



DIGITAL CURRENCY INVESTMENT AND VOLATILITY CONTROVERSIES – ETHICAL PERSPECTIVES AND EMPIRICAL EVIDENCE

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SUMMARY

Digital currencies and blockchain technology are viewed with scepticism in the financial sector and society, while the increasing popularity of some currencies, such as Bitcoin, has raised numerous ethical questions. With the growing popularity of cryptocurrencies, the demand for these assets has also increased as many investors see the potential for high returns in this new, bubbly, and rapidly developing market. However, investing in cryptocurrencies has significant risks as the market is highly volatile and still unregulated. In this article, we propose an analysis of the aspects related to investment and the volatility of digital currencies from a dual perspective: a) qualitative - a critical look at their pros and cons from an investment perspective, as well as the ethical implications for the economy and individuals; b) quantitative - based on empirical data on the issue of their volatility. The future of cryptocurrencies and blockchain technology is difficult to predict as it is characterized by high uncertainty. However, given the transformation process that the financial and currency markets undergo, the challenges posed by such innovations can no longer be ignored.

Keywords: ethics, digital currencies, volatility, investments

INTRODUCTION

The rapid spread of digital currencies has led to several ethical dilemmas, challenging legislators, and companies in the financial sector to find a balance between fostering innovation and ensuring adequate consumer protection. Bitcoin and blockchain technology are viewed with a degree of scepticism both in the financial sector and by the public. Opinions differ between those who see these innovations as an opportunity and those who view them with aversion or even fear.

The issues surrounding investment in cryptocurrencies have been analysed in numerous studies (Stubbs, 2021; Conklin and Ceballos, 2022; Hester, 2021). In an article published by Rutgers Business School, Scharding analyses the ethical perspective using the specific example of the cryptocurrency Bitcoin and asks whether this “star” of the industry can be considered an ethical currency (RBS, 2018). In addition, Stubbs (2021) examines the ethical concerns associated with investing in cryptocurrencies, while Conklin & Ceballos (2022) analyse the ethical pros and cons of such investments. Hester (2021) discusses the impact of cryptocurrencies from an environmental and social perspective, focussing on the example of Bitcoin.

There is a wealth of literature on the volatility of cryptocurrencies, especially Bitcoin, compared to other digital currencies, traditional currencies or stock indices.

Baur & Dimpfl (2017) show that the extremely high volatility of Bitcoin makes it difficult to use as a currency and limits its functionality as a medium of exchange, unit of account or store of value. In the same direction, Almagsoosi et al. (2022) point out that the high volatility makes Bitcoin a speculative and risky asset and emphasise the need for careful risk assessment before investing in cryptocurrencies. Doumenis et al (2021) analyse the volatility of Bitcoin compared to other financial assets. The results show that the volatility of Bitcoin is significantly higher than that of these traditional assets, suggesting that Bitcoin acts as a speculative asset rather

than a stable store of value. He (2024) shows that Bitcoin’s volatility is due to a combination of factors – the unpredictability of supply and demand, fluctuating market sentiment and the influence of the media – making it a speculative and volatile asset rather than a stable currency. Stråle Johansson & Tjernström (2014) analyse various factors that influence the volatility of the Bitcoin price, such as trading volume and the impact of certain events. They show that Bitcoin investors are often motivated by emotional and psychological factors, leading to investment decisions based on trends and speculation rather than economic reasons. Baur & Dimpfl (2021) Bitcoin’s extreme price volatility negatively impacts its ability to function as a currency, rendering it ineffective as a medium of exchange and limiting its utility as a risk diversifier in portfolios. Shokri & Sahab (2021) have analysed the spillover effects of Bitcoin volatility on other cryptocurrencies and show a high interdependence between cryptocurrencies that can amplify volatility in times of market instability.

On the other hand, Kyriazis (2021) emphasises that the inclusion of Bitcoin in portfolios of conventional assets can significantly improve the risk-return ratio of investment decisions. However, the authors show that cryptocurrency markets are far from fully efficient, although they tend to become more efficient over time. Cermak (2017) also highlights the positives, showing that Bitcoin can act as a safe haven and that as the market matures, its volatility could decrease, paving the way for its use as a viable currency.

The main contribution of this article lies in the integration of a dual framework for analysing investments in digital currencies through a qualitative approach that examines the ethical implications and a quantitative approach based on empirical data on the volatility of these assets. This complements the existing literature by providing a more in-depth assessment of the risks and benefits associated with cryptocurrencies in the context of extreme volatility and ethical concerns of investors.

METHODOLOGY AND DATA

We propose to analyse the aspects related to the investment and volatility of digital currencies from a dual perspective:

- Qualitative - a critical examination of their pros and cons from an investment perspective, as well as the ethical implications for the economy and individuals;
- Quantitative - based on empirical evidence on the issue of volatility.

The qualitative approach consists of a documentary analysis of the specialised literature, in which we will critically examine the pros and cons of digital currencies and the associated costs and benefits. We will also analyse the opportunities, risks and, in particular, the ethical consequences and the impact on the economy, the users and the society as a whole.

The quantitative approach provides for the analysis of volatility indicators - Historical Volatility, Realized Volatility and ATR (Average True Range). For a period of 5 years (2019-08-05 to 2024-08-05), the fluctuations of parities in USD were analysed as follows:

- 2 Cryptocurrencies Bitcoin-USD (BTC-USD); ETH-USD (Ethereum-USD);
- 2 Stock indices NASDAQ Composite (^IXIC), NYSE Composite (^NYA);
- 3 fiat currencies: EUR-USD (Euro-US Dollar exchange rate), JPY-USD (Japanese Yen-US Dollar exchange rate), GBP-USD (British Pound-US Dollar exchange rate).

Research phases:

- Downloading data from Yahoo Finance; daily closing rates, daily high and low (Yahoo Finance, 2024);
- Calculation of indicators for a period of 5 years and at 1-year intervals:
 - Historical Volatility: calculated as standard deviation of daily returns, annualised;
 - Realised Volatility: estimated on the basis of the daily range (high - low);
 - ATR (Average True Range): Calculated over a 14-day period;
- Interpretation of the results.

RESULTS AND DISCUSSION

Ethical controversies¹

Interest in investing in cryptocurrencies has increased during recent years as many investors have recognised their potential for high returns. In addition, it is clear that the investment also harbours great risks, as the markets are volatile and not yet regulated. Furthermore, critics (Medium, 2023) would even say that these are speculative bubbles. The main problem from this perspective is volatility, as the values of some cryptocurrencies fluctuate wildly, mostly as a result of speculative transactions. The inclusion of stablecoins, while tied to an external reference value and less volatile, raises other challenges (Torregrosa and Fontrodona, 2022).

Studies also point to cases of price manipulation, asymmetric insider trading or fraudulent initial offers – all problems that point to fraud as a result of a lack of regulation and transparency (Frankwitz, 2023). Ethical concerns are also expressed in the area of manipulation in connection with market manipulation. Frankwitz (2023) and Samuel-Ogbu (2022) point out that these are genuine speculative investments that should not be encouraged.

Investing in cryptocurrencies is ethically questionable, according to Kelly (2022), who argues that there are strong moral arguments against them from this perspective, particularly because of the impact that investing in cryptocurrencies has on individuals due

¹ An extended version of the synthesis analysis contained in this subsection - ethical controversies, was published by the author in the book Sistemul internațional de plăți în era banilor electronici, Chapter 6. Etică și controverse în sfera monedelor digitale private, Editura Universitară, Bucharest, 2024.

to the volatility of the currencies – people who do not understand the technology and the risks and are betting on it mainly for subjective and emotional reasons so as not to miss out on an opportunity and the prospect of profits. Furthermore, in this context, crypto markets appear as gambling due to their extreme volatility and large fluctuations within short periods of time, despite being advertised as investment instruments. Some authors (Stubbs, 2021) compare the marketing tactics of the crypto industry with those of companies offering quick loans. It is argued that the promotion of these active products can lead to financial losses and is ethically inappropriate (Hester, 2021).

From the classical utilitarian perspective, Conklin & Ceballos (2022) compares investments in digital currencies with those in traditional stocks and bonds and, based on the idea of opportunity cost (one of the effects of increased investment in cryptocurrencies is a reduction in other investments), concludes that investments in cryptocurrencies are unethical if they would lead to a dilution of investments in traditional securities.

Analysing volatility

Volatility of cryptocurrencies (Bitcoin and Ethereum). The annualised historical volatility of Bitcoin is 53.53%, which indicates significant price fluctuations over the 5 years under consideration. The realised volatility is also very high (\$22,688.94), indicating large fluctuations between the daily highs and lows; the high ATR (\$3,090.21) shows significant daily price fluctuations. Ethereum's historical volatility of 68.82 is even higher than that of Bitcoin. This confirms the high volatility of the cryptocurrency market, where price fluctuations can be very large. The realised volatility of \$1,747.30 and the ATR of \$192.09 show that Ethereum also experiences significant daily fluctuations, but the absolute values are lower than Bitcoin due to the relatively lower price of ETH compared to BTC.

Volatility of stock indices (NASDAQ Composite and NYSE Composite). The historical annualised volatility of the NASDAQ of 25.26% indicates a moderate but relatively high volatility for a stock index (specific to the US tech market, which is more prone to large swings due to the nature of tech companies). The realised volatility of \$1,782.11 also confirms significant movements within the market. As for the NYSE, the historical volatility of 20.35% is slightly lower than that of the NASDAQ,

Conklin & Ceballos (2022) also points out a pro component: the possibility of diversifying investments - they can play a valuable role in diversifying investment portfolios, and this diversification could reduce overall volatility in investment portfolios, thereby reducing risks and making the end result perceived as ethical. Scharding (2018) estimates that, on the one hand, volatility gives it the character of an interesting investment, but also ascribes to it the characteristic of a currency that is less suitable for the constant exchange of goods and services due to the uncertainty of its value (Scharding, 2018). On the other hand, if a cryptocurrency is adopted by a nation, it could become more ethical and thus provide a basis and a way to ensure stability and security of value (Scharding, 2018). In contrast, Hester (2021) talks about the adoption of cryptocurrencies in low-income countries (e.g. El Salvador) – this can have negative consequences as the purchasing power of residents is lost and an investment in this case is seen as unethical.

There is no universal standard to answer the question of whether investing in cryptocurrencies is ethical (Conklin and Ceballos, 2022). In the absence of a universal rating scale, one cannot compare gains with losses, and the evaluation of the ethics of cryptocurrency investments is ultimately context-dependent or even subjective.

indicating a somewhat more stable market. However, the realised volatility of \$1,833.43 is comparable to that of the NASDAQ, suggesting that both markets have significant daily fluctuations. The NASDAQ and NYSE equity indices exhibit moderate to high volatility, which is to be expected given the diversity of the companies included.

Exchange rate volatility (EUR-USD, JPY-USD, GBP-USD). The historical volatility of the EUR–USD exchange rate of 7.28% is much lower than that of cryptocurrencies and equity indices, reflecting the relative stability of this currency pair, and the realised volatility of \$0.0525 and ATR of \$0.0072 confirm that fluctuations are relatively low in the short term. For JPY-USD, both the historical volatility of 8.89% and the realised volatility and ATR are higher than for EUR-USD. At 9.25, the historical volatility of GBP-USD is the highest of the currency pairs analysed and reflects the economic and political uncertainties associated with the British pound in recent years. However, the realised volatility of \$0.0788 and the ATR of \$0.0073 show moderate daily fluctuations. Currency pairs show much lower volatility compared to cryptocurrencies and stock indices.

Table 1
5-year volatility indicators

Asset	Historical Volatility (%)	Realized Volatility (USD)	ATR (USD)
Bitcoin-USD	53.53	22688.94	3090.21
ETH-USD	68.82	1747.3	192.09
NASDAQ Composite (^IXIC)	25.26	1782.11	481.96
NYSE Composite (^NYA)	20.35	1833.43	253.39
EUR-USD	7.28	0.05	0.01
ETH-USD	68.82	1747.3	192.09
JPY-USD	8.89	10.66	3.14
GBP-USD	9.25	0.08	0.01

Source: compiled by author, based on research, Yahoo Finance (2024) data

If we look at the development of the volatility indices for periods of one year, we see the following:

- Cryptocurrencies (Bitcoin and Ethereum) have the highest volatility compared to other asset classes, both in terms of historical and realised volatility; Bitcoin and Ethereum have similar volatility, but Ethereum has had periods of even higher volatility than Bitcoin; they are significantly more volatile than equity indices and currency pairs, which makes them suitable for investors with a high-risk appetite;
- Stock indices (NASDAQ Composite and NYSE Composite) are more volatile than currency pairs, but much more stable than cryptocurrencies. The NASDAQ has been more volatile than the NYSE due to its greater exposure to the technology sector;
- Currency pairs (EUR-USD, JPY-USD, GBP-USD) are significantly less volatile, reflecting the relative stability of major economies. Volatility between currency pairs is relatively similar, with JPY-USD slightly more volatile than EUR-USD and GBP-USD; much more stable than both cryptocurrencies and equity indices, suitable for investors looking to take lower risk.

Table 2
1-year volatility indicators

Asset	Indicators / Period*	2019-2020	2020-2021	2020-2021	2021-2022	2022-2023	2023-2024
Bitcoin - USD	Historical Volatility (%)	46.94	59.86	66.82	52.8	36.37	45.49
	Realized Volatility (USD)	3818.64	6587.41	25652.16	14808.83	9723.72	25126.41
	ATR (USD)	250.52	1401.85	1929.44	215.72	1354.14	3090.21
ETH-USD	Historical Volatility (%)	54.27	78.4	88.89	71.78	38.81	53.21
	Realized Volatility (USD)	79.99	235.41	2294.34	1235.33	579.62	1555.02
	ATR (USD)	5.59	43.93	164.89	21.49	93.99	192.09
NASDAQ Composite (^IXIC)	Historical Volatility (%)	14.45	35.5	18.01	31.94	17.38	17.85
	Realized Volatility (USD)	712.85	1784.17	1573.36	1910.87	1055.02	1709.44
	ATR (USD)	59.57	130.08	268.64	243.01	143.92	481.96
NYSE Composite (^NYA)	Historical Volatility (%)	10.99	34.65	12.91	20.84	12.45	10.46
	Realized Volatility (USD)	951.45	2430.53	1441.94	1834.72	1146.06	1297.81
	ATR (USD)	64.9	139.17	177.98	234.39	144.21	253.39
EUR-USD	Historical Volatility (%)	4.82	7.42	5.6	9.78	7.53	5.35
	Realized Volatility (USD)	0.03	0.06	0.03	0.06	0.05	0.04
	ATR (USD)	0.01	0.01	0.01	0.01	0.01	0.01
JPY-USD	Historical Volatility (%)	5.92	8.28	5.19	11.6	9.93	9.45
	Realized Volatility (USD)	4.58	7.56	3.46	13.43	9.33	13.78
	ATR (USD)	0.47	0.53	0.5	2.43	1.54	3.14
GBP-USD	Historical Volatility (%)	8.64	10.97	6.58	12.2	8.2	5.53
	Realized Volatility (USD)	0.07	0.09	0.05	0.1	0.06	0.05
	ATR (USD)	0.01	0.02	0.01	0.01	0.01	0.01

Note: 1-year period intervals starting with 5.08.2019

Source: compiled by author, based on research, Yahoo Finance (2024) data

CONCLUSION

As the qualitative analysis shows, there are a number of elements that speak against investing in cryptocurrencies, highlighting the challenges and confirming the warning signs: high volatility, the lack of specific regulations, their speculative nature. In addition, the widespread adoption of cryptocurrencies in low-income countries can lead to a loss of purchasing power. Of course, there are also some elements in favour of cryptocurrencies: the potential for high returns, the role they play in diversifying portfolios and the ability to create innovation in the financial system.

When analysed quantitatively, cryptocurrencies (Bitcoin and Ethereum) have the highest volatility both historically and in real terms, indicating the potentially higher risks and returns associated with them. Indices

have moderate but significantly higher volatility than currencies, reflecting the nature of equities and the influence of economic and geopolitical factors. Currency pairs have the lowest volatility, making them a more stable choice for conservative investors or those looking to protect their capital.

To summarise, both approaches to analysis suggest that investing in cryptocurrencies can be ethically questionable, as their high volatility can affect individuals. Even though the lack of a generally recognised standard for ethical evaluation currently makes it difficult to analyse cryptocurrencies objectively, from an empirical perspective they can be considered attractive investment opportunities for risk-takers.

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