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Cryptocurrency as Newer Form of Digital Assets

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Abstract. The primary focus of this study is to monitor significant changes compared to the author's previous articles, with the objective of identifying alterations in the legality of cryptocurrency; the extent of its volatility; its profitability; and its use as a medium of exchange. The author asserts that, in 2025, the legality of cryptocurrencies underwent significant changes on a global scale. The regulatory approach to digital assets varies across nations, with some adopting a regulatory framework that encompasses these assets, while others have opted for a prohibitionist stance. The profitability of mining has been observed to decrease in consequence of rising time and energy costs, whilst the volatility index has been noted to decrease due to the entry of institutional investors and the adoption of merchant strategies. In summary, the profitability of crypto asset acquisition has reached a state of maturity. The focus has shifted from the initial hype to the development of effective strategies, the optimal timing of transactions, and the conducting of thorough research.

Keywords: cryptocurrency, legality, volatility, mining, profitability.

1. Introduction

Cryptocurrency is a newer form of digital asset, which has become a global phenomenon among investors and enthusiasts alike [1]. As of today, the total market cap & volume of cryptocurrencies globally, a result of 17,004 cryptocurrencies [2].

Cryptocurrencies are a growing market that involves an increasing number of people and organizations with rapid evaluations and increasing interconnections to other economic variables. This dynamism introduces potential risks to the broader economy that necessitate careful monitoring and analysis [3].

In recent years, the intensified use of high-frequency data has revolutionised the analysis of cryptocurrencies, which are now actively traded 24/7 across global markets. It is the case that a number of scientists have identified four major streams of research. Firstly, there is the return prediction and measurement of cryptocurrency volatility. Secondly, there is the (in) efficiency of cryptocurrencies. Thirdly, there is the price dynamics and bubbles in cryptocurrencies. Finally, there is the diversification, safe haven, and hedging properties of cryptocurrencies. [4].

It is submitted that regulatory frameworks and international collaboration can play pivotal roles in mitigating risks stemming from quantum computing advancements in the context of digital currencies. It is recommended that jurisdictions synchronise transition roadmaps with clear upgrade deadlines in order to enhance preparedness and standardisation across currency systems. International collaboration will also be important as blockchain technologies become increasingly global in nature [5].

It is imperative to closely monitor the spillovers of volatility during periods of market disruption, as evidenced by the peaks in the Total Connectedness Index during both global and crypto-specific crises. For investors and risk managers, understanding

these transmission dynamics can facilitate more informed trading and risk management decisions in the evolving crypto ecosystem. It is important to note that the time-varying and asymmetric nature of the aforementioned findings highlights the need for diversification strategies. [6].

The cryptocurrency market, known for its inherent volatility, has been significantly influenced by external shocks, particularly during periods of global crises such as the COVID-19 pandemic whilst past price fluctuations had a limited impact on future volatility for most cryptocurrencies, although leverage effects became evident during market anomalies. It is important that volatility depends on type of shocks: positive or negative. Baur and Dimpfl [7] reported that cryptocurrencies' volatility increases more in response to positive shocks than negative ones. Similarly, Salisu and Ogbonna [8] reinforced the finding that good news has a positive impact on return volatility. The observed volatility persistence and significant leverage effects during crises call for the development of market stabilization tools, such as circuit breakers or trading halts, particularly during periods of extreme market stress. These measures could help prevent panic selling and reduce the likelihood of excessive price fluctuations. By considering these implications, both investors and regulators should work towards mitigating risks associated with cryptocurrency volatility, especially during periods of heightened global uncertainty [9].

The integration of technological innovations into daily life is a phenomenon that is increasing in pace as society becomes more familiar with such developments. The result is the mainstreaming of technology, leading to its acceptance as a normal and stabilising element of life. As it reaches maturity, Bitcoin becomes integrated into the realm of everyday e-commerce, exhibiting reduced fluctuations in value. The cryptocurrency space is characterised by its dynamism, with new developments, adoption trends and regulatory changes occurring with great rapidity. It is therefore argued that Bitcoin has the potential to offer benefits to e-commerce businesses and customers, such as lower fees, security and global reach. Nevertheless, its implementation and utilisation within the domain of e-commerce continue to pose significant challenges. It is highly probable, with a 95% confidence level, that any loss incurred from a Bitcoin investment will be less than 4.4% of the total value of the investment. This figure is a key indicator for evaluating the risk involved in holding Bitcoin. [10].

Blockchain technologies, which form the base for most cryptocurrencies, have the potential to extend even deeper and more profoundly beyond cryptocurrencies to other business applications than they have thus far. Even though blockchain-based technologies can be applied to a wide range of industries (e.g., digital art management, supply chains, and healthcare), technical, organizational, regulatory hurdles must be overcome before mass adoption can take place. Meanwhile, AI (the act of simulating the processes of human intelligence by machines, especially computer systems), the IoT (an electronic system that is connected to any mechanical digital machine, object, animal, or person that has a unique identifier (UID) associated with it), and the FinTech industry (businesses and consumers that use technology to modify, enhance, or automate the delivery of financial services to businesses or consumers) are some of the most important emerging technologies closely associated with blockchain platforms.

Cryptocurrencies are viewed as a means of diversifying global technology investments [11]. But can technology protect investors from extreme losses? [12]. Truly forecast could protect investors from extreme losses but there is still not world-wide verified methodology how to predict price of cryptocurrency. Some studies attempted forecasting of cryptocurrency volatility of the most popular cryptocurrencies using the tree-based ensemble learning XGBM model delivered the most accurate forecast. This highlighted the strength of the model based on the regularization and aggregation of several models. [13, 21]

By cryptocurrency mining the severe energy consumption and high emissions caused triggered environmental concerns and further expanded the development of the green bond market. So, it is urgent to reduce the pollutants of crypto. Miners can replace the graphics processing unit (GPU) machine with more efficient devices, such as application-specific integrated circuits (ASICs), in the mining process to mitigate emissions. Carbon capture and storage technology can also be applied to restrain the spread of carbon emissions. Also, countries should vigorously develop renewable energy to provide power for crypto mining. Renewable energy sources such as wind and solar energy are not only cleaner than fossil energy but also sustainable, which is a better choice to provide electricity for mining machines. It is desirable to promote the construction of hydropower, wind power and other bases, equipment manufacturing, operation and maintenance, and waste disposal to build a green closed-loop industrial supply chain for renewable energy [14].

The environmental concerns associated with energy-intensive cryptocurrencies have led to the rise of clean cryptocurrencies, which aim to balance financial innovation and sustainability. Incorporating clean cryptocurrencies into dirty cryptocurrency portfolios effectively reduces tail risk, regardless of the portfolio optimization strategy employed. However, risk reduction may not always result in higher portfolio returns, volatility, drawdown risk, or risk-adjusted performance indicators [15].

The link between currency exchanges, stock indices, and cryptocurrency price volatility is now being studied by academics and practitioners. Alsulami and Raza [16] found positive symmetric effects of USA stock indices on crypto price volatility. Simultaneously, Japanese stock indices and currency exchanges have negative symmetric effects on crypto price volatility in USA– Japan.

To sum up tracked Scientifics' Articles there are key issues in cryptocurrency research:

1. Regulatory Uncertainty & Fragmentation - The lack of harmonized rules complicates compliance for exchanges and users, especially in cross-border transactions.

2. Market Volatility & Speculation - This volatility undermines crypto's use as a stable store of value or medium of exchange, especially for everyday payments.

Therefore, the primary focus of this study is to monitor significant changes compared to the author's previous articles [17, 18], with the objective of identifying alterations in the legality of cryptocurrency; the extent of its volatility; its profitability; and its use as a medium of exchange.

2. Previous works analysis

The first publication in cryptocurrency domain [17] presents an analytical framework. Uses Bitcoin's volatility index (Figs. 2–3) and standard deviation calculations (Section 2) to confirm high risk—aligning with 2019's "cons" (regulatory uncertainty, price swings).

Second publication [18] examined cryptocurrency investment viability. The core arguments focus on three main factors: high volatility (using Bitcoin as primary example), unstable mining profitability (with comparative tables across 15 cryptocurrencies), and impractical mining timelines (noting it takes over 4 years to mine 1 Bitcoin). Considered Explicitly links pandemic-driven cryptocurrency adoption (Section 1) to market volatility, extending work on black swan events [19]. 2021 Article [18] Contributions:

Quantifies volatility's impact on stability (Fig. 3) and mining diminishing returns.

Provides empirical mining profit/loss tables across 15 cryptocurrencies (Table 1).

Indirectly addressed via volatility's link to policy uncertainty (e.g., taxation omission in Conclusion).

Building on foundational work [17, 18, 19], this study aims to track how cryptocurrency transformed from speculative assets to payment instruments.

In total, Key Evolution of previous works: From *theoretical adoption drivers* (2019) → *empirical investment viability* (2021).

3. Methodology

This research is based on general scientific principles: integrity, data analysis, objectivity and openness in interpreting the data and drawing conclusions. The research flow of current study is shown on Fig. 1.

The searching process has been stimulated by designing the queries and then using the `scholarly` library to fetch the most cited articles. Exact query was: "cryptocurrency volatility"; "cryptocurrency profitability"; "cryptocurrency adoption"; "cryptocurrency mining profitability 2023-2024"; "cryptocurrency volatility drivers", "crypto market stability metrics 2024"; "cryptocurrency regulation"; "cryptocurrency legality"; "virtual currency acceptance framework".

Academic `insights` mean that author use the `scholarly` package from four full-text platforms/databases were carefully studied and comprehensively analyzed: ProQuest, Dimensions, ArXiv, ResearchGate, and statistical reports.

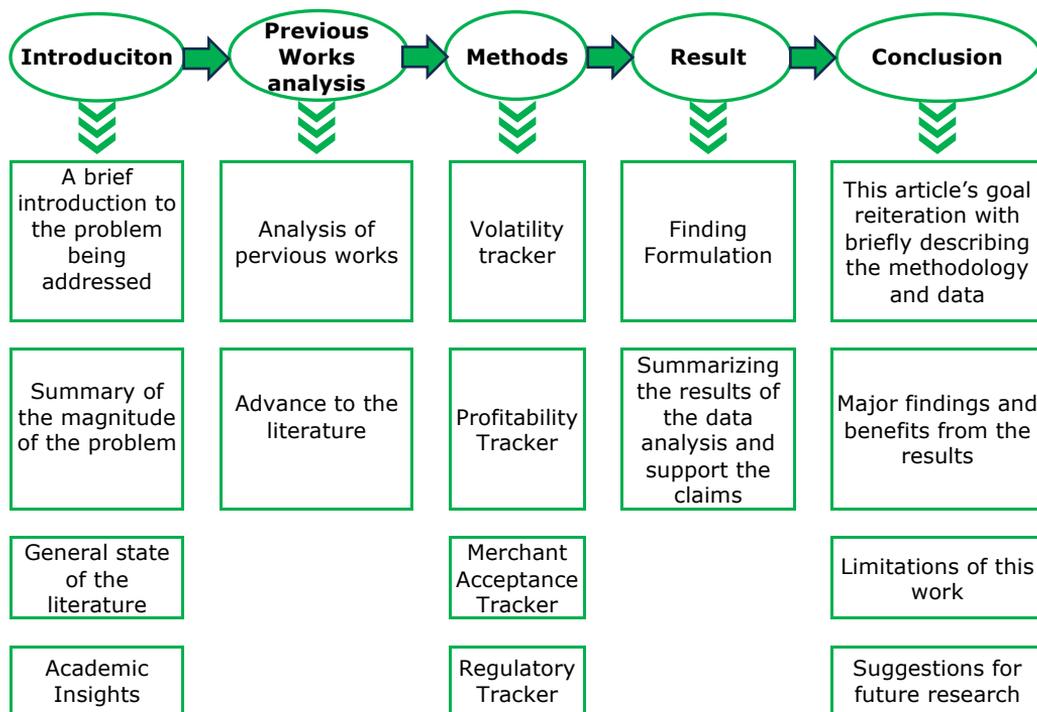


Fig. 3. Research Flow. Source: Author's elaboration.

It is important to notice that Search words as a query are enclosed in quotation marks to ensure a search for a whole phrase, not by individual words. If you do not use a whole phrase, then the search results are too scattered in different fields of database. For effective searching was established Data Collection Pipeline (Table 1).

Then we analyzed the fetched articles and simulate choosing articles for quotation.

Table 1. Data Collection Pipeline

Indicator	Source	Result
Profitability	Academics Articles; CoinWarz; CoinMarketCap; CoinGecko; CoinMetrics ROI indices; Kaiko Real-time Feed; Fidelity.com	Profitability analysis
Volatility	Academics Articles; BlackRock.com Blockchain.com/Glassnode; Coinbase API; Kaiko.get_volatility, BlackRock data; BIS 2025	Volatility Analysis
Merchant Acceptance	Academics Articles; BitPay Merchant Report 2024; CoinMap data; Chainalysis.com; plotly.express.density_heatmap()	Utilization Heatmap
Regulatory Status	Academics Articles; Central Banks News	Jurisdictions by countries

In order to initiate the process of data collection, it is first necessary to define the ten most prominent cryptocurrencies, with a view to facilitating and generalising the research. The most common seven major cryptocurrency from 1 January 2020 to 1 September 2024 were: Bitcoin (BTC), Ethereum (ETH), Tether (USDT), Binance Coin (BNB), USD Coin (USDC), XRP, and Cardano (ADA). [9]. As a result of investigating sources accordingly Data Collection Pipeline, complying with market capitalization and popularity, verified Top Crypto (2019-2024) are:

1. Bitcoin (BTC)
2. Ethereum (ETH)
3. Litecoin (LTC)
4. Bitcoin Cash (BCH)
5. Tether (USDT)
6. Binance Coin (BNB)
7. Starknet (STRK)
8. Solana (SOL)
9. (SLP)
10. Dogecoin (DOGE)

It is evident that the sequence and nomenclature of the foremost cryptocurrencies is subject to alteration on a recurrent basis. It is anticipated that the subsequent sections of this study will provide further evidence of this phenomenon.

4. Cryptocurrency Profitability

The most common ways to get Profit from cryptocurrency are:

1) Mining can be defined as the process of validating cryptocurrency transactions and adding them to a blockchain, which is essentially a public ledger of transactions. In the context of cryptocurrency mining, the process entails the utilisation of computational capabilities to address intricate mathematical problems. The initial miner who successfully identifies the solution is entitled to append the subsequent block of transactions to the chain, a feat that is accompanied by the allocation of newly issued cryptocurrency. The process is referred to as "mining" because it results in the release of new coins into circulation, thereby conferring ownership of the mined cryptocurrency to the miner in their digital wallet.

2) Acquisition/Buying. The term "purchasing digital currencies" is employed to denote the process of acquiring digital assets, otherwise referred to as "crypto" or "cryptocurrencies", through the utilisation of conventional currencies such as the US dollar or the euro, or via exchanges involving other cryptocurrencies. The process entails the acquisition of digital tokens on a blockchain, with the objective of retaining these for future profit.

Mining Profitability

The following list of cryptocurrencies (Fig.2) are being shown as the results for the mining profitability calculations and can be used to compare Bitcoin mining profits to determine if another cryptocurrency is more profitable to mine besides mining Bitcoin. The cryptocurrency profitability information displayed is based on a statistical mining calculation using the mining hashrate values entered and does not account for difficulty and price fluctuations, stale/reject/orphan rates, halvings, a pool's efficiency, and pool fees. Individual mining profitability may vary. Sort By Profit in USD in Descending order.

Cryptocurrency <small>Current Profitability Position</small>	Current Difficulty <small>14 Day Difficulty Chart</small>	Est. Coins <small>(Current / 24 Hr Avg)</small>	Exchange Rate BTC <small>14 Day Exchange Rate Chart</small>	Exchange Volume	Revenue / Profit <small>(per day)</small>
 Peercoin (PPC) <small>SHA-256</small> Network Hashrate: 27.99 PH/s Block Reward: 55.17265345 Blocks: 816,836 Block Time: 10.00 minute(s)	 21.31 -2.27%	10,414,586,888.8341 / 10,177,974,936.1420	 0.00000256 (CoinGecko) +0.78%	0.00 BTC 0.00 PPC	\$2,862,307,009.46 / \$2,862,307,001.0 <small>\$8.40 for electricity</small>
 Dogecoin (DOGE) <small>Scrypt</small> Network Hashrate: 2.10 PH/s Block Reward: 10,000.00 Blocks: 5,730,016 Block Time: 1.00 minute(s)	 30,813,711.41 -30.32%	94.0096 / 65.5092	 0.00000152 (CoinGecko) +0.66%	0.00 BTC 0.00 DOGE	\$15.34 / \$5.86 <small>\$4.46 for electricity</small>
 BitcoinCash (BCH) <small>SHA-256</small> Network Hashrate: 3.82 EH/s Block Reward: 3.1250 Blocks: 904,786 Block Time: 10.00 minute(s)	 557,246,995,748.91 -1.68%	0.0226 / 0.0222	 0.00462589 (CoinGecko) -0.18%	0.00 BTC 0.00 BCH	\$11.21 / \$2.81 <small>\$8.40 for electricity</small>
 Ethereum-Classic (ETC) <small>ETCHASH</small> Network Hashrate: 247.31 TH/s Block Reward: 3.20 Blocks: 22,518,276 Block Time: 15.00 second(s)	 3,709,621,253,627,700 +0.51%	0.4323 / 0.4345	 0.00015049 (CoinGecko) +0.19%	0.00 BTC 0.00 ETC	\$6.98 / \$2.42 <small>\$4.56 for electricity</small>
 Bitcoin (BTC) <small>SHA-256</small> Network Hashrate: 898.90 EH/s Block Reward: 3.1250 Blocks: 903,969 Block Time: 10.00 minute(s)	 126,411,437,451,910.00 0.00 %	0.0001 / 0.0001	 1.00 (\$107,387.95) 0.00 %	1,834.65 BTC	\$10.68 / \$2.28 <small>\$8.40 for electricity</small>

Fig. 2. Mining Profitability.

Key factors that shape mining profitability of cryptocurrencies:

The preponderance of energy costs - the most substantial expense remains unabated. Miners in regions characterised by low costs, such as Central Asia and Scandinavia, continue to enjoy a competitive advantage.

Hardware Efficiency - new equipment have been shown to offer a 35% improvement in performance in comparison to earlier models.

Regulatory Pressure - the imposition of more stringent regulations in the US and EU has prompted a shift in the mining industry towards offshore operations or the utilisation of renewable energy sources.

Market Volatility - the price of cryptocurrency is subject to considerable fluctuations, which directly impact the revenue of mining operations, with the effect being particularly pronounced in the period following a halving event.

Network Difficulty - the number of miners joining the network increases, the difficulty of the network's operations rises concomitantly, resulting in a reduction in the individual rewards received by miners. Following the discontinuation of Ethereum mining, alternative coins such as Kaspa and Ergo have gained popularity among GPU miners.

Acquisition/Buying profitability

The period between 2021 and 2025 has seen a volatile ride for those seeking to profit from cryptocurrency investments. This period has been characterised by significant fluctuations in market value, leading to both euphoric highs and painful corrections. Concurrently, investors have exhibited a growing sophistication in their

approach to the market. The following discussion will outline the evolution of the landscape.

Mass retail entry - the market witnessed a surge of new investors, estimated at millions, who were driven by factors such as stimulus checks, the surge in popularity of meme coins, and the influence of social media.

The opportunity for high profitability is contingent upon the judicious timing of the decision to act. In the early months of 2021, investors who had purchased Bitcoin, Ethereum, and alternative cryptocurrencies such as Solana (SOL) or Dogecoin (DOGE) experienced returns in excess of 100%.

The concept of a "volatility trap" is one that is of particular interest in this context. A significant number of latecomers purchased at near all-time highs in late 2021, only to subsequently experience substantial losses during the 2022 bear market.

Top Gainers on 28.06.2025					Top Losers on 28.06.2025				
#	Name	Price	20d		#	Name	Price	20d	
65	Yala YALA	\$0.1884	+47.38%		65	Yala YALA	\$0.1884	-47.38%	
92	Wahls Finance	\$0.5175	+35.58%		92	Wahls Finance	\$0.5175	-35.58%	
91	Academy Finance	\$0.7602	+26.92%		91	Academy Finance	\$0.7602	-26.92%	
49	SM SEI	\$0.2853	+25.52%		49	SM SEI	\$0.2853	-25.52%	
12	Blooin Cash BCH	\$498.69	+17.53%		12	Blooin Cash BCH	\$498.69	-17.53%	
84	Yala JTD	\$2.09	+16.62%		84	Yala JTD	\$2.09	-16.62%	
46	Sky SKY	\$0.08009	+15.92%		46	Sky SKY	\$0.08009	-15.92%	
11	Hyperliquid HTLH	\$3704	+7.78%		11	Hyperliquid HTLH	\$3704	-7.78%	
60	SPX6900 SPX	\$1.25	+4.95%		60	SPX6900 SPX	\$1.25	-4.95%	
15	YANUS SEI LEO LEO	\$9.08	+3.38%		15	YANUS SEI LEO LEO	\$9.08	-3.38%	

Fig.3. Top Gainers and Losers. Source: <https://coinmarketcap.com>

Observing data as of today (28.06.2025) for one year long we can see the following:

Top Gainers					Top Losers				
#	Name	Price	Volume	1y	#	Name	Price	Volume	1y
146	AB AB	\$0.008296	\$134,066,070	+13098.1%	543	Memecoin MEME	\$0.001507	\$15,678,138	-92.4%
83	SPX6900 SPX	\$1.25	\$62,394,040	+8273.8%	998	NetMind Token NMT	\$0.5022	\$1,636,447	-92.1%
139	Saros SAROS	\$0.2224	\$6,970,413	+8036.3%	513	Blast BLAST	\$0.001946	\$7,842,583	-91.4%
97	Virtuals Protocol VIRTUAL	\$1.47	\$127,110,010	+4674.1%	599	Xai XAI	\$0.04943	\$9,546,751	-89.5%
225	Cheems Token CHEEMS	\$0.051432	\$4,632,468	+4534.7%	639	Omni Network OMNI	\$1.52	\$12,209,881	-89.4%
949	Sentre SNTR	\$0.02723	\$75,597.14	+1976.1%	896	PepeCoin PEPECOIN	\$0.3306	\$397,926	-88.9%
917	Everybody HOLD	\$0.001058	\$221,838	+1576.5%	298	Notcoin NOT	\$0.001759	\$17,243,616	-88.3%
395	Acet ACT	\$0.0689	\$616,068	+1480.2%	440	AltLayer ALT	\$0.02638	\$17,907,031	-85.7%
430	aura AURA	\$0.1053	\$7,162,376	+1161.5%	433	BOOK OF MEME BOME	\$0.001462	\$24,439,229	-85.5%
905	MESSIER M87	\$0.00003423	\$742,107	+989.3%	550	Dymension DYM	\$0.2241	\$5,350,051	-85.4%
649	Unipoly UNP	\$0.1943	\$971,558	+957.1%	873	Fusionist ACE	\$0.4977	\$3,743,110	-85.3%
155	Onyxcoin XCN	\$0.01481	\$17,777,791	+794.9%	847	Saga SAGA	\$0.2111	\$13,421,576	-85.2%
980	tao.bot TAOTBOT	\$0.3338	\$63,055.73	+751.4%	454	Illuvium ILV	\$10.06	\$4,152,772	-85.0%

Fig. 4. Top Gainers and Losers for one year period. Source: <https://www.coingecko.com/en/crypto-gainers-losers?time=y1>.

Comparing data from 2019 and 2025 we can see that Losers and Gainers has been changing constantly in period (2019 – 2025) and it is still unpredictable as well as six years before.

5. Cryptocurrency Volatility and Adoption

In previous research, it was indicated that the cryptocurrency volatility index was elevated for Bitcoin, with a value in excess of 10 recorded in 2021 [18]. However, an examination of the present circumstances pertaining to BTC volatility (see Figure 5) reveals that the maximum volatility index for BTC in 2021 approximated 6. The discrepancy between figures for the same volume at the same time is indicative of the absence of a universally accepted methodology for evaluating cryptocurrency volatility and other merits.



Fig. 5. Bitcoin Volatility Index. Source: <https://bitbo.io/volatility/>.

As demonstrated in Fig. 5, there has been a decline in the pick of BTC volatility, from 6 to 1.33, over the five-year period from January 2021 to January 2025. It was determined by certain analytics that the increased general adoption of cryptocurrency by businesses and merchants was the reason for the conclusion (see Fig. 6).

Estimated evaluation of Crypto currency embracing by Merchants presents on Fig. 6.

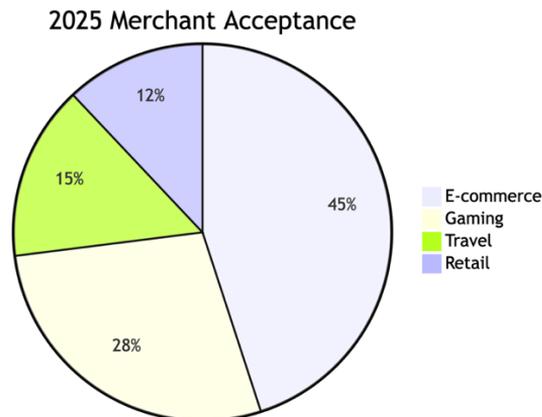


Fig. 6. Estimated evaluation of Cryptocurrency adoption by Sectors. Source: Chainalysis Merchant Adoption Report 2025; Fidelity (2025) *Staking Yields Report*; Chainalysis (2025) *Adoption Heatmaps*; <https://chat.deepseek.com>

The reasons that Businesses/Merchant are accepting Cryptocurrencies are:

Lower transaction fees - Crypto payments is often less than that of traditional credit card payments, typically amounting to less than 1%.

Faster accelerating - The processing of payments is expeditious, with no risk of chargebacks, making it an optimal solution for international commerce.

Enter to new markets - The field of crypto-currency has been shown to attract a clientele that is both technologically proficient and of an international disposition, who express a preference for digital assets.

And there is one more evidence that Cryptocurrency is adopted as new form of digital assets.

The distribution of supported cryptocurrency by leading merchants is outlined in Table 3.

Table 3. Supported Cryptocurrency by Top Merchant

Sector	Top merchant	Supported Cryptocurrency									
		BTC	ETH	LTC	BCH	DOGE	SLP	USDT	BNB	STRK	SOL
E-commerce	Newegg	✓	✓	✓							
	Shopify	✓	✓			✓					
	Overstock	✓	✓	✓	✓						
Travel, Hotels	Travala	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Expedia	✓						✓	✓		
Retail	Whole Foods	✓		✓		✓					
	Loblaws	✓		✓		✓					
Gaming	Axie Infinity		✓				✓				
	Star Atlas									✓	✓
Airlines	AirBaltic	✓	✓	✓							
	CheapAir	✓	✓	✓							
Services	AT&T	✓	✓					✓			
	Microsoft	✓	✓					✓			
	ExpressVPN	✓	✓					✓			

After tracking sources of volatility from Table 1 it was revealed how volatility patterns have changed (2021–2025):

The phenomenon of boom-and-bust cycles remains extant, albeit with new rhythms. The prevailing crypto cycle – characterised by a sequence of events that typically unfolds in this order: a surge in the value of Bitcoin, a season in which altcoins generally perform well, and subsequently a period of correction – remains in force. However, the temporal parameters and the magnitude of these occurrences are now more variable and difficult to predict.

Greater institutional influence: Since 2021, major institutional investors such as BlackRock and Fidelity have entered the market, which has served to reduce market fluctuations during periods of growth but to exacerbate them during economic downturns.

It is evident that there is a stronger correlation with traditional markets. The present study explores the increased correlation between crypto assets and equities during global risk events (e.g. inflation spikes, rate hikes), thereby reducing their perceived appeal as "uncorrelated assets".

The advent of derivatives and algorithmic trading has had a considerable impact on the field. Recent developments in the field of crypto-options and futures markets have precipitated a paradigm shift in the dynamics of financial volatility. This transition has given rise to a novel class of financial risks, encompassing sudden liquidations and flash crashes, among others.

The following factor has been identified as having a significant impact on volatility.

Regulatory uncertainty - Price volatility has been observed to occur in response to regulatory announcements made by the U.S. SEC, EU, and China. These price fluctuations have been particularly pronounced in contexts pertaining to the approval or rejection of ETFs (Exchange-Traded Funds).

The role of social media and sentiment in financial markets - Social media platforms such as Twitter and Reddit, along with the influence of prominent individuals in the digital landscape, have been observed to trigger spontaneous surges in market volatility. These fluctuations frequently exhibit a disconnect from fundamental economic factors.

Recent technological advancements have been a subject of considerable interest.

The phenomenon of liquidity fragmentation has resulted in a situation where the liquidity on smaller cryptocurrency exchanges or alternative coins has been found to be deficient. This has given rise to the possibility of price manipulation, especially during off-peak hours.

It is postulated that speculation and leverage have a significant impact on market fluctuations. High leverage trading, particularly on offshore platforms, has precipitated cascading liquidations, thereby exacerbating price drops. Concerns regarding inflation, alterations in interest rates, and geopolitical tensions have rendered crypto more susceptible to fluctuations in global risk sentiment.

6. Cryptocurrency Regulation

The cryptocurrency industry has experienced considerable turbulence in recent years. It experienced significant market volatility and substantial price collapses, including the 2021-2022 crypto winter and Bitcoin plunge, the collapse of Terra-Luna and FTX, mounting regulatory pressures, and widespread global bans [22]. Historically, cryptocurrency has been excluded from underwriting frameworks due to its volatility, regulatory uncertainty, and the inability to easily verify reserves, as exemplified by Bitcoin.

In 2025, countries continue to adopt Bitcoin for a combination of strategic, economic, and opportunistic reasons. The contemporary focus is no longer solely on curiosity; it is now about sovereignty, diversification and leverage (Fig.7).

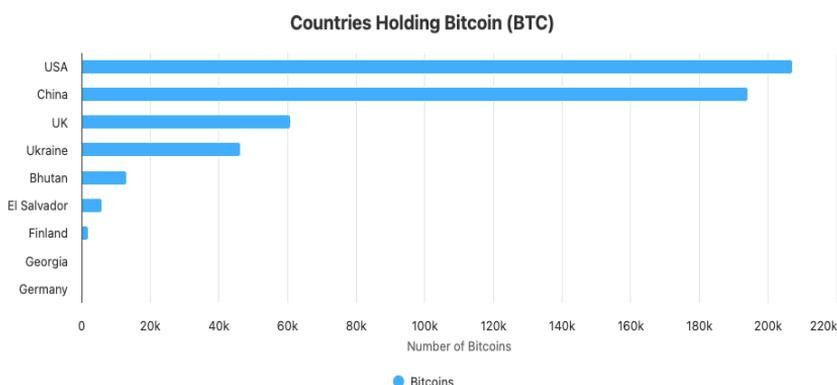


Fig. 7. Countries Holding Bitcoin. Source: [24]

In comparison to previous works [17, 18], there have been significant changes in the regulatory environment for cryptocurrency. These developments are largely influenced by the United States' strategic approach of recognising cryptocurrency as

a form of reserve asset. The current state of cryptocurrency legality in selected countries is demonstrated in Table 4.

Table 4. Cryptocurrency legality in selected countries (in alphabet order)

Country	Cryptocurrency Regulation
Australia	Australia has a comprehensive legal framework for cryptocurrencies. The Australian Securities and Investments Commission (ASIC) regulates digital asset businesses, and the government partners with blockchain firms to ensure compliance while fostering growth. Australia also offers a regulatory sandbox for crypto firms, and has progressive tax policies that benefit crypto traders and investors.
Bermuda	Crypto-friendly Bermuda is home to the Bermuda Monetary Authority (BMA), which provides regulatory guidance and favourable tax policies for blockchain businesses. It also collaborates with fintech firms to foster crypto adoption and offers blockchain courses.
Canada	Canada's blockchain ecosystem is robust and Bitcoin ETFs are allowed. Banks like Scotiabank and RBC provide services to crypto businesses and the country's tax policies are favourable for long-term investors.
China	Crypto payments banned although China is the largest bitcoin mining and holding state (Fig.7).
European Union	MiCA Phase 2 implementation
Hong Kong	Project Ensemble Sandbox explores asset tokenisation and government funds encourage Web3 entrepreneurship. Hong Kong's financial infrastructure and access to global markets make it a prime location for crypto enterprises.
India	Positioned to create a sovereign Bitcoin strategy
Japan	Licensed Exchanges
Panama	Regulatory clarity in the digital asset space and AML compliance requirements are developing. Panama does not impose capital gains tax on crypto transactions, making it an attractive location. Its reputation in the crypto space is growing.
Russia	Involving Crypto Ruble; Permitted mining and trading; considering to count Cryptocurrency as Newer Form of Digital Property.
Singapore	Singapore's Monetary Authority (MAS) regulates digital assets under the Payment Services Act, ensuring clarity and security. Blockchain programmes are offered by universities like NUS and SMU, while events like Blockchain Week help to develop industry knowledge. Low capital gains tax on crypto transactions makes Singapore an attractive destination for blockchain start-ups.
Switzerland	The Swiss Financial Market Supervisory Authority (FINMA) provides guidance for Initial Coin Offerings (ICOs) and crypto businesses. Switzerland also offers favorable tax policies for crypto investors.
The Cayman Islands	The Virtual Asset (Service Providers) Act provides clear licensing rules and guidance for AML/CFT compliance, and there are no direct taxes on cryptocurrency transactions. The jurisdiction offers regulatory clarity through its VASP framework and banking, IT and telecommunications support. The many crypto firms and hedge funds that choose the Cayman Islands are there because of tax benefits and the business-friendly environment.
United Arab Emirates (UAE)	The Dubai Virtual Asset Regulatory Authority (VARA) has a well-defined framework for digital assets, and has launched several crypto-friendly free zones, such as the Dubai Multi Commodities Centre (DMCC), and offers crypto education at Khalifa University. With no personal income tax and business-friendly regulations, the UAE is a top choice for crypto entrepreneurs.

Source: Author's compilation based on [22]; Central Banks websites.

The Federal Housing Finance Agency (FHFA) is evaluating whether Bitcoin holdings might count toward qualifying for a US home mortgage. And Head of the FHFA, announced in June 2025, that the agency will: “study the usage of cryptocurrency holdings as it relates to qualifying for mortgages” [23]. Cryptocurrency regulation in the U.S. presents significant challenges due to its fragmented nature, requiring businesses to comply with a complex framework of overlapping and, at times, conflicting federal and state laws [24].

During India’s G20 presidency in 2023, the national spokesperson for India’s ruling party noted, the government helped coordinate a crypto working group with the International Monetary Fund. However, other nations are already racing ahead. Bhandari said that while recommendations will take their due course, jurisdictions like Russia, China, Brazil and other G20 nations led by the US are not pausing their crypto efforts to wait for a consensus. He also cited the US government’s plan to expand its BTC reserves with budget-neutral purchases and pointed to three US states that already authorized Bitcoin as a reserve asset [25].

The national spokesperson for India’s ruling party said the US strategic Bitcoin (BTC) reserve and Bhutan’s state-led mining operations signal that global finance is shifting toward crypto. He added that India, with an expanding renewable energy infrastructure, is positioned to create a sovereign Bitcoin strategy. “This isn’t a reckless pivot,” Bhandari wrote: “It’s a calculated step toward embracing digital assets’ legitimacy.” But in India Crypto assets are taxed but unregulated. Despite this Indian government has imposed a 30% flat rate tax on virtual digital assets (VDAs) like BTC and ETH. India leader think that clear regulation could bring transparency and oversight to the emerging asset class and enable innovation while protecting investors. [25]. But despite on uncertainty of cryptocurrency official regulation, some countries hold cryptocurrency, e.g. Bitcoin (BTC) (Fig.7).

From 01.09.2026, Crypto Ruble is planned to be introduced in Russia. Bank of Russia named Crypto Ruble as the digital national currency. Bank of Russia declared [26] that Crypto Ruble will be issued by the Bank of Russia. If Bank of Russia issues Crypto Ruble he will control all of transaction with it. And on the one hand there is no single center for Crypto Ruble but on another hand Crypto Ruble is a national means of payment, a form of Russian national currency.

The value of Russians’ holdings in crypto assets exceeded 2 trillion rubles (\$25.4 bln) by the end of the first half of 2025, CEO of the mining data center operator GIS Mining Vasily Giryva said in an interview with TASS during the St. Petersburg International Economic Forum (SPIEF-2025) [27]. As soon as the ruble start enjoying demand, it would be needed for a bitcoin holder to be interested in having the digital ruble [28].

Russian Federal Law No. 259-FZ of 31 July 2020 (as amended on 28 December 2024), 'On Digital Financial Assets, Digital Currency, and Amendments to Certain Legislative Acts of the Russian Federation', legalises cryptocurrency mining and permits the circulation of foreign digital rights in Russia and Russian digital rights abroad. This law prohibits the use of cryptocurrencies for settlements in the Russian Federation, but specifies that this rule does not apply to currency mined by Russian miners. The law introduces a ban on advertising cryptocurrency, as well as goods, works and services, for the purpose of organising the circulation of cryptocurrency. The document permits the trading of foreign digital financial assets on Russian blockchain platforms [29].

The Markets in Crypto-Assets Regulation (MiCA) in the EU has a phased implementation, with the initial phase starting on December 30, 2024. For Crypto-Asset Service Providers (CASPs) operating within the EU, the deadline for achieving full MiCA compliance has been updated to June 30, 2025. This means CASPs have a transitional period of 12 to 18 months to align with the new regulations, depending on their specific jurisdiction [30].

The year 2025 marked a significant turning point in the legal landscape of cryptocurrency, ushering in a new era characterised by both global clarity and divergence in the regulatory framework. While a considerable number of countries have adopted digital assets with structured regulations, others continue to impose strict limitations or outright bans.

7. Conclusions

To sum up, the synthesis reveals a profitability-volatility paradox: assets with highest merchant adoption (STRK) show inverse volatility patterns, challenging author's [18] volatility models. This demands new GARCH formulations incorporating utility metrics. The 2021 volatility-profitability paradox has resolved through utility-driven stability.

Author concludes the tracking result since previous researches [17, 18, 19] as following: Mining profitability decreased due to halving/energy costs; volatility index decreased due to institutional entry and merchant adoptions; mining time increased due to energy limitations. In summary, the profitability of acquiring crypto assets has reached a state of maturity. The focus has shifted from the initial hype to the development of effective strategies, the optimal timing of transactions, and the conducting of thorough research. Cryptocurrency legality has changed globally in 2025. Some countries have regulated digital assets, while others have banned them.

Future research might be done in Google Sheets using Google Apps Script (JavaScript-based and running in the browser) or by an external script (Python, etc.) that updates the sheets via the Google Sheets API. This process needs a Google Apps Script configured to run periodically using triggers.

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Aims and Objectives

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The principal ambition of this periodical is the efficacious propagation of original insights and outcomes derived from human cerebral activity and exemplified in scholarly treatises through the utilisation of contemporary information and digital technology.

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