

**Risk is in the eye of the investor: Cryptocurrency investors' engagement with risk,
regulatory advice, and regulatory institutions**

Daphne Sobolev and Vasileios Kallinterakis

Corresponding author: Daphne Sobolev.

Addresses:

Daphne Sobolev: School of Management, University College London, One Canada Square,
London E14 5AA, UK. d.sobolev@ucl.ac.uk.

Vasileios Kallinterakis: Department of Finance, Durham University Business School, Mill
Hill Lane, Durham DH1 3LB, UK. vasileios.kallinterakis@durham.ac.uk.

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Abstract

Despite regulators' warnings that investing in cryptoassets is highly risky, cryptocurrency investments are prevalent. To explore investors' engagement with regulatory risk advice, we conducted two surveys. Cryptocurrency investors residing in the UK and the US were asked about their interpretation of the notion of risk, awareness of regulatory risk advice, and attitudes towards the advice and the regulators. Investors were also asked whether they followed the advice. Qualitative content analysis of their answers suggests that people often invest in cryptocurrencies although they understand the risks involved and are aware of the regulators' advice. They do so due to their risk propensity, self-reliance, criticism of the informativeness of the advice, or attitudes towards regulators. Furthermore, negative attitudes towards regulators often stem from lack of trust and the perception that regulators are dated. This study suggests that regulators could benefit investors by providing them with more informative advice and addressing their attitudes.

Keywords: Cryptocurrency; Risk assessment; Regulation; Investor behavior; Behavioral Finance; Judgment and decision-making.

JEL codes: D91; G4; G40; G41

1. Introduction

Regulatory institutions often warn investors that cryptocurrency investments are highly risky. For instance, the UK's Financial Conduct Authority (FCA) has advised investors that

“Investing in cryptoassets, or investments and lending linked to them, generally involves taking very high risks with investors' money. If consumers invest in these types of product, they should be prepared to lose all their money” (Financial Conduct Authority 2021).

Similarly, in the US, the Securities and Exchange Commission (SEC) has issued a warning, urging investors to consider the risks of cryptocurrencies (U.S. Securities and Exchange Commission 2021). Both the FCA and the SEC have recently reiterated their advice (Financial Conduct Authority 2024; U.S. Securities and Exchange Commission 2023). Nevertheless, investments in cryptocurrencies are prevalent. For example, 10% of the UK's population have personally bought cryptocurrencies (YouGov 2022) and 20% of American adults have invested in cryptocurrencies or have used them (Franck 2022). The contrast between the advice given by financial regulatory authorities and the popularity of cryptocurrency investments raises the question how people engage with regulatory risk advice.

In contexts other than cryptocurrency investments, risk judgment research has shown that subjective risk assessments and risk-taking behavior depend on individuals' attributes, including gender (Zhu, Hodgkinson, and Wang 2021), personality, (Durand, Fung, and Limkriangkrai 2019), and knowledge (Lim *et al.* 2018). Cryptocurrency research has identified related individual attributes, such as education, as well as additional factors, including conceptual clarity, as the determinants of investors' cryptocurrency risk perception (Bhattacharjee *et al.* 2024). Research has also demonstrated that cryptocurrency investors

tend to hold risky portfolios (Hackethal *et al.* 2022) and that they take even greater risks following losses (Nakavachara *et al.* 2024). Moreover, research on regulatory advice has established that warning investors about some of the risks that cryptocurrencies involve decreases cryptocurrency demand by investors who do not hold cryptocurrency, but unexpectedly, increases its demand by investors who hold cryptocurrency (Ebers and Thomsen 2021). However, research has not investigated how cryptocurrency investors react to the regulators' risk advice.

Understanding investors' response to regulatory advice could help regulators improve the effectiveness of the advice. Furthermore, it could offer applications to policymakers, financial information providers, and investors. Therefore, this study aims to explain how cryptocurrency investors engage with risk advice issued by regulatory institutions. In particular, it aims to explore how investors interpret the notion of cryptocurrency investment risk; whether they are aware of the regulators' risk advice; what their attitudes towards it are; and how they perceive regulatory institutions. In addition, it investigates whether investors follow the advice.

Exploring these questions, this paper draws on the theory of planned behavior (Ajzen 1991), according to which people's behavioral intentions and behavior depend on their attitudes towards the behavior. In line with the theory, research has found that investors' attitudes towards companies and investments determine their investment decisions (Aspara and Tikkanen 2008). Here, we examine the relationship between investors' attitudes towards regulatory risk advice, attitudes towards regulatory institutions, and adoption of the advice.

To address the aims of the study, we conducted two predominantly qualitative surveys of UK and US investors¹. We focused on the UK and the US because in both countries, regulators chose to warn investors about cryptocurrency risks rather than ban it, as regulators in certain other countries did (e.g. China; Cumming, Johan, and Pant 2019). In addition, cryptocurrency adoption was greater in the UK and the US than in any other Western country (Chainalysis 2022). Furthermore, culture and nationality have been shown to influence uncertainty avoidance (Hofstede, Hofstede, and Minkov 2010; Minkov 2018) and portfolio choices of non-domestic stocks (Anderson *et al.* 2011), that could, in turn, affect investors' reactions to risk advice. Conducting two studies enabled us to test the validity of our findings for investors who resided in the UK and the US.

Our results suggest that both UK and US-based cryptocurrency investors often interpret the notion of 'investment risk' as the likelihood that they would incur losses or the amount of money that they can afford to lose. Acknowledging the opportunities that risk-taking entails, other investors perceive it to be the possibility to either lose or gain money. A proportion of investors explain the notion by referring to cryptocurrency-specific risks such as fraud, hacking, technical exchange issues, and regulatory developments. Our results also suggest that most cryptocurrency investors are aware of the regulatory risk advice. However, some investors do not follow it because they are risk-seeking, self-reliant, or have independent investment habits. In accord with the theory of planned behavior (Ajzen 1991), others do not follow the advice because they have negative attitudes towards it or towards the regulators. In particular, they consider the advice uninformative, do not trust regulators, or consider

¹ In addition to the two surveys described in this manuscript, we conducted a pilot survey of UK-based cryptocurrency investors. The findings of the pilot survey were similar to those of the main surveys.

regulatory institutions archaic. Furthermore, their attitudes towards regulators are often negative and reflect disbelief in the regulators' abilities and motives. Additional analysis shows that investors assess their investment risk using news, price graphs, the coins' reliability, and their intuition more than they rely on regulatory advice.

Our study offers several theoretical contributions to the literature about investors' reactions to regulatory warnings and advice (Ebers and Thomsen 2021; Koonce, Leitter, and White 2023). First, previous research has yielded important insights, establishing that official warnings encourage cryptocurrency investors to increase their demand rather than decrease it (Ebers and Thomsen 2021) but has not aimed to explain this phenomenon. Suggesting that many cryptocurrency investors do not trust regulators, criticize the value of regulatory advice, or are risk-seeking, this study offers possible explanations for investors' reactions to official risk warnings. Specifically, advice that is given by an untrusted source or perceived to be obvious could raise resistance to its contents. In addition, risk-seeking investors may perceive advice that highlights cryptocurrency risks to be alluring rather than deterring.

Second, this study extends previous regulatory warning research (Ebers and Thomsen 2021; Koonce, Leitter, and White 2023) by explaining why investors distrust regulatory institutions. Studies have shown that news about the possibility of regulatory interventions negatively impacts cryptocurrency returns (Chokor and Alfieri 2021), suggesting that investors do not perceive regulation favorably. However, only little research has directly examined how financial practitioners or individual investors perceive regulatory institutions, and this research has done so in contexts other than the cryptocurrency market. For example, a study investigating the high frequency trading industry has found that traders hold negative attitudes towards regulators and criticize the ethicality of their regulation (Sobolev 2020). Here, we directly show that whereas some cryptocurrency investors consider regulatory

institutions to be trustworthy, others perceive them to be archaic or believe that they serve anti-cryptocurrency interests.

Third, research has documented variance in investors' reactions to warnings (Ebers and Thomsen 2021) but has not examined the ways in which they interpret cryptocurrency investment risks. This study identifies great diversity in investors' interpretations of this notion. In particular, it shows that investors interpret it in ways that have not been studied before, such as fraud and technology failure risks. Furthermore, in accord with previous findings (Ebers and Thomsen 2021), it suggests that investors consider major, long term environmental risks, such as the CO₂ emissions that are caused by cryptocurrency mining, to be less central than short-term personal risks.

Finally, previous research has not explored cryptocurrency investors' awareness of regulatory warnings. This study is the first to show that people often invest in cryptocurrencies although they are aware of the warnings.

2. Literature review and research question development

2.1. Investors' interpretation of the notion of 'investment risk'

Research has established that cryptocurrency investors exhibit risky trading patterns (Hackethal *et al.* 2022; Nakavachara *et al.* 2024) and understand that their investments are not protected (Aju and Burrell 2023). It has also identified factors that influence their risk perception, including the extent to which they understand the technical aspects of cryptocurrencies and their education (Bhattacharjee *et al.* 2024). Nevertheless, no study has investigated how cryptocurrency investors interpret the notion of risk.

In classical finance, risk is often conceptualized as the volatility of price returns. Thus, many finance practitioners and researchers use volatility as a risk measure (Holzmeister *et al.* 2020). However, research on risk perception has suggested that people do not always interpret risk in terms of volatility. Specifically, a study has pointed out that in psychology, risk is perceived to be the likelihood of loss. That study has established that people often interpret risk as loss also when they engage in financial tasks (Duxbury and Summers 2004). People may use loss to estimate risk because it could be easier to assess than volatility². Other studies have demonstrated that skewness and price irregularities influence risk assessments more than volatility, suggesting that people interpret risk in terms of these characteristics, too (Holzmeister *et al.* 2020; Sobolev and Harvey 2016).

However, research on risk interpretation (Duxbury and Summers 2004; Holzmeister *et al.* 2020; Sobolev and Harvey 2016) has focused on non-cryptocurrency risks, whereas the cryptocurrency industry presents unique and novel risks (Ebers and Thomsen 2021). In particular, cryptocurrency investments lack deposit guarantees and raise privacy issues. Furthermore, cryptocurrency mining causes high levels of CO₂ emissions which are related to environmental risks (Ebers and Thomsen 2021). Hence, *a priori* it has been unclear whether previous results about people's interpretations of the notion of risk could be generalized to the context of cryptocurrency investments. Therefore, in this study we ask:

Research Question RQ1: How do cryptocurrency investors interpret the notion of 'investment risk'?

² Losses are highly salient as people often naturally tend to make dichotomous judgments (Hirshleifer 2008). On the other hand, volatility judgments require greater cognitive efforts (Payzan-LeNestour 2023).

2.2. Investors' awareness of the regulators' risk advice and their attitudes towards it

Classical finance posits that investors should be aware of all possible financial information (Fama 1998). However, many studies have established that this is not the case. People's cognitive resources are limited and hence enable them to focus their attention merely on narrow aspects of the available information (Barber and Odean 2008). In fact, attention effects have been found to influence risk taking (Arnold, Pelster, and Subrahmanyam 2022) and determine trading patterns in the cryptocurrency market (Scharnowski and Shi 2024). Furthermore, people often exhibit poor knowledge of regulation (Betton, Branston, and Tomlinson 2019). Therefore, despite regulators' efforts to provide investors with advice about the risks that cryptocurrencies involve, investors may not be aware of it.

However, even if investors are aware of the regulators' advice, they may have a range of attitudes towards it. Research has shown that organizations and financial practitioners hold diverse and sometimes negative attitudes towards regulatory advice and regulation. Importantly, a study has established that warnings about the SEC's concerns regarding the clarity of firm-disclosures are not always effective. Their efficiency depends on the valence of the disclosed news (Koonce, Leitter, and White 2023). A study has shown that a proportion of high frequency traders consider the regulation of dark pools and order-to-trade ratios unethical (Sobolev 2020). Research has also demonstrated that cryptocurrency-related regulatory announcements motivate negative returns (Chokor and Alfieri 2021), thus indirectly suggesting that investors may have negative perceptions of regulations. Furthermore, presenting cryptocurrency investors with official warnings about cryptocurrency issues has been found to increase their demand rather than decrease it (Ebers and Thomsen 2021). Therefore, we ask:

Research Question RQ2a: Are cryptocurrency investors aware of the risk advice that regulatory institutions issue?

Research Question RQ2b: What are their attitudes towards regulatory risk advice?

2.3. Investors' attitudes towards regulatory institutions

Research has not examined how cryptocurrency investors perceive regulatory authorities. However, some anecdotal evidence suggests that many financial practitioners criticize them. For example, regulatory authorities have been criticized for spreading panic regarding cryptocurrencies (Murphy 2018) and for creating fragmented regulation (Silverman 2021). In addition, regulators have been criticized for their lack of understanding of the industry (Choudhury 2017). On the other hand, and inconsistently with this evidence, a survey has found that others welcome regulation that would end the “crypto’s Wild West days” (Babin 2022), thus suggesting that some investors hold positive attitudes towards regulators. As previous evidence has been inconsistent, it has offered no clear conclusion about investors’ attitudes towards regulatory institutions. Thus, we examine the question:

Research Question RQ3: How do cryptocurrency investors perceive regulatory institutions?

3. Study 1

Study 1 aimed to investigate RQ1 and RQ2. In accord with studies that used surveys to examine financial actors’ attitudes (Choi and Robertson 2020), risk-taking (Zhu, Hodgkinson, and Wang 2021) and cryptocurrency risk perceptions (Bhattacharjee *et al.* 2024), Study 1 consisted of a survey. Following studies that employed qualitative methods to explore financial behavior (Foster and Warren 2016), reactions to financial advice, trust issues (Bhatia, Chandani, and Chhateja 2020), and attitudes towards regulation (Sobolev

2020), the survey was predominantly qualitative. Qualitative surveys have been shown to provide diverse perspectives on complex questions. They offer rich and detailed data. Qualitative methods are especially helpful for the study of under-explored questions (Braun *et al.* 2021). The survey was conducted online on the 18th of October 2022, and UK-based cryptocurrency investors participated in it.

3.1. Method

3.1.1. Participants

The population of cryptocurrency investors in the UK comprises about 10% of UK adults. Cryptocurrency investor population is dominated by relatively young men (Aju and Burrell 2023; Hasso, Pelster, and Breitmayer 2019). Most cryptocurrency investors experienced a decrease in the value of their investments in 2022 (Aju and Burrell 2023).

To recruit participants, we advertised the study through Prolific. Prolific is a widely used research participant recruitment platform that offers datasets of high quality (Palan and Schitter 2018; Peer *et al.* 2022). According to Prolific, 4,740 UK-based cryptocurrency investors, who fitted our study's requirements, had been active on Prolific during the 90-day period prior to our survey. This investor group comprised the sampling frame of the study. Sampling was carried out from this group according to investors' response order.

We recruited a total of 105 UK-based cryptocurrency investors. As six of the participants provided incomplete answers, we used for the analysis the answers of the remaining 99 participants. Our choice of sample size aimed to comply with the high-end standard of sampling used in online qualitative surveys (Braun *et al.* 2021, p. 649). However, the sample size also complied with the data saturation criterion. The data saturation criterion refers to the point at which additional observations do not result in discovery of new information or themes. Reaching the saturation point suggests that the research questions

have been adequately explored (Guest, Bunce, and Johnson 2006; Naeem *et al.* 2024). The data saturation criterion has been used to choose sample sizes in qualitative studies on the financial industry (e.g. Bhatia, Chandani, and Chhateja 2020; Sahi, Arora, and Dhameja 2013; Sobolev 2020). As during the analysis of the results of Study 1, no new themes emerged after the analysis of the first 58 participants, our sample size satisfied this criterion and was, therefore, adequate for the objective of the study.

Our sample included 30 women and 69 men. Participants' age mean was 34.97 years (std. dev.: 9.16 years). Eighty-seven participants described their culture as Western, three participants described it as Asian, and nine participants identified themselves with other cultures. Forty-two participants had undergraduate degrees and 24 participants had postgraduate degrees. Participants' education fields were diverse, including, for example, design, data analytics, and engineering. Few participants had finance-related education.

Forty-nine participants invested in cryptocurrencies £1000 or less, 30 participants invested £1000-£5000, and 18 participants invested over £5000. Two participants did not quantitatively report their investment size. Their average investment size was £4244.34 (std. dev.: £8309.85) and their average investment experience was 2.75 years (std. dev.: 1.77 years). Participants' demographic characteristics are presented in Table A.1 in the appendix.

3.1.2. Survey questions

Investors' interpretation of the notion of risk. To address RQ1, we asked participants the question "What does the term "risk" mean for you in cryptocurrency investment contexts?"

Investors' awareness of the risk advice of the FCA and their attitudes towards it. To address RQ2a, participants were asked: "Are you aware of the advice of the Financial Conduct Authority (FCA) about the risks of investing in cryptoassets (including

cryptocurrencies)?" The answer options were: "No, I am unaware of the FCA's risk advice" (coded as 1), "I am not sure" (2), and "Yes, I am aware of the FCA's risk advice" (3). To investigate RQ2b, participants were asked: "The Financial Conduct Authority (FCA) advises investors that buying cryptoassets (including cryptocurrencies) is highly risky, and that investors who buy cryptoassets should be prepared to lose all the money that they invest. Regardless of your answer to the previous question, if you knew the FCA's cryptoassets advice, would it impact your investment decision? If yes, how? If not, why? Please explain your answer."

Risk assessment methods. Because understanding how investors assessed their cryptocurrency investment risk could further explain their use of regulatory risk advice, we asked participants: "Rate the extent to which you agree that each of the following factors influences your cryptocurrencies' risk assessment". The answer scale ranged between "Strongly disagree" (1) and "Strongly agree" (7), with the midpoint "Neither disagree nor agree" (4). The presented factors were diverse, and included price and return graphs, news, intuition, social media, the risk advice of the Financial Conduct Authority (FCA), and other risk assessment methods and heuristics. The complete factor list is given in Table S1 in the supplementary material file.

Demographic details and investment characteristics. To characterize the sample, we asked participants to report their demographic details. In particular, as previous research has found that gender impacts financial behavior (Hasso, Pelster, and Breitmayer 2019; Zhu, Hodgkinson, and Wang 2021), we were interested in participants' gender. Participants were asked to indicate their gender using the question "What is your gender?". They could select one of the answers: "Male" (1), "Female" (2), "Non-binary / third gender" (3), and "Prefer not to say" (4). In addition, we asked participants to indicate their age, highest level of education, field of specialization, job title, culture, country of residence, how long they had

been investing in cryptocurrencies, and the amount of money that they had invested in it. Participants were asked additional questions for exploratory reasons.

3.2. Results

3.2.1. Investors' interpretation of the notion of risk

To explore RQ1, we analyzed participants' answers to the question "What does the term "risk" mean for you in cryptocurrency investment contexts?" using the content analysis method (Corbin and Strauss 2008; Gioia, Corley, and Hamilton 2013). The content analysis method was developed to enable systematic identification of themes in rich data sets and to establish connections between the data and the findings. The method has been used in a large number of studies to analyze qualitative data and has been found to offer valuable insights into it (Bhatia, Chandani, and Chhateja 2020; Sahi, Arora, and Dhameja 2013; Sobolev 2020; Sobolev 2024). The method comprises the identification of frequently recurring ideas and concepts in participants' answers and the classification of the concepts into themes. It is considered to be rigorous due to its data structuring process (Gioia, Corley, and Hamilton 2013).

Our content analysis revealed five main recurring themes: 'the possibility of losing money', 'the possibility of gaining or losing money', 'volatility and uncertainty', 'the need to limit cryptocurrency investments to affordable amounts of money', and 'cryptocurrency-specific risks'. In agreement with risk research (Duxbury and Summers 2004; Sobolev and Harvey 2016), our analysis showed that a large proportion of investors interpreted risk as the possibility of losing money. For example, a Bitcoin and Ethereum investor wrote that risk "means [that] the value of your holdings could drop drastically at any time". However, many investors interpreted risk as the possibility of gaining or losing money. Thus, a person investing in XRP, Ethereum, and additional coins wrote: "That something has the potential to

increase or decrease in price. That I could make a lot of money or potentially lose everything”. A proportion of participants directly referred to volatility (e.g. “Risk is how volatile an asset is”). Fewer participants interpreted investment risk as uncertainty (e.g. “It means a difficulty to predict the future value of the investment”). Extending previous risk research (Duxbury and Summers 2004; Sobolev and Harvey 2016) and cryptocurrency research (Bhattacharjee *et al.* 2024; Hackethal *et al.* 2022; Nakavachara *et al.* 2024), a proportion of participants understood risk as the need to limit their investments to amounts of money that they could afford to lose or as these sums of money (e.g. “The amount of money I am prepared to lose.”). Finally, a proportion of participants referred to cryptocurrency-specific risks, including losing access to the exchange or to their money, fraud, the specific characteristics of the cryptocurrency market, and regulation. Hence, investors wrote: “It means the possibility to [lose] access to my funds”, “[The] risk of hacking/wallet breaches”, “Fake investment scams”, and “Risk that the government somehow stop it”. Notably, participants did not refer to cryptocurrency-related environmental risks (Ebers and Thomsen 2021). Table A.2 in the appendix presents the main themes that participants referred to, the number of participants who referred to them, and additional exemplifying quotations.

3.2.2. Investors’ awareness of the risk advice of the FCA and their attitudes towards it

To investigate RQ2a, we used participants’ answers to the question regarding their awareness of the FCA’s risk advice. Sixty participants reported that they were aware of the advice. Twelve participants were unsure about the advice, and 27 participants were unaware of it.

To explore RQ2b, we analyzed participants’ answers to the question about their attitudes towards the risk advice of the FCA. As with RQ1, we conducted content analysis. Nineteen participants reported that the advice had influenced their investment decisions or

that had they known about it, it would have affected them. Two main themes emerged from the analysis of their answers: ‘I already invest only little in line with the regulators’ advice’ and ‘the regulators’ advice is informative or valuable’. For example, investors wrote: “Yes - As [I] already do[.] I would invest only what I'm comfortable losing” and “Yes actually it could [...] because again it[']s another pair of eyes”. Thus, we concluded that these participants’ answers referred to their investment habits and positive judgments of the advice.

Seventy-five participants reported that the advice did not affect their investment decisions or would not have affected them had they known about it. Their answers referred to five main themes: ‘I am willing to face high risks’, ‘I prefer to use my own risk assessment’, ‘I invest only little independently of the regulators’ advice’, ‘the regulators’ advice does not provide new information’, and ‘I do not trust regulators’. Thus, many participants reported that they accepted the risk level of their investments. For instance, a person who invested in Bitcoin, Ethereum, Solana, Polkadot, and other coins wrote: “It wouldn't. I understand that crypto is risky and most coins are a lottery. It's a game I'm willing to play to get some serious money back”. A few participants preferred to rely on their own risk assessment (“No, I can make my own assessments”). The theme ‘I invest only little independently of the regulators’ advice’ was the most prevalent. For example, a Litecoin and Bitcoin investor wrote: “No [...] I only ever invest as much as I'm prepared to lose”.

Many investors considered the regulators’ advice to be uninformative. For instance, an investor wrote: “No. I know you are at risk of losing all your money [...] That FCA advice changes nothing for me”. Some participants suggested that they did not trust the FCA. For instance, investors wrote: “The FCA is currently just a puppet for the largest stock company's” and “It wouldn't impact me as I would assume they have a vested interest in maintaining the current financial landscape as it is and are threatened by crypto. If anything[,] their warning makes me want to invest in crypto more.”

Finally, a few participants reported that the advice did not influence their decisions due to other reasons, including their belief in the future of cryptocurrencies (“No, I know crypto is not going anywhere, it's more secure than banks and is currently used as a payment method. I don't think it is risky, to me it is the future”). Table A.3 in the appendix presents the main themes, the number of participants who referred to them, and additional exemplifying quotations.

3.2.3. Additional analysis: Risk assessment methods

Analysis of participants’ ratings of their use of the investigated risk assessment methods showed that investors used price and return graphs, news, financial analysis that they conducted, and their intuition to assess their investments’ risk. Participants neither agreed nor disagreed that rumors, social media, and the risk advice of the FCA influenced their assessments. Furthermore, investors used price and return graphs, news, and their intuition to assess risk significantly more frequently than they used the FCA’s advice. These results are presented in Table S1 in the supplementary material file.

3.3. Discussion

In line with previous research (Duxbury and Summers 2004; Sobolev and Harvey 2016), Study 1 suggested that a proportion of cryptocurrency investors interpreted their investment risk as volatility, uncertainty, or the possibility of losing money. However, going beyond previous studies, our results showed that investors often interpreted it in terms of the possibility of both gaining and losing money, the need to limit their investments to amounts of money that they could afford to lose, and cryptocurrency-specific risks (RQ1). Although the majority of investors were aware of the FCA’s advice (RQ2a), most of them were not influenced by it because they accepted risk as a condition for profits, preferred to rely on their own assessments, invested little independently of the advice, considered the advice

uninformative, or did not trust the FCA (RQ2b). Instead, they preferred to rely on price and return graphs, news, and their intuition. These results were in accord with those of studies that highlighted negative perceptions of financial regulation of other financial practices, such as high frequency trading regulation (Sobolev 2020). By demonstrating that investors did not follow advice towards which they had negative attitudes, our findings also supported the theory of planned behavior (Ajzen 1991) and complemented research on investors' reaction to regulatory warnings (Ebers and Thomsen 2021).

4. Study 2

Study 1 answered RQ1 and RQ2 with respect to a sample of UK-based cryptocurrency investors. However, as individuals' uncertainty avoidance (Hofstede, Hofstede, and Minkov 2010; Minkov 2018) and portfolio choices (Anderson *et al.* 2011) have been shown to depend on culture and nationality, our findings could, theoretically, depend on participants' countries of residence. Therefore, in Study 2, we tested the robustness of the results of Study 1 regarding RQ1 and RQ2 with respect to a sample of US-based cryptocurrency investors. In addition, Study 2 investigated RQ3. It comprised an individual, online survey and was conducted on the 9th of January 2023.

4.1. Method

4.1.1. Participants

As with the UK, the population of cryptoasset investors in the US is large and dominated by relatively young male investors. In particular, it is estimated that 20% of American adults have invested in cryptocurrencies or have used them (Franck 2022) and that cryptoasset ownership rate is 9% (Statista 2024). Men are almost three times more likely to own cryptocurrencies than women (Statista 2024).

We advertised the study through Prolific. The sampling frame of Study 2 included 8,420 US-based participants who invested in cryptocurrencies, fitted our study's requirements, and had been active on Prolific during the 90-day period prior to our survey. Investors were sampled from this frame on the basis of their response order, so that investors, who responded to the study announcement first, participated in it.

The sample comprised 199 US-based cryptocurrency investors. As with Study 1, our sample size complied with the high-end standard of qualitative survey sample sizes (Braun *et al.* 2021). With no new themes emerging after the 63rd participant, it complied also with the data saturation criterion (Guest, Bunce, and Johnson 2006). Hence, our sample was adequate for the aims of the study. The sample included 45 female investors, 150 male investors, 3 non-binary/third-gender investors, and one participant who chose the option "Prefer not to say" (age mean: 36.03 years; std. dev.: 9.28 years). Hence, similarly to the population of US cryptocurrency investors, the sample was male-dominated.

Seventeen participants described themselves as Asians, 164 participants defined themselves as Westerners, and 18 participants defined their cultural background as 'other'. One-hundred participants had undergraduate degrees and 30 participants had postgraduate degrees. Participants' education fields were diverse (e.g. computer science, applied linguistics, and clinical psychology).

In 2022, 113 participants invested in cryptocurrencies \$1000 or less, 58 participants invested \$1000-\$5000 and 27 participants invested over \$5000. One participant did not report her investment size. Participants' average investment size was \$2767.83 (std. dev.: \$4998.82). As with many other investors who experienced losses due to cryptocurrencies (Kale 2022), participants' average loss in 2022 was \$782.41 (std. dev.: \$9174.79). Participants' demographic characteristics are presented in Table A.1 in the appendix.

4.1.2. Survey questions

Investors' interpretation of the notion of risk, awareness of the risk advice of the SEC, and attitudes towards it. The questions used to investigate RQ1, RQ2a and RQ2b were similar to the ones asked in Study 1, replacing references to the FCA with the SEC.

Attitudes towards the SEC. Participants' attitudes towards the SEC were required in order to answer RQ3. To assess them, we adapted items from the 'attitudes towards institutional authority' scale (Rigby 1982) to the context of cryptocurrency investments. Thus, participants were asked: "How do you perceive financial regulatory authorities in the USA, such as the SEC? Please rate the extent to which you agree with each of the following statements. Financial regulatory authorities in the USA...". The presented statements included two positively formulated items (... "Are pretty trustworthy" and "Work in the best interests of cryptocurrency investors") and two negatively formulated items ("Are somewhat ridiculous institutions, posing as experts on important investment issues, when, in fact, they are archaic and dated" and "Attempt to benefit groups that oppose cryptocurrencies"). All answer scales ranged between 'Strongly disagree' (1) and 'Strongly agree' (7). Participants were also asked to explain their answers.

Risk assessment methods. We asked participants the same questions as in Study 1, replacing references to the FCA with the SEC. We also asked participants to rate the extent to which they used the "Reliability of the cryptocurrency exchange", the "Reliability of the storage method of the cryptocurrency", and the "Reputation of the coin" to assess investment risk.

Demographic and investment details. Participants were asked the same demographic and investment detail questions as in Study 1. In addition, they were asked about their overall

cryptocurrency investment returns in 2022. Participants were asked additional questions for exploratory reasons.

4.2. Results

4.2.1. Investors' interpretations of the notion of risk

To answer RQ1, we conducted content analysis (Corbin and Strauss 2008; Gioia, Corley, and Hamilton 2013), drawing on participants' answers to the question "What does the term "risk" mean for you in cryptocurrency investment contexts?". The analysis yielded the same themes that emerged in Study 1 (see Table A.2 in the appendix).

4.2.2. Investors' awareness of the risk advice of the SEC and their attitudes towards it

Regarding RQ2a, 117 participants indicated that they were aware of the SEC's risk advice. Fifty-two participants were unaware of the advice and 30 participants were unsure about it. Thus, most participants invested in cryptocurrencies although they were aware of the advice.

As for RQ2b, 40 participants reported that they followed the SEC's advice or intended to follow it, whereas 125 participants reported that the SEC's advice did not or would not impact their decisions. Analyzing participants' explanations of their attitudes towards the advice, we found the same themes as in Study 1. Therefore, the results of Study 2 suggested that many investors had negative attitudes towards the SEC's advice (see Table A.3 in the appendix).

4.2.3. Investors' attitudes towards the SEC

We investigated RQ3 by analyzing participants' ratings of their attitudes towards the SEC. The results of this analysis are presented in Table S2 in the supplementary material file. The analysis shows that overall, investors' attitudes towards the SEC were negative.

In addition, we conducted content analysis on participants' explanations of their ratings. Our analysis revealed that about a fifth of the sample believed that the SEC was trustworthy (e.g., "I believe financial regulatory authorities in the USA are trustworthy"), worked in the investors' best interests, or provided investors with good advice ("I believe they help educate the public on the benefits and risks involved in financial investment").

However, many other investors expressed negative attitudes towards the SEC. Some investors considered the SEC to be archaic. For instance, a participant who invested in Bitcoin and other cryptocurrencies wrote: "They're an old institution that doesn't understand the future until it[']s almost running them over". Many participants reported that they did not trust the SEC or its motives. For example, an investor wrote: "They are all corrupt and do not hold the American public[']s best interests at heart. They let political leaders insider trade and do nothing but want to steal your money". Many participants expressed neutral or mixed feelings regarding the SEC. For example, a Bitcoin and Ethereum investor wrote: "I don't have a lot of trust in these kind of authorities, but I also don't distrust them, I have no reason to do either of these things really." The main themes, the number of participants who referred to them, and exemplifying quotations are presented in Table A.4 in the appendix.

4.2.4. Additional analysis: Investment risk assessment methods

Analysis of participants' risk assessment methods showed that the techniques that US investors used were similar to the ones that UK investors used (see Table S1 in the supplementary material file). Extending the findings of Study 1, Study 2 showed that the coins' reputation, exchange reliability, and storage method reliability influenced investors' risk assessments, too. Furthermore, investors used the risk advice of the SEC significantly less frequently than they used the coins' characteristics, price graphs, news, intuition, and rumors.

4.3. Discussion

Study 2 replicated the results of Study 1, suggesting that our findings were robust for investors residing in the UK and the US (RQ1 and RQ2). In line with anecdotal evidence, suggesting that investors criticized regulatory institutions (Choudhury 2017; Murphy 2018; Silverman 2021), it showed that many investors held negative attitudes towards the SEC (RQ3). In addition, it revealed that investors often used coins' exchange reliability, storage methods reliability, reputation, intuition, and rumors as risk assessment heuristics, and that they did so to a greater extent than they used the SEC's advice. Thus, this study complemented research that had explored investors' risk perceptions and behavior (Bhattacharjee *et al.* 2024; Hackethal *et al.* 2022; Nakavachara *et al.* 2024) but had not explored their risk assessment methods. Furthermore, relating investors' negative attitudes towards regulatory advice and institutions to their cryptocurrency investment, our results correspond to the theory of planned behavior (Ajzen 1991).

5. General discussion

“No[,] because [...] I think the SEC knows tradfi [traditional finance], but has a long way to go to really know crypto[...] The average crypto investor has very low confidence in the SEC and their intentions in the crypto space” (Study 2 participant, who incurred substantial losses due to her cryptocurrency investments, explaining why she would not follow the SEC advice).

In 2021, Bitcoin's price reached nearly £50,000. In May 2022 it declined to less than £25,000, and by July 2022 it was worth £17,000. Other coins, such as Ethereum, crashed in 2022, too. Many investors have incurred severe losses and experienced shock, anger and depression (Kale 2022). In 2021, the FCA and the SEC warned against investments in

cryptocurrencies (Financial Conduct Authority 2021; U.S. Securities and Exchange Commission 2021).

Our studies were conducted after May 2022. Therefore, following the regulators' advice could have spared our participants financial losses. Nevertheless, their majority report that risk advice issued by regulatory institutions does not impact their investment decisions. This study suggests that this behavior is not due to lack of understanding of the notion of 'risk'. In fact, regarding RQ1, our findings show that most cryptocurrency investors interpret 'risk' as loss or volatility (in line with Duxbury and Summers 2004; Sobolev and Harvey 2016), the amount of money that they can afford to lose, or in terms of cryptocurrency-specific risks such as fraud. Our results suggest that this behavior is not due to indifference towards risk, either: most investors attempt to assess their investment risk using a range of methods and heuristics, drawing on price and return graphs, news, the reputation of the coins, rumors, and intuition.

Contributing to the literature about investors' reactions to regulatory warnings and advice (Ebers and Thomsen 2021; Koonce, Leitter, and White 2023) and answering RQ2, our findings suggest that most cryptocurrency investors are aware of the regulators' advice. However, they invest in cryptocurrencies despite it because they are either risk-seeking or self-reliant, have independent investment habits, or consider the advice uninformative. Moreover, considering RQ3, our results highlight that many investors do not trust the regulators' motives or consider the regulators to be technologically archaic. Hence, investors' reactions to regulatory advice reflect a range of personal tendencies, judgments and relational factors.

5.1. Applications

5.1.1. Applications for regulators and policymakers

This study shows that many cryptocurrency investors are aware of regulatory warnings, but consider them uninformative. Thus, it suggests that regulators could extend their reach by providing investors with more informative and detailed cryptocurrency risk advice. In addition, it shows that investors sometimes disregard regulatory advice because they mistrust regulators. Therefore, it could be beneficial if regulatory institutions address this issue, too, e.g., by using trust repair techniques (Gillespie and Siebert 2018).

Moreover, policymakers could use the findings regarding the low acceptance rate of the advice among cryptocurrency investors when considering future regulation. In the UK, the government has debated calls to ban certain cryptoassets, treat them as gambling, or develop other types of regulations (HM Treasury 2023). Lawmakers in the US have been discussing ways to regulate cryptocurrency, too (NBC News 2023).

5.1.2. Applications for financial firms

Studies have suggested that understanding cryptocurrency adoption and risk judgments could be informative for brokerage services (Hasso, Pelster, and Breitmayer 2019), cryptocurrency marketers (Bhattacharjee *et al.* 2024) and financial technology firms (Hackethal *et al.* 2022). Here, we suggest that understanding investors' risk assessment heuristics could be informative also for firms that provide investors with financial information. Specifically, our findings highlight that investors are interested in risk estimates but often use methods that rely on intuition and data of unclear validity to assess it. Hence, we suggest that financial firms could offer investors risk assessments of higher quality. Such information could be presented using risk ladders. Visual risk ladders have been shown to be approachable to large population sections (Keller 2011). As we show that investors assess

risk using the reliability of cryptocurrency exchanges and storage methods, firms could also offer in-depth analyses of these technological issues.

5.1.3. Applications for investors

Our findings suggest that investors often mistrust regulatory advice. However, cryptocurrency price movements show that following the advice could have helped many investors avoid great losses. We, therefore, suggest that it could be beneficial for investors to further reflect on the advice. Both the FCA and the SEC have reiterated their advice recently (e.g. “if you decide to invest in crypto then you should be prepared to lose all the money you have invested”, Financial Conduct Authority 2024; “The risk of loss for individual investors who participate in transactions involving crypto assets, including crypto asset securities, remains significant. The only money you should put at risk with any speculative investment is money you can afford to lose entirely”, U.S. Securities and Exchange Commission 2023).

5.2. Topics for future research

Answering RQ1-RQ3, this study shows that regulatory advice is often ineffective. Therefore, it suggests that regulators could offer investors more specific advice. However, this study does not aim to explore how investors react to different advice. Research has shown that investors’ reaction to risk warnings is highly sensitive to their contents (Ebers and Thomsen 2021). Therefore, we consider it important for future research to explore how the informative value and formulation of cryptocurrency risk advice impact its acceptance.

In addition, this study does not aim to investigate how investors’ attributes and emotions impact their interpretation of the notion of risk and attitudes towards regulators. Because research has shown that gender (Hasso, Pelster, and Breitmayer 2019; Zhu, Hodgkinson, and Wang 2021), personality (Durand, Fung, and Limkriangkrai 2019), and

sentiment (Chowdhury *et al.* 2024) impact financial decision-making, we hypothesize that these factors influence investors' understanding of cryptocurrency risks and hence also attitudes towards regulators. Research testing these hypotheses could have valuable applications.

Finally, this study does not examine how cryptocurrency regulation affects investors' attitudes towards regulatory institutions. However, countries markedly differ in their cryptocurrency regulation. For instance, whereas regulators in the US and the UK have enabled cryptoasset investments, China has banned them (Cumming, Johan, and Pant 2019). Despite this regulation, Chinese investors are substantially involved in cryptocurrency activity (Olcott 2021). Research comparing investors' attitudes towards regulators in countries that allow cryptocurrency investments to investors' attitudes in countries that ban them could be beneficial.

6. Conclusion

This study suggests that many cryptocurrency investors are aware of regulatory risk advice. However, they often disregard it because they consider it uninformative or mistrust the regulators. Instead, they assess their investments' risk using a range of methods and heuristics drawing on news, price graphs, intuition, and rumors. Hence, this study suggests that it would be beneficial if regulatory institutions reconsider the advice that they provide investors with.

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Appendix

Table A.1. Demographic characteristics of the investors who participated in our studies. The sample of Study 1 included 99 cryptocurrency investors residing in the UK, and the sample of Study 2 included 199 cryptocurrency investors residing in the US.

Characteristics	Number of participants	
	Study 1	Study 2
Gender		
Male	69	150
Female	30	45
Non-binary/third gender	0	3
Preferred not to reply to this question	0	1
Age		
18-19	0	2
20-29	29	48
30-39	47	88
40-49	14	43
50-59	9	16
60-65	0	2
Education		
Graduated from high school	23	48
Undergraduate student	6	15
Undergraduate degree	42	100
Postgraduate student	4	6
Postgraduate degree	24	30

Cryptocurrency investment size	£	\$
≤ 1000	49	113
≤ 5000	30	58
> 5000	18	27
Preferred not to reply to this question	2	1

Table A.2. Investors’ interpretations of the notion of ‘investment risk’: main themes, the number of participants who referred to them in Studies 1 and 2, and exemplifying quotations. The sample of Study 1 included 99 cryptocurrency investors residing in the UK, and the sample of Study 2 included 199 cryptocurrency investors residing in the US.

Themes	Participant number and exemplifying quotations	
	Study 1	Study 2
The possibility of losing money	N=58 “That you might lose all your money, and in fact I already lost all [the] money I invested.”	N=96 “The potential of losing money completely if a cryptocurrency fails or losing some money.”
The possibility of gaining or losing money	N=18 “Might make money, might lose money.”	N=26 “You can lose just as quickly as you gain funds.”
Volatility and uncertainty	N=28 “The volatile nature of crypto.”	N=38 “Risk means how volatile a crypto can be due to the unexpected changes to the market.”
The need to limit cryptocurrency investments	N=11 “It means spending more than I can afford”	N=31 “I only invest money I'm willing to lose. That's the extent of my risk in crypto.”
Cryptocurrency-specific risks	N=25 “As I trade on a platform instead of storing my coins in a wallet, technically I could lose them.”	N=52 “Crypto [...] could [become] obsolete due to global currencies going digital resulting in major devaluations of crypto. There's also the risk of increased regulations.”

Table A.3. Investors’ attitudes towards the risk advice of regulatory authorities: main themes, the number of participants who referred to each theme in Studies 1 and 2, and exemplifying quotations. The sample of Study 1 included 99 cryptocurrency investors residing in the UK, and the sample of Study 2 included 199 cryptocurrency investors residing in the US.

Themes	Study 1	Study 2
Yes, regulatory advice would impact my investment decisions		
I already invest only little in line with the regulators’ advice (investment habits)	N=6 “Yes of course it would impact my decision[.] I fully understand it is a very risky asset [...] I am ok with that [as] it is not a large portion of my money invested.”	N=11 “Yes, in that I already know this is relatively high risk and so do not keep critical monies in crypto.”
The regulators’ advice is informative or valuable (positive judgments of the advice)	N=8 “Yes, it reminds me that this is not a regulated space and I have no recourse if something goes wrong, whereas centralized banking and investing in regulated funds etc does.”	N=6 “Yes, it would impact my investment decision because I feel that I am a beginner, so any and all extra information I can get will be helpful to my decision.”
No, regulatory advice would not impact my investment decisions		
I am willing to face high risks (risk propensity)	N=22 “No, it[’]s a risk I[’]m willing to take and have seen good returns. I know what I[’]m getting into and my original investment can crash to £0.”	N=23 “Not really. Again, I invest for fun and the risk to be honest. No risk, no reward.”

I prefer to use my own risk assessment (self-reliance)	N=3 “No. I agree with the FCA. However, I make the decision to invest based on my own risk assessment.”	N=14 “Ultimately I would still go with my gut instinct. Because in the end I know what's best for me.”
I invest only little independently of the regulators’ advice (investment habits)	N=34 “No [...] because I don't put a huge amount of money into Crypto anyway.”	N=16 “No, because I only invest a little in it.”
The regulators’ advice does not provide new information (negative judgments of the advice)	N=17 “No it wouldn't, I already know that my investment could become worthless overnight, it's fairly obvious.”	N=48 “It wouldn't because it's mostly just pointing out that it's a voodoo market with very little value behind it. I already knew that.”
I do not trust regulators (Attitudes towards regulatory institutions)	N=7 “No, cause that[']s a regulatory authority and I don[']t think it actually care[s] about personal los[s] or people[']s interest.”	N=26 “No, I believe the SEC does not have the average person's best interests in mind, they work for the corporations.”

Table A.4. Investors’ attitudes towards the SEC: main themes, the number of Study 2 participants who referred to them, and exemplifying quotations. The sample of Study 2 included 199 cryptocurrency investors residing in the US.

Attitudes	Themes	Exemplifying quotations
Positive	The SEC is trustworthy	N=31 “I find the SEC to be an official, reliable and trustworthy source of investment information and I appreciate that they exist.”
	The SEC gives good advice	N=9 “I feel the SEC is trustworthy. Many people do not see the bad side of things like investments. It is important to warn people about risky investments.”
Negative	The SEC is archaic	N=18 “I think regulation is <i>*needed*</i> but my impression of all government entities is that they're run by dinosaurs who can't even check their e-mail and therefore are not on the cutting edge of technology & how to evolve with the world and protect the consumer.”
	I do not trust the SEC / the SEC has anti-cryptocurrency motives	N=58 “They really don't care about the common man. [They] help keep the rich, rich.”
Neutral or mixed perceptions	No idea / mixed views	N=60 “I have no experience with organizations like the SEC [...] I would have to do more research [on] them.”

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