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Between money and speculative asset: the role of financial literacy on the perception towards Bitcoin in Italy

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Abstract

With Bitcoin at the forefront, cryptocurrencies are gaining traction as an alternative asset investment, particularly among young investors. Although most of the empirical evidence has shown that it could not be defined as a currency, some Bitcoin users argue the opposite. This paper analyzes the factors influencing the perception of Bitcoin, i.e., whether it is a currency or an asset, with a focus on financial literacy among a subject pool of university students in Italy. The results show that, after controlling for several individual characteristics such as behavioral biases, personal attitudes, psychological traits, and socio-demographic information, this cryptocurrency is considered more than just an asset, and thus it could replace currency, among subjects with lower financial literacy, higher knowledge of Bitcoin, and those who do not trust the banking system. In contrast, Bitcoin is considered a speculative asset among those individuals with higher financial literacy. In line with the recent evidence that cryptocurrencies are mostly owned by young investors, results indicate the importance of increasing the level of financial education among them.

Keywords: Bitcoin, Financial education, Financial literacy, Behavioral bias

JEL codes: D14, D91, E42, O33

1. Introduction

In recent years, cryptocurrencies have become a widely used financial instrument. In particular, Bitcoin has gained significant attention as an alternative asset, reaching a trillion dollars market capitalization.¹

Although the increasing interest in Bitcoin as a digital currency, which was created in 2008 by an unknown person with the pseudonym of Satoshi Nakamoto, empirical works mainly argue that cryptocurrencies should be seen as investment instruments (assets) rather than alternative currencies (money). Analyzing transaction data, Baur et al. (2018) point out that Bitcoin is mainly used as a speculative asset and not as an alternative currency or a medium of exchange. Also, Söderberg (2018) points out that crypto assets cannot be classified as money. The same conclusion is supported by Griffin and Shams (2020) who argue that, despite cryptocurrencies being designed to bypass traditional banking systems, these do not remove the need for external surveillance, monitoring, and a regulatory framework, typical of centralized currency systems. Despite the potential financial bubble characterizing crypto assets (Caferra et al., 2021; Vidal-Tomás et al., 2019), some studies support the idea that Bitcoin can act as a store of value. Blau et al. (2023) showed that Bitcoin has shown potential as a hedge against inflation since its price variation tends to lead to changes in the expected inflation (for a review of investors' behavior in cryptocurrency markets see Almeida and Gonçalves, 2023).

All these works are based on empirical transaction data, the literature lacks a paper discussing an important behavioral aspect of this debate, namely whether and why people perceive Bitcoin as money or as an asset. Some survey studies exist about the adoption of cryptocurrencies, mainly arguing that, although cryptocurrencies are increasing in popularity across all age groups (Hasso et al., 2021), this asset class is mostly owned by young people (Steinmetz et al., 2021).² However, most of these studies do not investigate the perception of Bitcoin as a money or asset.

Therefore, conducting an original survey on a subject pool of 682 university students belonging to Italy, a country characterized by a low level of financial literacy³, this paper addresses this research gap by

¹ <https://www.cnbc.com/2021/02/19/bitcoin-hits-1-trillion-in-market-value-as-cryptocurrency-surge-continues.html>

² See Sousa et al. (2022) for a systematic review on the adoption of cryptocurrencies.

³ For an international comparison of financial literacy see Klapper and Van Oudheusden (2015, World Bank).

providing an empirical analysis of the determinants of the perception towards Bitcoin as a money or asset, with a focus on the role of financial literacy.

2. Research hypotheses

Starting from the whitepaper by Nakamoto (2008), Bitcoin has been born as a decentralized alternative to the actual financial and banking system. Despite this, most of the empirical works fail to define Bitcoin as a new currency. In fact, according to transaction data, it does not fit the functional definition of currency, which must act as i) means of payment; ii) unit of account; iii) store of value (Stanley, 1875). Rather, it seems to follow the stylized facts of classical financial assets (Caferra et al., 2022). However, these stylized facts and the definition of money could be reasonably known only by individuals with a deeper financial literacy. In this case, it is reasonable to expect that people with a higher financial literacy should evaluate Bitcoin as a speculative asset only, while the opposite is expected for those with lower financial literacy. The first hypothesis (*H1*) is formulated accordingly.

Hypothesis 1: Higher (lower) financial literacy is positively related to the perception of Bitcoin as an asset (money).

Nevertheless, the increasing popularity and mainstream adoption of Bitcoin could not be related to its initial aim. In fact, it seems that people tend to invest in Bitcoin mainly to get a positive return in time (i.e, herding effect), typical of the individual's behavior generating financial bubbles (see Caferra et al., 2021, for a comparison between the crypto's 2017 bubble and Dotcom bubble of 2000). In the context of financial bubbles, Vidal-Tomás et al. (2019) point out that the herding phenomenon does not refer to Bitcoin only, and the smallest digital currencies are herding with the largest ones. Since these dynamics are mainly driven by the possibility to gain an economic return, it is reasonable to assume that Bitcoin could be considered as an alternative to traditional currencies only for those who know about Bitcoin more in-depth, being more in line with the Nakamoto's ideas rather than positive return only. Accordingly, we formulate the following hypothesis (*H2*).

Hypothesis 2: Higher (lower) knowledge about Bitcoin is positively related to the perception of Bitcoin as money (asset).

3. Methodology

In line with the recent evidence that cryptocurrencies are mostly owned by young investors (Steinmetz et al., 2021), we have surveyed a group of 682 Italian university students. The survey has been conducted via Microsoft Forms and spread out on social media (Instagram) in February 2023.⁴

The dependent variable is obtained from the survey question “On a scale from 1 to 5, where 1 is not at all, and 5 is definitely, how much do you think Bitcoin can replace the current currencies in circulation?”. In order to test the complementary hypothesis, namely Bitcoin is perceived as an asset, another dependent variable has been proposed. It is a dummy variable taking the value of 1 if respondents declared that Bitcoin is an asset.

The first main regressor is a measure of financial literacy. The methodology used to construct it has been taken from Hsu (2022), which refers to Calcagno and Monticone (2015). It is proxied by respondents’ answers regarding i) inflation, ii) interest, and iii) diversification, and are reported in Appendix A1. As in Bannier et al. (2019), we also control for the perceived financial literacy, which level has been obtained from the question “*What level of financial education do you think you have?*” on a 10 points Likert scale.

The other main regressor refers to the knowledge about Bitcoin, which is proxied by the *Bitcoin literacy index*, obtained by re-proposing the same survey questions of Bannier et al. (2019), who introduced this concept in the literature. It results in an ordinal index measuring the number of correct answers to the 6 Bitcoin literacy questions.⁵ We then also control for Bitcoin usage, obtaining the respondent’s information on whether he or she has ever invested in or used Bitcoin to make payments. All these variables have been included in the estimation of the baseline model.

In addition to this baseline model, we then included behavioral biases and personal attitudes as control variables that may affect the perception of Bitcoin as money or an asset. First, drawing on Hsu (2022), we control for overconfidence, self-enhancement, self-protection, and mental accounting bias. Moreover, we include some personal attitudes towards the financial system and social preferences, such as financial

⁴ The structure of the survey is reported in the online Appendix A1.

⁵ The questions are reported in the section 1 of the survey. For the methodology, see Bannier et al. (2019).

stress; generalized trust; trust in institutions, banks, and the central bank; political orientation and participation; social capital; tax morality; climate change, and informatic concern.

Finally, a full model that considers personality traits and socio-demographic information is proposed. Following Bannier et al. (2019), the big five personality traits are also included (openness, conscientiousness, extraversion, agreeableness, and neuroticism)⁶, as well as the socio-demographic information regarding gender, age, employment status, and educational attainment.

4. Results

Given the ordinal nature of the dependent variable, table 1 reports the ordered probit estimates of the determinants of Bitcoin as a possible substitute for actual money. As it is visible, the hypotheses seem to be confirmed: the higher the financial literacy, the lower the perception of Bitcoin as money (H1). On the contrary, the probability of stating that Bitcoin can substitute money is significantly higher at a 1% level among individuals who show a deeper knowledge of Bitcoin and those who have invested or made payments in Bitcoin. These results are consistent across all three proposed specifications. From the second and third models, it is visible that the effect of behavioral bias is not significantly related to the perception towards Bitcoin except for the self-enhancement which is significant at the 10% level. Among attitudes, people who trust the banking system more do not consider Bitcoin as a potential substitute for money, and vice versa. Also, social capital significantly affects the perception towards Bitcoin: those individuals involved in voluntary associations seem to not value Bitcoin as a substitute for money. The personality traits do not significantly affect the perception of Bitcoin as money. Finally, among the socio-demographic information, Bitcoin seems to be seen as money significantly more among females, NEET, and self-employed workers.

[Table 1]

To test the complementary side of the perception, namely, Bitcoin is considered an asset, table 2 reports the probit estimates of the probability of stating that Bitcoin is just a speculative asset. Estimates are overall coherent with the previous ones, confirming both research hypotheses. As one can see from the first column, coherently with the evidence in Table 1, higher financial literacy is positively related to the

⁶ Survey questions are taken from the UAS: <https://uasdata.usc.edu/index.php>

perception of Bitcoin as an asset. On the contrary, Bitcoin is perceived to be just an asset significantly less among respondents who have a higher general knowledge about Bitcoin and those who have used it as an investment and/or a means of payment. The latter evidence is key: people who invest in Bitcoin do not see it as a speculative investment, rather they expect Bitcoin to substitute money in the future. Hence, Bitcoin users consider it more than a simple asset. Also in this context, people who trust the central banking system more perceive Bitcoin as an asset rather than a substitute for money. Considering that Bitcoin may be used to make illegal payments, subjects who do not justify tax evasion coherently see it as a speculative asset rather than a means of payment.

[Table 2]

5. Concluding remarks

Although it is increasing in popularity, Bitcoin cannot be defined as money according to most of the literature. However, it is essential to understand what leads people to consider it as an asset or an alternative to the actual currency system. To this aim, we conducted a survey to elicit young individuals' perception of Bitcoin as money or an asset, focusing on the role of financial literacy. Results showed that subjects with a higher financial literacy recognize that Bitcoin cannot substitute money, rather it is a speculative asset. On the opposite, only individuals with a deeper knowledge of Bitcoin consider it as a currency. Although this evidence, Bitcoin users who invest in this crypto do not see it as a speculative investment only, rather they expect Bitcoin to substitute money in the future, thus it is considered more than a simple asset. In line with Nakamoto (2008), subjects who do not trust the banking system consider Bitcoin as an alternative monetary system. By taking as reference Italy, which is characterized by a low level of financial literacy, results remark the importance of increasing the level of financial literacy also among young investors.

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Table 1. Ordered probit estimates
 Dependent variable “Bitcoin substitutes money” (1-5)

	(1) Baseline		(2) Biases and attitudes		(3) Full model	
	Coeff.	Averag ME †	Coeff.	Average ME †	Coeff.	Average ME †
Financial literacy	-0.141*** (0.034)	-0.002	-0.111*** (0.035)	-0.000	-0.076** (0.037)	0.001
BTC literacy index	0.105*** (0.038)	0.006	0.099** (0.039)	0.006	0.107*** (0.040)	0.006
Invested in BTC	0.499*** (0.102)	0.030	0.437*** (0.105)	0.024	0.496*** (0.110)	0.026
Paid in BTC	0.632*** (0.169)	0.038	0.500*** (0.173)	0.028	0.447** (0.179)	0.024
Perceived financial literacy	-0.035 (0.028)	-0.009	-0.007 (0.029)	-0.006	0.022 (0.031)	-0.004
Behavioral biases						
Over confidence			0.008 (0.118)	0.000	-0.021 (0.120)	-0.001
Self enhancement			0.533* (0.284)	0.030	0.526* (0.291)	0.029
Self protection			-0.150 (0.106)	-0.008	-0.197* (0.109)	-0.010
Mental accounting			0.133 (0.144)	0.007	0.162 (0.146)	0.008
Attitudes						
Financial stress			0.057 (0.099)	0.003	0.089 (0.102)	0.004
Social capital			-0.272** (0.106)	-0.015	-0.296*** (0.109)	-0.016
Voted in elections			-0.011 (0.123)	-0.001	-0.002 (0.128)	0.000
Trust in institutions			-0.038 (0.054)	-0.002	-0.027 (0.055)	-0.001
Trust in banks			-0.106* (0.064)	-0.006	-0.107 (0.065)	-0.006
Trust in ECB			-0.143** (0.060)	-0.008	-0.123** (0.061)	-0.007
Generalized trust			-0.010 (0.056)	-0.001	-0.011 (0.058)	-0.001
Tax morale			-0.069 (0.050)	0.004	-0.077 (0.051)	0.004
Political orientation			-0.049 (0.053)	-0.003	-0.042 (0.054)	-0.002
Climate change concern			-0.000 (0.048)	-0.000	-0.007 (0.049)	-0.000
Informatic concern			0.081* (0.045)	0.005	0.074 (0.045)	0.004
Personality traits						
Openness					0.018 (0.059)	-0.003
Conscientious					-0.060 (0.065)	-0.003
Extraversion					-0.027 (0.041)	-0.001
Agreeableness					-0.006 (0.056)	-0.000
Neuroticism					-0.060 (0.049)	0.001
Socio demographics						
Female					0.346*** (0.114)	-0.016
Age					-0.002 (0.014)	-0.000
Neet					0.947** (0.458)	0.067
Unemployed					0.533 (0.421)	0.038
Self-employed					0.787*** (0.302)	0.070
Employee					0.196 (0.175)	0.011
Worker/student					0.072 (0.103)	0.004
Education: high school diploma					-0.064 (0.502)	-0.003
Bachelor’s Degree					-0.253 (0.508)	-0.013
Master’s Degree					-0.249 (0.520)	-0.012
PhD					0.639 (0.621)	0.067
Pseudo R-squared	0.050		0.075		0.094	
Observations	682		682		682	

Standard errors in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. The marginal effects are computed at the highest level of the dependent variable (5).

Table 2. Probit estimates
Dependent variable “Bitcoin is an asset” (dummy)

	(1) Baseline		(2) Biases and attitudes		(3) Full model	
	Coeff.	Average ME †	Coeff.	Average ME †	Coeff.	Average ME †
Financial literacy	0.172*** (0.043)	0.053	0.149*** (0.045)	0.044	0.154*** (0.048)	0.044
BTC literacy index	-0.132*** (0.049)	-0.041	-0.114** (0.052)	-0.034	-0.128*** (0.054)	-0.036
Invested in BTC	-0.582*** (0.126)	-0.179	-0.518*** (0.131)	-0.152	-0.600*** (0.139)	-0.171
Paid in BTC	-0.784*** (0.211)	-0.242	-0.748*** (0.222)	-0.220	-0.658*** (0.228)	-0.189
Perceived financial literacy	0.060* (0.035)	0.019	0.043 (0.037)	0.013	0.051 (0.040)	0.015
Behavioral biases						
Over confidence			0.110 (0.154)	0.033	0.112 (0.157)	0.031
Self enhancement			0.234 (0.339)	0.070	0.246 (0.356)	0.070
Self protection			0.081 (0.136)	0.025	0.088 (0.141)	0.025
Mental accounting			-0.032 (0.193)	-0.010	-0.034 (0.198)	-0.010
Attitudes						
Financial stress			-0.096 (0.126)	-0.029	-0.095 (0.129)	-0.027
Social capital			0.366** (0.145)	0.108	0.381** (0.150)	0.110
Voted in elections			-0.162 (0.164)	-0.049	-0.247 (0.174)	-0.072
Trust in institutions			-0.036 (0.071)	-0.010	-0.034 (0.073)	-0.010
Trust in banks			0.081 (0.082)	0.024	0.045 (0.085)	0.013
Trust in ECB			0.156** (0.078)	0.045	0.157** (0.080)	0.045
Generalized trust			-0.009 (0.073)	-0.003	0.002 (0.076)	0.001
Tax morale			0.133** (0.065)	-0.038	0.142** (0.067)	-0.040
Political orientation			0.026 (0.068)	0.009	0.025 (0.071)	0.007
Climate change concern			-0.013 (0.063)	-0.005	-0.009 (0.065)	-0.003
Informatic concern			-0.040 (0.059)	-0.012	-0.023 (0.060)	-0.007
Personality traits						
Openness					-0.066 (0.080)	-0.019
Conscientious					0.028 (0.086)	0.008
Extraversion					-0.080 (0.054)	-0.023
Agreeableness					0.137* (0.076)	0.039
Neuroticism					0.007 (0.065)	0.002
Socio demographics						
Female					-0.152 (0.150)	0.038
Age					-0.029* (0.017)	-0.008
Neet					0.235 (0.561)	0.085
Unemployed					-0.224 (0.499)	-0.068
Self-employed					-0.544 (0.397)	-0.174
Employee					-0.089 (0.225)	-0.028
Worker/student					0.089 (0.138)	0.024
Education: high school diploma					0.712 (0.612)	0.227
Bachelor's Degree					0.785 (0.621)	0.246
Master's Degree					0.696 (0.637)	0.221
PhD					0.423 (0.784)	0.132
Constant	-0.268 (0.306)		-0.671 (0.680)		-0.791 (1.023)	
Pseudo R-squared	0.111		0.145		0.170	
Observations	682		682		682	

Standard errors in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Appendix A1. Survey structure

Section 1: Bitcoin Literacy (reference: Bannier et al., 2019)⁷

1. Bitcoin allows for direct transactions between two parties without a third party involved.
 - a. True (#)
 - b. False
2. All Bitcoin transactions are recorded on a distributed ledger that is publicly accessible.
 - a. True (#)
 - b. False
3. The total supply of Bitcoin is fixed.
 - a. True (#)
 - b. False
4. Bitcoin holdings are insured by the government.
 - a. True
 - b. False (#)
5. Bitcoin transfers are irreversible.
 - a. True (#)
 - b. False
6. All Bitcoin transactions go through a central repository.
 - a. True
 - b. False (#)

Section 2: Perception and Bitcoin Usage

7. On a scale from 1 (not at all) to 5 (definitely), how much do you think Bitcoin can replace the current currency in circulation?
 - a. 1
 - b. 2
 - c. 3
 - d. 4
 - e. 5
8. If you were to define Bitcoin you would define it mainly as:
 - a. Speculative asset
 - b. Money
 - c. Other
9. Have you ever invested in Bitcoin?
 - a. Yes
 - b. No
 - c. I will never invest in Bitcoin
10. Have you ever used Bitcoin to make payments?
 - a. Yes
 - b. No

Section 3: Financial literacy (reference: Hsu, 2022)

11. On a scale from 1 to 10, what level of financial education do you think you have?
12. Imagine an account yields 2% yearly (net of costs and taxes). With inflation at 2% per year, how much do you think you will be able to buy after two years (without moving funds in the account)?
 - a. More than what I could buy today
 - b. Less than what I could buy today (#)
 - c. The same as what I could buy today
 - d. I do not know
13. Imagine you know with certainty that in six months the interest rates will rise. Do you think you should buy fixed rate bonds today?
 - a. Yes
 - b. No (#)
 - c. Don't know
14. What do you think having correctly diversified investments mean?
 - a. Having in one's own portfolio both bonds and stocks
 - b. Do not hold same asset for too long
 - c. Invest in as many assets as possible
 - d. Invest in more assets to limit risk exposure of single ones (#)
 - e. Do not invest in very risky assets
 - f. Do not know

⁷ Please note that the right answer is denoted with #.

15. Which of these portfolios is better diversified?
 - a. 70% T-bills, 15% Equity funds, 15% in 2–3 stocks
 - b. 70% T-bills, 30% Equity funds (#)
 - c. 70% T-bills, 30% in 2–3 stocks
 - d. 70% T-bills, 30% in stocks of companies I know well
 - e. Don't know
16. On a scale from 1 (not risky at all) to 5 (very risky) How risky do you think these products are?
 - a. Private bonds
 - b. Government bonds
 - c. Stocks
 - d. Stock mutual funds
 - e. Bond mutual funds
 - f. Deposits
 - g. Housing

Section 4: Behavioral biases (Reference: Hsu, 2022)

17. From 2005 through 2019, the compound annual return for stocks was 8.6 percent. In any given year, what returns do you expect on your stock investments to produce?
 - a. Below 8.6 percent.
 - b. About 8.6 percent.
 - c. Above 8.6 percent.
 - d. Well above 8.6 percent.
18. When returns to your portfolio increase, to what do you believe the change in performance is mainly due?
 - a. Your investment skill.
 - b. A combination of investment skill and luck.
 - c. Luck.
19. When returns to your portfolio decrease, to what do you believe the change in performance is mainly due?
 - a. Your investment skill.
 - b. A combination of investment skill and luck.
 - c. Luck.
20. Imagine that you have decided to see a concert and have paid the ticket price of \$1200 beforehand. As you arrive at the venue, you find that you lost the ticket. Will you spend money to buy another ticket?
 - a. Yes
 - b. No
21. Imagine that you have decided to see a concert where admission fee is \$1200 per ticket. As you arrive at the venue, you find that you have lost \$1200 cash. Will you still pay \$1200 for a ticket to the concert?
 - a. Yes
 - b. No

Section 5: Personal attitudes (Reference: European Social Survey, ESS; European Values Study, EVS).

22. Have you been experiencing financial stress for the last three years?
 - a. Yes
 - b. No
23. Are you a member of voluntary/non-profit associations? (e.g. cultural, political, sports, etc.)
 - a. Yes
 - b. No
24. Did you vote in the last election?
 - a. Yes
 - b. No
25. From 1 to 5: How much trust do you have in the institutions of your country (e.g. Government, Parliament)?
 - a. 1 Not at all
 - b. 2
 - c. 3
 - d. 4
 - e. 5 A great deal
26. From 1 to 5: How much trust do you have banks?
 - a. 1 Not at all
 - b. 2
 - c. 3
 - d. 4
 - e. 5 A great deal
27. From 1 to 5: How much trust do you have in the European Central Bank?
 - a. 1 Not at all
 - b. 2
 - c. 3
 - d. 4
 - e. 5 A great deal

28. From 1 to 5: How much do you trust other people in general?
- 1 Not at all
 - 2
 - 3
 - 4
 - 5 A great deal
29. Would you say that it is a behavior that can always be justified, never justified or something in the middle that of "cheating on taxes to be paid if you have the opportunity"
- 1 Never justified
 - 2
 - 3
 - 4
 - 5 Always justified
30. How worried are you/are you about climate change?
- 1 Not at all
 - 2
 - 3
 - 4
 - 5 A great deal
31. How worried are you/a about cyber attacks (e.g. hacker attacks)?
- 1 Not at all
 - 2
 - 3
 - 4
 - 5 A great deal
32. From 1 (left) to 5 (right) how would you define your political orientation?
- 1 left
 - 2
 - 3
 - 4
 - 5 right

Section 6: Personality traits (Reference: Bannier et al., 2019)

33. From 1 to 5, how much do you agree with the following statement? "*You tend to do things (e.g. work, study) thoroughly and efficiently*"
- 1 completely disagree
 - 2
 - 3
 - 4
 - 5 strongly agree
34. "You're emotionally stable, not easily disturbed"
- 1 completely disagree
 - 2
 - 3
 - 4
 - 5 strongly agree
35. "You are little shy, sociable"
- 1 completely disagree
 - 2
 - 3
 - 4
 - 5 strongly agree
36. "You are caring/a and kind to almost everyone"
- 1 completely disagree
 - 2
 - 3
 - 4
 - 5 strongly agree
37. "You are inventive, curious"
- 1 completely disagree
 - 2
 - 3
 - 4
 - 5 strongly agree

Section 7: Socio-demographic information

38. How old are you? [open question]
39. Gender: M/F/Other
40. What is your latest educational attainment?
 - a. Middle school diploma
 - b. High school diploma
 - c. Bachelor's degree
 - d. Master's degree
 - e. PhD
41. Roughly, what is your family's monthly net income?
 - a. Less than 1.500€
 - b. Between 1.500€ and 3.500€
 - c. Between 3.500€ and 4.500€
 - d. More than 4.500€
42. What is your occupational status?
 - a. Student
 - b. Student/worker
 - c. Self employed
 - d. Employee
 - e. Unemployed
 - f. Neet