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Factors affecting users purchase intention in cryptocurrency market: FoMo

Does FoMo affect the users purchase intention in cryptocurrencies market?

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Master Thesis

presented as partial requirement for obtaining a Master's Degree in Data Science and Advanced Analytic

NOVA Information Management School
Instituto Superior de Estatística e Gestão de Informação
Universidade Nova de Lisboa

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by

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STATEMENT OF INTEGRITY

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ABSTRACT

Cryptocurrency has been a hot topic for the past few years, with different coins emerging every day. Since it is a recent innovation, cryptocurrency holders must do a fair amount of research to understand how the system and each coin work. Still, it has been demonstrated that most crypto investors have little knowledge of how these markets truly work, being necessary to understand the drivers for their decisions and purchase intention. Moreover, fear of missing out (FoMo) is a construct often linked to purchase intention, also covering the cryptocurrency market.

This study aimed to analyze if FoMo affects users' purchase intention in the cryptocurrency market, with a focus on two key hypotheses. Guided by the stressor-strain-outcome (SSO) framework, this study tries to establish the relationship between three variables: herding, FoMo, and purchase intention of cryptocurrencies. Specifically, we examine whether herding positively affects FOMO (H1), and whether FOMO mediate the effect of herding on purchase intention (H2). By following a quantitative research method, we investigated the relationships among all three variables. The study's sample was constituted by 202 people, who received an online questionnaire through forums that pertain to cryptocurrency.

A total of 173 valid responses remained, with the obtained results demonstrating that there is an indirect positive effect between herding and FoMo and that there is a positive effect between FoMo and purchase intention of cryptocurrencies. This study contributes to the field by proving that people tend to imitate others' behaviors due to the fear of missing out on rewarding experiences, and by showing that that fear of missing out is applicable to the purchase intention of cryptocurrencies, due to the fear of not doing the same as others do (herding), experiencing more revenues from this innovative investment.

KEYWORDS

CRYPTOCURRENCY; HERDING; FOMO; PURCHASE INTENTION

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LIST OF ABBREVIATIONS AND ACRONYMS

BTC	Bitcoin
CRYPTO	Cryptocurrency
DeFi	Decentralized finance
FOMO	Fear of Missing Out
SSO	Stressor-strain-outcome
SNS	Social networking sites
SMN	Social media networks

1. INTRODUCTION

Cryptocurrency has been a hot topic in the past few years, being described as one of the “greatest breakthroughs since the internet”. In fact, new investors get into cryptocurrency every day. Although by definition cryptocurrency is a digital coin that can be used to buy goods and services, it disrupts a wider variety of transactions and allows users to access a global payment system, anywhere and anytime. People see these coins as investments and the future of money. Indeed, as of May 2021, there were already 10.115 different coins listed, and this number increases every day. But cryptocurrency implies a considerable level of risk from the people that invest.

Being an encrypted and decentralized digital coin, it has its value dependent on investors, and it is a highly speculative investment with a big probability for price swings. This implies that cryptocurrency holders must make a fair amount of research to understand how the system and each coin works. The risk comes when people do not study enough and go by someone else’s speculation.

A study by Cardify concluded that the majority of crypto investors say they have little knowledge of how these markets truly work (Cardify, 2021). This majority is composed by young men, with mid to upper income levels. Why would people invest their money on something they do not quite understand? Could it be fear of missing out on the possible gains? Or of being part of a community of investors who are up to date with new technology and the future?

This investigation combines psychological theories and marketing concepts and aims to demonstrate that FoMo is unconsciously present in the minds of the majority of users when there is an intention to purchase crypto assets in the cryptocurrency market. The following topics have an essential role in empirically explaining the cryptocurrency market stressors that a user is exposed to (speculation), leading to the phenomenon of fear of missing out, generating a compulsive act of purchase intention unconsciously.

The research question defined for the present investigation is:

- Does FoMo affect the users purchase intention in cryptocurrencies market?

And, the hypothesis framed to solve the above research question are the following:

- H1: Herding positively affects FOMO.
- H2: FOMO mediates the effect of Herding on Purchase Intention.

1.1. RELEVANCE

Since the launch of BTC, cryptocurrency has gained a lot of traction and has become one of the hottest topics of the 21st century. Some experts believe that these technologies - Cryptocurrency and blockchain - will revolutionize the future, ending central banking systems, traditional modes of exchange, and even the very nature of financial control and government (Murphy, 2019). It is undeniable that the crypto sphere is experiencing exponential growth and already exerting substantial influence on the financial landscape. This surge in innovation is ready to disrupt key industries worldwide. Blockchain and cryptocurrencies underpin the foundation of decentralized finance (DeFi), presenting novel financial instruments that could reshape the conventional concept of money.

These recent pumps in crypto, might be explained by the global COVID-19 recession, leading to trillions of dollars in stimulus being sent out worldwide. Also, nowadays, there is very low or noninterest being paid from banks. Dividends have been cut and people are trying to find places to get yield. As so, people seem to feel disillusioned with banks, creating the perfect opportunity for assets like crypto that remain unregulated and completely decentralized.

Cryptocurrencies have piqued the interest of millions of individuals worldwide who seek new investment opportunities (Cambridge, 2017). But like any other currency, the value of an object rests in two things: confidence and exchange value. In the scope of cryptocurrencies, the intrinsic value of a coin still appears to be primarily speculative. While numerous projects have introduced proof-of-stake mechanisms, the question remains whether the typical user or investor possesses a genuine comprehension of this value.

This forthcoming study holds significance for this field as it aims to elucidate whether cryptocurrency purchasers are making informed or uninformed choices. It will contribute to our understanding of whether the average user comprehends the intricacies of these new digital currencies or is driven primarily by the fear of missing out. It is essential to recognize that cryptocurrency, as a financial innovation, remains in its growing stage, having only been in existence for a decade. Consequently, substantial uncertainty persists regarding the future landscape of digital currencies. The potential economic implications of cryptocurrencies are substantial, as they are poised to become a multi-trillion-dollar economic opportunity (Feiner, 2021), Consequently, it is important that we conduct comprehensive research in this domain while it is still in its formative phase.

2. LITERATURE REVIEW

2.1. CRYPTOCURRENCY

The story of cryptocurrencies had its beginning in 1983, with the cryptographer David Chaum, who developed a cryptographic system called eCash, and, twelve years later, created another system, DigiCash, offering individuals the right to transfer virtual assets without having to share personal information (as with physical cash; there are no records of whose hands it passes through) (Woodford, 2019). While DigiCash never gained traction with users, in 1998 the idea of “cryptocurrency” was coined by Wei Dai, a Chinese engineering computer, that began to think about developing a new payment method that used a cryptographic system and which main characteristic was decentralization (Davies, n.d.). Wei’s idea was to develop an exchange in which government intervention wasn’t necessary at all.

In 2008, the concept of cryptocurrency fully emerged, with the dissemination of a white paper by “Satoshi Nakamoto”, explaining the foundations of the blockchain and introducing bitcoin, the first cryptocurrency. Inspired by the article written in 1998 by Wei Dai, Nakamoto created Bitcoin, a “purely peer-to-peer version of electronic cash that would allow online payments to be sent directly from one party to another without going through a financial institution” (Nakamoto, 2008). The creation of Bitcoin changed the regular finance model. With the use of cryptocurrencies, users were now able to exchange value digitally without third party oversight (Devries, 2016). This was only possible thanks to blockchain technology, a distribution system that logs transactions records on linked blocks and stores them on an encrypted digital ledger (Yaga et al., 2019).

As time passed by, Bitcoin started being more widely accepted. With this, developers started creating new projects on chain, adding new features and improving the blockchain ecosystem. Most of these projects were known as “Alternative Coins” (Altcoins), and these tokens were what enthusiasts called “game-changers”. Some Altcoins were developed in entire new frameworks and served different purposes, from messaging applications, to online marketplaces (Bradbury, 2020). Even though Bitcoin was the pioneer in cryptocurrencies, this field is continually expanding, and the next significant digital token can be released at any moment. Since its release, there have been more than 4000 new cryptocurrencies announced (Figure 1) (De Best, 2021).

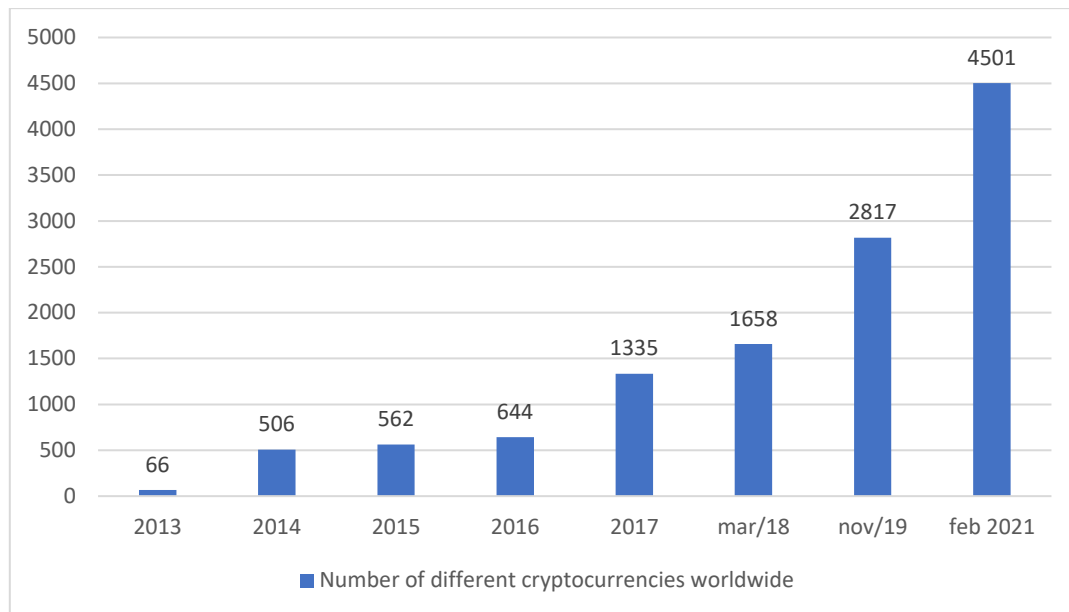


Figure 1 - Number of cryptocurrencies worldwide from 2013 to 2021 – Image adapted from Statista 2021

Besides being considered a digital store of value, these tokens are trading assets similar to stocks. The difference is that the value of stocks is based on factors like risks, competitors, and the most important, profit. The average stock investor tends to put their money into the companies that they believe are undervalued. If other investors follow them, or the company presents good results in the long term, the stock value will rise to allow the investor to take profit (Hayes, 2021). Speculation is, of course, part of this theory, but when it comes to cryptocurrencies, it can reach extremes levels. People are being driven to invest in these tokens thanks to price volatility and the opportunity for speculative investments, which encourage users not to use cryptocurrency to purchase goods and services, but rather to trade them (Carr, 2015).

According to the Cardify report “All Aboard The Crypto Train: Who Are The Latest Crypto Investors?”, 2021, the average user is depositing more money into cryptocurrency than in the past. This study shows that deposits nearly tripled from January 2019 to January 2021. While withdrawals also increased, it shows that more money is coming into the system than going out, revealing an increase in user’s purchase behavior (Cardify, 2021). After analysing verified transactions data, Cardify interviewed cryptocurrencies investors to better understand who they are. It concluded that they are primarily young people (34 years old or less), males, with upper income (Cardify, 2021). As the capital markets continue to rally and valuations get increasingly stretched across nearly all assets’ classes, it is inevitable that investors start to cast a wider net. Speculative investments like cryptocurrency, which are mostly fuelled by information that is quickly shared via social network sites (SNS) and zero-cost trading on some exchanges, lured investors after delivering unique short-term returns (Litman, 2021). These remarkable returns and constant speculation of crypto news on SNS can tempt investors to take risks beyond what they would normally consider acceptable when searching for incremental returns.

2.1.1. Behavioral analysis of cryptocurrencies

Behavioral finance, as a subfield of finance, offers valuable insights into the impact of human psychology on investment decisions. Numerous studies have provided direct evidence of the significant influence of investor emotions on their investment choices (Bollen et al., 2011a; Guo et al., 2017; Nofsinger, 2010) highlighting the pronounced irrationality that often characterizes investors' decision-making processes (Baker & Nofsinger, 2002). Notably, behavioral finance explores a wide range of psychological factors such as overconfidence (Odean, 1998), loss aversion (Kahneman & Tversky, 1979), and herding behavior (Bikhchandani et al., 1992), understanding why investors sometimes make decisions that might not be the best for them, and the things that can lead them to do that.

The literature on behavioral aspects of cryptocurrencies, while continually evolving is primarily guided by two distinct approaches. The first approach involves modeling the dynamic properties of cryptocurrencies to indirectly uncover the profound connections between crypto asset prices and the latent behavior of investors (Alabi, 2017; Kristoufek, 2013). This approach highlights the importance of understanding how investor sentiments and emotions can drive the crypto market. The second approach focuses on modeling the demand for this emerging asset class as a function of market fundamentals (Corbet et al., 2018). Both these studies provide an intuitive basis for using sentiment and behavioral analysis in determining prices of cryptocurrencies assets as they indicate the potential herding behavior amongst investors (Celeste et al., 2020; Kristoufek, 2013).

These insights become particularly relevant when we consider the characterization of Bitcoin as a 'bubble' by experts such as Andrian Cheung, Eduardo Roca and Jen Je Su (Cheung et al., 2015). Robert J. Shiller characterized a bubble as "a situation in which news of price increases spurs investor enthusiasm, which spreads by psychological contagion from person to person, in the process amplifying stories that might justify the price increases and bringing in a larger and larger class of investors despite doubts about the real value of an investment" (Shiller, 2016) being fuelled in this case by SNS (Litman, 2021).

From a behavioral perspective, Jean-Paul Rodrigue has introduced a graphical representation of four bubble stages (Stealth, Awareness, Mania, and Blow-off phase) to define which behavioral biases, both cognitive and emotional, manifest at each of these stage (Rodrigue, 2020). In the Stealth phase, investors may exhibit cognitive biases like confirmation bias, as they quietly accumulate positions while avoiding public scrutiny. The Awareness phase witnesses the emergence of behavioral biases such as overconfidence and the trend effect, as increasing attention draws more investors into the market. The Mania phase, characterized by irrational exuberance, sees heightened emotional biases like fear of missing out (FOMO), which can lead to parabolic price increases. Finally, the Blow-off phase is marked by panic selling and emotional biases like regret and loss aversion, resulting in a rapid market decline (Barberis et al., 2001; Bradford De Long et al., 1990; Statman & Fisher, 2002).

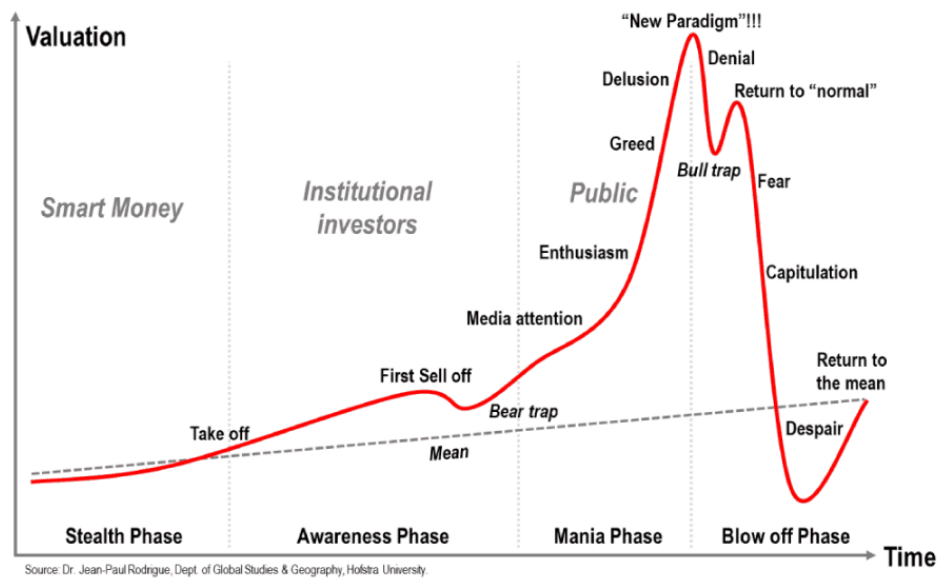


Figure 2 - Four Bubble Stages Graphic

According to Taofik Hidajat, cognitive and emotional biases have a significant impact on the decision-making of cryptocurrency users and can be applied in the context of cryptocurrency investments. In his study, Hidajat proposed and designed a conceptual model for understanding the behavioral biases that affect cryptocurrency investing, mentioning several cognitive biases that play a crucial role in shaping investor behavior. These cognitive biases include herding, optimism, overconfidence, confirmation bias, loss aversion, and the gambler's fallacy (Hidajat, 2019). These biases not only find resonance in the cryptocurrency market but also build a correlation with Jean-Paul Rodrigue's four bubble stages graphic, taking a closer look at the ways investors make choices and how their decisions can be influenced by certain biases:

- Herding behaviour: is the tendency of individuals to follow the crowd or mimic the actions of others in a group. In the context of cryptocurrencies, this can lead to a rapid surge in prices as more investors join the trend. Herding behavior is well-documented in behavioral finance and has been explored in the context of digital assets (Singh, 2013).
- Optimism bias: refers to the tendency of individuals to be overly optimistic about the future, leading them to underestimate risks and overestimate potential returns. In cryptocurrency markets, excessive optimism can contribute to the creation of price bubbles, as investors may overlook the inherent risks (Hirshleifer & Shumway, 2003).
- Overconfidence bias: occurs when individuals have too much confidence in their own knowledge or abilities, which can lead to overtrading or taking excessive risks. Recent studies in the cryptocurrency field have explored how overconfidence can affect trading behavior and outcomes (Hidajat, 2019).
- Confirmation Bias: involves seeking out information that confirms pre-existing beliefs and ignoring information that contradicts them. In cryptocurrency investments, this bias can lead investors to cherry-pick information that supports their decisions and neglect critical analysis (Hirshleifer & Shumway, 2003).

- Loss Aversion: is the tendency to strongly prefer avoiding losses over acquiring equivalent gains. In the context of cryptocurrencies, this bias can lead to the 'hold on to losing positions' behavior, even when it may not be rational to do so (Hidajat, 2019).
- Gambler's Fallacy: is the belief that past random events influence future random events. In the cryptocurrency market, this bias can lead to expectations of a market correction after a period of gains or vice versa, even when prices follow no specific pattern (Auer & Claessens, 2018).

These cognitive biases, which are deep-rooted in human psychology, play a significant role in cryptocurrency investing, affecting decisions at each stage of Jean-Paul Rodrigue's bubble model and contributing to the market's behavioral dynamics.



Figure 3 - Behavioral Biases in Bubble Stages

The preceding discussion has delved into the various cognitive biases that play a pivotal role in shaping investor behavior, especially within the context of cryptocurrency investments. These biases, such as herding, optimism, overconfidence, confirmation bias, loss aversion, and the gambler's fallacy, underscore the significance of understanding the behavioral dynamics that drive asset price bubbles. In this thesis, we will focus our attention on the Stealth phase, which is the earliest stage in Jean-Paul Rodrigue's four-stage model of bubble development. This choice is grounded in several key reasons.

The Stealth phase serves as a critical starting point in the lifecycle of a bubble, marking the beginning of a speculative investment opportunity. During this phase, a select group of individuals with greater access to information and a higher level of market sophistication become aware of new investment prospects (Hidajat, 2019). However, what distinguishes this phase from subsequent stages is that the supporting evidence for the investment opportunity is not yet robust, and its true potential remains largely unproven (Rodrigue, 2020). This moment in a market's evolution is characterized by a unique interplay of optimism, early interest, and latent uncertainty.

In recent years, the Stealth phase has collected increasing attention from both academic researchers and market participants due to the growing recognition of the role it plays in shaping market dynamics. Several factors justify the focus on this phase within the context of this thesis as follows.

The Stealth phase is often the earliest stage where informed investors detect the potential for an emerging investment opportunity (Hidajat, 2019). Since the information about the emerging opportunity may be known to a limited group, leading to information asymmetry within the market.

This can influence the behavior of investors who have access to privileged information and can offer valuable lessons on how information dissemination impacts decision-making (Fama, 1970). Studies examining cryptocurrency market dynamics have revealed how early adopters influence market sentiment and asset prices as they transition from the Stealth phase to the Awareness phase (Garcia et al., 2014). Similarly, research in traditional financial markets has shown that the early stages of asset bubbles are characterized by an intricate interplay of information diffusion, optimism, and the cautious testing of market waters (Kindleberger & Aliber, 2005).

Moreover, the rise of social media and online communities has amplified the impact of early adopters in the Stealth phase. The information and sentiments they share through various digital platforms can lead to a snowball effect in the subsequent phases of a bubble, making it imperative to understand how these individuals operate and influence the broader investment landscape (Bollen et al., 2011).

As we delve deeper into the dynamics of the Stealth phase, one behavioral bias emerges as a predominant influence on investor behavior during this stage: herding. Herding behavior is the tendency of individuals to follow the crowd or mimic the actions of others in a group, often without conducting their independent research or analysis.

In the Stealth phase, as early adopters become aware of an emerging investment opportunity, herding behavior often takes hold. These early adopters, driven by a combination of optimism and the desire to capitalize on the perceived opportunity, may start to invest in the asset. The presence of information asymmetry amplifies the influence of these early investors, as others look to them for guidance and validation. As more investors follow suit, this herding behavior can lead to rapid price increases and the initial stages of a potential bubble.

The importance of herding behavior in the Stealth phase cannot be overstated. It not only shapes investor decisions but also lays the foundation for the later stages of the bubble, where herding becomes even more pronounced. Understanding how and why herding behavior emerges in the early stages of a bubble is crucial for comprehending the broader behavioral dynamics of market bubbles. It also provides insights into the interplay between cognitive biases such as overconfidence and optimism and their influence on investor decision-making.

In conclusion, the Stealth phase, with its blend of early awareness, optimism, information asymmetry, and herding behavior, offers a compelling vantage point for examining the behavioral dynamics that underpin investment bubbles. By studying this phase, in particular the Herding behavioral, we can gain a deeper understanding of the factors that drive market sentiment, influence investment decisions, and potentially lay the groundwork for the emergence of investment bubbles. This focus is especially relevant in today's dynamic and interconnected financial markets, where the dynamics of asset bubbles can have profound implications for both investors and financial stability.

By emphasizing the role of herding behavior within the Stealth phase, we can gain a deeper appreciation of how investor behavior evolves as an investment opportunity progresses through its various stages. This perspective transcends the boundaries of cryptocurrency investments and has broader implications for understanding the behavior of investors and the dynamics of asset bubbles in a wide range of financial markets.

2.2. HERDING

Herding behavior is a phenomenon in which individuals mimic the actions and decisions of others, often akin to how a flock of sheep follows the lead of one member. This pattern of behavior is not limited to the animal kingdom; it also manifests prominently in the realm of finance, where individuals tend to conform to the actions of their peers. For instance, during the dotcom bubble that occurred between 1998 and 2001, financial institutions heavily relied on online actions, illustrating the prevalence of herding behavior within the investment landscape (Singh, 2013).

In the context of the cryptocurrency market, understanding herding behavior is of paramount importance, as it can significantly impact the dynamics of digital asset prices. Two representative models shed light on rational herding behavior, providing valuable insights into the decision-making processes of investors.

The first model, known as the external returns model, posits that investors seek additional information when they observe others doing the same. In essence, the behavior of others becomes a signal for individuals to pursue more information, as it is perceived to be valuable (Devenow & Welch, 1996). In traditional asset markets, the information acquired and the investment decisions of others are swiftly reflected in asset prices. However, in the realm of cryptocurrencies, which is often information-poor compared to traditional financial markets, observing the actions of other investors can be one of the primary means of gathering information (Chiang & Zheng, 2010).

The second model is the information cascade model. Information cascades occur when individual investors have access to private information. When a decision is communicated to subsequent investors, subsequent probabilistic expectations of current market conditions lead to the same decision. The better the information, the faster the cascade. However, this model can have dangerous consequences (Balcilar et al., 2012; Ballis & Drakos, 2020).

The cryptocurrency market has witnessed several instances of herding behavior in recent years, exemplifying the impact of social and psychological factors on investment decisions. For example, during the sudden rise of Bitcoin in late 2017, many investors joined the market due to FOMO, the Fear of Missing Out, causing a surge in prices and widespread herding behavior (Wang et al., 2023). Similarly, during the GameStop short squeeze in early 2021, many retail investors collectively decided to buy the stock, creating a powerful herding effect that disrupted conventional market dynamics.

Herding behavior can have several consequences in the cryptocurrency market. Firstly, the initial signal that triggers herding may not always be accurate, but investors follow it due to the fear of missing out on potential gains. Secondly, the situation can be disrupted by another, more credible signal that supersedes the initial one, causing abrupt shifts in market sentiment and behavior. Thirdly, even the most substantial signals may be based on incomplete information, leading to suboptimal decision-making and market volatility (Easley & Kleinber, 2010).

In conclusion, herding behavior remains a significant driver of investor decisions and market dynamics, particularly within the cryptocurrency market. It is a behavioral phenomenon that often arises from social influences, cognitive biases, and involves with the fear of missing out on potentially lucrative opportunities. As the cryptocurrency market continues to evolve and attract a diverse range of

participants, understanding and studying herding behavior is crucial for both investors and researchers.

2.3. FEAR OF MISSING OUT

Fear of missing out is a phenomenon discovered by the marketing strategist, Dan Herman, in the mid-'90s. While studying investors in focus groups and individual interviews for other research topics, Dan Herman noticed that most investors expressed a fearful attitude towards the chance of failing to exhaust their opportunities and miss the expected happiness of succeeding in doing it. By that time, Dan Herman knew that this phenomenon could mean a significant new development in investor psychology and started studying it, coining the term "fear of missing out", also known as FoMo (Herman, 2000).

FoMo had its first official definition by Anew Przybylski and Patrick McGinnis in 2013, as a "pervasive apprehension that others might be having rewarding experiences from which one is absent" and it is characterized as the will to always relate to what others are doing (Przybylski et al., 2013). In a more in-depth study, Przybylski states in 2013 that FoMo can be seen as involving two specific primary components:

- a) Fear that others are having rewarding experiences from which one is missing– mapping onto the cognitive aspect of anxiety.
- b) The persistent desire to stay connected with people and the surrounding environment - this component can be seen as a behavior strategy to relieve such anxiety.

The continuous monitoring behavior associated with FoMo extends beyond proactive actions like actively searching the internet. It also encompasses a reactive dimension, where users compulsively respond to social notifications on their devices (Elhai, Yang, & Montag, 2020).

Several self-report scales were developed to measure FoMo. The most widely used is the 10-item, unidimensional scale, set on 5-point Likert-type responses made by (Przybylski et al., 2013). This FoMo scale measures the degree to which one fears missing out on social events.

As more research was conducted and became available, psychologists started getting a clearer image of what FoMo entails and how it affects us, noticing its many negative effects, and that it was more common than what they were expecting. According to (Oberst et al., 2017), FoMo revealed being very prevalent in adolescents.

A later study suggested that FoMo was mainly linked to SNS and more significant smartphone usage, and not directly associated with age or gender (Wolniewicz et al., 2018). It showed that this increase of exposure to social media through smartphones was related to fears of positive and negative evaluations by others, even affecting the mood of a person, regardless of age or gender.

Numerous investigations have also examined FoMo in relation to levels of problematic smartphone usage. Most of these studies were conducted with samples from all ages groups and all conclude that there is a large positive association between problematic smartphone use and FoMo (Elhai et al., 2018; Elhai, Yang, Fang, et al., 2020; Liu & Ma, 2018; Servidio, 2019; Sette et al., 2019; Sha et al., 2019; Traş, 2019).

Today, every individual with a smartphone can access what they are missing out on (i.e., dinners, meetings, or other opportunities). This opportunity of being constantly connected through social media can be seen as the fuel for FoMo's fire (Miller, 2021). When individuals start noticing the things they are missing out on, it causes feelings of dissatisfaction, anxiety, and stress, leading to more anxious and irritable behavior, resulting in less thoughtful and conscientious actions (Sette et al., 2019).

Understanding FoMo and its effects on individuals provides a valuable lens through which to examine consumer behavior, particularly in the context of purchase intention. As individuals increasingly engage with social media and technology, the fear of missing out can play a significant role in shaping their consumption choices. The constant exposure to products, trends, and experiences through digital channels fuels the desire to participate and engage, not only socially but also economically.

FoMo can drive consumer purchase intention in several ways. Individuals, driven by the fear of missing out on a particular product or trend, may be more inclined to make impulsive buying decisions to ensure they are part of the experience. The fear of missing out on exclusive offers, limited-time deals, or unique experiences can trigger a sense of urgency, compelling consumers to take action.

The impact of FoMo on consumer behavior is a growing area of interest for marketers and researchers. As technology and social media continue to evolve, understanding how the fear of missing out influences consumer purchase intention is becoming increasingly relevant.

2.4. PURCHASE INTENTION

Purchase intention reflects investors' predictions about their own purchasing actions (Schlosser, 2003). This prognosis may be based on the investors' intentions to accept, buy, or use a particular product or service that may or may not have been mentioned by the company or brand (Chang & Wildt, 1994).

Delving into the intricate correlation between purchase intention and various influencing factors, the research by Rao and Monroe, knowledge of the product is the principal factor in product purchasing decision (Monroe, 1988). Similarly, Satish and Peter highlight the significance of investor knowledge in shaping purchase intentions (Jayachandran et al., 2004). Payne and Holt contribute to the discourse by positing that perceived value, denoting the relationship between investors and the product, is a crucial determinant of purchase intention (Payne & Holt, 2001). This perspective aligns with the assertion that a higher perceived value corresponds to an elevated intention to purchase (Chang & Wildt, 1994). The perceived value of a product has different dimensions that are both intangible and tangible (Snoj et al., 2004).

In the marketing domain, purchase intention, is point out as essential by Morrison, serves as a metric for marketers to gauge investors' willingness to acquire products both pre- and post-launch (Morrison, 1979). Additionally, this metric serves as a valuable indicator of investors' knowledge levels (Armstrong et al., 2000).

Bao, and Sheng contribute a practical approach to measuring purchase intention through a Likert scale, capturing respondents' sentiments with statements like "*The likelihood of my purchasing this product is very high*", "*The probability that I would try this product is very high*", and "*My willingness to buy this product is very high*". This scale uses seven response categories, ranging from 1=Strongly Disagree to 7=Strongly Agree. (Bao et al., 2011).

In cryptocurrency market, the concept of perceived value, as articulated by Snoj et al. (2004) above, takes on essential significance. This involves considering both tangible and intangible dimensions, offering insights into how investors perceive the inherent value of cryptocurrencies.

Tangible aspects in the cryptocurrency market may include features related to security, scalability, and overall technological advancements. For instance, cryptocurrencies with robust security measures and efficient transaction processing may be perceived as having tangible value. Technological upgrades and innovative features further contribute to the tangible dimensions of a cryptocurrency (Caginalp & Caginalp, 2018).

On the other hand, intangible dimensions of perceived value encompass factors like community sentiment, brand image, and recognition. Positive community support, belief in the project's mission, and a reputable brand image contribute to the intangible value of a cryptocurrency. Additionally, cryptocurrencies that are perceived as innovative and capable of addressing real-world challenges in novel ways hold intangible value, influencing investors' perceptions (Moro-Visconti, 2022).

The correlation lies in investors' perceptions of a cryptocurrency's value, considering both tangible and intangible aspects. A cryptocurrency project that successfully communicates and embodies strong security features, technological advancements, positive community sentiment, and a reputable brand image may be perceived as more valuable. These perceived values significantly influence investors' decisions to buy or hold. In the context of the present dissertation, purchase intention is conceptualized as behavior-driven, emphasizing the intrinsic connection between investors' behaviors and their intentions.

3. HYPOTHESES DEVELOPMENT

Cryptocurrency markets are bustling with action, drawing in investors from various backgrounds. In this dissertation, the focus will be on two psychological behaviors, herding and FOMO, and explore how they affect people's decisions to buy in the cryptocurrency market.

Herding behavior is not new but is particularly evident in the cryptocurrency space. It describes the inclination of individuals to mimic the actions of others, often without conducting independent research. Herding often stems from the Fear of Missing Out (FOMO) and can lead to impulsive decision-making. Prior studies at the literature review show that herding is prevalent in the cryptocurrency market, especially during price surges and influential market movements.

FoMo is a powerful psychological force that drives individuals to make decisions driven by the fear of missing out on potential gains. In the context of cryptocurrencies, where prices are highly volatile and market sentiment can change rapidly, FoMo plays a substantial role. The fear of missing out on the next big price rally can trigger impulsive investment decisions (Wang et al., 2023).

The first hypothesis establishes that herding behavior in cryptocurrency markets positively influences FoMo. The prior studies support this hypothesis, indicating a strong correlation between herding and FoMo.

FoMo is not just a consequence of herding but can also mediate the relationship between herding and its outcomes. In cryptocurrency markets, FoMo seems to intensify the impact of herding on investment decisions, particularly purchase intentions. So, the second hypothesis suggests that FoMo mediate the influence of herding on purchase intention. This means that when herding behavior is accompanied by a strong sense of FoMo, it is more likely to impact an individual's purchase decisions.

Therefore, on the basis previous discussions, the following hypothesis were defined:

H1: Herding have a positive impact on FOMO.

H2: FoMo mediates the effect of Herding on Purchase Intention.

4. METHODOLOGY

4.1. RESEARCH DESIGN

The research model will be grounded on the SSO model. All the relevant theories presented in the literature review will be divided into three key aspects (Stressor, Strain and Outcome) as shown in the conceptual framework.

To make sure the research is relevant and that the purpose of this thesis is fulfilled, a quantitative research method will be applied, using a correlational research design to investigate the relationships between all the study variables without inferring causality (A. Swanson & F. Holton, 2005).

For data treatment, first will apply the factor analysis technique to reduce larger numbers of variables into fewer factors that will be more manageable and understandable (Child, 1990). Then will used process (SPSS ad-on), more specifically model 4, which tests a linear regression with FoMo as the mediator. This model was chosen due to its compatibility with the conceptual framework I have chosen.

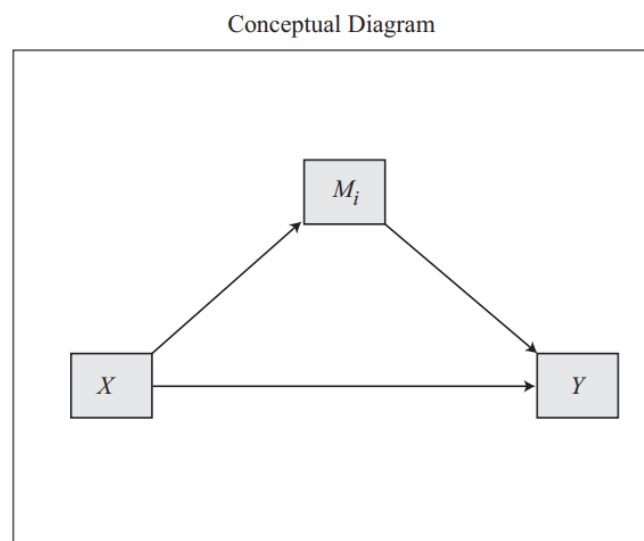


Figure 4 - SPSS (Process) - Model 4

Follow below the representation of each variable in the previous model presented:

- X = Herding
- M= FoMo
- Y = Purchase intention

This model allows measuring the direct effects between x - m, m-y and x-y. It also makes it possible to analyse other direct effects between variables and to have a better understanding of the relationship between them.

4.2. UNIVERSE AND SAMPLE

The Universe, also known as the target population, is the whole population for which the study results are desired (Setia, 2016). The population for a study is that group from whom the researcher wants to draw conclusions (Abutabenjeh & Jaradat, 2018).

Since with this study I plan to investigate if FoMo affects users purchase intention in cryptocurrencies, the target population must be involved with this market. Hence, for this study the universe can be defined as “Individuals exposed to speculative content related with cryptocurrencies”.

Prior studies have reported that socio-demographic factors, such as gender (Kircaburun et al., 2018) and age (Reer et al., 2019), can influence individuals’ social media experiences that are subsequently correlated with FoMo. So, to account for those possible confounding effects, age, gender, education will be considered as control variables.

Regarding the sample size, the initial objective was to have a final sample between 200 and 300 respondents in order to have a solid sample able to lead to meaningful conclusions. The final sample size was **202** persons.

4.3. INSTRUMENT CONSTRUCTION AND DATA COLLECTION

For this dissertation, an online questionnaire was the chosen instrument to collect data and further draw conclusions. The questionnaire was open from May 27th to August 17th, allowing participants a substantial timeframe to provide their responses. The *Qualtrics* tool was used to elaborate the questionnaire. This tool is an online platform that facilitates the construction of surveys.

Data recruitment was carried out via online forums that pertain to cryptocurrency since the general public is not very familiar with or accustomed to using cryptocurrencies. By doing so, it was guaranteed that the participants had a certain level of familiarity and conventional opinions regarding cryptocurrencies as a whole, which enhances the credibility of the results.

Social Media Forums used in this survey

- reddit.com/r/bitcoin
 - reddit.com/r/cryptocurrency
 - reddit.com/r/ethtrader
 - reddit.com/r/redditrpxp
 - reddit.com/r/dogecoin
 - Twitter
 - cryptocompare.com (bitcoin)
 - cryptocompare.com (xrp)
-

The survey starts by measuring Herding behaviour on a 5-point Likert scale, ranging from 1 (“Strongly disagree”) to 5 (“Strongly agree”). Scores were computed for each participant by averaging across all five items. It may be challenging, as herding behaviour typically involves making decisions based on the actions or opinions of others rather than relying on one's own judgment. However, for the purpose of this thesis, a scale was developed with Likert scale items that capture the tendency to conform to others' judgments or follow the crowd.

It's important to note that this Likert scale items have not been validated as measures of herding behavior and would need to be tested in more research studies besides the present one to determine their true validity and reliability.

The instruments used to measure FoMo and Purchase Intention in the questionnaire were adapted from existing and validated published studies. Since these instruments had not been used in the cryptocurrency context, some modifications had to be made to each item to guarantee their validity in the current research context.

At the end, it follows a brief section to collect general demographic details, the questions relating to the research model were based on previously validated scales in prior literature. All items were measured on 5-point Likert scales ranging from 1 “Strongly Disagree” to 5 “Strongly Agree”.

Construct	Item	Adapted From	Cronbach's alpha
Herding	1. When making decisions, I often follow what others are doing. 2. I am more likely to trust the judgments of a group than my own individual judgment. 3. I feel more comfortable making a decision if it is consistent with the decisions made by others. 4. I find it challenging to go against the opinions of a majority. 5. I would be more likely to buy a product if it was recommended by many people, even if I had doubts about it.	-	-
FoMo	1. I fear that if I don't invest, others might earn more money than me. 2. I fear that if I don't invest my friends might earn more money than me. 3. I get worried when I find out my friends are earning money and I am not. 4. I get anxious when I don't know in what my friends are investing in. 5. It is important that I understand my friends “in jokes” regarding cryptocurrencies. 6. Sometimes, I wonder if I spend too much time keeping up with what is going on in the crypto space. 7. It bothers me when I miss an opportunity to invest in crypto with my friends. 8. When I have a good opportunity or return of investment in crypto it is	(Przybylski et al., 2013)	0,90

	important for me to share the details online (e.g. updating status). 9. When I miss out on a joint-investment opportunity it bothers me. 10. When I go on vacation, I continue to keep tabs on what my friends and crypto influencers are doing in crypto space.		
Purchase Intention	1. The likelihood of my purchasing crypto assets is very high. 2. The probability of my purchasing crypto assets if they appear promising is very high. 3. My willingness to buy a crypto asset that seems promising is very high.	(Bao et al., 2011)	0,92

Table 1 – Construct and Item Summary

To test the content and validate the questionnaire before starting my study, I searched for the opinion of an expert from the fields of psychology and marketing, and after the approval, a pilot test survey was conducted with a small circle of known users with cryptocurrency experience. This strategic initiative allowed for comprehensive insights into the usability and effectiveness of the survey instrument, laying a robust base for the subsequent full-scale data collection process. The in-depth feedback and perspectives gathered from this knowledgeable group further enriched the survey design, contributing to the refinement of questions and methodologies for optimal research outcomes.

5. RESULTS AND DISCUSSION

5.1. DATA-PREPARATION PROCESS

The analysis started with 202 participants. Subsequently, after excluding respondents who answered "No" to the question, "Have you previously engaged in cryptocurrency investments?", a total of 173 valid responses remained.

5.2. SAMPLE CHARACTERIZATION

The participants were 63% male, 35,8% female and 1,2% non-binary/third gender. Most of the participants are between 25 to 34 years old, with a representation of 56,6%, and the majority of the participants have a Bachelor's degree (Table 2).

		Percentage	Cumulative Percentage
Gender	Male	63,0	63,0
	Female	35,8	98,8
	Non-binary/third gender	1,2	100,0
Age	18-24	27,7	27,7
	25-34	56,6	84,4
	35-44	13,9	98,3
	45-54	1,7	100,0
Education	No schooling completed	2,3	2,3
	High school graduate, diploma or the equivalent	4,0	6,4
	Some college credit, no degree	5,8	12,1
	Trade/technical/vocational training	9,2	21,4
	Bachelor's degree	59,0	80,3
	Master's degree	18,5	98,8
	Doctorate degree	1,2	100,0

Table 2 - Demographics of the sample

5.3. MEASURES RELIABILITY

For the Herding scale, the sample had a mean score of 3,51 (SD =0,60), and a reliability score of $\alpha=0,76$. For the FoMo scale, the sample had a mean score of 3,04 (SD=0,78), and a reliability score of $\alpha=0,91$. For the Purchase Intention scale, the sample had a mean score of 3,76 (SD=0,70), and a reliability score of $\alpha=0,81$.

Since the presented results reveal an internal consistency of variables through reliability score, with all the Cronbach's alpha values having a greater value than 0.70, we can consider the chosen constructs valid and with satisfactory reliability results for the objectives of this thesis.

5.4. RESULTS FROM THE HYPOTHESES TESTING

The statistic model used for this analysis utilises 5000 samples for percentile Bootstrap confidence intervals to test for significance. If the Bootstrap confidence interval does not include 0, the indirect effect is significant. A p-value of 0,05 was used as a cut-off to determine the significance of effects for the simple regression analysis. Lastly, standardised coefficients (β) were used to describe the association between predictor and outcome variable.

5.4.1. Direct effects

The regression analysis revealed that Herding positively predicts FOMO scores ($\beta=0,54$, $p<0,01$). Furthermore, FOMO positively predicts Purchase Intention ($\beta=0,50$, $p<0,01$), whereas Herding does not have a significant association with Purchase Intention ($p=0,99$). This model [$F(2, 170) = 28,83$, $p<0,01$] explains $R^2=0,25$ of Purchase Intention scores.

5.4.2. Indirect effects

When accounting for FOMO, Herding has a significant, positive indirect effect on Purchase Intention of $\beta=0,27$ (Bootstrap confidence interval=[0,15;0,39])

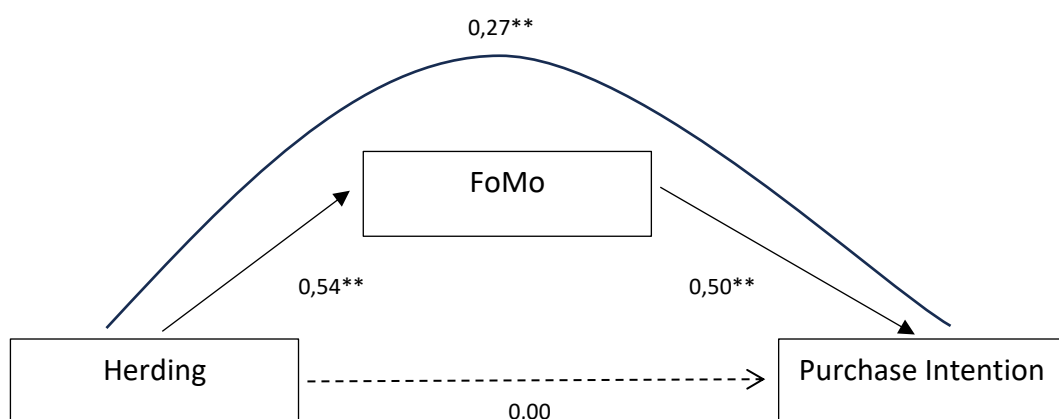


Figure 5 - Standardized coefficients of the indirect relationship between Herding, FoMo and Purchase Intention, * $p<0,05$; ** $p<0,01$

6. CONCLUSION

This study revealed a positive effect of FoMo on users' purchase intentions within the cryptocurrency market, establishing a relationship between the three variable previously studied in the literature review: herding, FoMo and purchase intention in cryptocurrencies market.

The results obtained from this investigation reveal several notable findings. Firstly, it was observed that Herding significantly and positively predicts FoMo scores, aligning with the first hypothesis (H1) that Herding positively affects FoMo. Sustained by the literature review, the positive link between Herding and FoMo can be justified by the underlying connection between these constructs. Herding reflects the tendency to imitate group behavior, a common occurrence in financial decision-making (Singh, 2013). In contrast, FoMo is the persistent desire to remain connected with others' experiences and rewards, which individuals believe they may miss out on surrounding environment (Przybylski et al., 2013). Therefore, herding positively affects FoMo because people tend to emulate others in the cryptocurrency market due to their perceived lack of information and the assumption that imitating others equates to possessing superior knowledge.

Additionally, the results show a direct and positive link between FoMo and Purchase Intention as support the second hypothesis (H2) that FoMo mediates the effect of herding on purchase intention. As demonstrated in the literature review the direct link between FoMo and Purchase Intention in cryptocurrencies is associated with the premise that individuals seek to join in rewarding experiences, thereby leading them to invest in products or services that others are engaging with. In this context, users' knowledge about the product or service appears to be irrelevant in shaping their purchase intentions (Monroe, 1988), as individuals invest in cryptocurrencies regardless of their level of market knowledge, financial expertise and its tangible or intangible value (Payne & Holt, 2001).

Overall, and based on the SSO framework (Koeske & Koeske, 2010), this research demonstrates that Herding behavior within the cryptocurrency market serves as a stress-inducing factor, impacting individuals who exhibit Fear of Missing Out (FoMo). Consequently, FoMo directly results in behavioral consequences and unfavourable psychological effects, such as impulsive or uninformed purchase intentions. For instance, during a sudden and substantial surge in a particular cryptocurrency's price, individuals experiencing FoMo may impulsively invest without thorough research or understanding, just due to the fear of missing out on potential profits. Alternatively, in a highly volatile market, the anxiety and sense of urgency induced by FoMo may lead individuals to make hasty buy or sell decisions, often without a rational basis, further emphasizing the complex impact of this phenomenon on consumer behaviour.

6.1. LIMITATIONS AND FUTURE WORK

This work presents a contribution to our comprehension of user behaviour within the cryptocurrency market and serves as a foundation for future research endeavours in this ever-evolving and dynamic field, however, it is essential to recognize its limitations. The research design and sample size, while informative, may not comprehensively capture the complex dynamics and multifaceted nature of the cryptocurrency market. For instance, response bias may emerge when survey participants, influenced by social desirability, provide answers that they believe are more socially acceptable rather than

reflecting their true behaviours or opinions. This could potentially lead to an overestimation or underestimation of certain behaviours related to cryptocurrency purchase intention.

As an alternative suggestion for future research designs, employing mixed-method approaches that combine surveys with qualitative interviews or observation methods could provide a more comprehensive understanding of cryptocurrency users' behaviours and motivations. Additionally, longitudinal studies tracking participants over an extended period may offer insights into how these behaviors evolve over time and adapt to the ever-changing cryptocurrency landscape.

In the pursuit of advancing this field of study, future research should consider expanding the sample size to cover a more diverse range of cryptocurrency investors worldwide. A deeper exploration of their motivations and underlying drivers for purchasing cryptocurrencies could provide valuable insights. Additionally, further investigation into the negative direct effect between Herding and Purchase Intention is needed to uncover the elaborate dynamics between these two elements.

Lastly, given that a Herding Likert scale was developed for the purposes of this thesis, I recommend its continued utilization for testing in additional research studies beyond the present one to determine its true validity and reliability. In the context of this thesis, the Cronbach's alpha was calculated as 0.76, indicating a reliable measure.

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APPENDIX A

DESIGN OF QUESTIONNAIRE

https://novaims.eu.qualtrics.com/jfe/form/SV_9QYzl8ivogrxJD8

Start of Block: INTRODUCTION

CONSENT Informed Consent Form

Dear participant,

In this research survey you will be asked to answer a few questions about yourself. Before starting, please read the information below and sign the consent form.

Remember there is no right or wrong answer, since the purpose of this questionnaire is simply to know your opinion. It will take about 6 minutes to complete this research. There is no risk involved in answering this survey. Your response is very relevant, anonymous, and will be used only for academic purposes.

I declare that I am 18 or over 18 years old and agree to participate in this research. I declare that I was informed that my participation in this study is voluntary and that I can leave this survey at any time without penalty, and all data is confidential. I understand that this study does not offer serious risks.

- ☐ I agree to participate in this survey (1)
- ☐ I do not agree to participate in this survey (2)

Skip To: End of Survey If Informed Consent Form Dear participant, In this research survey you will be asked to answer a few... = I do not agree to participate in this survey

End of Block: INTRODUCTION

Start of Block: HERDING

HERD INTRO Next, you will be asked to answer five questions related with making decisions.

Please treat each item separately from every other item and be sincere.

HERD Q1

1) When making decisions, I often follow what others are doing.

- ☐ Strongly disagree (1)
 - ☐ Somewhat disagree (2)
 - ☐ Neither agree nor disagree (3)
 - ☐ Somewhat agree (4)
 - ☐ Strongly agree (5)
-

HERD Q2

2) I am more likely to trust the judgments of a group than my own individual judgment.

- ☐ Strongly disagree (1)
 - ☐ Somewhat disagree (2)
 - ☐ Neither agree nor disagree (3)
 - ☐ Somewhat agree (4)
 - ☐ Strongly agree (5)
-

HERD Q3

3) I feel more comfortable making a decision if it is consistent with the decisions made by others.

- ☐ Strongly disagree (1)
 - ☐ Somewhat disagree (2)
 - ☐ Neither agree nor disagree (3)
 - ☐ Somewhat agree (4)
 - ☐ Strongly agree (5)
-

HERD Q4

4) I find it difficult to go against the opinions of a majority.

- ☐ Strongly disagree (1)
 - ☐ Somewhat disagree (2)
 - ☐ Neither agree nor disagree (3)
 - ☐ Somewhat agree (4)
 - ☐ Strongly agree (5)
-

HERD Q5

5) I would be more likely to buy a product if it was recommended by many people, even if I had doubts about it.

- ☐ Strongly disagree (1)
- ☐ Somewhat disagree (2)
- ☐ Neither agree nor disagree (3)
- ☐ Somewhat agree (4)
- ☐ Strongly agree (5)

End of Block: HERDING

Start of Block: SCREENR

screener The following questions are about investments in cryptocurrencies.
Have you ever invested in cryptocurrencies before?

- ☐ Yes (1)
- ☐ No (2)

Skip To: End of Block If The following questions are about investments in cryptocurrencies. Have you ever invested in cryp... = No

End of Block: SCREENR

Start of Block: PURCHASE INTENTION

PI INTRO The purpose of the following questions is to analyze purchase intentions. Please answer honestly.

PI Q1 The likelihood of me purchasing crypto assets if there is a buzz in social media networks about it is very high:

- ☐ Strongly Disagree (1)
 - ☐ Somewhat disagree (2)
 - ☐ Neither agree nor disagree (3)
 - ☐ Somewhat agree (4)
 - ☐ Strongly agree (5)
-

PI Q2 The probability that I would try crypto assets if there is a buzz in social media networks about it is very high:

- ☐ Strongly disagree (1)
 - ☐ Somewhat disagree (2)
 - ☐ Neither agree nor disagree (3)
 - ☐ Somewhat agree (4)
 - ☐ Strongly agree (5)
-

PI Q3 My willingness to buy a crypto asset if there is a buzz in social media networks about it is very high:

- ☐ Strongly disagree (1)
- ☐ Somewhat disagree (2)
- ☐ Neither agree nor disagree (3)
- ☐ Somewhat agree (4)
- ☐ Strongly agree (5)

End of Block: PURCHASE INTENTION

Start of Block: FOMO

FOMO Q1 Below is a collection of statements about your investing experience related with cryptocurrencies.

Using the scale provided please indicate how true each statement is.

Please answer according to what really reflects your experiences rather than what you think your experiences should be.

	Not at all true of me (1)	Slightly true of me (2)	Moderately true of me (3)	Very true of me (4)	Extremely true of me (5)
I fear that if I don't invest, others might earn more money than me. (1)	☐	☐	☐	☐	☐
I fear that if I don't invest my friends might earn more money than me. (2)	☐	☐	☐	☐	☐
I get worried when I find out my friends are earning money and I am not. (3)	☐	☐	☐	☐	☐
I get anxious when I don't know in what my friends are investing in. (4)	☐	☐	☐	☐	☐
It is important that I understand my friends "in jokes" regarding cryptocurrencies. (5)	☐	☐	☐	☐	☐

Sometimes, I wonder if I spend too much time keeping up with what is going on in the crypto space. (6)

☐☐☐☐☐

It bothers me when I miss an opportunity to invest in crypto with my friends. (7)

☐☐☐☐☐

When I have a good opportunity or return of investment in crypto it is important for me to share the details online (e.g. updating status). (8)

☐☐☐☐☐

When I miss out on a joint-investment opportunity it bothers me. (9)

☐☐☐☐☐

When I go on vacation, I continue to keep tabs on what my friends and crypto influencers are doing in crypto space. (10)

☐☐☐☐☐

End of Block: FOMO

Start of Block: DEMO

DEMO INTRO Thank you for your attention and effort. Before ending the survey, we would like to know a little bit more about you.

DEMO Q1 Please indicate your gender:

- ☐ Male (1)
 - ☐ Female (2)
 - ☐ Non-binary / third gender (3)
 - ☐ Prefer not to say (4)
-

DEMO Q2 What is your age:

- ☐ 18-24 (1)
 - ☐ 25-34 (2)
 - ☐ 35-44 (3)
 - ☐ 45-54 (4)
 - ☐ 55-64 (5)
 - ☐ Above 64 (6)
-

DEMO Q3 What is your highest level of education completed?

- ☐ No schooling completed (1)
- ☐ Primary Education (2)
- ☐ High school graduate, diploma or the equivalent (for example: GED) (3)
- ☐ Some college credit, no degree (4)
- ☐ Trade/technical/vocational training (5)
- ☐ Bachelor's degree (6)
- ☐ Master's degree (7)
- ☐ Doctorate degree (8)
- ☐ Prefer not to answer (9)

End of Block: DEMO



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