

Master Thesis

Psychological Effects during Cryptocurrency Trading

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Statement of Originality

This document is written by Peter Nagel who declares to take full responsibility for the contents of this document.

I declare that the text and the work presented in this document is original and that no sources other than those mentioned in the text and its references have been used in creating it.

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Abstract

Over the last few years, the cryptocurrency market has grown exponentially. The exponential growth of the cryptocurrency market caused a new concept to emerge called cryptocurrency trading. Like in stock trading, there are psychological effects in play during cryptocurrency trading. Understanding psychological effects could give traders a trading advantage. This study aimed to examine how psychological effects influence cryptocurrency trading. The hypotheses were tested with data obtained from an online survey. Results have shown that newly released cryptocurrency cause more “fear of missing out” and “fear, uncertainty and doubt” compared to dated cryptocurrency. Furthermore, traders that are loss averse are less willing to take risks compared to traders that are non-loss averse. In addition, having a sunk cost or not having a sunk cost does not seem to influence risk taking, as traders prefer to avoid taking risks. Lastly, self-evaluated “risk taking intention” does not seem to accurately predict “actual risk taking”. Limitations and improvements for future research are discussed.

Introduction

In 2008 Satoshi Nakamoto introduced the first decentralized cryptocurrency known as Bitcoin. Bitcoin is a peer-to-peer version of electronic cash that would allow online payments to be sent directly from one party to another without going through financial intermediaries such as banks (Nakamoto, 2008). Due to the lack of financial intermediaries, money transferred via Bitcoin is both faster and cheaper when compared to central banks (Blockchain FAQ, 2017). Every transfer via Bitcoin is permanently saved on the blockchain. A blockchain is an open, distributed ledger that can record transactions between two parties efficiently and in a verifiable permanent way (Iansiti & Lakhani, 2017). The blockchain essentially replaces the tasks done by central banks such as bookkeeping and wiring money to different accounts. Bitcoin is not the only cryptocurrency on the market. After the introduction of Bitcoin, many cryptocurrency companies arised with their own cryptocurrency. As of January 2018 there are almost 1400 cryptocurrencies on the market and rising (Wikipedia, 2018). Cryptocurrency is a globally spreading phenomenon and is addressed both in the media and by financial institutions. There is not a primary interest in cryptocurrency as an alternative transaction system but as an investment opportunity known as cryptocurrency trading (Glaser et al., 2014).

Market Cap

All cryptocurrencies are valued by a market cap. The market cap is the amount of a cryptocurrency multiplied by its price. For example, there are around 16.8 million Bitcoins on the market with a price of 14.327¹ dollars each, this makes up for a market cap of over

1. The price of Bitcon on 10 January 2018

240 billion dollars. This market cap can be seen in figure 1. Bitcoin has grown massively over the last three years with nearly a quadrupled market cap. Bitcoin along with Ethereum, Bitcoin Cash, Ripple and Litecoin make up for the five cryptocurrencies with the highest market cap. Around 130 cryptocurrencies have a medium market cap (more than 200 million) and the remaining cryptocurrencies have a small market cap (less than 200 million).

Figure 1. A visualization of Bitcoins growth from 2016 till present (CoinMarketCap, 2018)



Cryptocurrency Trading

Cryptocurrency trading is the exchange of cryptocurrencies. The goal of cryptocurrency trading is getting a profit in either short term or long term. For example, a successful trade would be trading into Bitcoins into Ethereum, which after several days increases in value and thus gaining profit. However, due to the volatile nature of cryptocurrencies, trading cryptocurrencies is not without risk (Heid, 2013). Cryptocurrencies can collapse which means losing value in a short amount time. Cryptocurrencies can also surge, which is the opposite of collapse, gaining value in a short amount of time. For example, in 2015 Ethereum's price surged from 95 dollar cents to

400 dollars 18 months later, which is a gain of 42.000%. However in the next four weeks Ethereum collapsed losing 52% of its value (Business Insider, 2017). In September 2017 Bitcoins price collapsed due to China making an announcement about halting all trading by the end of September. Bitcoins price dropped from 3900 dollars to 3400 dollars in five hours (Quartz, 2017), showing the volatility of cryptocurrency.

Bitcoins volatile nature reached new records from October 17 till present as can be seen in figure 1. Bitcoin reached its peak of almost 20.000 dollars per Bitcoin on 17th December 2018 followed by a collapse to 13.000 dollars in less than a week later. Trading cryptocurrency, can be seen as stock trading except there is higher risk involved with cryptocurrency trading due to its volatile nature because cryptocurrencies can collapse and surge in a short period of time (Heid, 2013). Therefore, traders can both gain and lose money in a short period of time which can cause a variety of psychological effects.

FOMO and FUD

Due to the volatility of cryptocurrencies psychological effects can take place (Gandal et al, 2014). One of these psychological effects is called fear of missing out (FOMO). Fear of missing out can be described as a pervasive apprehension that others might be having rewarding experiences from which one is absent (Przybylsk et al., 2013). For example, you miss out on a Bitcoin surge while your friends acted upon it. Another psychological effect could be fear, uncertainty and doubt (FUD). FUD can be described as the spreading of disinformation to induce fear, uncertainty and doubt (Pfaffenberger, 2000). For example, after the Bitcoin collapse in September due to China halting all trading, numerous articles arised stating that Bitcoin is going

to crash (CNBC, 2017). This disinformation tries to scare traders which can potentially influence their trading behavior.

Aim of the Thesis

The aim of this master thesis is to gain scientific insight how psychological effects influences cryptocurrency trading. We will explore psychological effects which are specifically observed during cryptocurrency trading such as fear of missing out, and fear, uncertainty and doubt. We will also explore if the psychological effects that are observed during stock trading are also observed during cryptocurrency trading such as loss aversion and sunk costs. Currently there are not any scientific articles that explore psychological effects during cryptocurrency trading and how it influences trading behavior. Understanding cryptocurrency trading behavior could help traders to make more sound decisions. The next chapter will delve deeper into literature and theories regarding psychological effects and cryptocurrency trading. The third chapter will describe the methodology and research design. The fourth chapter will describe the results. The last chapter will provide a summary, discussion and conclusion.

Literature Review

The purpose of the literature review is to get a theoretical background on both cryptocurrency trading and the psychological effects. The psychological effects are divided in two parts. In the first part will look at two psychological effects that are popular on informal sources (such as forums and social media). In the second part we will look at two psychological effects that are present during stock trading which could be applied to cryptocurrency trading as well but have not been scientifically explored yet. However, we will first look at recent literature and developments regarding cryptocurrency trading to gain insight on the history of cryptocurrency trading.

Bitcoin as Investment Opportunity

When Bitcoin was released in 2008 it was defined as a form of electronic cash allowing cash to be sent from one party to another without going through intermediaries such as banks (Nakamoto, 2008). However, in present day there is not a primary interest in cryptocurrency as an alternative transaction system but as an investment opportunity. New users do not seem to consider Bitcoin's original purpose as an alternative transaction system but are solely interested in Bitcoin as an investment opportunity. This interest has an influence on volume of Bitcoin traded at the exchange but not on the volume within the Bitcoin system. Glaser et al. (2014) argue that a possible interpretation for this result is that new users keep their acquired Bitcoins in their exchange wallet for speculation purposes and the users do not intend to use their acquired Bitcoins as a currency. New Bitcoin users tend to trade Bitcoin rather than using Bitcoin as a means to buy services and goods (Glaser et al., 2014).

Another problem why Bitcoin users are not using Bitcoin as a currency to buy goods and services is the rising transaction costs. Miners solve complex cryptographic puzzles to add transactions to the blockchain. However, due to the ever-increasing complexity of these cryptographic puzzles it takes more and more computer power to solve these puzzles and thus more electricity. This causes transactions to be more expensive and also take more time. On average Bitcoin users are paying a transaction fee of 28 dollars per transaction, which means that 15% to 40% of the total transaction is the transaction fee (CNCB, 2017). The increasing transaction fees could potentially cause Bitcoin users to stray away from Bitcoin's original purpose, Bitcoin as a currency to buy goods and services, to cryptocurrency trading.

Volatility in Stocks and Cryptocurrency

Volatility is the degree of a trading price over time. Cryptocurrencies and stocks share certain similarities regarding volatility. Both the value of cryptocurrencies and stocks are influenced by the news related events, this could be a formal news article in The New York Times or an informal tweet posted by a cryptocurrency trader (Glaser et al., 2014). When an unexpected or dramatic news event (or economic shock) happens people tend to overreact which in turn affects stock prices and cryptocurrency prices either negatively or positively (De Bondt & Thaler, 1985). However, economic shocks have much more effect on cryptocurrencies than on stocks. The single largest factor for stock market volatility is economic recession, accounting for 60% of variance in stock returns (Hamilton & Lin, 1996). An economic recession can be defined as a significant decline in economic activity lasting more than a few months. Bitcoin's volatility is largely explained by economic shocks, such as The People's Bank of China banning of Chinese financial institutions from using Bitcoin or the ever-increasing transactions costs of Bitcoin (Fry

& Cheah, 2016). The main difference between the volatility in cryptocurrencies and the volatility in stocks is time. Stocks can lose their value due to an economic recession lasting for a few months. Cryptocurrencies can lose value much shorter period, as is observed with Bitcoin collapsing from 20.000 dollars to 13.000 dollars in less than a week. However, cryptocurrencies can also gain value in a short period of time. Therefore, losing or gaining money via cryptocurrency trading will go more rapidly due to an increase in volatility compared to stock trading (Vejačka, 2014).

There are also volatility differences in between cryptocurrencies. Bitcoin can be classified as the most stable cryptocurrency compared to other cryptocurrencies. The value of other cryptocurrencies, especially newly released cryptocurrencies, tend to be influenced by unexpected news events (Hayes, 2016). This allows cryptocurrency traders as well as cryptocurrency developers to potentially lose or gain a large amount money in a short period of time due to high market volatility. This causes a competition between cryptocurrency developers for a high market share (Gandal & Halaburda, 2014).

Competition in Cryptocurrency (Gandal & Halaburda, 2014)

Bitcoin has the highest price and market cap out of all other cryptocurrencies. A possible explanation for this is the first mover advantage, since Bitcoin was the first cryptocurrency to be released. However, Bitcoin is not without flaws, rising transaction costs and decreasing speed of transaction. Other cryptocurrencies were developed to fix the shortcomings of Bitcoin, these other cryptocurrencies are called Altcoins (alternate cryptocurrencies). As of 2018 there are over 1400 cryptocurrencies on the market. This surge in new cryptocurrencies is due to the fact that the

costs of entering the market is low and founders of certain cryptocurrencies have made significant profit. In conclusion, the two main reasons for developing new cryptocurrencies is fixing shortcomings and capitalizing on the popularity of cryptocurrency.

However, these two reasons show a disagreement in what the driving factor for developing cryptocurrency is. Will users buy the cryptocurrency due to their potential as a cryptocurrency since it is supposed to fix shortcoming and use it to buy goods and services, or will users buy the cryptocurrency as an investment opportunity. According to Gandal & Halaburda (2016), both factors are in play with two different effects called the reinforcement effect and the substitution effect.

The reinforcement effect is an increase in demand due to popularity and dominates in the early stages of a (newly released) cryptocurrency. The reinforcement effect causes users to massively buy the new cryptocurrency as they believe it will be a “winner take all” race against other cryptocurrencies which in turn causes an increase in demand. For example, WAX is one of the newest cryptocurrencies the biggest on the cryptocurrency market. WAX was released in December 2018 and has a market cap of around 540 million. In figure 2, a reinforcement effect could potentially take place. Cryptocurrency traders massively buy WAX which results in a peak in both the price of WAX and the market cap of WAX. In less than a week WAX starts to stabilize where a new effect takes place, called the substitution effect.

Figure 2. A visualization of WAX’s market cap and price from release till present (CoinMarketCap, 2018).



The substitution effect is a decrease in demand due to fear and dominates in the later stages of a (dated) cryptocurrency. The substitution effect causes traders to massively sell the cryptocurrency which in turn causes a decrease in demand. Going back to the example, cryptocurrency traders start to fear that WAX might be overvalued causing traders to massively sell WAX which causes a drop in both the price of WAX and the market cap of WAX. Once the substitution effect is over, WAX starts to stabilize.

We propose that two psychological effects are experienced before a reinforcement effect or a substitution effect take place: fear of missing out (FoMO) and fear, uncertainty and doubt (FUD). In addition, we propose that the release date of a cryptocurrency (newly released or dated) influences the experienced intensity of the two psychological effects FoMO and FUD.

Fear of Missing Out (FoMO)

The first psychological effect is called fear of missing out (FoMO). Fear of missing out can be described as a pervasive apprehension that others might be having rewarding experiences from which one is absent (Przybylsk et al., 2013).

Based on the previously described reinforcement effect, a newly released cryptocurrency causes users to think it will be a “winner take all” race against other cryptocurrencies and therefore cause the cryptocurrency to increase in demand (Gandal & Halaburda, 2014). In other words, traders might fear that they are missing out on a potential investment opportunity, since the price of the cryptocurrency could surge right after release. Therefore we propose that a newly released cryptocurrency will cause more fear of missing out compared to a dated cryptocurrency.

Fear of missing out is also associated with lower life satisfaction as well as higher social media engagement (Przybylsk et al., 2013). FoMO is also associated with problematic smartphone use and use frequency (Elhai et al., 2016). This could explain that traders who engage with each other through social media about their successful trades moderates the levels of fear of missing out traders experience. This means that traders that use media frequently (such as Facebook or Reddit) to communicate about their trades with other traders will experience more FoMO compared to traders that use media less frequently.

Based on this information we formulate the first hypothesis.

H1a. Newly released cryptocurrency (vs dated crypto currency) causes more FoMO.

H1b. The relationship between newly released cryptocurrency and FoMO is moderated by smartphone usage, as in more smartphone usage will lead to more FoMO

Fear, Uncertainty and Doubt (FUD)

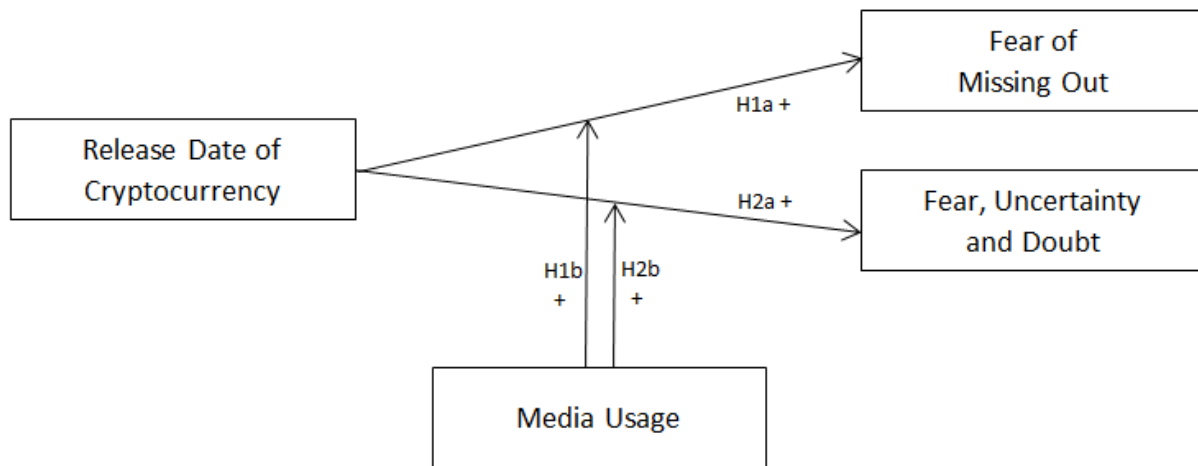
The second psychological effect is called fear, uncertainty and doubt (FUD). FUD can be described as the spreading of disinformation to induce fear, uncertainty and doubt (Pfaffenberger, 2000). The disinformation can be spread through social media or news sites. For example, news articles that suggest that there will be a Bitcoin crash even though the author does not have any reliable sources. These articles are there to induce fear, uncertainty and doubt, which in turn influences the trading behavior of cryptocurrency traders. The substitution effect that causes a decrease in demand could be triggered news articles spreading fear, uncertainty and doubt. Due to the substitution effect taking place after a cryptocurrency is released we expect dated cryptocurrency to cause more FUD compared to newly released cryptocurrency.

Smartphones allows traders to access social media and news sites on the go. There are also smart phone applications (such as Cryptotrader) that allow traders to see their profits/losses in realtime. This could explain that traders who engage with social media or smartphone usage often will experience more FUD compared to traders who engage with social media or smartphone usage less often. Based on this information we formulate the second hypothesis.

H2a. Dated cryptocurrency (vs newly released cryptocurrency) causes more FUD.

H2b. The relationship between dated cryptocurrency and FUD is moderated by smartphone usage, as in more smartphone usage will lead to more FUD.

Figure 3. A visualization of the proposed model (part 1).



Loss Aversion

Loss aversion can be defined as a tendency to prefer avoiding losses to acquiring equivalent gains (Kahneman and Tversky, 1984). For example, it is better not to lose five dollars than to win five dollars. Putting loss aversion into context, cryptocurrencies can either surge (gaining value) or collapse (losing value). According to the loss aversion theory, traders should prefer missing out on a cryptocurrency which gains in value due to an increase in price compared to your own cryptocurrencies losing in value due to a decrease in price.

Loss aversion can also be observed in stock trading and is called myopic loss aversion. Myopic loss aversion is a combination of (1) greater sensitivity to losses than to gains and (2) frequent evaluation of outcomes. However, stock market traders who display myopic loss aversion are willing to accept more risks if they evaluate their investments less often. On top of that, stock market traders who evaluate their investment most often took the least risk and earned the least money (Thaler et al., 1997). Bringing this into context with cryptocurrency, traders that are loss averse will be less willingly to take risks compared to traders that are not loss averse. This means that loss averse traders will likely invest in cryptocurrencies that are considered safe or stabilized compared to cryptocurrencies that are recently released and unstable.

Based on this information we will test the two assumptions for loss aversion within the cryptocurrency context and if more risk taking leads to more money on average:

H3. Loss averse traders (vs non loss averse traders) are less willing to take risks (risk avoiding).

Sunk Costs

A sunk cost is a cost that is (1) already incurred and (2) cannot be changed (Arkes & Blumer, 1985). For example, a manager of a company decided to enter into a new market. After investing a large amount of money into research and development, it turns out that entering a new market will not be profitable. The manager should stop investing since the research and development is a sunk cost, it is already incurred and cannot be changed. However, managers tend to continue investing, as they do not want to see all the time and money spend being wasted, this is called the sunk cost fallacy.

The sunk cost fallacy is frequently observed in stock market trading. For, example you bought 100 shares for 1000 euros, however the 100 shares keep dropping in value. You refuse to sell the 100 shares for below the price you bought them as this would mean you lose money. Eventually the company goes bankrupt and you lost all your money. In this case you have fallen for the sunk cost fallacy. The sunk cost fallacy causes people to exhibit more risk taking behavior (Zeelenburg & Van Dijk, 1997). We want to explore if the sunk cost fallacy is also at work during cryptocurrency trading. Based on previous research regarding the sunk cost fallacy in stock trading we can formulate hypothesis 4:

H4. Traders with sunk costs (vs traders without sunk costs) are more willing to take risks.

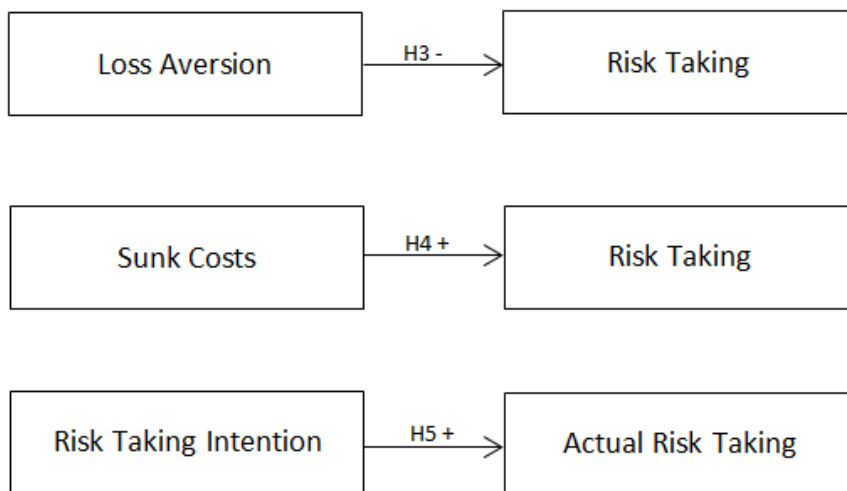
Risk Taking Intention

To further explore the risk aspect of cryptocurrency trading, we will also look into actual risk taking versus risk taking intention. We try to find out if traders that consider themselves a risk taker also exhibit more actual risk taking behavior in their cryptocurrency trading. For example, traders that consider themselves risk takers would more likely invest into cryptocurrencies that are high risk, high reward compared to traders that do not consider themselves risk takers.

There has been very little research that tested if your own intention of risk taking is in line with your actual risk taking. Morrongiello (2004) tested actual risk taking versus risk taking intention in children on elementary school. Based on the results the intention of the children's risk taking was in line with their actual risk taking. Therefore we expect that traders that do not consider themselves will also exhibit less actual risk taking compared to traders that do consider themselves risk takers.

H5. Traders risk taking intention is positively related to actual risk taking.

Figure 4. A visualization of the proposed model (part 2).



This research will try to find a scientific answer whether psychological effects which are observed during stock trading are also in play during crypto currency trading. We will focus on when FoMO and FUD are dominant and if this effect is influenced by media usage. Lastly we will test if loss aversive traders are less willingly to take risks, if a sunk cost will cause traders to take more risks and if risk taking intention is in line with actual risk taking. The hypothesis will be tested by performing a survey on cryptocurrency traders asking about their cryptocurrency behavior and emotions.

Methodology

Design

An online survey was conducted to test the hypothesis. The survey is a within-subjects design and consisted of 33 questions divided over two parts. The first part of the survey tests the first part of the proposed model (showed in figure 3) and the second part of the survey tests the second part of the proposed model (showed in figure 4). The online survey used in the study can be seen in appendix A.

The first part of the survey had one independent variable which is “release date of crypto currency” (old vs new) and two dependent variables which is “Fear of Missing Out” (FoMO) and “Fear, Uncertainty and Doubt” (FUD). The first part of the survey also had one moderating variable which is “Media Usage”. The second part of the survey had three independent variables which is “Loss Aversion”, “Sunk Costs” and “Risk Taking Intention” and one dependent variables which is “Risk Taking”.

Sample

Participants for the survey were sampled via international forums which focus on cryptocurrency trading. In total 103 participants completed the survey. Out of those 103 participants 11 participants answered all the questions. Thus 92 participants were used to test the hypothesis. The average age of the sample was 31.43 (SD = 10.70) and 89% was male (11% was female). The most common nationality of the sample was Dutch.

Procedure

The participants of the survey clicked on the link in the forum post which brought them to the survey made via Qualtrics. The first thing the participants saw was a general introduction, explaining the purpose of the survey, stating that there are no right or wrong answers and the approximate time it takes to complete the survey. Participants could proceed with the survey if they checked a box which stated that the participants are aware that their data will be used anonymously for the study.

The first questions of the survey are general questions such as age, gender and experience which will be used as control variables. The participants also have the option to leave their email address so the results of the study could be shared with them. After the general questions the questions were focused on the independent variables and the dependent variables. Once the questions for a variable are completed, the participants are given a short explanation on how to answer the next questions. Once all the questions were filled in the participants were thanked for their participation.

Measures

Control Variables

To make sure certain variables are not influencing the relationship between the independent variable and the dependent variable, several control variables are used in the study. The control variables are gender, age, and cryptocurrency trading expertise. These control variables are the first questions the participants have to answer. The first two control variables gender and age are measured by asking the participants what their gender and age is. Cryptocurrency trading expertise is measured by asking the participant how they would rate their cryptocurrency expertise on a one to five scale where 1 is novice, 2 is advanced beginner, 3 is competent, 4 is proficient and 5 is expert (Rauner, 2007).

Media Usage

To determine the moderating variable “media usage” two questions were asked. The first question asks the participants to give an estimation of how many minutes per day they spend on cryptocurrency activities on their smartphone. The second question asks the participants to give an estimation of how many minutes per day they spend on cryptocurrency activities on their other devices such as PC or laptop. The reason this is asked separately is because spending time on cryptocurrency activities on a smartphone alone could potentially already be a moderating variable.

Fear of Missing Out

To determine the dependent variable “fear of missing out” the FoMO scale developed by Przybylski et al. (2013) was used. It is a ... reliable measure ($\alpha = .826$) aimed at measuring fear of missing out with 10 statements. Figure 4 shows the inter-item statistics for the FOMO scale, no item should be deleted, since the reliability of the scale would not be increased. The participants have to indicate how true each statement is for them. The participants rate the statements based on a 1 to 5 Likert scale, where 1 = “Not at all true for me”, 2 = “Slightly true for me”, 3 = “Moderately true for me”, 4 = “Very true for me”, 5 = “Extremely true for me”. Out of the 10 statements used in the FoMO scale, 5 statements were used in the survey due to the length of the survey. An example of a statement is “I fear my friends are having more rewarding experiences than me.”.

Table 1. Inter-Item Statistics for the FoMO scale.

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
|---------|----------------------------|--------------------------------|----------------------------------|----------------------------------|
| FoMO1.1 | 17,98 | 36,022 | ,335 | ,827 |
| FoMO1.2 | 18,37 | 35,225 | ,463 | ,816 |
| FoMO1.3 | 17,41 | 31,476 | ,552 | ,807 |
| FoMO1.4 | 17,21 | 33,221 | ,474 | ,815 |
| FoMO1.5 | 18,33 | 33,980 | ,521 | ,810 |
| FoMO2.1 | 18,17 | 33,156 | ,633 | ,800 |
| FoMO2.2 | 18,27 | 33,541 | ,608 | ,803 |
| FoMO2.3 | 17,60 | 32,771 | ,496 | ,813 |
| FoMO2.4 | 17,38 | 32,304 | ,530 | ,809 |
| FoMO2.5 | 18,30 | 33,357 | ,558 | ,806 |

Fear, Uncertainty and Doubt (FUD)

To determine the dependent variable “fear, uncertainty and doubt” titles of news articles were used. There is currently not existing scale that measures fear uncertainty and doubt. Therefore, a scale was developed based on real news article titles. The cryptocurrency used in the original news article title was renamed to a made cryptocurrency (such as Coin X) to make sure that their experience with the cryptocurrency mentioned in the news article title would not influence the outcome. The FUD scale was a reliable measure ($\alpha = .929$). Figure 5 shows the inter-item statistics for the FUD scale, no item should be deleted, since it would be a very small gain for Cronbach’s alpha (from $\alpha = .944$ to $\alpha = .949$). The participants were asked to indicate if the news article titles would influence their cryptocurrency trading behavior. The participants rate the statements based on a 1 to 5 Likert scale, where 1 = “Not at all true for me”, 2 = “Slightly true for me”, 3 = “Moderately true for me”, 4 = “Very true for me”, 5 = “Extremely true for me”. Five news article titles were used in total. An example of a news article title is “Coin X will peak at \$60,000 – and then crash” – The Telegraph.”.

Table 2. Inter-Item Statistics for the FUD scale.

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
|--------|----------------------------|--------------------------------|----------------------------------|----------------------------------|
| FUD1.1 | 16,73 | 45,782 | ,486 | ,929 |
| FUD1.2 | 17,25 | 44,299 | ,562 | ,926 |
| FUD1.3 | 17,22 | 42,546 | ,753 | ,916 |
| FUD1.4 | 17,26 | 41,865 | ,766 | ,915 |
| FUD1.5 | 17,09 | 41,091 | ,818 | ,912 |
| FUD2.1 | 17,07 | 45,468 | ,551 | ,926 |
| FUD2.2 | 17,28 | 43,128 | ,735 | ,917 |
| FUD2.3 | 17,24 | 42,074 | ,825 | ,912 |
| FUD2.4 | 17,35 | 41,614 | ,858 | ,910 |
| FUD2.5 | 17,21 | 41,528 | ,793 | ,913 |

Release of Cryptocurrency

To determine if the independent variable “release of cryptocurrency” (new vs old) influences the dependent variables “fear of missing out” and “fear, uncertainty and doubt” the participants were asked to complete the FoMO and FUD questions twice. The first time the participants started the FoMO and FUD questions the following scenario was described for the newly released cryptocurrency: “Coin X is a new cryptocurrency that gets released in two weeks. According to your own research Coin X will resolve some limitations of other cryptocurrencies, making it a potential investment opportunity.” When the FoMO and FUD questions were completed a new scenario was described with an existing old cryptocurrency called Coin Y. The participants were then asked to complete the same FoMO and FUD questions again keeping the new scenario in mind.

Loss Aversion

To determine the independent variable “loss aversion” a 2 items scale developed by Kahneman & Tversky (1979) was used. The two items are based on Kahneman’s prospect theory and are slightly altered so it can be used in a cryptocurrency context. The two items describe a scenario where the participants have to choose in which cryptocurrency they want to invest. Either the participants can choose for Coin A which is “50% chance to gain €1000 profit and 50% chance to the €500 investment” or for Coin B, which is “100% chance to gain €450 profit”. The second question describes the same scenario with one modification; the participant now has a different amount of money based on the answer of the previous question (invest in Coin A or invest in Coin B). The expected utility for the loss aversion scale is €500 for Coin A and €450 for Coin B.

Sunk Costs

To determine the independent variable “sunk costs” a 2 item scale developed by Zeelenberg and Van Dijk (1997) was used. The sunk cost scale is slightly altered so it can be used in a cryptocurrency context. A scenario is described where the participants lost some money and thus the sunk cost has occurred. After reading the scenario the participants are asked how they want to invest their remaining money. Either the participants can choose for Coin X which is “Investing into Coin X will net you a guaranteed €500 profit” or for Coin Y, which is “Investing into Coin Y will net you a 50% chance to make a profit of €1000 (also making up for your failed Coin Z investment) and a 50% chance to lose your €500.” The expected utility for the sunk cost scale is €500 for both Coin X and Coin Y.

Risk Taking Intention and Actual Risk Taking

Risk taking intention is measured by 1 item which asks the participant to rate the following statement based on a 1-5 Likert scale: “I consider myself as a risk-taker.”. Actual Risk Taking is based on the loss aversion question where participants have to choose in which coin they want to invest. Participants are either a risk taker or not a risk taker. If participants choose the 50% chance to gain €1000 and 50% chance to lose your €500 investment, they are considered a risk taker. If participants choose to the guaranteed chance to gain €500, they are not considered as a risk taker.

Statistical Procedure

The survey was created via Qualtrics and the statistics were analyzed with SPSS. Before analyzing the data, every response was checked if it fulfilled two requirements: (1) all questions were filled in and (2) participants spend at least 1 minute per day on cryptocurrency activities. Both the “fear of missing out scale” and the “fear, uncertainty and doubt scale” had a reliability of $\alpha > .7$ and did not require any item to be removed for an increased reliability.

After the reliability of the scales was considered sufficient, distributions of the continuous dependent variables (FoMO and FUD) were tested for normality. In table 1 the skewness and kurtosis for the independent and dependent variables are shown. For the “fear of missing out” variables the skewness and kurtosis are in an acceptable range. However, the skewness for both “FUD New” and “FUD Old” are quite high which could indicate that the distribution is highly skewed. Therefore, a Kolmogorov-Smirnov test and a Shapiro-Wilk test was conducted to further explore the normality of the dependent variables

Table 3. Skewness, Kurtosis and SE of the dependent variables

| | Skewness | SE | Kurtosis | SE |
|----------|----------|------|----------|------|
| FoMO New | .458 | .251 | -.480 | .498 |
| FoMO Old | .671 | .251 | -.245 | .498 |
| FUD New | .920 | .251 | .961 | .498 |
| FUD Old | .858 | .251 | .039 | .498 |

The Kolmogorov-Smirnov test as well as the Shapiro-Wilk test is significant for “FoMO New”, “FomO Old”, “FUD New” and “FUD Old” . The significance of the Kolmogorov-Smirnov test and the Shapiro-Wilk test could indicate a problem with the normal distribution of the dependent variables.

Table 4. Kolmogorov-Smirnov test and Shapiro-Wilk test of the dependent variables.

| | Kolmogorov-Smirnov | | | Shapiro-Wilk | | |
|----------|--------------------|-----------|----------|--------------|-----------|----------|
| | Statistic | <i>df</i> | <i>p</i> | Statistic | <i>df</i> | <i>p</i> |
| FoMO New | .145 | 92 | .000 | .952 | 92 | .002 |
| FoMO Old | .135 | 92 | .000 | .936 | 92 | .000 |
| FUD New | .124 | 92 | .001 | .930 | 92 | .000 |
| FUD Old | .134 | 92 | .000 | .904 | 92 | .000 |

However, the Shapiro-Wilk test does not work well with several values that are the same, which is the case for the dependent variables as the range is between one and five and multiple participants have the same score for the dependent variables. Another problem with using the Kolmogorov-Smirnov test and the Shapiro-Wilk to determine normality is the sensitivity to sample size. The tests are sensitive to the sample size and the sample size used in this study (N = 92) is consider low. Therefore, probability plots and histograms of the differences between “FoMO New” and “FoMO Old”, and the differences between “FUD New” and “FUD OLD” will be used to further determine the normality of the two dependent variables.

In figure 5 and figure 6 the probability plots and the histograms of the differences between “FoMO New” and “FoMO Old”, and the differences between “FUD New” and “FUD OLD” are shown. Both probability plots show that most values are on the line (indicating normality) and some values are not on the line (indicating non-normality).

Figure 5. Probability plot and histogram of the differences between “FoMO New” and “FoMO Old”.

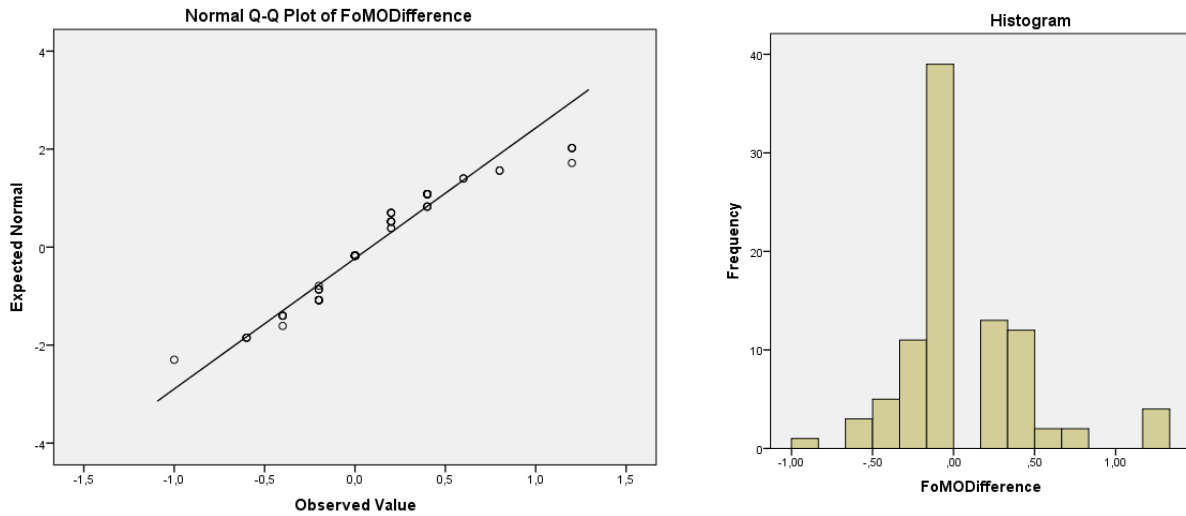
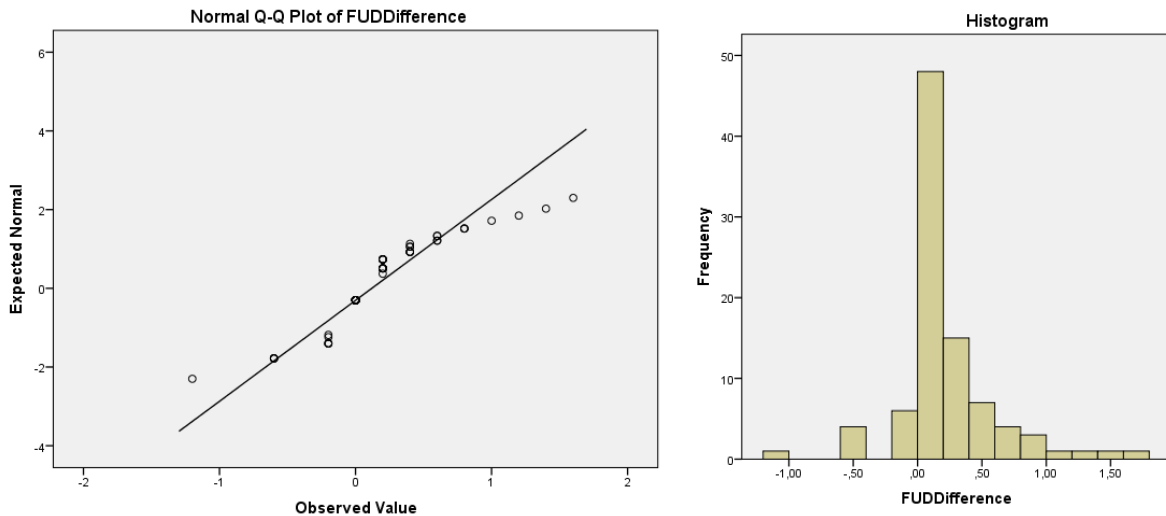


Figure 6. Probability plot and histogram of the differences between “FUD New” and “FUD Old”.



The histograms of the differences for “FoMO” and “FUD” do indicate a normal distribution as a bell shape can be observed. Based on probability plots and histograms it is likely that the data is normally distributed. However, since we cannot draw a decisive conclusion about the normality of FoMO and FUD, a non-parametric test (together with a parametric test) will also be used to test the hypothesis 1 and hypothesis 2.

Results

Out of the 103 responses, 11 responses were removed as they did not spend any minute per day trading cryptocurrency and could therefore not be considered as cryptocurrency traders. The inter-item correlation test showed that the “fear of missing out scale” and the “fear, uncertainty and doubt scale” did not require any item to be removed for an increased reliability. 92 (N= 92) responses was used to test the hypothesis. All the statistical tests are conducted with SPSS, the raw output of the SPSS results can be seen in appendix B.

Control Variables

Before testing the hypothesis, a correlation matrix was generated (see table 5) to test if the three control variables gender, age and expertise, have any influence on the dependent variables. Table 3 shows that there were no significant correlations between the control variables gender and the dependent variables, and the control variable age and the dependent variables, indicating that gender and age does not influence the dependent variables. However, there was one significant correlation between the control variable “expertise” and the moderating variable “media usage”. This correlation was further explored by conducting a regression where the independent variable is “expertise” and the dependent variable is “media usage”. Based on the regression, there was significant positive relationship between expertise ($M = 2.48$, $SD = .943$) and media usage ($M = 110.63$, $SD = 134.167$), $t(91) = 4.001$, $p < .001$. These results indicate that someone with high expertise in cryptocurrency trading will spend more minutes per day on cryptocurrency activities compared to someone with low expertise in cryptocurrency trading.

Table 5. Correlation matrix between the variables used in the study.

| <i>Variables</i> | <i>M</i> | <i>SD</i> | <i>1</i> | <i>2</i> | <i>3</i> | <i>4</i> | <i>5</i> | <i>6</i> | <i>7</i> | <i>8</i> | <i>9</i> | <i>10</i> | <i>11</i> |
|------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|
| 1. Gender | 1.11 | .313 | - | | | | | | | | | | |
| 2. Age | 31.43 | 10.70 | .133 | - | | | | | | | | | |
| 3. Expertise | 2.48 | .943 | -.141 | -.070 | - | | | | | | | | |
| 4. Media Usage | 110.63 | 134.67 | -.042 | .034 | .389** | - | | | | | | | |
| 5. FoMO New | 2.03 | .627 | -.041 | -.004 | -.064 | -.061 | - | | | | | | |
| 6. FoMO Old | 1.95 | .699 | -.073 | .054 | -.077 | -.067 | .845** | - | | | | | |
| 7. FUD New | 1.97 | .742 | -.032 | .093 | -.141 | -.098 | .372** | .417** | - | | | | |
| 8. FUD Old | 1.85 | .760 | -.004 | .065 | -.155 | -.090 | .410** | .488** | .865** | - | | | |
| 9. Risk Averse | 1.10 | .299 | -.115 | .069 | -.012 | -.097 | .065 | .078 | -.075 | -0.89 | - | | |
| 10. Sunk Cost | 1.08 | .267 | -.100 | .112 | -.059 | -.060 | .261** | .353** | .168 | .145 | .457** | - | |
| 11. Risk Taking | 2.67 | .903 | -.068 | -.077 | .250 | .047 | .073 | .062 | .095 | .161 | .201 | .150 | - |

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

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

Fear of Missing Out (H1a). Since a decisive conclusion for the normality of the “fear of missing out score” could not be drawn, a parametric test and a non-parametric test was used to test hypothesis 1a. The average FoMO score for newly released cryptocurrency and dated cryptocurrency was analyzed with a paired-sample t-test (parametric) and a Wilcoxon signed-rank test (non-parametric). Based on the paired-sample t-test, there was a significant difference between the FoMO scores for a newly released cryptocurrency ($M = 2.03$, $SD = .627$) and dated cryptocurrency ($M = 1.95$, $SD = .699$), $t(91) = 2.222$, $p = .029$. Based on the Wilcoxon signed-rank test, there was a significant difference between the FoMO scores for a newly released

cryptocurrency and dated cryptocurrency, $Z = -2.086$, $p = .037$. These results indicate that there is a significantly higher “fear of missing out score” for a newly released cryptocurrency compared to a dated cryptocurrency and thus evidence to support hypothesis 1a.

Fear, Uncertainty and Doubt (H2a). Since a decisive conclusion for the normality of the “fear, uncertainty and doubt score” could not be drawn, a parametric test and a non-parametric test was used to test hypothesis 2a. The average FUD score for newly released cryptocurrency and dated cryptocurrency was analyzed with a paired-sample t-test (parametric) and a Wilcoxon signed-rank test (non-parametric). Based on the paired-sample t-test, there was a significant difference between the FUD scores for a newly released cryptocurrency ($M = 1.97$, $SD = .742$) and dated cryptocurrency ($M = 1.85$, $SD = .760$), $t(91) = 2.94$, $p = .004$. Based on the Wilcoxon signed-rank test, there was a significant difference between the FUD scores for a newly released cryptocurrency and dated cryptocurrency, $Z = -3.049$, $p = .002$. These results indicate that there is a significantly higher “fear, uncertainty and doubt score” for a newly released cryptocurrency compared to a dated cryptocurrency. This result is not in line with hypothesis 2b, as hypothesis 2b stated that dated cryptocurrency would cause more FUD compared to newly released cryptocurrency. We can conclude that there is not enough evidence to support hypothesis 2b. This result is further discussed in the discussion section.

Media Usage (H1b & H2b). The moderation effect of media usage on the FoMO scores and FUD scores for newly released cryptocurrency and dated cryptocurrency was tested with a linear regression. To test the moderation effect, the differences between the FoMO score for newly released cryptocurrency and the FoMO score for dated cryptocurrency (hypothesis 1b), and the differences between the FUD score for newly released cryptocurrency and the FUD score for dated cryptocurrency (hypothesis 2b) were used. Based on the linear regression, there was no significant moderation effect of “media usage” on the relationship between “release date of cryptocurrency” and FoMO, $t(91) = .207, p = .837$. There was also no significant moderation effect of “media usage” on the relationship between “release date of cryptocurrency” and FUD, $t(91) = -.113, p = .911$. Lastly, there was a linear regression conducted to explore if smartphone usage alone (which means excluding cryptocurrency activities on PC, tablet and other devices) has a moderation effect on the experienced FoMO and FUD, but the results were also not significant (respectively $p = .7889$, and $p = .911$). These results indicate that the experienced FoMO and FUD is not influenced by the amount of time spend doing cryptocurrency activities on media devices (such as smartphone and tablet). We can conclude that there is not enough evidence to support hypothesis 1b and 2b.

Loss Aversion (H3). The “risk taking option” and the “non-risk taking option” for loss aversive participants and non-loss aversive participants was tested with a chi square test. In table 4 the frequencies for loss aversion and risk taking are shown. The chi square test was significant, indicating that the frequencies are not due to chance, $X^2(1, N = 92) = 46.097, p < .001$. Out of 92 participants, 83 participants were loss aversive and 9 people were non-loss aversive. Out of the 83 loss aversive participants, 80 people did not take any risk, which means that most loss

aversive participants did not take any risk (80 out of 83). Out of the 9 non-loss aversive participants, 7 participants did take risk, which means that most non-loss aversive participants did take risk (7 out of 9). These results indicate that loss aversive traders are less willingly to take risks compared to non-loss aversive traders and thus supporting hypothesis 3.

Table 6. Frequencies for loss aversion and risk taking.

| | | Risk Taking | | Total |
|---------------|-----|-------------|----|-------|
| | | Yes | No | |
| Loss Aversive | Yes | 3 | 80 | 83 |
| | No | 7 | 2 | 9 |
| Total | | 10 | 82 | 92 |

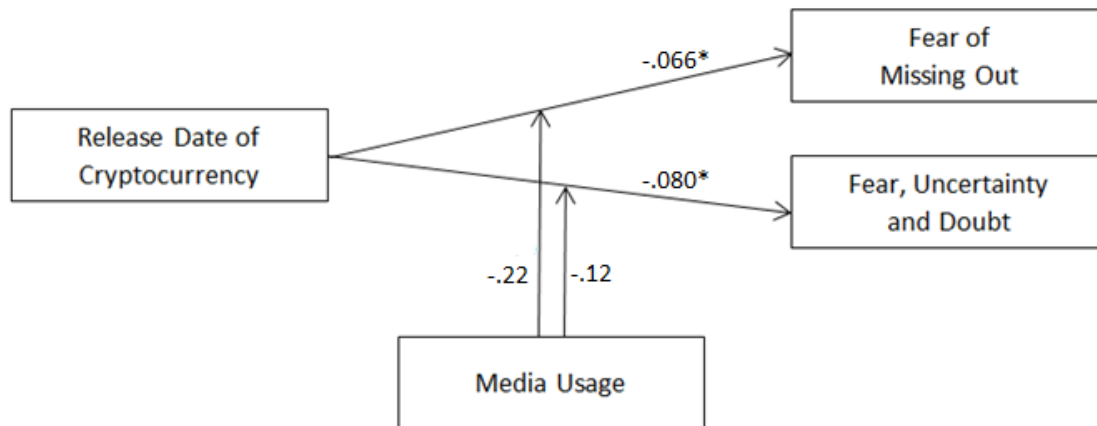
Sunk Costs (H4). The risk taking option and the not risk taking option for participants with sunk costs and without sunk costs was tested with a chi square test. In table 5 the frequencies for sunk costs and risk taking are shown. The chi square test was significant, indicating that the frequencies are not due to chance, $X^2(1, N = 92) = 12.991, p = .005$. When a sunk cost incurred, 85 participants did not take any risk and only 7 people did take a risk. Out of those 85 participants if asked again if they would take a risk but with no sunk cost incurred, 77 participants would again take no risk (77 out of 85), only 8 people would take a risk. These results indicate that having a sunk cost or not a sunk cost, in both instances traders prefer to take no risk. Based on these results we can conclude that there is not enough evidence to support hypothesis 4.

Table 7. Frequencies for sunk costs and risk taking.

| | | No Sunk Cost Incurred | | Total |
|--------------------|---------|-----------------------|------|-------|
| | | No Risk | Risk | |
| Sunk Cost Incurred | No Risk | 77 | 8 | 85 |
| | Risk | 3 | 4 | 7 |
| Total | | 80 | 12 | 92 |

Risk Taking Intention (H5). The risk taking intention (Likert-scale from 1 to 5) and the actual risk taking was tested (yes or no) was analyzed with a binary logistic regression. Out of 92 participants, 83 participants took no risk and 9 participant took risk. Based binary logistic regression test, there was no significant relationship between risk taking intention ($M = 2.67$, $SD = .903$) and actual risk taking ($p = .062$). We can conclude that there is not sufficient evidence to support hypothesis 5. It can be concluded that risk taking intention is not a valid predictor for actual risk taking. These results indicate that cryptocurrency traders are not able to accurately self-evaluate if they are a risk taker or not a risk taker. This result is further discussed in the discussion section.

Figure 7. A visualization of standardized coefficients of hypothesis 1 and hypothesis 2.



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

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

Discussion

General Discussion

Over the last few years the amount of different cryptocurrency and the total market capitalization has grown exponentially (Coinmarketcap, 2018). Like in stock trading, there are psychological effects in play during cryptocurrency trading. Research in stock trading has shown that there are psychological effects in play such as “loss aversion” and “sunk costs” during stock trading and how stock traders should be aware of these psychological effects as the psychological effects could negatively influence stock trading (Arkes & Blumer, 1985; Thaler et al., 1997). It is therefore imperative to know if these psychological effects are in play during cryptocurrency trading. This study attempts identify if and how psychological effects are in play during cryptocurrency trading. The study focuses on psychological effects observed in stock trading such as “loss aversion” and “sunk costs” as well as psychological effects which have already

been observed in cryptocurrency trading through informal sources: “fear of missing out” and “fear, uncertainty and doubt”.

Firstly, the psychological effects “fear of missing out” (FoMO) and “fear, uncertainty and doubt” (FUD) were explored. The study attempts to identify when FoMO and FUD are experienced the most, when a cryptocurrency is just released (newly released) or an older cryptocurrency which has been on the cryptocurrency market for some time (dated cryptocurrency). It was proposed that FoMO is experienced more on newly released cryptocurrency (vs. dated cryptocurrency) and FUD is experienced more on dated cryptocurrency (vs. newly released cryptocurrency). Based on the results, both “fear of missing out” and “fear, uncertainty and doubt” is experienced most on a newly released cryptocurrency (vs. dated cryptocurrency). This result is partly consistent with what was hypothesized. It was hypothesized that FoMO is experienced more on a newly released cryptocurrency (vs. dated cryptocurrency) which is supported by the results. However, it was hypothesized that FUD is experienced more on a dated cryptocurrency rather than newly released cryptocurrency, which was not supported by the results. A possible explanation why FUD was experienced more on a newly released cryptocurrency (vs. dated cryptocurrency) is lack of information. FUD is experienced through information, when you read a negative article about cryptocurrency you could experience FUD. When a cryptocurrency gets released, information available about the cryptocurrency is limited compared to information available of a dated cryptocurrency. When negative information is shared about the newly released cryptocurrency (for example, through social media or news sites) there is limited information available to verify if this negative information is disinformation (false) or information (true). Research has shown that negative information weighs more heavily on the brain compared to positive information Ito, Larsen,

Smith & Cacioppo, 1998). Since negative information weights more heavily on the brain compared to positive information and due to lack of information available to verify if the negative information is true or false, it is reasonable to expect that FUD is experienced more on a newly released cryptocurrency (vs. dated cryptocurrency).

Secondly, it was explored if the experienced FoMO and FUD was moderated by media usage. Media usage is defined as time spend on cryptocurrency activities on devices such as smartphone, tablet or PC. These cryptocurrency activities include time spend communicating about cryptocurrency via WhatsApp or other chat applications. It was hypothesized that media usage positively moderated the experienced FoMO and FUD on a newly released cryptocurrency and a dated cryptocurrency. This means that traders spending more time doing cryptocurrency activities on their smartphone, PC or other devices will experience more FoMO and FUD compared to traders that spend less time doing cryptocurrency activities on their smartphone, PC or other devices. Based on the results, there was not enough evidence to conclude that media usage influences the experienced FoMO or FUD. Therefore we can conclude that it does not matter if a trader spends 300 minutes per day doing cryptocurrency activities or 15 minutes per day doing cryptocurrency activities, the experienced FoMO and FUD will not be influenced by time spend on doing cryptocurrency activities.

Thirdly, it was explored if loss aversion and sunk cost influence risk taking in a cryptocurrency context. Previous research explored loss aversion and sunk cost in a stock trading context. Loss aversion is defined as a tendency to prefer avoiding losses to acquiring equivalent gains. Sunk cost is a cost that is (1) already incurred and (2) cannot be changed. Sunk costs can cause the sunk cost fallacy, which causes decisions to be made based on the money already invested (emotionality) rather than rationality (Arkes & Blumer, 1985). In a stock trading context

loss aversion (vs non-loss aversion) leads to less willingness to take risks, and having sunk costs (vs not having sunk costs) leads to more willingness to take risks. This study tested if loss aversion leads to less willingness to take risks and having sunk costs leads to more willingness to take risks in a cryptocurrency trading context. The results show that in a cryptocurrency trading context loss aversion leads to less risk taking, which is in line with loss aversion in a stock trading context. However, having sunk cost in a cryptocurrency trading context leads to less risk taking, which is not in line with having sunk costs in a stock trading context. We can conclude that cryptocurrency traders prefer to avoid taking risks. A possible explanation of why having sunk costs leads to less risk taking rather than more risk taking is discussed in the limitations.

Lastly, it was explored if traders that consider themselves a risk taker also exhibit more actual risk taking behavior in their cryptocurrency trading. Based on a previous research, the intention of the children's risk taking was in line with their actual risk taking. Therefore it was hypothesized that traders that do not consider themselves risk takers will also exhibit less actual risk taking compared to traders that do consider themselves risk takers. Based on the results, there was not a conclusive answer if risk taking intention was positively related to actual risk taking. A possible explanation for this is the amount of participants, out of 92 participants only 10 participant took the risk taking option, thus having a rather small sample of risk takers. A higher number of participants could give a conclusive answer if risk taking intention is positively related to actual risk taking.

Limitations

When conducting research, it is imperative to minimize the limitations but no research is without limitations. The limitations discussed in this chapter are mainly due to lack of resources.

Improving on the limitations discussed in this chapter requires more participants and more research on cryptocurrency trading. Improvements for future research are discussed after each limitation. Limitations are further discussed in the next chapter, suggestions for future research.

The first limitation of the study is the distinction made between newly released cryptocurrency and dated cryptocurrency. The distinction between a newly released cryptocurrency and a dated cryptocurrency was operationalized with a small scenario. Participants were asked to read the scenario describing a cryptocurrency that will get released in two weeks (newly released cryptocurrency) and a cryptocurrency that has been on the cryptocurrency market for a long time (dated cryptocurrency). The statements measuring FoMO and the new article titles measuring FUD for the newly released cryptocurrency and dated cryptocurrency were exactly the same. There were 10 statements measuring FoMO in total, first 5 statements measuring FoMO for newly released cryptocurrency, followed by 5 statements measuring FoMO for dated cryptocurrency. There were also 10 news article titles measuring FUD in total, first 5 new article titles measuring FUD for newly released cryptocurrency, followed by 5 news article titles measuring FUD for dated cryptocurrency. Participants might have not read the scenario and go straight into rating the FoMO statements (or FUD news article titles), which results in participants thinking they are rating the same statements (or news article titles) twice. For FoMO, 39 out of 92 participants had the exact same FoMO rating for newly released cryptocurrency and dated cryptocurrency. For FUD, 48 out of 92 participants had the exact same FUD rating for newly released cryptocurrency and dated cryptocurrency. This could

imply that a portion of the participants did not read the scenario making the distinction between newly released cryptocurrency and dated cryptocurrency. Future research could improve the distinction between newly released cryptocurrency and dated cryptocurrency by using three different groups to measure FoMO and FUD: a control group, a newly released cryptocurrency group and a dated cryptocurrency group. By using three different groups, participants will only have to rate the FoMO statements or FUD news article titles once instead of twice in the current study. Using three different groups (control, newly released, dated) instead of one group (all participants are in newly released and dated) will ensure that participants are not getting the impression that they are rating the FoMO statements or FUD news article titles twice.

Secondly, the operationalization of risk taking (used to test risk taking in both loss aversion and sunk costs) is limited. Risk taking was measured by giving participants an option to either gain a guaranteed 1500 euros or a 50% chance gain 3000 euros and 50% to gain nothing (and thus lose your whole investment). In reality, there is no guaranteed chance to gain X amount of euros or a 50% chance to lose your whole investment. Losing your whole investment would mean that the price of the cryptocurrency you invested would go to zero and this does not happen in a cryptocurrency trading context. Cryptocurrencies lose or gain value over time. Losing or gaining value for cryptocurrency can happen very fast due to the volatile nature of cryptocurrency but it is not a win all or lose all situation. Sell orders also give traders an option to automatically sell a cryptocurrency if the price of a cryptocurrency goes below a threshold. In the current study the risk taking questions were put into a cryptocurrency trading context by a small scenario where participants have the option to choose between investing into two different cryptocurrency. It could be possible that the operationalization is not sufficient and that the risk taking questions measure risk taking in general instead of risk taking during cryptocurrency

trading. Future research could improve the operationalization of risk taking for cryptocurrency trading by putting the questions more into a cryptocurrency trading context. This can be done by adding cryptocurrency trading keywords such as, sell order, buy order, stop order or limit order.

Thirdly, an online survey was used to collect data of cryptocurrency traders. Almost all questions required self-evaluation. For example, media usage was operationalized by asking participants how many minutes per day they spend on their smartphone, pc or other devices on cryptocurrency activities. It could be possible that participants are underestimating or overestimating the amount of time spend on their smart, pc or other devices doing cryptocurrency activities. In addition, statements such as “I fear my friends have more rewarding experiences than me” requires self-knowledge. Participants could have answered the statement based on their “ideal self” (who they would like to be) rather than their “true self” (how they actually are). Future research could improve the accuracy of the data by using a data tracker on the phones of the participants. Using a data tracker will allow researchers to observe exactly how many minutes participants spend on cryptocurrency activities. In addition, the study could be done where the participants are in pairs, participants will have rate the statements for themselves and for their friend. Using pairs as participants allows researchers to not entirely rely on self-evaluation and will give researchers the option to compare the data (data filled in by the participant and data filled in about the participant by a friend) to get a more accurate representation of the data.

Lastly, the reinforcement effect and substitution effect are discussed in the literature review. The reinforcement effect is an increase in demand due to popularity and the substitution effect is a decrease in demand due to fear. This study investigated the relationship between “release of cryptocurrency” and FoMO, and the relationship between “release of cryptocurrency”

and FUD. The next step is to investigate if FoMO and FUD cause a reinforcement effect (increase in price) or a substitution effect (decrease in price). In short, future research should investigate if FoMO and FUD influence the price of cryptocurrencies.

Conclusion

To summarize, this study investigated the psychological effects during cryptocurrency trading. The first part of the conceptual model of the study focused on the relationship between release of cryptocurrency (newly released vs dated) and the two psychological effects “fear of missing out” and “fear, uncertainty and doubt”. It was hypothesized that “fear of missing out” would be experienced more with newly released cryptocurrency and “fear, uncertainty and doubt” would be experienced more with dated cryptocurrency. Results have shown that both “fear of missing out” and “fear, uncertainty and doubt” is experienced more with newly released cryptocurrency. The conceptual model also included one moderation variable “Media Usage”. It was hypothesized that the amount of minutes spent per day on devices such as smartphone, PC or tablet would positively influence the relationship between release of cryptocurrency (newly released vs. dated) and the two psychological effects “fear of missing out” and “fear, uncertainty and doubt”. However, the moderation effect was not significant.

The second part of the conceptual model focused on psychological effects observed during stock trading: “loss aversion”, “sunk costs” and “risk taking”. It was hypothesized that loss aversion (vs. non-loss aversion) would lead to less willingness to take risks and having sunk costs (vs. not having sunk costs) would lead to more willingness to take risks. Results have shown that sunk cost does lead to less willingness to take risks. However, having sunk cost or

not having sunk cost does not influence the willing to take risks as traders prefer in both instances (having sunk costs and not having sunk costs) to not take any risk.

Lastly, risk taking intention was compared to actual risk taking. It was hypothesized that traders risk taking intention will be in line with their actual risk taking. Results have shown that there is not enough evidence yet to support the hypothesis.

Limitations of the study must be considered. Firstly, the distinction between newly released cryptocurrency and dated cryptocurrency was minimal. Future research could use a between participants design instead of a within participants design. Secondly, the operationalization of risk taking is limited. Future research could use keywords used in cryptocurrency trading (such as sell orders, buy orders and stop orders) to more accurately describe risk taking in a cryptocurrency trading context. Lastly, an online survey was conducted to collect data used in the study. Most questions or statements relied on self-evaluation, which can be a problem to get accurate data as participants might answer the questions or statement based on their “ideal self” (who they would like to be) rather than their “true self” (how they actually are). Future research could use phone trackers to accurately collect data about the amount of time spend on smartphones doing cryptocurrency activities. In addition, use pairs as participants so participants are rated by themselves and by a friend.

In conclusion, this study is the first attempt to identify psychological effects in cryptocurrency trading. Due to the exponential growth of the cryptocurrency market it is imperative to understand these psychological effects and how they influence cryptocurrency trading. Traders understanding how psychological effects influence their decision-making during cryptocurrency trading could potentially have a trading advantage.

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Appendix A: The Survey

Introduction

Dear participant,

First of all, thank you for taking the time to complete this survey! I am currently doing my masters in Business Administration at the University of Amsterdam. For my master thesis I am researching the psychological effects that influence cryptocurrency trading. The purpose of this study is to get an understanding how a cryptocurrency trader would deal in certain situations regarding cryptocurrency trading. Getting this information might explain the psychology behind cryptocurrency trading behavior.

I will be able to share the results of my thesis with you. These results could help you, as a trader, get better understanding of the behavior of cryptocurrency traders and make more well-informed decisions on your trades. You have the option to leave your email address at the next page.

Please keep in mind that there are no right or wrong answers and that your participation is anonymous. All responses will be processed confidentially.

The survey will approximately take **8 minutes** of your time. There is also a progress bar at the top of the survey page to track your progress.

Thank you for your participation,
Peter

Please tick the following box to proceed.

- I am aware of the fact that my responses will be used anonymously for the purpose of this study and I agree to participate.

Control Variables

What is your gender?

- Male
- Female

How old are you?

What is your nationality?

In what year did you start trading cryptocurrency?

How would you rate your expertise regarding cryptocurrency trading?

- | | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Novice | Advanced Beginner | Competent | Proficient | Expert |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

(Optional) If you are interested in the results you can leave your e-mail address below

How many **minutes** on average **per day** do you spend on the following activities (fill in 0 if you do not spend any time on the activity):

On your smartphone doing
any cryptocurrency activities.

On other devices (such as laptop or PC)
doing any cryptocurrency activities.

FoMO New

Imagine the following:

"Coin A is a **new** cryptocurrency that gets released in two weeks. You have the opportunity to invest into Coin A prior to its release. Your friends think this is the moment to invest in Coin A, as they believe it is very likely Coin A will surge right after release, thus making a hefty profit.

You have a few thousand € saved on your bank account. Your friends have already invested a few thousand € into Coin A."

Keeping this situation in mind, please indicate how true each statement is for you.

1. I fear my friends have more rewarding experiences than me.

Not at all true for me Slightly true for me Moderately true for me Very true for me Extremely true for me

2. I get anxious when I don't know what my friends are up to.

Not at all true for me Slightly true for me Moderately true for me Very true for me Extremely true for me

3. Sometimes, I wonder if I spend too much time keeping up with what is going on.

Not at all true for me Slightly true for me Moderately true for me Very true for me Extremely true for me

4. It bothers me when I miss an investment opportunity.

Not at all true for me Slightly true for me Moderately true for me Very true for me Extremely true for me

5. When I made a good investment it is important for me to share the details online (e.g. updating status).

Not at all true for me Slightly true for me Moderately true for me Very true for me Extremely true for me

FOMO Old

Imagine the following:

"Coin B is one of the **oldest** cryptocurrency on the cryptocurrency market. The price of Coin B has collapsed. Your friends think is the moment to invest into Coin B, as they believe it is very likely that Coin B will surge again, thus making a hefty profit.

You have a few thousand € saved on your bank account. Your friends have already invested a few thousand € into Coin B."

Keeping this situation in mind, please indicate how true each statement is for you:

1. I fear my friends have more rewarding experiences than me.

Not at all true for me Slightly true for me Moderately true for me Very true for me Extremely true for me

2. I get anxious when I don't know what my friends are up to.

Not at all true for me Slightly true for me Moderately true for me Very true for me Extremely true for me

3. Sometimes, I wonder if I spend too much time keeping up with what is going on.

Not at all true for me Slightly true for me Moderately true for me Very true for me Extremely true for me

4. It bothers me when I miss an investment opportunity.

Not at all true for me Slightly true for me Moderately true for me Very true for me Extremely true for me

5. When I made a good investment it is important for me to share the details online (e.g. updating status).

Not at all true for me Slightly true for me Moderately true for me Very true for me Extremely true for me

FUD New

Imagine the following situation:

"Coin X is a **new** cryptocurrency that gets released in two weeks. According to your own research Coin X will resolve some limitations of other cryptocurrencies, making it a potential investment opportunity.

You decide to invest a quarter (25%) of your savings into Coin X"

Keeping this situation in mind, rate how would the following news article titles influence your trading behavior:

1. "Rising Transaction Costs Could Trigger a Coin X Price Crash" – Cryptocoin News

| Not at all | Slightly | Moderately | Very | Extremely |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

2. "Coin X will peak at \$60,000 - and then crash" – The Telegraph

| Not at all | Slightly | Moderately | Very | Extremely |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

3. "No way out in Coin X crash, warns exchange" – The Times

| Not at all | Slightly | Moderately | Very | Extremely |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

4. "The Coin X crash is coming" – Huffington Post

| Not at all | Slightly | Moderately | Very | Extremely |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

5. "Collateral Damage From The Inevitable Coin X Crash" – Forbes

| Not at all | Slightly | Moderately | Very | Extremely |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

FUD Old

Imagine the following situation:

"Coin Y is one of the oldest cryptocurrency on the cryptocurrency market. According to your own research Coin Y will surge due to an increase in demand, making it a potential investment opportunity.

You decide to invest a quarter (25%) of your savings into Coin Y"

Keeping this situation in mind, rate how would the following news article titles influence your trading behavior:

1. "Rising Transaction Costs Could Trigger a Coin X Price Crash" – Cryptocoin News

| Not at all | Slightly | Moderately | Very | Extremely |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

2. "Coin X will peak at \$60,000 - and then crash" – The Telegraph

| Not at all | Slightly | Moderately | Very | Extremely |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

3. "No way out in Coin X crash, warns exchange" – The Times

| Not at all | Slightly | Moderately | Very | Extremely |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

4. "The Coin X crash is coming" – Huffington Post

| Not at all | Slightly | Moderately | Very | Extremely |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

5. "Collateral Damage From The Inevitable Coin X Crash" – Forbes

| Not at all | Slightly | Moderately | Very | Extremely |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Loss Aversion

Imagine the following situation:

"You received a €500 gift from a close relative and decide to invest it into a cryptocurrency. You are allowed to invest once in a cryptocurrency. You can choose to either invest in Coin A or Coin B.

Investing into Coin A would net you:

- 50% chance to gain €1000 profit and 50% chance to lose your €500 investment

Investing into Coin B would net:

- 100% chance to gain €450 profit

Keep in mind that you can only invest **once**"

In which coin would you invest?

- Coin A
- Coin B

If Coin A is picked in the first question.

"You were smart enough to invest into Coin A before it was released and you made €1000 profit! You now have €1500 and you are given a second investment opportunity. You can choose to invest in either Coin A or Coin B.

Investing into Coin A would net you:

- 50% chance to gain €3000 profit and a 50% chance to lose your investment of €1500

Investing into Coin B would net you:

- 100% chance to gain €1450

Keep in mind that you can only invest **once**"

In which coin would you invest?

- Coin A
- Coin B

If Coin B is picked in the first question.

"You made the safe choice by investing into Coin B and made €450 profit! You now have €950 and you are given a second investment opportunity. You can choose to invest in either Coin A or Coin B.

Investing into Coin A would net you:

- 50% chance to gain €1900 and a 50% chance to lose your investment of €950

Investing into Coin B would net you:

- 100% chance to gain €900 profit

Keep in mind that you can only invest once"

In which coin would you invest?

- Coin A
- Coin B

Risk Taking Intention

1. I consider myself as a risk-taker.

Not at all true for me Slightly true for me Moderately true for me Very true for me Extremely true for me

2. I consider myself as someone who tries to avoid taking risks.

Not at all true for me Slightly true for me Moderately true for me Very true for me Extremely true for me

Sunk Costs

Imagine the following situation:

"You decide to invest €1000 into cryptocurrencies. You start investing €500 of the €1000 into Coin Z since it looks very promising. Unfortunately, you were wrong and you lost your €500 investment.

You now have a choice where to invest your remaining €500. You can either decide to invest your €500 into Coin X or Coin Y:

- Investing into Coin X will net you a guaranteed €500 profit.
- Investing into Coin Y will net you a 50% chance to make a profit of €1000 (also making up for your failed Coin Z investment) and a 50% chance to lose your €500."

Which option will you pick?

- Coin X
- Coin Y

If Coin X is picked in the first question.

"You invested into Coin X and made a profit of €500. You now have €1000 again, which is the same amount as you started with. You decide to invest the €1000 again and can either invest into Coin X or Coin Y:

- Investing into Coin X will net you a guaranteed €500 profit.
- Investing into Coin Y will net you a 50% chance to make a profit of €1000 and a 50% chance to lose your €500."

Which option will you pick?

- Coin X
- Coin Y

If Coin Y is picked in the first question.

"Your investment into Coin Y was a success and you gained €1000 profit. You now have €1500 and you decide to invest €1500 into cryptocurrency. You can either decide to invest your €1500 into Coin X or Coin Y:

- Investing into Coin X will net you a guaranteed €1500 profit.
- Investing into Coin Y will net you a 50% chance to make a profit of €3000 (also making up for your failed Coin Z investment) and a 50% chance to lose your €1500."

Which option will you pick?

- Coin X
- Coin Y

Appendix B: SPSS Results

SPSS Results for Expertise and Media Usage.

Variables Entered/Removed^a

| Model | Variables Entered | Variables Removed | Method |
|-------|------------------------|-------------------|--------|
| 1 | Expertise ^b | . | Enter |

a. Dependent Variable: MU

b. All requested variables entered.

Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1 | ,389 ^a | ,152 | ,142 | 124,73069 |

a. Predictors: (Constant), Expertise

ANOVA^a

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|-------|------------|----------------|----|-------------|--------|-------------------|
| 1 | Regression | 250274,456 | 1 | 250274,456 | 16,087 | ,000 ^b |
| | Residual | 1400196,979 | 90 | 15557,744 | | |
| | Total | 1650471,435 | 91 | | | |

a. Dependent Variable: MU

b. Predictors: (Constant), Expertise

Coefficients^a

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|-------|------------|-----------------------------|------------|---------------------------|-------|------|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | -27,163 | 36,734 | | -,739 | ,462 |
| | Expertise | 55,601 | 13,863 | ,389 | 4,011 | ,000 |

a. Dependent Variable: MU

SPSS Results for Hypothesis 1a (Parametric)

Paired Samples Statistics

| | | Mean | N | Std. Deviation | Std. Error Mean |
|--------|---------|--------|----|----------------|-----------------|
| Pair 1 | FoMONEW | 2,0326 | 92 | ,62707 | ,06538 |
| | FoMOOLD | 1,9457 | 92 | ,69920 | ,07290 |

Paired Samples Correlations

| | N | Correlation | Sig. |
|--------------------------|----|-------------|------|
| Pair 1 FoMONEW & FoMOOLD | 92 | ,845 | ,000 |

Paired Samples Test

| | | Paired Differences | | | | t | df | Sig. (2-tailed) | |
|--------|-------------------|--------------------|----------------|-----------------|---|--------|-------|-----------------|-------|
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | |
| | | | | | Lower | | | | Upper |
| Pair 1 | FoMONEW - FoMOOLD | ,08696 | ,37540 | ,03914 | ,00921 | ,16470 | 2,222 | 91 | ,029 |

SPSS Results for Hypothesis 1a (Non-Parametric)

Ranks

| | | N | Mean Rank | Sum of Ranks |
|-------------------|----------------|-----------------|-----------|--------------|
| FoMOOLD - FoMONEW | Negative Ranks | 33 ^a | 28,71 | 947,50 |
| | Positive Ranks | 20 ^b | 24,18 | 483,50 |
| | Ties | 39 ^c | | |
| | Total | 92 | | |

a. FoMOOLD < FoMONEW

b. FoMOOLD > FoMONEW

c. FoMOOLD = FoMONEW

Test Statistics^a

| | FoMOOLD - FoMONEW |
|------------------------|---------------------|
| Z | -2,086 ^b |
| Asymp. Sig. (2-tailed) | ,037 |

a. Wilcoxon Signed Ranks Test

b. Based on positive ranks.

SPSS Results for Hypothesis 1b

Variables Entered/Removed^a

| Model | Variables Entered | Variables Removed | Method |
|-------|-----------------------------|-------------------|--------|
| 1 | FoMODifference ^b | . | Enter |

a. Dependent Variable: MU

b. All requested variables entered.

Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1 | ,022 ^a | ,000 | -,011 | 135,38789 |

a. Predictors: (Constant), FoMODifference

ANOVA^a

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|-------|------------|----------------|----|-------------|------|-------------------|
| 1 | Regression | 782,210 | 1 | 782,210 | ,043 | ,837 ^b |
| | Residual | 1649689,225 | 90 | 18329,880 | | |
| | Total | 1650471,435 | 91 | | | |

a. Dependent Variable: MU

b. Predictors: (Constant), FoMODifference

Coefficients^a

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|-------|----------------|-----------------------------|------------|---------------------------|-------|------|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 109,951 | 14,493 | | 7,587 | ,000 |
| | FoMODifference | 7,810 | 37,806 | ,022 | ,207 | ,837 |

a. Dependent Variable: MU

SPSS Results for Hypothesis 2a (Parametric)

Paired Samples Statistics

| | | Mean | N | Std. Deviation | Std. Error Mean |
|--------|--------|--------|----|----------------|-----------------|
| Pair 1 | FUDNEW | 1,9674 | 92 | ,74201 | ,07736 |
| | FUDOLD | 1,8478 | 92 | ,75962 | ,07920 |

Paired Samples Correlations

| | | N | Correlation | Sig. |
|--------|-----------------|----|-------------|------|
| Pair 1 | FUDNEW & FUDOLD | 92 | ,865 | ,000 |

Paired Samples Test

| | | Paired Differences | | | | t | df | Sig. (2-tailed) | |
|--------|-----------------|--------------------|----------------|-----------------|---|--------|-------|-----------------|-------|
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | |
| | | | | | Lower | | | | Upper |
| Pair 1 | FUDNEW - FUDOLD | ,11957 | ,39005 | ,04067 | ,03879 | ,20034 | 2,940 | 91 | ,004 |

SPSS Results for Hypothesis 2a (Non-Parametric)

Ranks

| | | N | Mean Rank | Sum of Ranks |
|-----------------|----------------|-----------------|-----------|--------------|
| FUDOLD - FUDNEW | Negative Ranks | 33 ^a | 22,80 | 752,50 |
| | Positive Ranks | 11 ^b | 21,59 | 237,50 |
| | Ties | 48 ^c | | |
| | Total | 92 | | |

a. FUDOLD < FUDNEW

b. FUDOLD > FUDNEW

c. FUDOLD = FUDNEW

Test Statistics^a

| | FUDOLD - FUDNEW |
|------------------------|---------------------|
| Z | -3,049 ^b |
| Asymp. Sig. (2-tailed) | ,002 |

a. Wilcoxon Signed Ranks Test

b. Based on positive ranks.

SPSS Results for Hypothesis 2b

Variables Entered/Removed^a

| Model | Variables Entered | Variables Removed | Method |
|-------|----------------------------|-------------------|--------|
| 1 | FUDDifference ^b | . | Enter |

a. Dependent Variable: MU

b. All requested variables entered.

Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1 | ,012 ^a | ,000 | -,011 | 135,41044 |

a. Predictors: (Constant), FUDDifference

ANOVA^a

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|-------|------------|----------------|----|-------------|------|-------------------|
| 1 | Regression | 232,494 | 1 | 232,494 | ,013 | ,911 ^b |
| | Residual | 1650238,940 | 90 | 18335,988 | | |
| | Total | 1650471,435 | 91 | | | |

a. Dependent Variable: MU

b. Predictors: (Constant), FUDDifference

Coefficients^a

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|-------|---------------|-----------------------------|------------|---------------------------|-------|------|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 111,120 | 14,773 | | 7,522 | ,000 |
| | FUDDifference | -4,098 | 36,392 | -,012 | -,113 | ,911 |

a. Dependent Variable: MU

SPSS Results for Hypothesis 3

| | | Risk Taking | | Total |
|---------------|-----|-------------|----|-------|
| | | Yes | No | |
| Loss Aversive | Yes | 3 | 80 | 83 |
| | No | 7 | 2 | 9 |
| Total | | 10 | 82 | 92 |

Chi-Square Tests

| | Value | df | Asymp. Sig. (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) |
|------------------------------------|---------------------|----|-----------------------|----------------------|----------------------|
| Pearson Chi-Square | 46,097 ^a | 1 | ,000 | | |
| Continuity Correction ^b | 38,760 | 1 | ,000 | | |
| Likelihood Ratio | 27,909 | 1 | ,000 | | |
| Fisher's Exact Test | | | | ,000 | ,000 |
| Linear-by-Linear Association | 45,596 | 1 | ,000 | | |
| N of Valid Cases | 92 | | | | |

SPSS Results for Hypothesis 4

| | | No Sunk Cost Incurred | | Total |
|--------------------|---------|-----------------------|------|-------|
| | | No Risk | Risk | |
| Sunk Cost Incurred | No Risk | 77 | 8 | 85 |
| | Risk | 3 | 4 | 7 |
| Total | | 80 | 12 | 92 |

Chi-Square Tests

| | Value | df | Asymp. Sig. (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) |
|------------------------------------|---------------------|----|-----------------------|----------------------|----------------------|
| Pearson Chi-Square | 12,991 ^a | 1 | ,000 | | |
| Continuity Correction ^b | 9,123 | 1 | ,003 | | |
| Likelihood Ratio | 8,653 | 1 | ,003 | | |
| Fisher's Exact Test | | | | ,005 | ,005 |
| Linear-by-Linear Association | 12,850 | 1 | ,000 | | |
| N of Valid Cases | 92 | | | | |

SPSS Results for Hypothesis 5

Omnibus Tests of Model Coefficients

| | | Chi-square | df | Sig. |
|--------|-------|------------|----|------|
| Step 1 | Step | 3,617 | 1 | ,057 |
| | Block | 3,617 | 1 | ,057 |
| | Model | 3,617 | 1 | ,057 |

Model Summary

| Step | -2 Log likelihood | Cox & Snell R Square | Nagelkerke R Square |
|------|---------------------|----------------------|---------------------|
| 1 | 55,314 ^a | ,039 | ,082 |

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than ,001.

Classification Table^a

| Observed | | Predicted | | | |
|----------|------------------|--------------------|----|--------------------|-------|
| | | ActualRiskTaking | | Percentage Correct | |
| | | Yes | No | | |
| Step 1 | ActualRiskTaking | Yes | 0 | 9 | ,0 |
| | | No | 0 | 83 | 100,0 |
| | | Overall Percentage | | | 90,2 |

a. The cut value is ,500

Variables in the Equation

| | | B | S.E. | Wald | df | Sig. | Exp(B) |
|---------------------|----------|-------|-------|--------|----|------|--------|
| Step 1 ^a | RiskTake | -,735 | ,395 | 3,472 | 1 | ,062 | ,479 |
| | Constant | 4,363 | 1,290 | 11,431 | 1 | ,001 | 78,494 |