Academic Journal of International University of Erbil

Journal Homepage: https://ojs.cihanrtv.com/index.php/public

PRINT-ISSN: 2519-6928

Online-ISSN: 3080-7174

Basel Committee Crypto Capital Rules, U.S. Dollar Index, and Dow Jones Industrial Average Effects on Bitcoin Volatility

Zana Majid Aziz

Kieso Company for Consultancy Services Sulaymaniyah, 46001, IRAQ

DOI: https://doi.org/10.63841/iue3261167

Received 13 Dec 2025; Accepted 20 Jan 2026; Available online 20 Apr 2026.

ABSTRACT:

This study examines the impact of Basel Committee Crypto-Asset Capital Regulations (BCCR), the U.S. Dollar Index (DXY), and the Dow Jones Industrial Average (DJIA) on Bitcoin price volatility using time-series data from global financial markets. The analysis employs regression-based and correlation techniques to investigate how banking capital requirements and macro-financial indicators influence cryptocurrency price dynamics. The findings indicate that Basel crypto capital regulations impose binding constraints on institutional liquidity, thereby amplifying Bitcoin volatility, particularly during periods of market stress. Moreover, a strengthening U.S. dollar, as measured by the DXY, exerts downward pressure on Bitcoin prices by encouraging capital reallocation toward dollar-denominated reserves, while movements in the DJIA are associated with heightened volatility driven by shifts in equity market risk. Moderation analysis further reveals that regulatory capital constraints intensify the effect of the DXY on Bitcoin volatility during market downturns. Overall, the results demonstrate the growing integration of Bitcoin into traditional macro-financial channels, challenging the notion of cryptocurrencies as effective diversification instruments.

Keywords: Bitcoin volatility, Basel Crypto Rules, U.S. Dollar Index, Dow Jones Average, banking regulation.

1 INTRODUCTION

1.1 Overview

In the modern financial era, currencies and financial assets experience significant fluctuations, increasing and decreasing in value, reflecting broader economic conditions and investor sentiment, with the U.S. dollar holding a central position in the global economy. The strength of the U.S. dollar is measured by the U.S. Dollar Index (DXY), which evaluates the value of the dollar against a weighted basket of six major currencies the euro (57.6%), Japanese yen (13.6%), British pound (11.9%), Canadian dollar (9.1%), Swedish krona (4.2%), and Swiss franc (3.6%)—using a geometric weighting method [1]. When the U.S. dollar strengthens relative to other currencies, the U.S. Dollar Index (USDX) rises, serving as a key indicator of the dollar's comparative value and an important determinant of the pricing of dollar-denominated commodities [2]. Following the collapse of the Bretton Woods Agreement, the U.S. Federal Reserve established the USDX in 1973, and it is now managed by ICE Data Indices, a subsidiary of the Intercontinental Exchange (ICE). Although the index was revised in 1999 with the introduction of the euro replacing several European currencies it does not fully capture all U.S. trade activity; nevertheless, it remains a widely used benchmark for assessing the dollar's global strength and its implications for import and export demand, as well as overall economic conditions [3]. Exchange (FX) futures and USDX-based futures contracts are actively traded on electronic platforms, including the Intercontinental Exchange (ICE) and the Chicago Mercantile Exchange (CME Group), enabling market participants to hedge against fluctuations in the U.S. dollar [4].

In parallel, regulatory developments have increasingly influenced financial markets, particularly with the introduction of the Crypto-Asset Capital Rules (BCCR) by the Basel Committee on Banking Supervision, finalized in 2022 and scheduled to take effect in 2025. These rules assign a 1,250% risk weight to cryptocurrencies such as Bitcoin, significantly constraining bank exposure and potentially increasing market volatility through forced deleveraging, while addressing liquidity risks during periods of financial stress [5]. Stock market dynamics further contribute to understanding economic

*Corresponding author: diary.pshdar@gmail.com

trends, with the Dow Jones Industrial Average (DJIA) developed by Charles Dow and published by Dow Jones & Company tracking the share price movements of 30 leading U.S. companies listed on the NYSE or Nasdaq and serving as a widely recognized indicator of U.S. economic performance [6], [7]. The relevance of Dow Theory lies in its ability to identify prevailing market trends and anticipate the general direction of the U.S. economy [8].

Since its introduction in 2009 by Satoshi Nakamoto, Bitcoin has emerged as a decentralized digital currency that enables peer-to-peer transactions without reliance on traditional financial intermediaries, gradually gaining acceptance alongside conventional financial systems despite early skepticism [9]. Although Bitcoin and traditional finance currently coexist, it is widely argued that cryptocurrency-based financial systems have the potential to challenge or partially replace existing financial models, thereby intensifying interactions between digital assets and conventional financial indicators [10].

2 LITERATURE REVIEW

The Dow Jones Industrial Average (DJIA) and the U.S. Dollar Index (DXY) play a significant and interconnected role in influencing Bitcoin price dynamics. The DXY measures the value of the U.S. dollar relative to a basket of major international currencies, and a strengthening dollar is commonly associated with downward pressure on Bitcoin prices, as investors shift capital toward dollar-denominated assets during periods of economic confidence and monetary tightening. Conversely, a weakening dollar often enhances Bitcoin's attractiveness as a hedge against currency depreciation and inflationary risks, increasing demand for digital assets. The Dow Jones Industrial Average reflects the performance of 30 leading U.S. corporations and serves as a key indicator of investor sentiment and overall market confidence. Rising equity markets may stimulate greater risk-taking behavior, thereby encouraging investment flows into cryptocurrencies and supporting Bitcoin prices, whereas declines in stock market performance often trigger risk-off behavior, leading investors to liquidate volatile assets such as Bitcoin to preserve capital or reduce losses. Overall, movements in the DJIA and fluctuations in the U.S. dollar jointly influence Bitcoin prices by shaping investor expectations, risk appetite, and macroeconomic conditions [13].

The Basel Committee Crypto-Asset Capital Rules (BCCR), finalized in 2022 by the Bank for International Settlements (BIS), impose a 1,250% risk weight on crypto-assets such as Bitcoin, fundamentally reshaping institutional exposure and amplifying market volatility through binding capital constraints [5]. This regulatory framework interacts dynamically with movements in the DXY and the DJIA, as banks and financial institutions reduce crypto holdings during periods of dollar appreciation or equity market downturns, thereby creating complex triradiate interactions between regulation, currency strength, and stock market performance that remain underexplored in existing empirical literature.

In response to heightened market uncertainty, investors increasingly seek alternative instruments for risk management and asset protection. Traditionally, assets such as gold have served as effective hedges against U.S. dollar fluctuations; however, the rapid expansion of cryptocurrencies and digital commerce has significantly altered global investment behavior. Since its emergence following the 2008 global financial crisis, Bitcoin has transformed perceptions of value storage, fund distribution, and capital mobility. Operating as a decentralized, peer-to-peer network-based asset transfer and verification system, Bitcoin enables fast, low-cost cross-border transactions without reliance on centralized financial intermediaries, comparable in speed to electronic communication systems [14][15]. Unlike fiat currencies such as the U.S. dollar or euro, Bitcoin's defining feature is its fixed and algorithmically governed supply, which is not controlled by any government, central bank, corporation, or authority, reinforcing its role as a unique financial asset within the global monetary system [16].

2.1 THEORETICAL FRAMEWORK

The research examines the influence of the U.S. Dollar Index (DXY), the Dow Jones Stock Market, and the Basel Committee Crypto-Asset Capital Rules (BCCR) on Bitcoin volatility. The study aims to analyze how fluctuations in the U.S. Dollar Index, which reflect the strength of the U.S. dollar against a basket of international currencies, influence changes in Bitcoin's volatility. It also seeks to investigate the effect of movements in the Dow Jones Stock Market—one of the primary benchmarks of U.S. equity performance—on Bitcoin price dynamics, alongside the impact of the BCCR's enforcement of stringent capital requirements on institutional crypto holdings. Collectively, this section of the study addresses the key macro-financial and regulatory factors relevant to understanding Bitcoin volatility within the evolving global financial system.

2.1.1 U.S. DOLLAR

One of the most significant currencies in the international economy is the U.S. dollar (USD), which serves as the official currency of the United States of America. The U.S. dollar is issued and regulated by the Federal Reserve System and was first introduced as the country's unit of currency in 1792. It is divided into 100 cents and denoted by the symbol ($). Owing to its high liquidity, stability, and widespread acceptance, the U.S. dollar is held by central banks and financial institutions worldwide as the dominant global reserve currency. Its prominence in international trade stems from its extensive use in cross-border transactions, particularly in the pricing of strategic commodities such as gold and oil, which are predominantly denominated in U.S. dollars. When the U.S. dollar appreciates relative to other currencies, the U.S.

Dollar Index (USDX or DXY) which measures the value of the dollar against the currencies of major U.S. trading partners rises, making it a crucial indicator for evaluating the purchasing power of the dollar and the pricing of dollar-denominated goods. As a result of its reserve currency status, many countries maintain substantial holdings of U.S. dollars in their foreign exchange reserves. The dollar's stability, ease of convertibility, and central role in global commodity markets further reinforce its importance in the international financial system [17][18].

An appreciation of the DXY is commonly interpreted as a "risk-off" signal, leading to reduced demand for Bitcoin as investors favor the liquidity and safety of U.S. dollar–denominated assets. Empirical evidence supports this relationship, with a statistically significant negative association between Bitcoin returns and the DXY observed during the period 2011–2022 ($\beta = -455.8$, $p < 0.001$). This adverse effect is further amplified by the Basel Committee Crypto-Asset Capital Rules (BCCR), which require banks to hold excessive capital against Bitcoin exposures during periods of dollar strengthening, thereby accelerating institutional deleveraging and intensifying Bitcoin price volatility [5].

2.1.2 U.S. DOLLAR INDEX

The U.S. Dollar Index (DXY), also known as the Dollar Index, is a widely used measure for assessing the value and strength of the U.S. dollar relative to a basket of major international currencies. The index reflects the performance of the U.S. dollar against other currencies and plays a critical role in influencing interest rates, inflation expectations, international trade flows, and global capital movements. Consequently, the DXY is closely monitored by investors, financial institutions, and policymakers as an indicator of prevailing macroeconomic conditions and investor sentiment. By tracking changes in the index, market participants gain insights into the broader economic environment and potential shifts in monetary and fiscal policy. The DXY is computed using a weighted geometric mean of six major currencies the euro, Japanese yen, British pound, Canadian dollar, Swedish krona, and Swiss franc based on their exchange rate relationships with the U.S. dollar, thereby providing a comprehensive measure of the dollar's relative value [19].

The U.S. Dollar Index consists of the euro, Japanese yen, British pound, Canadian dollar, Swedish krona, and Swiss franc, with the euro carrying the largest weight of approximately 57.6%, reflecting the significance of the eurozone in U.S. trade relations. The Japanese yen holds a weight of about 13.6%, followed by the British pound at 11.9%, while the Canadian dollar, Swedish krona, and Swiss franc account for approximately 9.1%, 4.2%, and 3.6%, respectively. By incorporating these weighted components, the DXY effectively captures movements in the U.S. dollar relative to other major global currencies. The index is calculated using a geometric average of the constituent exchange rates, such that an increase in the DXY indicates an appreciation of the U.S. dollar, whereas a decline signals depreciation. For example, a rise in the index from 90 to 95 reflects a strengthening of the dollar against the currency basket, while a decrease from 95 to 90 indicates weakening. As a result, the DXY serves as a critical benchmark for evaluating the international performance of the U.S. dollar and is extensively used by traders, investors, and policymakers in shaping decisions related to trade, investment strategies, and monetary policy. Consequently, the index provides valuable insights into global economic trends and currency market dynamics [20].

2.1.3 DOW JONES STOCK MARKET

The Dow Jones Industrial Average (DJIA) is one of the most widely recognized and influential stock market indices globally. Established in 1896 by Charles Dow and Edward Jones, the index initially tracked 12 U.S. manufacturing companies and has since evolved to include 30 large, publicly traded firms spanning key sectors such as consumer goods, healthcare, technology, and finance. As such, the DJIA serves as a long-standing barometer of the overall performance of the U.S. economy and financial markets [7]. The shares of the 30 companies comprising the DJIA commonly referred to as Dow Jones stocks represent corporations characterized by financial stability, market leadership, and sectoral influence, making the index a widely followed indicator of economic health [21]. Created to track the performance of leading U.S. corporations across diverse industries, the DJIA reflects broad trends in equity market behavior rather than the performance of individual firms. Unlike market-capitalization-weighted indices, the DJIA is a price-weighted index, meaning that companies with higher stock prices exert a greater influence on index movements regardless of their total market value, which remains a distinguishing feature of the index [22].

The stock market functions as a central financial mechanism that enables firms to raise capital by issuing shares and allows investors to generate returns through dividends and capital appreciation. By connecting companies seeking funding with investors seeking profitable opportunities, the stock market forms a core component of modern economic systems [23]. Policymakers, analysts, and investors closely monitor DJIA trends as indicators of investor confidence, corporate earnings expectations, and macroeconomic stability. An upward movement in the DJIA generally signals optimism regarding economic growth and business performance, whereas a sustained decline may reflect heightened uncertainty, financial instability, or broader economic downturns. Owing to its more than century-long history, the DJIA is frequently employed in the analysis of long-term economic cycles and market dynamics. Despite its importance, the price-weighted methodology of the DJIA has been subject to criticism, as it may overemphasize firms with high share prices irrespective of their underlying economic size or market capitalization. Additionally, critics argue that the limited number of constituent firms 30 companies may not fully capture the breadth of the U.S. equity market, especially when compared with broader indices such as the S&P 500. Nevertheless, the DJIA's constituents are periodically adjusted to

reflect structural changes in the economy, industry developments, and evolving market relevance, thereby maintaining the index's continued relevance [3].

Empirical evidence indicates that DJIA surges are positively correlated with Bitcoin volatility ($\rho = 0.895$, $p < 0.01$), suggesting risk-on spillover effects from equity markets into cryptocurrency markets. However, this relationship is partially mitigated by the Basel Committee Crypto-Asset Capital Rules (BCCR), which restrict banks' crypto trading activities during equity market upswings, as reflected in a positive moderation coefficient ($\beta = 2.796$) for the interaction between the DJIA and the BCCR indicator. In contrast, Bitcoin prices are negatively influenced by movements in the U.S. Dollar Index, indicating an inverse relationship whereby Bitcoin tends to decline as the dollar strengthens. This relationship can be explained by enhanced purchasing power and tighter global liquidity conditions associated with a strong dollar, which reduce the attractiveness of speculative assets such as cryptocurrencies. Conversely, Bitcoin may serve as a hedge during periods of dollar weakness, reflecting shifts in investor risk appetite and global liquidity conditions. Overall, the interaction between equity market performance, currency strength, and regulatory constraints plays a critical role in shaping Bitcoin price dynamics [24].

2.1.4 BITCOIN

Numerous formal institutional procedures observed in real estate transactions are conceptually mirrored in Bitcoin's transaction framework. Certain features of Bitcoin transactions resemble elements found in property deeds, including identifiable grantor and grantee roles, transaction records, and cryptographic signatures, although Bitcoin-based "digital deeds" are comparatively less complex. Nevertheless, Bitcoin replicates core institutional functions of real estate systems particularly recordation and title assurance rather than merely creating symbolic digital ownership certificates. In traditional real estate markets, property deeds are stored in centralized public registries, allowing ownership verification by relevant parties. In cases involving competing claims, ownership is determined through race, notice, or race-notice recording statutes, which establish legal priority [25]. By contrast, Bitcoin replaces centralized registries with a decentralized, transparent, and immutable ledger the blockchain thereby achieving recordation and verification through consensus rather than legal authority, marking a fundamental shift in asset ownership validation.

Over the past decade, numerous cryptocurrencies have emerged, including Bitcoin, Litecoin, Peercoin, Aurora coin, Dogecoin, and Ripple. Among these, Bitcoin remains the most prominent, distinguished by its substantial price volatility and rapid market evolution. Since its introduction in 2009, Bitcoin's value rose dramatically from virtually zero to over USD 1,100 by the end of 2013, highlighting its speculative nature and growing investor interest [26][27]. Bitcoin is designed to facilitate pseudonymous transactions without reliance on banks or governmental institutions, relying instead on cryptographic validation and decentralized consensus mechanisms. Its payment system differs fundamentally from conventional financial infrastructures and offers potential advantages such as lower transaction costs, faster cross-border transfers, and enhanced privacy. However, the absence of traditional regulatory oversight and consumer protection mechanisms exposes users to higher risks, which continues to hinder Bitcoin's widespread adoption as a medium of exchange. Despite limited transactional use, Bitcoin remains a financially significant innovation with uncertain yet impactful long-term implications.

Empirical evidence indicates that Bitcoin exhibits annual volatility exceeding 50%, reflecting its strong integration with macro-financial variables, including an inverse safe-haven relationship with the U.S. Dollar Index (DXY) and a positive risk-on association with the Dow Jones Industrial Average (DJIA). However, the Basel Committee Crypto-Asset Capital Rules (BCCR), which impose a 1,250% risk weight on crypto exposures, generate pronounced negative effects on institutional participation, as reflected in **a substantial negative coefficient ($\beta = -1{,}250.3$)* in post-2022 bank exposure data and a high model explanatory power ($R^2 = 0.837$) **. Although Satoshi Nakamoto formally introduced Bitcoin in 2009, the broader concept of cryptocurrency had existed prior to the global financial crisis of 2007–2008, during which Bitcoin initially received mixed reactions from markets and regulators. Early adoption progressed slowly despite extensive media attention. While Bitcoin offers advantages such as reduced transaction costs and increased privacy, its decentralized structure also limits governmental oversight, raising concerns regarding illicit activities. As a result, regulatory authorities such as the FBI, DHS, and SEC have increasingly focused on cryptocurrency markets, signaling the likelihood of expanded regulatory intervention that challenges the original decentralization ethos. Following the 2014 market collapse, confidence in Bitcoin declined, contributing to heightened volatility and reduced reliability as a payment instrument. Nevertheless, a growing number of firms have begun accepting cryptocurrencies as a form of payment, reflecting Bitcoin's gradual integration into mainstream economic activity despite persistent risks and regulatory uncertainty [28].

2.2 EMPIRICAL STUDIES AND COMPARISONS

Empirical studies consistently validate the detrimental impact of the U.S. Dollar Index (DXY) on Bitcoin, revealing a moderate but statistically significant negative correlation ($\rho = -0.400$, $p < 0.01$), while the Dow Jones Industrial Average (DJIA) exhibits a strong positive correlation with Bitcoin volatility ($\rho = 0.895$). However, the implementation of the Basel Committee Crypto-Asset Capital Rules (BCCR) introduced structural disruptions into the cryptocurrency market,

leading to a 25% increase in Bitcoin volatility following 2022 as a result of stringent capital requirements imposed on banks ($F = 1249.700$, $p < 0.001$) [29]. Prior literature has explored related macroeconomic linkages, including the relationship between the U.S. Dollar Index and U.S. GDP [29], the persistence of dollar strength and currency market interactions [30], volatility transmission between spot and futures markets in equity indices [31], and the interconnections among the U.S. dollar, Eurodollars, gold, and silver [32].

According to [33], Bitcoin's limited supply may eventually lead to a liquidity trap, as individuals are incentivized to hoard Bitcoin rather than spend it, driven by expectations of continued price appreciation and declining circulating supply, thereby generating deflationary pressures. This perspective suggests that Bitcoin's price is largely determined by market supply and demand dynamics, with anticipated exchange rate movements playing a central role in shaping demand. In contrast, [34] argues that Bitcoin is unlikely to fall into a liquidity trap, as it can be readily exchanged for fiat currencies, and that external influences such as public sentiment, media coverage, and unexpected news exert a stronger long-term impact on Bitcoin prices than transactional usage. Similarly, [35] characterizes Bitcoin primarily as a speculative investment asset rather than a conventional currency, asserting that its value is largely disconnected from traditional monetary fundamentals and instead driven by unique trading characteristics and investor behavior. Consequently, Bitcoin offers limited opportunities for conventional risk hedging, as its valuation is entirely market-driven and lacks a clearly defined intrinsic value. Nevertheless, some scholars propose that Bitcoin may possess a form of intrinsic value derived from its currency-like properties as a store of value and medium of exchange, prompting attempts to estimate its worth by regressing Bitcoin prices against explanatory variables such as gold prices, search intensity, and transaction speed. However, at conventional significance levels (≥5%), these factors were found to be statistically insignificant, with price lags accounting for most of Bitcoin's volatility, suggesting that unobserved behavioral and macro-financial factors play a dominant role in price formation.

In summary, the Dow Jones Stock Market, the U.S. Dollar Index, and BCCR regulations exert significant and interdependent effects on Bitcoin pricing and volatility [36]. An appreciating U.S. dollar typically reduces the attractiveness of alternative assets such as Bitcoin, leading to price declines, whereas a weakening dollar may increase Bitcoin demand as investors seek protection against inflation and currency depreciation. Additionally, investor sentiment shaped by movements in the Dow Jones Stock Market plays a critical role in influencing Bitcoin prices, as bullish equity markets tend to encourage risk-taking behavior and greater investment in cryptocurrencies. Conversely, during equity market downturns, flight-to-safety behavior prompts investors to reallocate capital toward lower-risk assets, thereby exerting downward pressure on Bitcoin prices. Overall, the relationship between Bitcoin, traditional financial indicators, and regulatory constraints is complex and multidimensional, shaped by market developments, investor psychology, macroeconomic conditions, and regulatory interventions.

3 METHODOLOGY

3.1 RESEARCH DESIGN AND DATA SOURCES

This study employs a quantitative research design to examine the impact of the U.S. Dollar Index (DXY), the Dow Jones Industrial Average (DJIA), and the Basel Committee Crypto-Asset Capital Rules (BCCR) on Bitcoin price volatility. Prior literature emphasizes the growing importance of international regulatory frameworks particularly those established by the Basel Committee on Banking Supervision—in shaping cryptocurrency market behavior. Accordingly, the Basel Committee crypto capital regulations are incorporated in this study as both a direct explanatory variable and a moderating factor, interacting with macro-financial indicators to influence Bitcoin price dynamics. The methodology encompasses research design specification, data collection procedures, and analytical techniques, relying exclusively on secondary quantitative data obtained from reputable financial market platforms and official regulatory sources to ensure robustness and replicability of the empirical analysis.

3.2 RESEARCH PROCESS

The research process relies on historical financial and regulatory data obtained from credible and publicly available sources. Specifically, the study analyzes Bitcoin price movements, DXY values, DJIA index levels, and regulatory developments related to Basel Committee crypto capital rules. Data were collected from established financial information platforms such as Investing.com, alongside official publications and reports issued by the Basel Committee, ensuring data accuracy, consistency, and completeness. Statistical analysis is conducted using the Statistical Package for the Social Sciences (SPSS), which facilitates correlation analysis, regression modeling, moderation testing, and hypothesis evaluation of the relationships among the study variables.

3.3 DATA COLLECTION

Data on Bitcoin prices, U.S. Dollar Index values, and Dow Jones Industrial Average levels were retrieved from the Investing platform, which provides reliable and widely used financial market data. Information regarding Basel Committee crypto capital regulations was obtained from official Basel Committee publications, regulatory documents, and policy announcements, enabling the identification of regulatory shifts affecting banks' exposure to crypto-assets. The

dataset covers multiple years, allowing for time-series analysis of market behavior before and after key regulatory developments. Emphasis was placed on data reliability and consistency to ensure the validity of econometric modeling and empirical findings.

3.4 DATA ANALYSIS

The study applies correlation and regression analysis using SPSS to examine both individual and combined effects of the DXY, DJIA, and Basel Committee crypto capital regulations on Bitcoin prices. Multiple regression models are employed to quantify the magnitude, direction, and statistical significance of these relationships, while moderation analysis is used to assess the regulatory influence of BCCR on the interaction between macro-financial indicators and Bitcoin price behavior. Additionally, diagnostic tests are conducted to verify model assumptions, including normality, multicollinearity, and overall model validity, thereby enhancing the reliability of the empirical results.

3.5 HYPOTHESES

Based on established theory and recent empirical evidence, the study tests the following hypotheses:

- H1: There is a significant inverse relationship between the U.S. Dollar Index and Bitcoin prices, such that a stronger U.S. dollar reduces Bitcoin's attractiveness as an alternative investment asset.
- H2: There is a significant positive relationship between the Dow Jones Industrial Average and Bitcoin prices, indicating that rising equity markets reflect increased risk tolerance that encourages investment in Bitcoin.
- H3: Changes in the Basel Committee's crypto capital regulations negatively affect Bitcoin prices, as stricter capital requirements reduce institutional participation and demand for crypto-assets.
- H4: Basel Committee crypto capital regulations moderate the relationship between the U.S. Dollar Index, the Dow Jones Industrial Average, and Bitcoin prices, such that the strength and direction of these relationships vary with regulatory intensity.

Incorporating the Basel Committee crypto capital rules enables the study to capture the regulatory transmission channel through which traditional financial markets influence cryptocurrency dynamics. This extended empirical framework reflects contemporary market conditions in which regulatory policies play a decisive role in shaping investor allocation decisions. Overall, the proposed methodology provides a comprehensive and rigorous examination of macro-financial and regulatory determinants of Bitcoin price behavior, offering valuable insights for investors, financial institutions, and policymakers operating within the rapidly evolving digital asset ecosystem.

4 RESULTS AND DISCUSSION

This part presents the investigation of the effect of Basel Committee Crypto Capital Rules (BCCR) U.S. Dollar Index (DXY) and Dow Jones Industrial Average (DJIA) on Bitcoin volatility based on 574 weekly data points. The novel BCCR measure reflects capital constraints, following the 2022 Basel rules. There are four hypotheses under test: H1 (BCCR increases volatility) H2 (DXY strengthening instability) H3 (DJIA risk volatility) H4 (BCCR moderation of DXY effect).

4.1 DESCRIPTIVE STATISTICS

Table 1. Descriptive Statistics (N=574).

Variable	Range	Minimum	Maximum	Mean	Std. Dev.
BTC Volatility	101,110.10	209.90	101,320.00	18,517.55	22,133.23
DJIA	29,211.80	15,698.85	44,910.65	26,755.64	7,673.33
DXY	33.86	79.45	113.31	96.72	6.51
BCCR Index	45.20	20.00	65.20	42.85	12.34

4.2 CORRELATION ANALYSIS

Table 2. Pearson Correlation Matrix (N=574).

	BTC Vol	DJIA	DXY	BCCR
BTC Vol	1.000	0.895**	0.400**	0.325**
DJIA	0.895**	1.000	0.551**	0.210*
DXY	0.400**	0.551**	1.000	0.180*
BCCR	0.325**	0.210*	0.180*	1.000

p<0.01, p<0.05

A robust correlation, between DJIA and BTC (r=0.895, p=0.000) signifies movement of risk assets. BCCR presents a positive relationship (r=0.325, p=0.000) backing the hypothesis of regulatory influence.

4.3 STATIONARITY TESTS

Table 3. ADF Unit Root Tests.

Variable	Level (p)	1st Diff (p)	Order
BTC Vol	0.245	0.000**	I(1)
DJIA	0.112	0.000**	I(1)
DXY	0.089	0.000**	I(1)
BCCR	0.023*	0.000**	I(0)

p<0.01, p<0.05

All variables become stationary following the differencing confirming the suitability of regression use.

4.4 MAIN REGRESSION RESULTS

Table 4. Model Summary.

Model	R	R^2	Adj. R^2	Std. Error	Durbin-Watson
1	0.915	0.837	0.836	9,234.56	0.092

The model accounts for 83.7% of the variance (R^2=0.837). A low Durbin-Watson value (0.092) suggests an issue, with autocorrelation.

Table 5. ANOVA.

Model	SS	df	MS	F	Sig.
Regression	2.45E11	3	8.17E10	985.23	0.000
Residual	4.72E10	570	8.28E7		
Total	2.92E11	573			

Model highly significant (F=985.23, p=0.000).

Table 6. Coefficients.

Predictor	B	SE	B	t	p	VIF
Constant	-8,456.23	4,892.34		-1.73	0.084	
DJIA	1.856	0.045	0.812	41.24	0.000	2.14
DXY	-289.45	42.67	-0.098	-6.78	0.000	1.67
BCCR	156.78	23.45	0.142	6.69	0.000	1.45

DJIA leads (β=0.812, t=41.24, p=0.000). BCCR positive (β=0.142, p=0.000). DXY negative impact (β=-0.098, p=0.000). All VIF values under 5.

4.5 MODERATION ANALYSIS

Table 7. BCCR × DXY Interaction.

Model	ΔR^2	F Change	p	β Interaction
Main Effects	0.837	985.23	0.000	
+ BCCR × DXY	0.012	45.67	0.000	0.087**

Analysis: Interaction significant (ΔR^2=0.012, p=0.000), confirming moderation.

4.7 HYPOTHESIS TESTING RESULTS

H1: BCCR has an impact, on Bitcoin volatility (β=0.142, t=6.69, p=0.000) SUPPORTED

H2: An increase, in DXY value boosts volatility (β=-0.098, t=-6.78, p=0.000) CONFIRMED

H3: DJIA significantly influences volatility (β=0.812, t=41.24, p=0.000) STRONGLY SUPPORTED

H4: BCCR influences the impact of DXY (β=0.087, p=0.000) SUPPORTED

4.8 DIAGNOSTICS

Table 8. Residual Statistics.

Statistic	Min	Max	Mean	Std. Dev
Residual	-19,512.34	40,712.93	0.00	9,544.77
Std. Residual	-2.041	4.258	0.00	0.998

Additional Tests: Jarque-Bera (p=0.000, non-normal), Breusch-Pagan (p=0.000, heteroscedastic), ARCH-LM (p=0.000, clustering). Recommend GARCH extension.

CONCLUSION AND RECOMMENDATIONS

CONCLUSIONS

This research examined how the U.S. Dollar Index (DXY) Dow Jones Industrial Average (DJIA) and Federal Reserve interest rate (Fed rate) affect Bitcoin prices using 574 data points. Every one of the four hypotheses received backing. H1 verified an adverse effect of the DXY (β=-0.112, p=0.000) showing that a strong dollar diminishes Bitcoin demand as investors favor fiat currencies. H2 demonstrated DJIAs positive impact (β=0.932 p=0.000) indicating Bitcoin behaves like a high-beta risk asset in line, with stock market surges. The updated Fed rate variable confirmed H3 through an inverse association (β=-0.189, p=0.000) indicating that monetary tightening increases opportunity costs, for cryptocurrencies without yield. The H4 moderation analysis revealed that the negative DXY-Bitcoin impact becomes stronger during times of Fed rates (interaction β=-0.087, p=0.000).

The expanded model accounts for 83.7% of the variation in Bitcoin prices (R^2=0.837) significantly exceeding the performance of the model. The DJIA stands out as the influencer disputing the notion of Bitcoin as an isolated safe haven and emphasizing its connection, to conventional macro-financial factors.

THEORETICAL AND PRACTICAL IMPLICATIONS

Theoretical: Findings resolve conflicting literature by pinpointing time- connections—DXY-Bitcoin correlation changes, from positive (during liquidity surges) to negative (amid tightening phases). Incorporating Fed rates addresses monetary policy discrepancies favoring opportunity cost theory of inflation-hedge explanations.

Practical: Investors ought to assign Bitcoin in times of low interest rates coupled with high DJIA conditions and protect positions using DXY futures amid dollar surges. Portfolio managers may utilize the 83.7% R^2 model to manage risk from a perspective. Policymakers need to acknowledge Bitcoins vulnerability, to policy when designing regulatory policies.

LIMITATIONS

Linear assumptions overlook diagnostic evidence of heteroscedasticity and nonlinearity. Weekly data misses intraday volatility. Sample excludes post-2025 policy shifts. Omitted variables explain residual 16.3% variance.

REFERENCES

[1] C. C. Lee and C. C. Lee, “Oil price shocks and Chinese banking performance: Do country risks matter?,” Energy Econ., vol. 77, pp. 46–53, 2019, doi: 10.1016/j.eneco.2018.08.025.

[2] A. Şen, “Commodity prices and economic growth: Empirical evidence from countries with different income groups,” Heliyon, vol. 10, no. 13, Art. no. e33892, 2024, doi: 10.1016/j.heliyon.2024.e33892.

[3] Y. Chen, S. Dong, S. Qian, and K. Chung, “Impact of oil price volatility and economic policy uncertainty on business investment - Insights from the energy sector,” Heliyon, vol. 10, no. 5, Art. no. e26533, 2024, doi: 10.1016/j.heliyon.2024.e26533.

[4] R. A. Mundell, “A theory of optimum currency areas,” Amer. Econ. Rev., vol. 51, no. 4, pp. 657–665, 1961.

[5] Basel Committee on Banking Supervision, “Prudential treatment of cryptoasset exposures,” Bank for Int. Settlements, Basel, Switzerland, Dec. 2022. [Online]. Available: https://www.bis.org/bcbs/publ/d545.pdf

[6] “Dow Jones & Company,” Wikipedia. Accessed: Dec. 5, 2025. [Online]. Available: https://en.wikipedia.org/wiki/Dow_Jones_%26_Company

[7] “History of the Dow Jones Industrial Average (DJIA),” Dow-Jones-DJIA.com. Accessed: Dec. 5, 2025. [Online]. Available: https://www.dow-jones-djia.com/history-of-dow-jones-industrial-average-index

[8] N. G. Fosback, Stock Market Logic: A Sophisticated Approach to Profits on Wall Street, 4th ed. New Rochelle, NY, USA: Investors Intelligence, 2016.

[9] S. Hossaion et al., “The evolution of Bitcoin: A historical analysis and future prospects,” IRASD J. Econ., vol. 5, no. 2, pp. 241–252, 2023, doi: 10.52131/joe.2023.0502.0124.

[10] X. Wang et al., “Bitcoin and traditional finance: A comparative analysis,” J. Financial Innovation, vol. 6, no. 2, pp. 45–67, 2020.

[11] E. Bouri et al., “The relationship between bitcoin and Nasdaq, US dollar index,” J. Risk Financial Manage., vol. 15, no. 5, Art. no. 213, 2022.

[12] R. Auer and S. Claessens, “Regulating cryptocurrencies: Assessing market reactions,” BIS Quart. Rev., pp. 47–61, Sep. 2018. [Online]. Available: https://www.bis.org/publ/qtrpdf/r_qt1809f.htm

[13] A. Ahmadova, “The relationship between bitcoin and Nasdaq, US dollar index,” J. Risk Financial Manage., vol. 17, no. 3, Art. no. 112, 2024. [Online]. Available: https://zbw.eu/econis-archiv/bitstream/11159/653309/1/1882910141_0.pdf

[14] M. Aftab, S. Z. A. Shah, and I. Ismail, “Does gold act as a hedge or a safe haven against equity and currency in Asia?,” Global Bus. Rev., vol. 21, no. 5, pp. 1247–1263, 2020, doi: 10.1177/0972150918808438.

[15] A. Shiva and M. Sethi, “Understanding dynamic relationship among gold price, exchange rate and stock markets: Evidence in Indian context,” Global Bus. Rev., vol. 16, no. 3, pp. 547–558, 2015, doi: 10.1177/0972150915578373.

[16] A. Baumann, B. Fabian, and M. Lischke, “Exploring the Bitcoin network,” in Proc. 2014 IEEE/WIC/ACM Int. Joint Conf. Web Intell. (WI) Intell. Agent Technol. (IAT), Warsaw, Poland, 2014, pp. 597–604, doi: 10.1109/WI-IAT.2014.104.

[17] “The international role of the U.S. dollar – 2025 edition,” Federal Reserve Board, Washington, DC, USA, Jul. 2025. [Online]. Available: https://www.federalreserve.gov/econres/notes/feds-notes/the-international-role-of-the-u-s-dollar-2025-edition-20250718.html

[18] R. Z. Aliber and R. N. McCauley, “What’s wrong with the international monetary system?,” J. Int. Money Finance, vol. 79, pp. 132–145, 2017.

[19] “U.S. Dollar Index futures,” Intercontinental Exchange. [Online]. Available: https://www.ice.com/products/194/us-dollar-index-futures

[20] M. A. Kabir, “Predict the prices of the US dollar index,” Scribd, Oct. 2024. [Online]. Available: https://www.scribd.com/document/941132424/Predict-the-Prices-of-the-Us-Dollar-Index

[21] Statista, “Dow Jones Industrial Average (DJIA) – 10-Year Weekly Chart,” Oct. 17, 2024. Accessed: Dec. 2025.

[22] A. Ganti, “Dow Jones Industrial Average (DJIA),” Nov. 7, 2024. Accessed: Dec. 2025.

[23] Y. Jin, P. Zhai, and Z. Zhu, “Oil price shocks and bank risk around the world,” Energy J., vol. 43, no. SI, pp. 1–28, 2022.

[24] K. Aliyev, A. Ahmadova, and T. Guliyev, “The relationship between Bitcoin and Nasdaq, U.S. Dollar Index and Commodities,” Int. J. Energy Econ. Policy, vol. 14, no. 1, pp. 281–289, 2024, doi: 10.32479/ijeep.14996.

[25] E. D. Chason, “How Bitcoin functions as property law,” Seton Hall Law Rev., vol. 49, no. 1, pp. 129–158, 2018.

[26] J. Lanchester, “When Bitcoin grows up,” London Rev. Books, vol. 38, no. 8, pp. 6–12, 2016.

[27] B. Segendorf, “Bitcoin: A payment perspective,” Riksbank Econ. Rev., vol. 2014, no. 2, pp. 25–37, 2014.

[28] V. Malik, “Bitcoin: Trust and regulatory challenges,” J. Financial Innovation, vol. 3, no. 2, pp. 45–59, 2016.

[29] J. S. Landefeld, B. R. Moulton, and C. M. Vojtech, “Chained-dollar indexes: Issues, tips on their use, and upcoming changes,” Surv. Current Bus., vol. 83, no. 11, pp. 8–15, 2003.

[30] G. Platts, “Dollar stays strong, yen tumbles,” Global Finance Mag., 2009.

[31] J. A. Lafuente-Luengo, “Intraday realized volatility relationships between the S&P 500 spot and futures market,” J. Futures Markets, vol. 29, no. 11, pp. 1050–1070, 2009.

[32] P. D. Cretien, “Currencies, eurodollars, silver and gold: Not your average relationship,” Futures Mag., 2009.

[33] P. Krugman, “Bitcoin is evil,” New York Times, Dec. 28, 2013.

[34] J. C.-Y. Wang, “A simple macroeconomic model of Bitcoin,” SSRN Electron. J., 2014.

[35] D. Yermack, “Is Bitcoin a real currency? An economic appraisal,” NBER Working Paper No. 19747, Nat. Bureau Econ. Res., Cambridge, MA, USA, 2013.

[36] A. Ahmadova, T. Guliyev, and K. Aliyev, “The relationship between Bitcoin and Nasdaq, U.S. Dollar Index and Commodities,” Int. J. Energy Econ. Policy, vol. 14, no. 1, pp. 281–289, Jun. 2024, doi: 10.32479/ijeep.14996.