectating a poker tournament. These are examples where the gambling itself may come secondary, and thus making social rewards the main motive. This can be compared to actively engaging in discussions related to CC on one or more online messaging boards or face to face in public with friends or likeminded people.

Mood change also correlates with investment horizon. This correlation suggest that people are more likely to invest in long-term CC in an attempt to maintain interest and excitement ultimately affecting their mood positively in the long run. This is coherent with Cox et al. (2020) who suggested that some investors trade for fun and excitement. Fun and excitement are feelings which could be associated with Csikszentmihalyi and Bennett (1971) description of the state of *play*. What is interesting in this correlation is that those who view CC as a medium-term or short-term investment are less mood change oriented in the manner of the variance explained ($R^2 = .059$). This also suggests that there is a connection between mood change and chance of winning according to the model of (Binde, 2013).

Furthermore, an interesting correlation that was detected was between mood change and risk tolerance. These findings could be explained with Otto and Eichstaedt (2018)

findings that mood states and language usage of gamblers is a significant factor for risk tolerance. Intuitively, in light of gambling theory, those who seek to change their mood to a more positive would invest with higher risk in order to create some excitement (Binde, 2013). This suggests that the findings of Cox et al. (2020) is present in this research, where the need for a state of *play* would increase the investor's risk tolerance. This phenomenon can be seen in gambling as people gamble in different risk-based games for pure excitement alone and to experience the thrill and excitement of the high-risk high reward factor. Looking back on the discussed correlations tied to social rewards and mood change, we can use this information to argue for the hypotheses H4 and H3.

Last of the alternate gambling motives, is the review of the underlying factor in many forms of gambling, the dream of hitting the jackpot, which for the sake of this correlation study was transformed into the variable ambition. As discussed earlier, ambition correlates significantly with risk tolerance and investment horizon. It is without doubt that investors choose to invest in order to make money either it is short or long term, however it seems that ambitious investments are long term oriented, as they one day hope that one of their investments will create large earnings. This means that timeframe as an aspect is important in the understanding of CC investment behaviour. Also, it separates CC investment from gambling in that gamblers has a defined short-run timeframe. However, ambition applies to gambling as well where winnings are present every turn, as well as the chance of hitting the jackpot. This also suggests that the findings of Blalock et.al (2007) where this underlying ambition made poor people invest a disproportionate amount of their income in lottery tickets.

The correlation between investment horizon and ambition could indicate a high perceived chance of making easy money tied to CC investments. The ambition variable consists of questions with the focus of determining the respondents believes connected to if there will be another extraordinary price increase such as BTC and ETH. Therefore, those who answered high on ambition and on investment horizon could be viewed as evidence for a higher perceived chance of winning. Although this might suggest that their perceived chance of winning is higher than actual, the unfortunate reality is that we cannot know that for sure based on our data analysis in this thesis. However, we know that the people investing with high ambition generally view CC as a long-term investment with beliefs that it one day will skyrocket in price, and in accordance with Hodkinson (2019) it provides reasons to assume that these types of investments are heavily influenced by SoMe. SoMe influence on CC investments currently consists of many high profiled investors, entrepreneurs or just content creators in general posting SoMe posts and videos regarding specific stocks and certain CCs.

This is referred to cited literature as SMIs. These posts or videos has a significant effect on the stock's/CC's market value. Therefore, the literature from Daniel et al. (1998) is highly relevant as regular investors view SoMe posts as more private than public information. By viewing this type of information as private rather than public gives the recipient a sense of overreaction to the content, creating the feeling that they have some sort of "inside" information (Daniel et al., 1998). This perception and overreaction to the reliability, quality and impact of this type of information is reflected in the ambition variable. The work of Tandon et al. (2021) regarding Elon Musk's tweets could also help to explain the ambition variable. However, since ambition and social rewards had no significant correlation, this argument's strength is weakened. The correlation of ambition with risk tolerance could be interpreted as the more you believe that there will be a significant rise, or a jackpot similar event tied to a certain CC, the more risk you are willing to take, corresponding well with Blalock et al. (2007). Data shows that many respondents had invested in several low-end and fairly unknown coins just in case there would be a significant rise in price. Suggesting that in their attempts to experience the same ride of early CC investors, they are willing to invest with higher risk in order to achieve their dream of hitting the jackpot. Moreover, a closer look at the response surrounding the risk tolerance variable reveals that the respondents with high-risk tolerance are more likely to invest more after a big loss and are not afraid of losing their money. This could be associated with poker player who gamble more when experiencing a big loss (Smith et al., 2009). This also suggests a presence of loss aversion where investors tend to sell stocks that have attained a higher value in fear that they also may decrease in value and instead hold on to the stocks that have already done so (Gupta & Shrivastava, 2021). Therefore, we argue that the fear of loss and herding behaviour are evidence of the ambition behind investments and therefore acts as evidence that the dream of hitting the jackpot according to the five-dimensional model presented by Binde (2013) is present among CC investors. With this in mind, H5 regarding the presence of the dream of hitting the jackpot in CC investment behaviour are therefore evidential in these arguments.

The term jackpot is consistent with a large pay out typically around the proximity of a 1000x the bet size or more. In investment terms, there is not really a jackpot definition considering the amount might be considerably large for person A, but not necessarily for person B. It is therefore for the sake of comparison ideal to use the same 1000x rate in gambling terms for investment terms going forwards. Stories of immense success, in other words hitting the jackpot, by early CC investors are being used as a marketing tool to get more and more people involved in CC. Although the chances of these extreme rises to reoccur

are slim, there is always that hope from the investors that it might, which can affect their investment behaviour. When asked about questions related to ambition and FOMO regarding unknown and/or smaller CCs, some of the respondents had invested a small portion of their portfolio into these unknown coins in case it was to take off. This is consistent with the findings of Baur and Dimpfl (2018) on their research related to the underlying asymmetrical volatility of CC, suggesting a presence of FOMO in the CC market. Due to the large amount of new coins being introduced and put available into the market every day and it is unreasonably difficult to know which one will take off or crash. The reason behind a potential extreme rise occurring again could be a very successful marketing scheme connected to a pump-and-dump scheme, or the chance of investing in a coin that possesses a technologically breakthrough for the future. However, the findings of Hodkinson (2019) was not reflected in the analysis, as ambition did not correlate with social rewards. This means we cannot prove that FOMO was effected by external appeals.

Regardless of the causal factors for this potential rise, a fortune is potentially made and therefore the investment was worth the risk. Considering some respondents had a small portion of their portfolio connected to these lesser coins in case they were to experience an unlikely extreme rise, it is reasonable to compare this type of investments to participating in chance games e.g., playing the lottery. The lottery is perhaps the most popular chance game within the gambling realm as this allows the participants to buy a lottery ticket for pocket change and gives them a chance to win millions (Blalock et al., 2007). The thought of "it might happen" is the lottery participants' reasoning, similar to the CC investors who invest in lesser-known small cap coins. This is therefore grounds along with the correlation between ambition and risk tolerance for us to argue for hypothesis H5; the dream of hitting jackpot is an investment motive among CC investors.

The remaining factor is the core motive in the five-dimensional of gambling and investing in general, chance of winning. As mentioned earlier, timeframe and risk tolerance reflect this core motive. It has been clear throughout this discussion that these factors are present and tied with many of the alternate motives through significant correlations. These factors, and both investing and gambling in general, would not exist if it the core motive of winnings is not present in any way.

Overall, we can argue for all of the hypotheses presented in this thesis, suggesting that all the optional motives of the five-dimensional model of Binde (2013) is present in CC investments in this thesis' dataset. However, some of the motives' original term were changed to more accurately fit and describe the aspect of CC investment.

6.1.   Limitations

The intent of this paper was to determine whether a CC investor's behaviour had similarities to a gambler's behaviour. First, the research problem revolves around comparing and analysing personal behavioural traits in fixed settings, gambling and CC investing. These two settings are very different on paper as gambling has a social stigma to it that many believe to be a waste of both one's money and time. The other, CC investing is a fairly new phenomenon within the financial world which hasn't yet been "assigned" by the public a consensus opinion or stigma to it. In doing our preliminary research, we got the feeling that there is a mixed opinion on the subject whereas some believe it to be pure gambling due to the unknowingness and lack of use in today's society, whereas others believe it to be the currency and technology of the future. This is partly what sparked our research question but being able to answer it to the best of our capabilities deemed to be difficult.

In order to gain generalisable findings related to behavioural traits to answer our research question we had to conduct a quantitative research method with the use of a survey. A reasonable selection size in order to do so with accurate results is in the proximity of 300-400 respondents, a number which appeared to be way out of our total respondents we had managed to gather towards the end of our data collection period. Conducting the quantitative research method in online communities which neither of us had no prior history or engagement with turned out to be an optimistic approach. By having no relationship to the moderators or prevalent members of the respective online communities we had no initial boost in form of exposure through direct URL sharing or likes and/or comments on our survey distributional posts. With tens of thousands of members in each Facebook group, thousands of posts and next to no comments or likes on our posts, the Facebook algorithm did not ensure the amount of traffic and views, evidently leading to not nearly as many respondents as we initially hoped or thought.

These limitations had a negative effect on the strength of the results. All our findings had a Pearson $r < .4$, which is the border between a weak correlation and a moderate correlation. Due to the low reliability, these results may therefore not reflect the real mindset of a CC investor. The results' variation explained by the correlation is therefore of low value as well. This means that the line of best fit does not reflect most of the sample size's variation and may reduce the validity of our findings as well. Because of this and the low number of respondents, these results can therefore not be generalised.

6.2. Further research

With the limitations of this paper's reliability and generalisability, we would suggest a larger quantitative study with the same research aim. Involvement of a respected member within a CC community through direct participation in the research or just the data gathering, is recommended to bolster the amount of respondents. Ideally, given an extended period of time without the restriction of a deadline, we would have continued to gather data until we had a sufficient enough selection in order to make generalisable findings. Further research is therefore advised to continue on the same path to try and draw similarities between different behavioural traits and motives in order to identify the typical CC investor, based on stronger statistical evidence.

In addition to the overall investment motives behind CC, future research may also investigate deeper into which age groups invest in what types of CC, and whether SoMe exposure is a direct causal variable for this. However, per 2022 several financial sectors of various governments have started to prosecute SoMe accounts promoting CC pump-and-dump schemes, hence a clear line is advised to be drawn between identifying pump-and-dump schemes and "honest" promotion of certain coins if future research were to investigate the SoMe effects.

Also, our research encourages future studies to focus on the individual correlations discovered in this thesis. This would not only strengthen our findings, but also deepen the understanding of CC investment behaviour.

7. Conclusion

There is no denying that CC is an ongoing force pushing the current technology and society in new directions. It is a rather unknown phenomenon and is today mainly being used as a form of investment. This research aims to uncover different motives behind CC investments by seeing if there are similarities between CC investors and gamblers.

During the literary review we uncovered and presented five central factors for gambling behaviour that could be applied for CC investors: *Chance of winning*, *intellectual challenge*, *mood change*, *social rewards*, and *the dream of hitting the jackpot*. Due to its application in investment theory, the factor chance of winning was split and reiterated as; *investment horizon*, and *risk tolerance*, while the factor the dream of hitting the jackpot were reiterated as *ambition*. Intellectual challenge, mood change, and social rewards remained as presented in the literary review.

To be able to discuss the different relevant research approaches we need to state the research question once more: *Are there similarities between cryptocurrency investment behaviour and gambling behaviour?* The question implies an investigation of similarities between two subjects; therefore, the question naturally aims to identify what similarities are present between gambling and CC investment behaviour. A method in which we can quantitative compare the two is therefore of high relevance for this thesis. This entails that a quantitative research method would be best suited to answer the research question.

A correlational study was performed and analysed to uncover similarities between the factors identified during the literary review. The positive linear correlation between investment horizon and risk tolerance mirrored the investment behaviour of traditional investors. Nevertheless, the positive linear correlation between intellectual challenge and risk tolerance suggest that investors would be more willing to bet on their level of knowledge and challenge themselves intellectually, by purchasing CCs with higher risk. This again would give the impression that CC investors would associate dividend from high-risk investments with skill and intellect. Intellectual challenge also correlated significantly with investment horizon. This could be explained by some investors firmly believe that CC is the currency of the future and/or seeking a challenge of correctly predicting the future outcome of a certain coin's market price. Thus, we reject the null hypothesis for H2 and keeping the alternate hypothesis, that intellectual challenge is an investment motive for CC investors.

Mood change correlates with risk tolerance, suggesting that when CC investors are bored, they are more likely to invest with a higher risk in an attempt to create some

excitement and change their current state of mood. Also, mood change correlates with social rewards suggesting that investors are more willing to participate in discussions and communities when experiencing boredom. Additionally, mood change correlates with investment horizon which may hint at maintaining interest and creating excitement in the long run. We reject the null hypothesis for H3 and keeping the alternate hypothesis, that mood change is an investment motive among CC investors.

Social rewards correlates with intellectual challenge suggesting that CC investors value the various social aspects and benefits tied to CC. This includes the feeling of communion through participation in online discussions with people of shared interest. It also suggests that people seek the social acknowledgement tied to a successful investor, especially related to crypto's underlying complexity, by showing signs of ostentation. We reject the null hypothesis for H4 and keeping the alternate hypothesis, that social rewards is an investment motive among CC investors.

Ambition correlates with investment horizon, suggesting that those who believe they could hit the jackpot of CC investments, similar to the early investors of BTC and ETH, have a long-term position consisting of several different coins, in case that event was to reoccur. This is coherent with literature on FOMO. This is connected to the ambition and risk tolerance correlation, which intuitively suggests that those who seek such an event are more willing to take higher risks in their pursuit to hit the jackpot. We reject the H5 null hypothesis keeping the alternate hypothesis, that the dream of hitting the jackpot is an investment motive among CC investors.

These motives would not exist if chance of winning is not present in any way. The correlation between risk tolerance and investment horizon suggest that CC investors are willing to take more risks in the long term compared to short term. Along with the previous correlations regarding investment horizon and risk tolerance to other factors, it illustrates the implication of chance of winning. Thus, we reject the H1 null hypothesis and keep the alternate hypothesis that, perceived chance of winning is present among CC investors.

Only one optional motive must be present according to Binde (2013) in order to determine the existence of gambling behaviour. Based on this thesis' results and analysis, where all four optional motives, along with the core motive are present, we can argue for the presence of gambling behaviour in CC investments in this thesis, which may serve as evidence for further research and discoveries.

This study has succeeded in its aim to connect CC consumer behaviour with gambling behaviour. Although similarities have been discovered and discussed, the results are not

generalisable due to the low sample size. Yet, they may become grounds for further research when tying investment and gambling literature.

The authors declare no conflict of interest that relate to the research described in this thesis.

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Appendix 1

Demographics

Q1.	*How old are you?*	*Under 18* *18-25* *26-35* *36-45* *46-55* *56-65* *Over 66*
Q2.	*Gender?*	*Male* *Female* *Other* *I choose not to answer*
Q3.	*Level of education*	*Primary School/Secondary school* *High School* *College/University (Bachelor or less)* *College/University (Masters or PH. D)*
Q4.	*Employment*	*Full employee (75% or more)* *Part-time employee (less than 75%)* *Unemployed*

Appendix 2.

General

Q5.	*Do/have you owned any crypto currencies?*	• *Yes* • *No*
Q6.	*What type of currencies do you buy?*	○ *High-end Well known and established (E.g. Bitcoin, Ethereum and Tether)* ○ *Fairly known* ○ *Lesser known*
Q7.	*How often have you invested in cryptocurrencies?*	• *Less than once a year* • *1 to 5 times a year* • *6 to 10 times a year* • *11 to 15 times a year* • *More than 16 times a year*
Q8.	*Are you comfortable with the amount you have invested?*	• *1 to 5 scale (Too little - too much)*

Appendix 3.

Rank the following statements:	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Some-what agree	Agree	Strongly agree
1. *(Chance of winning) Low-end crypto is a long-term investment.*							
2. *(Chance of winning) Middle-end crypto is a long-term investment.*							
3. *(Chance of winning) High-end crypto is a long-term investment*							
4. *(Chance of winning) A big loss doesn't scare me*							
5. *(Chance of winning) The probability of a rise in price is higher if it has recently fallen*							
6. *(Intellectual Challenge) My investments are mainly based on other people's*							

advice							
7. *(Intellectual Challenge) I enjoy doing my own research before investing*							
8. *(Intellectual Challenge) There is an intellectual stimulus in cryptocurrency investing.*							
9. *(Intellectual challenge) Assuming equal profit: I would rather have a successful portfolio than one successful coin*							
10. *(Mood Change) I find investing in cryptocurrency fun*							
11. *(Mood Change) I enjoy monitoring the market*							
12. *(Mood Change) I research the market more when I'm bored.*							
13. *(Mood Change) I am more likely to invest when I'm bored.*							

14. *(Social Rewards) I would invest based on what my group of friends tell me*			70				
15. *(Social Rewards) I enjoy participating in social communities and discussions online regarding cryptocurrency*							
16. *(Social Rewards) I find myself bragging about my successful cryptocurrency investments more often than I should*							
17. *(Social Rewards) I have gotten new friends and acquaintances because of my crypto interest.*							
18. *(Dream of hitting the Jackpot) I only have some crypto in case of an extreme rise like bitcoin*							
19. *(Dream of hitting the Jackpot) I would invest in*							

an advertised crypto currency regardless of market cap.			71				
20. (Dream of hitting the Jackpot) After a loss, I would invest riskier.							
21. (Dream of hitting the Jackpot) I invest a lot in crypto hoping one coin explodes							