Decrypting Cryptocurrencies: An Exploration of the Impact on Financial Stability

Journal of
Risk and Financial Management

MDPI

Article

Decrypting Cryptocurrencies: An Exploration of the Impact on Financial Stability

Mohamed Nihal Saleem [1], Yianni Doumenis [1], Epameinondas Katsikas [2], Javad Izadi [1,*] and Dimitrios Koufopoulos [3]

[1] The Claude Littner Business School, University of West London, London W5 5RF, UK; nihalsalym@gmail.com (M.N.S.); yianni.doumenis@uwl.ac.uk (Y.D.)
[2] Kent Business School, University of Kent, Canterbury CT2 7NZ, UK; e.katsikas@kent.ac.uk
[3] The Centre for Distance Education, University of London, London WC1E 7HU, UK; dimitrios.koufopoulos@london.ac.uk
* Correspondence: javad.izadi@uwl.ac.uk

Abstract: This study aims to empirically examine the relationship between cryptocurrency and various facets of the financial system. It seeks to provide a comprehensive understanding of how cryptocurrencies interact with, and influence, the stock market, the U.S. dollar's strength, inflation rates, and traditional banking operations. This is carried out using linear regression models, Granger causality tests, case studies, including the collapse of the Futures Exchange (FTX), and the successful integration of Binance. The study unveiled a strong positive correlation between cryptocurrency market capitalization and key financial indicators like the Dow Jones Industrial Average, Consumer Price Index, and traditional banking operations. This indicates the growing significance of cryptocurrencies within the global financial landscape. However, a mild association was found with the U.S. dollar, suggesting a limited influence of cryptocurrencies on traditional fiat currencies currently. Despite certain limitations such as reliance on secondary data, methodological choices, and geographic focus, this research provides valuable insights for policymakers, financial industry stakeholders, and academic researchers, underlining the necessity for continued study into the complex interplay between cryptocurrencies and financial stability.

Keywords: cryptocurrencies; market capitalization; futures exchange; financial stability

Citation: Saleem, Mohamed Nihal, Yianni Doumenis, Epameinondas Katsikas, Javad Izadi, and Dimitrios Koufopoulos. 2024. Decrypting Cryptocurrencies: An Exploration of the Impact on Financial Stability. *Journal of Risk and Financial Management* 17: 186. https://doi.org/10.3390/jrfm17050186

Academic Editor: Thanasis Stengos

Received: 2 March 2024
Revised: 7 April 2024
Accepted: 17 April 2024
Published: 30 April 2024

1. Introduction

Backdrop and Context: Understanding the Cryptocurrency Market

As the 21st century progresses, we are observing how technological innovations, particularly cryptocurrencies (Dwyer 2015; Corbet et al. 2019; Doumenis et al. 2021; Boyko et al. 2022; Duan et al. 2023; Huang 2024), are transforming the financial landscape. The emergence of Bitcoin and a multitude of altcoins ushers in a new era of monetary concepts and poses challenges to conventional financial systems. Predicted to surpass a market capitalization of USD 2 trillion by the end of 2024, these digital assets are no longer a mere curiosity, but rather a major participant in the global economy. However, what does this indicate for the future?

Decentralized Finance (DeFi) is an additional innovation that surpasses ordinary asset transfers and enables more complex transactions, such as lending, borrowing, and yield farming, via blockchain technology (George 2021). However, is DeFi a fad or a sustainable evolution?

This raises the crucial question: how do fluctuations in the cryptocurrency market directly impact key components of financial crimes of U.S. financial stability such as stock market performance, valuation of the U.S. dollar, inflation rates, traditional banking operations, and prevalence?

This study examines the complex relationship between cryptocurrencies and the financial dynamics in using a mixed-methods approach (Jones 2022). Due to the rapid rate of change in this field, it is imperative to comprehend its broader implications. This investigation is motivated by the need to decipher this rapidly changing environment and its potential impact.

In 2009, the world of finance experienced a transformative moment with the inception of Bitcoin (Nakamoto 2008). Emerging as innovative disruptors to the established norms of the traditional central banking systems, cryptocurrencies—decentralized digital assets anchored in robust cryptographic and blockchain mechanisms—necessitated a re-evaluation of the prevailing financial landscape.

Within this evolving ecosystem, the emergence of DeFi is a significant development. DeFi is an alternative financial system that utilizes the blockchain. In stark contrast to Centralized Finance (CeFi), DeFi is significantly less reliant on intermediary entities (Kaplan et al. 2023).

The introduction of smart contracts exemplifies this change. These digital agreements, which implement autonomously upon the fulfilment of predefined conditions, eliminate the need for intermediaries and improve the efficiency of transactions (Kaplan et al. 2023).

Moreover, the incorporation of DeFi applications and Non-Fungible Tokens (NFTs) expands the applicability of cryptocurrencies beyond their traditional transactional and investment functions. They introduce novel techniques for storing and transmitting value, thereby challenging and reshaping conventional perceptions (George 2021).

Despite cryptocurrencies' rapid expansion and decentralized nature, they face significant obstacles. Notably, the stability of the financial system is threatened, particularly in the U.S. (Drakopoulos et al. 2021; International Monetary Fund 2022). Current regulatory gaps in cryptocurrency trading and its potential misuse pose substantial threats to financial stability (Financial Stability Board 2022; Trozze et al. 2022; Financial Stability Board 2022; Trozze et al. 2022).

The rapid growth and inclusion of cryptocurrencies into the U.S. financial system have sparked significant interest. Nevertheless, despite extensive scrutiny, a comprehensive understanding of their potential impact on financial stability remains elusive (Sharma 2022; Bank for International Settlements 2020). This knowledge gap constitutes a significant research gap, highlighting the importance of this study, which endeavours to illuminate the relationship between cryptocurrencies and key elements of the U.S. financial system.

Prior research (Sharma 2022; Bouri et al. 2017; Adrian et al. 2022) indicates a correlation between cryptocurrencies and the Dow Jones Industrial Average (DJIA) in relation to the stock market. However, the fragmented and frequently contradictory nature of the current literature demonstrates the urgent need for additional research to reconcile these divergent perspectives and clarify the nuances of this relationship.

Likewise, the influence of cryptocurrencies on the U.S. dollar reveals a substantial research vacuum. Some studies indicate a weak correlation or no correlation (Erdaş and Caglar 2018; Fulton 2022), whereas others warn of potential disruption (Bouri et al. 2017; Bertaut et al. 2021). This study is significant because it attempts to contribute new insights to this ongoing dialogue.

The potential relationship between cryptocurrencies and inflation remains a contentious issue in academic circles, highlighting yet another research void. With differing opinions on the efficacy of cryptocurrencies as an inflation hedge (Conlon et al. 2021; Liu and Tsyvinski 2018) and others predicting potential disruption (Supra Oracles 2022; Skrill 2023), it is evident that additional research in this field is both essential and necessary.

Regarding the impact of cryptocurrencies on conventional banking activities, the scholarly community is still divided. Some imply that the growth of cryptocurrencies could undermine traditional banking (Berentsen and Schär 2018; Mersch 2017), while others predict the opposite (Mersch 2017; Kavuri et al. 2021). This unresolved viewpoint disparity highlights the research gap that this study aims to cover.

2. Background of Cryptocurrencies and Financial Stability

2.1. The Crypto Influence: Changing Financial Operations with Digital Assets

Cryptocurrencies have a significant impact on the global financial dynamics and are deeply altering U.S. financial practises and investment norms. According to Franco (2022), the number of American adults who owned at least one cryptocurrency increased by 19.0% between 2021 and 2022, reaching 33.7 million in 2022. This trend highlights the increasing significance of cryptocurrencies in reshaping the U.S. financial landscape (Sonnenshein 2022).

Numbers of U.S. financial institutions embracing cryptocurrencies are on rise, signifying a significant paradigm shift. Jones (2022) observed an increase in the number of U.S. financial service providers that offer trading and custody services for crypto assets, indicating the extensive adoption of these digital assets. Concurrently, U.S. hedge funds are becoming increasingly interested in investing in crypto-assets. However, traditional asset managers are more cautious due to volatility and regulatory uncertainty (McCabe 2021).

The influence of cryptocurrencies extends beyond transactions and investments, upending conventional notions of value storage and transfer in the U.S. financial sector. These concepts are being profoundly altered by innovations such as Decentralized Finance (DeFi) applications and Non-Fungible Tokens (NFTs) (George 2021).

However, the digital revolution presents its own unique difficulties. Although still in their infancy, emerging crypto-asset derivative markets add complexity and risk to the financial system (Tiwari 2021). In addition, growing institutional involvement in cryptocurrencies, coupled with regulatory transparency concerns, may exacerbate threats to financial stability. Keeping these risks in mind, Section 2.2 will examine the relationship between cryptocurrency trends and financial stability, focusing on the potential repercussions of these evolving phenomena.

Exploring the Relationship: Cryptocurrency Behaviour and Financial Stability

The ability of the financial system to sustain external shocks and prevent the unwinding of financial imbalances is essential for global financial stability (International Monetary Fund 2021). Given the growing size and influence of cryptocurrency markets, there are extensive discussions among academics, policymakers, and practitioners (Giudici et al. 2019) regarding the potential effects of cryptocurrency markets on financial stability and their possible use in financial crimes (Drakopoulos et al. 2021). Financial stability is threatened by the rapid growth of crypto-assets and their inherent vulnerabilities, as well as their increasing integration with traditional financial systems (Financial Stability Board 2022; Boyko et al. 2022). Strategies to mitigate risk and encourage sustainable economic growth are necessary for maintaining balance in this digital finance era.

The increasing interest of institutional investors in crypto assets introduces additional complication (Fries 2023). This may result in more mature markets, but the volatility of these assets and regulatory ambiguity poses risks (Michael and Groves 2023). This expanding integration and the unregulated nature of cryptocurrencies, according to the Financial Stability Board (2022), may increase the risk of financial instability and cause disruptions comparable to a financial crisis (Salami 2018).

Due to concerns about the stability of the overall financial system and the potential disruption as cryptocurrencies become more closely linked to traditional financial systems, the regulation of cryptocurrencies is a key topic in the current literature (Financial Stability Board 2022; Cox 2022; The White House 2022). Also, researchers and regulatory bodies are concerned about the potential misuse of cryptocurrencies for illicit activities such as money laundering and fraud (Trozze et al. 2022; FATF 2020; Warren 2022; Fletcher 2021).

However, many studies highlight the revolutionary potential of cryptocurrencies. These digital assets can enhance financial inclusion (Ozili 2022; Carmona 2022) and simplify financial services by eliminating intermediaries and reducing transaction costs. The literature often cites the increased privacy and security of cryptocurrencies due to their transparent and unchangeable transaction records as factors that build trust and reduce fraud (Böhme et al. 2015).

The relationship between cryptocurrencies and conventional stock markets reveals a complex interaction. Several studies indicate that these two variables tend to correlate (Wang et al. 2022; Vardar and Aydogan 2019; Erdaş and Caglar 2018), especially during times of financial distress (Sharma 2022; Adrian et al. 2022). Such periods may see them move in tandem, displaying shared spikes and dips. For instance, Sharma (2022) found a significant correlation between cryptocurrencies and the stock market after 2017.

2.2. Cryptocurrency and Financial Interplay: An Academic Recapitulation

Exploring the multifaceted landscape of cryptocurrencies and their interaction with conventional financial frameworks yields compelling insights, highlighting both opportunities and challenges for financial stability. This analysis of the existing literature sheds light on several significant themes and identifies research gaps.

On the cryptocurrency market, an extraordinary surge and maturation are initially observed. According to the preponderance of recent research (Ozili 2022; Financial Stability Board 2022; Siddik et al. 2023), the size and scope of this market do not pose an imminent threat to financial stability, despite significant growth (Ozili 2022; Financial Stability Board 2022; Siddik et al. 2023). Nevertheless, the accelerated pace of cryptocurrency integration into traditional finance suggests the possibility of a change in dynamics, emphasising the need for additional research to understand potential future effects.

Second, the complex relationship between cryptocurrencies, equity markets, exchange rates, and inflation emerges as a key theme (Sharma 2022; Bertaut et al. 2021; Berentsen and Schär 2018). Despite the fact that this topic has received substantial attention, no consensus has been reached because studies and contexts have produced contradictory results. To fathom the long-term effect of cryptocurrencies on these variables, there is a substantial gap in the literature, necessitating additional research.

Third is the potential impact of cryptocurrencies on conventional banking operations (Berentsen and Schär 2018; Barnes 2018; Mersch 2017; Kavuri et al. 2021; Geva 2019; Zohuri et al. 2022). There is a paucity of research on the long-term effects, necessitating additional scholarly attention.

FATF (2020); Kethineni and Cao (2019); Durrant and Natarajan (2019) provide extensive insight into the connection between cryptocurrencies and financial crimes such as money laundering, fraud, and cybercrime. While the need for robust regulation and law enforcement is evident (Narain and Moretti 2022; Barr 2020), there is a paucity of research evaluating methods to mitigate these risks without jeopardising the potential benefits of cryptocurrencies.

This recapitulation serves as a concise summary of the major themes emerging from the literature, while also emphasising the knowledge gaps that necessitate additional research in this dynamic field.

3. Theoretical Framework, Methodology and Data Collection

With the aim of comprehending the impact of decrypting cryptocurrencies on financial stability, this study empirically explores their relationship with various elements of the financial system. It seeks to thoroughly investigate how cryptocurrencies affect the stock market, the strength of the U.S. dollar, inflation rates, and traditional banking operations, drawing upon insights from the Austrian theory of capital (Mises 1949; Hayek 1941; Garrison 2000). This theory highlights the significance of time and subjective preferences in capital allocation and formation within an economy. It suggests that capital goods, including cryptocurrency, are diverse and reflect individuals' subjective evaluations of present and future utility. Furthermore, it proposes that capital formation is influenced by saving and investment, driven by entrepreneurs' expectations of future profits, and guided by market prices and interest rates.

This study also relies on the Modern Portfolio Theory (Sharpe 1964) which describes how investors can construct optimal portfolios that maximize returns for a given level of risk, or minimize risk for a given level of return.

This study focuses predominantly on performing linear regression analyses on monthly data from January 2019 to December 2022. The aim is to probe the statistical significance of the relationship between cryptocurrency market capitalization and a host of dependent variables, including the Dow Jones Industrial Average (DJIA), the U.S. Dollar Index (DXY), Consumer Price Index (CPI), and Suspicious Activity Reports (STRs) tied to financial crimes (Berentsen and Schär 2018; Ozili 2022; Financial Stability Board 2022; Siddik et al. 2023; Sharma 2022). To supplement this analysis and determine the direction of causality, the study will employ the Granger causality test (Granger 1969).

Complementing the quantitative analysis, qualitative case studies will delve into the real-world effects of cryptocurrencies on financial stability. This approach includes an examination of the FTX collapse and its ramifications for the broader cryptocurrency market, as well as the contrasting success story of Binance and its integration into traditional financial systems. Through these case studies, we aim to elucidate the dual nature of the cryptocurrency market, highlighting both the inherent risks and complexities, as exemplified by FTX, and the potential for successful, stable integration demonstrated by Binance.

The synchronization of these quantitative and qualitative approaches aims to provide a comprehensive comprehension of the impact cryptocurrencies have on financial stability. This study aims to contribute to the formulation of well-informed policy recommendations and to pave the way for future research in this rapidly developing field (Berentsen and Schär 2018; Barnes 2018; Mersch 2017; Kavuri et al. 2021; Geva 2019; Zohuri et al. 2022).

Research Design and Hypotheses Development

As decentralized digital assets, cryptocurrencies have established their presence on the global financial stage, attracting investors, regulators, and policymakers (Bouri et al. 2017). According to Nakamoto (2008), these digital currencies promise swift transactions, minimal fees, and enhanced security. Nevertheless, their potential to disrupt financial stability and serve as a vehicle for financial crimes has prompted ongoing debates (Bouri et al. 2017).

This research endeavour seeks to address the pivotal question: "What are the prospective impacts of cryptocurrencies on financial stability, encompassing their effects on the stock market dynamics, the U.S. dollar, the Consumer Price Index, and financial crimes?" In a bid to thoroughly explore this multifaceted issue, the study employs a mixed-methods approach.

This study concentrates primarily on conducting linear regression analyses on monthly data from January 2019 to December 2022. The aim is to probe the statistical significance of the relationship between cryptocurrency market capitalization and a host of dependent variables, including the Dow Jones Industrial Average (DJIA), the U.S. Dollar Index (DXY), Consumer Price Index (CPI), and Suspicious Activity Reports (STRs) tied to financial crimes (Berentsen and Schär 2018; Ozili 2022; Financial Stability Board 2022; Siddik et al. 2023; Sharma 2022). This study aims to generate empirical evidence that clarifies the potential impact of cryptocurrencies on financial stability.

To complement the quantitative analysis, qualitative case studies will explore the real-world impacts of cryptocurrencies on financial stability. These will include an examination of the FTX collapse and its wider effects on the cryptocurrency market, as well as the successful integration of Binance into the traditional financial system. The inclusion of Binance serves to balance the analysis by illustrating not only the risks and complexities, as highlighted by the FTX incident, but also the potential for stable and beneficial integration of cryptocurrencies into the financial landscape.

This research seeks to contribute to the well-informed policy recommendations and pave the way for future research in this rapidly evolving field (Berentsen and Schär 2018; Barnes 2018; Mersch 2017; Kavuri et al. 2021; Geva 2019; Zohuri et al. 2022).

An overview of these hypotheses, along with the literature from which they are derived, is presented in Table 1.

Furthermore, to validate these hypotheses, the Granger causality test will be implemented. This test will ascertain the directionality of relationships between variables, providing a groundwork for supporting the stated hypotheses.

Table 1. Overview of the hypotheses.

Hypothesis Number	Null Hypothesis (H0)	Alternative Hypothesis (H1)	Derived From
H1	Cryptocurrency market capitalization has no significant impact on the stock market, as represented by the Dow Jones Industrial Average ((DJIA).	Cryptocurrency market capitalization has a significant impact on the stock market, as represented by the Dow Jones Industrial Average.	Sharma (2022), Adrian et al. (2022), Fulton (2022)
H2	Cryptocurrency market capitalization has no significant impact on the U.S. Dollar Index (DXY).	Cryptocurrency market capitalization has a significant impact on the U.S. Dollar Index (DXY).	Roubini (2018), Bertaut et al. (2021)
H3	Cryptocurrency market capitalization has no significant impact on inflation (CPI).	Cryptocurrency market capitalization has a significant impact on inflation rates.	Salisu et al. (2018), Blau et al. (2021)
H4	Increases in cryptocurrency market capitalization do not significantly affect key operational aspects of traditional banking, specifically bank deposits.	Increases in cryptocurrency market capitalization significantly affect key operational aspects of traditional banking.	Berentsen and Schär (2018), Barnes (2018), Mersch (2017), Kavuri et al. (2021), Geva (2019), Zohuri et al. (2022)

Source: Own elaboration.

Selection of Variables and Data

The variables chosen for this study are intended in Table 2 to measure the impact of cryptocurrencies on financial stability as the primary concern. The selection of variables is founded on a number of key factors associated with each domain.

Table 2. Summary of dependent and independent variables, corresponding hypotheses, and rationale for selection in the study.

Variable Type	Hypothesis	Variable Name	Description	Rationale
Dependent	H1	DJIA	Benchmark stock market index reflecting the performance of major U.S. companies	To assess the potential impact of cryptocurrencies on the stock market
Dependent	H2	DXY	Value of the U.S. dollar relative to a basket of other currencies	To evaluate the impact of cryptocurrencies on the exchange rate and the strength of the U.S. dollar
Dependent	H3	CPI	Measure of price level changes in an economy	To provide insight into the broader economic effects of cryptocurrencies
Dependent	H4	Bank Deposits	Key operational aspects of traditional banking	To assess the potential consequences of cryptocurrencies on the banking industry
Independent	H1–H4	Crypto Market Cap	The monthly value of all cryptocurrencies in circulation	To ensure consistency in measuring the impact of cryptocurrencies on all dependent variables

Note: The Financial Crimes data underwent a filtering process to ensure its relevance. The focus was placed on specifics such as industry type (Securities/Futures), instrument type (Funds Transfer), product type (Futures/Options on Futures, Options on Securities, and Security Futures Products), crime type (Money Laundering, Terrorism financing, Fraud), and the relevant regulatory body (SEC). Source: Own elaboration.

The Dow Jones Industrial Average (DJIA) as a representative stock market index, the U.S. Dollar Index (DXY) indicating the strength of the U.S. dollar, inflation as a crucial macroeconomic factor, and traditional banking metrics, such as bank deposits, are dependent variables associated with financial stability. The incorporation of the monthly total of

Suspicious Activity Reports (STRs) broadens the scope of the analysis to include financial crimes and aims to provide a comprehension of the potential effects of cryptocurrencies on various aspects of the financial stability of the US.

The market capitalization of cryptocurrencies serves as the independent variable for Hypotheses 1 through 4, representing the total market value of all cryptocurrencies.

Data for this research were gathered from a variety of credible platforms. The specifics of each variable, including the source and collection time frame, can be found in Table 3.

Table 3. Data sources and collection period for the variables employed in the study.

Variable	Data Source	Time Period
Cryptocurrency Market Capitalization	TradingView.com	1st Jan 2019–31st Dec 2022
DJIA	Investing.com	1st Jan 2019–31st Dec 2022
DXY	Investing.com	1st Jan 2019–31st Dec 2022
CPI	Federal Reserve Economic Data (FRED)	1st Jan 2019–31st Dec 2022
Bank Deposits	Federal Reserve Economic Data (FRED)	1st Jan 2019–31st Dec 2022

Source: Own elaboration.

To conform to the data's characteristics and the objectives of this study, all variables were transformed into their natural logarithmic forms. This step, which is an integral part of the data transformation and regression formulation processes, was taken to reduce the impact of outliers and improve the linearity of relationships between variables.

In Table 4, regression equations are constructed for each dependent variable to examine the impact of Cryptocurrency Market Capitalization on various financial aspects. In the log form of these equations, the independent variable is ln(CMC). The application of simple linear regression analysis then reveals the existence, direction, and strength of relationships between CMC and the dependent variables, facilitating the testing of the hypotheses.

Table 4. Log-linear regression models for analysing the impact of transformed cryptocurrency market capitalization on key financial indicators.

Dependent Variable (Transformed)	Independent Variable (Transformed)	Associated Regression Equation
ln(DJIA)	ln(CMC)	$\ln(DJIA) = \beta0 + \beta1 \times \ln(CMC) + \varepsilon$
ln(DXY)	ln(CMC)	$\ln(DXY) = \beta0 + \beta1 \times \ln(CMC) + \varepsilon$
ln(CPI)	ln(CMC)	$\ln(CPI) = \beta0 + \beta1 \times \ln(CMC) + \varepsilon$
ln(Bank Deposits)	ln(CMC)	$\ln(\text{Bank Deposits}) = \beta0 + \beta1 \times \ln(CMC) + \varepsilon$
ln(STRs Filings)	ln(ACMC)	$\ln(\text{STRs Filings}) = \beta0 + \beta1 \times \ln(ACMC) + \varepsilon$

Note: In these equations, β0 represents the intercept, β1 is the coefficient of the independent variable (ln(CMC) or ln(ACMC)), and ε is the error term. "ACMC" refers to the Average Cryptocurrency Market Capitalization for the respective time period. Source: Own elaboration.

The outcomes of the regression analysis would displays using appropriate tables and statistical metrics such as the coefficient of determination (R-squared), the coefficient of correlation (r), and the *p*-value. Higher R-squared values suggest a more robust relationship between CMC and the dependent variable, while positive R-values indicate a positive relationship, and negative values signal a negative relationship. *p*-values below 0.05 would denote statistically significant relationships.

4. Data Analysis Techniques

Given the research's focus on the impact of cryptocurrencies on financial stability various statistical analysis techniques are employed (in Table 5) to scrutinize the dataset and interpret the results effectively. These methods, encapsulated in the table below, involve exploratory data analysis, correlation and regression analyses, diagnostic tests, and the Granger causality test.

Table 5. Data analysis techniques and their roles in the study.

Data Analysis Technique	Description
Descriptive Statistics	Understand the fundamental characteristics of the dataset, including mean, median, mode, standard deviation, skewness, and kurtosis.
Correlation Analysis	Determine the degree of association between independent and dependent variables using Pearson's correlation coefficient.
Regression Analysis	Estimate the relationship between dependent and independent variables via multiple logarithmic regression models, facilitating hypothesis testing.
Diagnostic Tests	Ensure the reliability of regression results by conducting tests for heteroscedasticity (Breusch–Pagan test), autocorrelation (Durbin–Watson statistic).
Granger Causality Test	Infer causality between variables to understand if one variable can predict another.

Source: Own elaboration.

Case Study Approach

This research also adopts a case study to explore the cryptocurrency industry, selecting the FTX collapse and Binance's success as focal points. The decision to examine FTX stems from its significant impact on both the cryptocurrency market and traditional financial systems, providing a valuable lens through which to study the potential effects of crypto market disruptions. A qualitative strategy is employed to analyze various aspects of the FTX collapse, encompassing the immediate responses from investors, other crypto platforms, and regulatory bodies, alongside the broader shockwaves sent through the financial markets.

In contrast, the inclusion of Binance as a case study illustrates a successful integration of cryptocurrency into traditional finance. Binance's journey offers insights into how strategic management, regulatory compliance, and innovation can contribute to a cryptocurrency platform's growth and stability, reflecting the positive potential of cryptocurrencies in the financial ecosystem.

Data for both case studies were sourced from news articles, official statements, financial reports, and public records. This diverse data collection strategy aimed to develop a comprehensive understanding of the FTX collapse and Binance's operational successes, their aftermath, and their longer-term effects on both the cryptocurrency and traditional financial markets.

Through thematic analysis, meaningful insights were extracted, comparing and contrasting the qualitative findings with the quantitative regression results. This approach allowed for a nuanced view of how disruptions in the cryptocurrency market, exemplified by FTX, could pose threats to financial stability, while successful integrations, as demonstrated by Binance, could reinforce the sector's robustness. The parallel examination of these case studies provides a balanced perspective on the dual potential of cryptocurrencies to either destabilize or enhance financial stability within the traditional financial sector.

5. Results

5.1. Descriptive Statistics, Granger Causality Test and Regression Analysis

The focus is on describing the relationship between the market capitalization of digital currencies (CMC), a key parameter in the crypto-economy, and indicators of financial stability. According to the chosen method, basic linear regression analysis and Granger causality tests are performed. This combination of analytical methods enables both the identification of relationships and the investigation of potential causality among variables.

This research is guided by four hypotheses (H1 to H4). Each hypothesis relates the natural logarithms of significant financial stability indicators to distinct aspects of cryptocurrency market value. For hypotheses H1 to H4, the natural logarithm of the

monthly capital of the digital currency market (ln(CMC)) acts as an independent variable whose relationship with various dependent variables is examined.

H1 to H4 are designed to identify potential relationships between cryptocurrency market capitalization and important indicators of economic health and stability, including the following:

Stock market performance, represented by the natural logarithm of the Dow Jones Industrial Average (ln(DJIA)), serves as a measure of overall stock market health and investor sentiment.

The U.S. Dollar Index, or ln(DXY), is a measure of the value of the U.S. dollar against a basket of foreign currencies, which affects international trade and investment.

Inflation, captured by the natural logarithm of the consumer price index (ln(CPI)), reflects the economic consequences of currency fluctuations on everyday goods and services.

The role of conventional banking operations, encapsulated by the natural logarithm of bank deposits (ln(Bank Deposits)), which can provide insight into public trust in traditional financial institutions in the digital currency era

The empirical investigation begins with an exploration of descriptive statistics.

Table 6 provides a perspective on the characteristics of the investigated variables. This table presents the central tendency, dispersion, and shape of the data distribution for the natural logarithm transformations of indicators of financial stability, such as Cryptocurrency Market Capitalization (ln(CMC)), the Dow Jones Industrial Average (ln(DJIA)), the U.S. Dollar Index (ln(DXY)), inflation (ln(CPI)), bank deposits (ln(bank deposits)), and Average Cryptocurrency Market Capitalization (ln(ACMC).

Table 6. Descriptive statistics of variables.

Statistic	ln(CMC)	ln(DJIA)	ln(DXY)	ln(CPI)	ln(Bank Deposits)	ln(ACMC)	ln(STRs Filings)
Mean	6.4	10.3	4.568	5.595	9.655	6.395	6.218
Median	6.63	10.3	4.569	5.57	9.689	6.598	6.454
Std. dev.	0.98	0.13	0.04	0.055	0.139	0.982	1.215
Skewness	−0.06	−0.18	0.434	0.71	−0.461	−0.044	−0.313
Kurtosis	1.55	1.85	2.977	2.011	1.6	1.537	2.318
Jarque–Bera	4.21	2.88	1.506	5.986	5.621	4.204	1.712
Probability	0.12	0.24	0.471	0.05	0.06	0.117	0.425
Observations	48	48	48	48	48	48	48

Note: The variables in the above tables including Cryptocurrency Market Capitalization (ln(CMC)), the Dow Jones Industrial Average (ln(DJIA)), the U.S. Dollar Index (ln(DXY)), inflation (ln(CPI)), Bank Deposits (ln(Bank Deposits)), and Average Cryptocurrency Market Capitalization (ln(ACMC). Source: Own elaboration.

Initial evidence suggests that the relatively higher average values of ln(DJIA) and ln(Bank Deposits) may have a significant impact on the investigated financial stability indicators. A greater standard deviation in ln(STRs filings) may indicate increased variability or volatility in the market for financial crime. The assumption of a normal distribution for subsequent analysis is supported by the near-normal distribution skewness and kurtosis of all variables and the *p*-values of the Jarque–Bera statistic for all variables that exceed 0.05.

On the other hand, Figure 1, which consists of scatter plots, provides an examination of the linear relationship between cryptocurrency market capitalization and other key financial variables. The scatter plots suggest linearity between the cryptocurrency market and the other variables, with the exception of the natural logarithm of the U.S. Dollar Index (ln(DXY)). The absence of a clear linear pattern in the case of ln(DXY) could indicate a less robust relationship between this variable and cryptocurrency market capitalization, contrasting with the other variables.

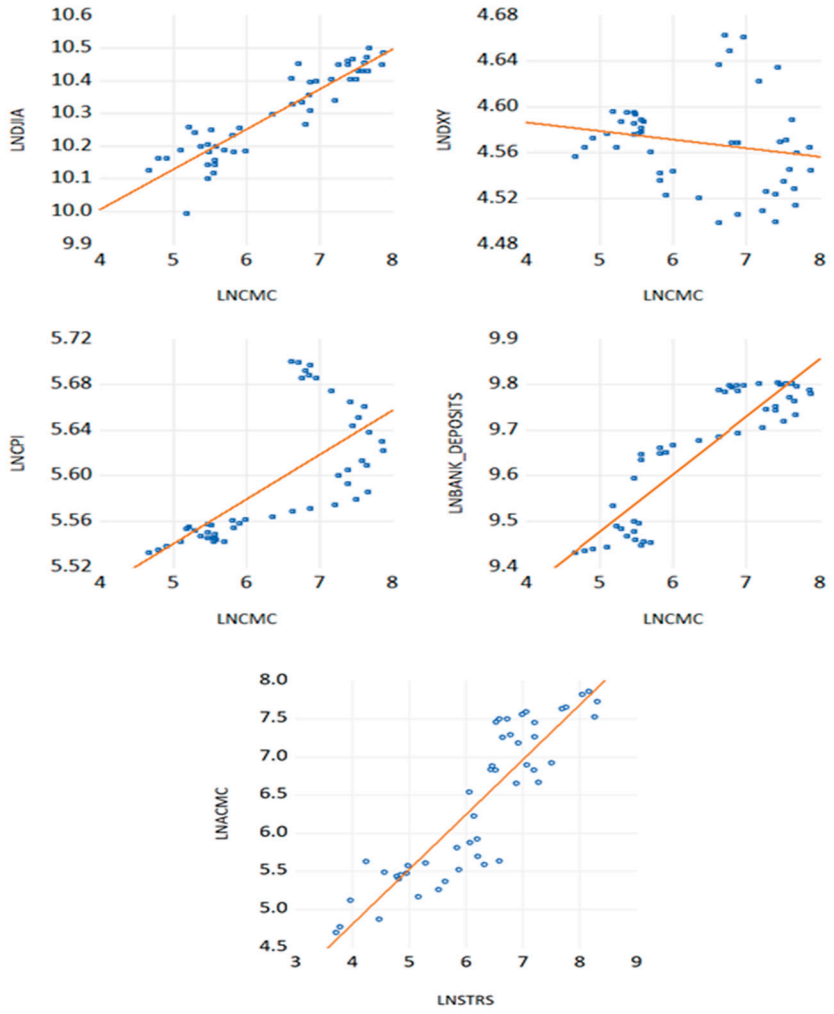

Figure 1. Scatterplots for all variables. Source: Own elaboration.

5.2. Granger Causality Test

Building upon the results from the pre-estimation analysis, the research takes a deeper dive into uncovering causal relationships among the variables. This stage of the empirical investigation employs the Granger causality tests, which probe whether changes in one variable precede changes in another, thereby implying a directional cause-and-effect relationship (See Table 7).

Table 7. Granger causality test results.

Hypothesis	Observations	F-Statistic	Probability
H1: ln(CMC) is not the Granger cause of ln(DJIA)	46	6.485	0.004
H1: ln(DJIA) is not the Granger cause of ln(CMC)	46	1.257	0.295
H2: ln(CMC) is not the Granger cause of ln(DXY)	46	1.333	0.275
H2: ln(DXY) is not the Granger cause of ln(CMC)	46	3.296	0.047
H3: ln(CMC) is not the Granger cause of ln(CPI)	46	5.712	0.007
H3: ln(CPI) is not the Granger cause of ln(CMC)	46	0.563	0.574
H4: ln(CMC) is not the Granger cause of ln(Bank Deposits)	46	0.63	0.538
H4: ln(Bank Deposits) is not the Granger cause of ln(CMC)	46	0.905	0.413

Source: Own elaboration.

Initially, an examination of the relationship between Cryptocurrency Market Capitalization (ln(CMC)) and the Dow Jones Industrial Average (ln(DJIA)) reveals that changes in ln(CMC) appear to be the Granger cause of changes in ln(DJIA). This relationship, as depicted in Hypothesis H1, is supported by an F-statistic of 6,485. Nevertheless, the

reverse relationship lacks significant causality, indicating a unidirectional impact from cryptocurrency market capitalization to the Dow Jones Industrial Average.

In the case of ln(CMC) and ln(DXY) in Hypothesis H2, the data do not support a Granger causality between ln(CMC) and ln(DXY). However, an intriguing result emerges in which changes in ln(DXY) appear to cause changes in ln(CMC) via Granger. This result, indicated by an F-statistic of 3.296 (p0.047), highlights the prospective impact of the U.S. Dollar Index on the market capitalization of cryptocurrencies.

Concerning Hypothesis H3, which investigates the relationship between ln(CMC) and inflation (ln(CPI)), there is a significant Granger causality from ln(CMC) to ln(CPI), as indicated by a significant F-statistic of 5.712 (p0.007). In contrast, the data do not support the conclusion that ln(CPI) Granger causes variations in ln(CMC).

Turning to Hypothesis H4, the test results do not indicate a significant Granger causality in either direction between ln(CMC) and bank deposits (ln(Bank Deposits)), indicating that there is no temporal precedence between these variables.

In essence, these results from the Granger causality analyses corroborate some initial findings from the correlation analysis, namely the significant influence of market capitalization for cryptocurrencies on key indicators of financial stability. Importantly, the significant relationship between the average market capitalization of cryptocurrencies and reports of suspicious transactions is highlighted, which may have implications for financial crime. This lends itself to a subsequent investigation using regression modelling, which can better quantify these relationships (See Table 8).

Table 8. Regression model analysis results.

Metrics	H1: ln(DJIA)	H2: ln(DXY)	H3: ln(CPI)	H4: ln(Bank Deposits)
Coefficient	9.518	4.616	5.345	8.845
Std. error	0.051	0.038	0.039	0.06
t-Statistic	187.306	120.42	137.102	147.215
Probability	***0.000***	***0.211***	***0.000***	***0.000***
R-squared	0.841	0.034	0.477	0.802
Adjusted R-squared	0.837	0.013	0.466	0.797
S.E. of regression	0.053	0.04	0.041	0.062
F-statistic	243.158	1.608	41.98	185.905
Prob(F-statistic)	***0.000***	***0.211***	***0.000***	***0.000***
Durbin–Watson stat	0.935	0.41	0.057	0.175

Note: Based on the Granger causality tests, five regression models were formulated, each corresponding to a specific hypothesis, as follows: for H1, H2, H3 and H4 we considered, respectively: ln(DJIA) = β0 + β1 × ln(CMC) + ε), ln(DXY) = β0 + β1 × ln(CMC) + ε, ln(CPI) = β0 + β1 × ln(CMC) + ε, and ln(Bank Deposits) = β0 + β1 × ln(CMC) + ε. Source: Own elaboration.

Starting with Hypothesis H1, the regression model reveals a significant coefficient of 9.518 for ln(CMC), with a standard error of zero. This suggests that the market capitalization of cryptocurrencies has a substantial positive effect on the Dow Jones Industrial Average. With an impressive R-squared of 0.841, the t-statistic is highly significant, indicating that approximately 84.1% of the variation in ln(DJIA) can be explained by changes in ln(CMC).

Taking into account Hypothesis H2, the model suggests a positive effect of market capitalization for cryptocurrencies on the U.S. Dollar Index, as indicated by a coefficient of 4.616 for ln(CMC). However, the model's explanatory power is relatively weak, with an R-squared value of 0.034.

Concerning Hypothesis H3, the model exhibits a positive coefficient of 5.345 for ln(CMC), indicating that as the market capitalization of cryptocurrencies increases, inflation does as well. The model's explanatory power is moderate, with an R-squared value of 0.47.

For Hypothesis H4, the model indicates that the market capitalization of cryptocurrencies has a positive effect on bank deposits, as indicated by a coefficient of 8.845 for ln(CMC). The high R-squared value of 0.802 indicates a strong explanatory power, accounting for approximately 80.2% of the variation in ln(Bank Deposits).

In conclusion, these regression models validate a number of the previously uncovered essential insights. They highlight the substantial impact of cryptocurrency market capital-

ization on key indicators of financial stability, such as the Dow Jones Industrial Average and bank deposits. In addition, the potential relationship between. The focus is on the average market capitalization of cryptocurrencies and its correlation with financial crime

5.3. Post-Diagnosis

In Table 9, the regression modelling, a series of diagnostic checks were carried out to test the robustness of the models and ensure the validity of the underlying regression analysis assumptions. These checks are crucial for substantiating the study findings and the ensuing interpretations.

Table 9. Diagnostic checks and post-diagnostic analysis results.

Hypothesis	Diagnostic Test	Variable	F-Statistics	Obs*R-Squared	Prob. Chi-Squared	Prob(F-Statistics)	Probability
H1	Breusch–Godfrey Serial LM Test	ln(DJIA)	10.18	15.18	0.005	0.001	-
H1	Breusch–Pagan–Godfrey Test	ln(DJIA)	4.992	4.699	0.03	0.03	-
H1	Histogram Normality Test	ln(DJIA)	-	-	-	-	0.459
H2	Breusch–Godfrey Serial LM Test	ln(DXY)	36.031	29.802	0	0	-
H2	Breusch–Pagan–Godfrey Test	ln(DXY)	3.979	3.821	0.051	0.052	-
H2	Histogram Normality Test	ln(DXY)	-	-	-	-	0.117
H3	Breusch–Godfrey Serial LM Test	ln(CPI)	458.392	45.802	0	0	-
H3	Breusch–Pagan–Godfrey Test	ln(CPI)	6.117	5.634	0.176	0.017	-
H3	Histogram Normality Test	ln(CPI)	-	-	-	-	0.011
H4	Breusch–Godfrey Serial LM Test	ln(Bank Deposits)	124.497	40.792	0	0	-
H4	Breusch–Pagan–Godfrey Test	ln(Bank Deposits)	0.595	0.613	0.623	0.445	-
H4	Histogram Normality Test	ln(Bank Deposits)	-	-	-	-	0.24
H5	Breusch–Godfrey LM	ln(STRs)	3.32	6.294	0.043	0.045	-
H5	Breusch–Pagan–Godfrey	ln(STRs)	1.172	1.192	0.275	0.2847	-
H5	Histogram Normality	ln(STRs)	-	-	-	-	0.485

Source: Own elaboration.

Included in the tests conducted were the Breusch–Godfrey Serial Correlation LM Test, the Breusch–Pagan–Godfrey Test for heteroskedasticity, and the Histogram Normality Test. Each of these examinations focused on a distinct aspect of the regression models.

During the preliminary experiments, the presence of serial correlation and heteroscedasticity were identified as obstacles. However, a built-in mechanism utilising Newey–West in EViews effectively mitigated these issues, thereby enhancing the reliability and validity of the regression models. The results of this procedure are shown in Appendix 8.8 for reference purposes.

Initially, the diagnostics for Hypothesis H1 revealed substantial serial correlation in the residuals of the model for ln(DJIA) and ln(CMC), as well as heteroskedasticity. However, the Newey–West mechanism satisfactorily addressed these concerns.

The Histogram Normality Test consistently produced probabilities greater than 0.05 across all hypotheses, indicating that the residuals adhere to a normal distribution, despite the detected issues. This lends the models and the insights derived from them additional credibility.

In conclusion, although the diagnostic checks initially revealed a number of issues with the regression models, the implementation of sophisticated techniques ensured that these issues were effectively addressed.

6. Result and Findings

Having verified the validity of the regression model through diagnostic tests, in Table 10, the overall key findings of the hypotheses testing are summarized in the following table. This comprehensive overview provides insights into the impact of cryptocurrency market capitalization on various economic indicators. Each hypothesis is evaluated based on correlation, Granger causality, and regression outcomes.

Table 10. Summary of hypotheses testing results: investigating the impact of cryptocurrency on financial stability.

Hypothesis	Correlation	Granger Causality	Regression (R-Squared, *p*-Value)	Interpretation
H1: Impact on the U.S. Stock Market (DJIA)	Positive, Strong (0.917)	One-way (from Crypto market capitalization to DJIA)	Significant ($R^2 = 0.841$, $p = 0.000$)	Crypto market capitalization has a significant impact on DJIA
H2: Impact on USD (DXY)	Negative, Weak (−0.184)	One-way (from DXY to Crypto market capitalization)	Not statistically significant ($R^2 = 0.034$, $p = 0.2$)	Crypto market capitalization does not have a significant impact on DXY
H3: Impact on Inflation (CPI)	Positive, Moderate (0.691)	One-way (from Crypto market capitalization to CPI)	Significant (CPI: $R^2 = 0.4772$, $p = 0.000$)	Crypto market capitalization has a significant impact on CPI
H4: Impact on Traditional Banking Operations (Bank Deposits)	Positive, Strong (Bank Deposits: 0.895)	No direction	Significant (Deposits: $R^2 = 0.802$, $p = 0.000$)	Crypto market capitalization has a significant impact on bank deposits

Note: the categorisation of correlation strength adheres to established parameters: strong (≥0.7), moderate (0.4 to 0.69), weak (0.1 to 0.39), or negligible (≤0.1). The directionality of correlation is expressed as either positive or negative. The Granger causality direction is inferred from the statistically significant outcomes. The results from regression are deemed statistically significant if the *p*-value is at or below the threshold of 0.05. Source: Own elaboration.

7. Discussion

Hypotheses Discussion:

H1. *Cryptocurrency Market Capitalization and Its Impact on the U.S. Stock market.*

The main hypothesis, H1, investigates the relationship between cryptocurrency market capitalization (ln(CMC)) and the Dow Jones Industrial Average (ln(DJIA)), a key marker of U.S. financial stability.

The regression analysis reveals a significant positive relationship between cryptocurrency market capitalization and the Dow Jones Industrial Average. This finding suggests that as the cryptocurrency market capitalization grows, the Dow Jones Industrial Average tends to rise as well. Therefore, this lends support to the alternative hypothesis that cryptocurrencies have a major influence on the movements of the stock market. These conclusions align with previous studies by Sharma (2022), Bouri et al. (2017), and Adrian et al. (2022), emphasizing that the movements in the cryptocurrency market can significantly impact traditional financial markets and, therefore, U.S. financial stability.

The FTX collapse serves as a pertinent case study, demonstrating the potential market volatility associated with cryptocurrencies. This event led to a notable downturn in major cryptocurrencies, which in turn influenced the DJIA, providing practical evidence of the strong correlation established in our research. Conversely, the integration of cryptocurrencies into traditional finance has also seen successes, as evidenced by Binance's operations. Binance, unlike FTX, has successfully navigated the complexities of financial regulation, achieving substantial growth and stability in the market. This success story offers a counterpoint to the FTX collapse, illustrating how effective management and regulatory compliance in the cryptocurrency sector can lead to positive outcomes in traditional financial markets.

As noted by Sharma (2022), our analysis also indicates a growing correlation between cryptocurrencies and stock markets since 2017, propelled by increasing interest from retail and institutional investors and the merging of traditional financial institutions with cryptocurrency markets. Entities like Sequoia Capital, Genesis, and Galaxy Digital have disclosed significant exposures to cryptocurrencies, underscoring the intertwined relationship between these markets.

When considering causality, the Granger causality test uncovers a one-way causal link from the cryptocurrency market capitalization to the stock market. The implications of this

relationship are noteworthy, hinting that the cryptocurrency market might act as an early signal for changes in the stock market, offering a unique predictive tool.

However, it is important to remember that while the Granger causality test implies a sequence of events, it does not confirm causality in the traditional sense. The causality found in this research suggests that past information from the cryptocurrency market could be useful in predicting future stock market movements.

The high R-squared value of 0.841, derived from the regression model (See Table 10), indicates that about 84.1% of the changes in the stock market can be explained by changes in the cryptocurrency market capitalization. This strong correlation is even more significant considering the growing market capitalization of cryptocurrencies, especially as digital assets like Bitcoin gain wider acceptance (Gaies et al. 2022). If the cryptocurrency market continues to grow, it may have a deeper influence on traditional markets, affecting overall U.S. financial stability (Sharma 2022; Adrian et al. 2022; Bank for International Settlements 2020).

On the other hand, there are different viewpoints in academic research, as seen in studies by Bouri et al. (2017), which did not find a significant correlation between Bitcoin and S&P 500 returns. These contrasting perspectives could be due to variations in the chosen cryptocurrencies, market conditions at the time, or the periods for data collection. Nonetheless, this research, with its focus on the overall cryptocurrency market capitalization, aims to provide a broader view of this complex relationship.

H2. *Cryptocurrency Market Capitalization and Its Impact on the U.S. Dollar.*

This section shifts the focus from the antecedent sections to a critical examination of the impact of cryptocurrencies on the U.S. dollar. This section focuses primarily on hypothesis H2, analysing the relationship between the market capitalization of cryptocurrencies (ln(CMC)) and the U.S. Dollar Index (ln(DXY)), a key indicator of the dollar's international currency status.

The regression analysis reveals a statistically insignificant relationship between the market capitalization of cryptocurrencies and the U.S. Dollar Index. This indicates that variations in the market capitalization of cryptocurrencies neither substantially strengthen nor weaken the U.S. Dollar Index. These results are consistent with the null hypothesis, which asserts that cryptocurrencies have a negligible impact on the strength of the U.S. dollar, a crucial pillar of U.S. economic stability. This is consistent with the findings of Erdaş and Caglar (2018) and Fulton (2022), who discovered a weak correlation between Bitcoin and the U.S. dollar.

Further, the FTX debacle of 2022, a significant disruption in the cryptocurrency domain, caused the cryptocurrency market to fluctuate significantly. This resulted in significant depreciations of prominent cryptocurrencies like Bitcoin. Despite these fluctuations, the DXY indicated that the global standing of the U.S. dollar remained relatively stable. This fact strengthens the weak correlation identified by regression analysis and is consistent with the views of academicians such as King 2021 and Rubenking 2021, who downplay the potential for cryptocurrencies to challenge the U.S. dollar's status as the global reserve currency.

In addition, the Granger causality test reveals a unidirectional causal relationship between the U.S. Dollar Index and the market capitalization of cryptocurrencies. This finding implies that fluctuations in the value of the U.S. dollar may be predictive of market changes in cryptocurrencies. This is consistent with the findings of and contradicts those of Mokni and Ajmi (2021) and Kwon (2020), who reported a bilateral relationship.

In addition, the R-squared value of 0.034 derived from the regression model (See Table 10) indicates that only about 3.4% of the variations in the U.S. Dollar Index can be explained by fluctuations in the market capitalization of cryptocurrencies. This low R-squared value highlights the negligible impact of the cryptocurrency market on the U.S. Dollar Index, strengthening the null hypothesis.

Contrastingly, it is important to note the diverging opinions in the academic field, as seen in the studies by Bouri et al. (2017), and in the views presented by Bertaut et al. (2021) foresee a significant disruption of the U.S. dollar's dominance by cryptocurrencies.

H3. *Cryptocurrency Market Capitalization impact on Inflation.*

This section investigates the intriguing relationship between the market capitalization of cryptocurrencies (ln(CMC)) and inflation (ln(CPI)), allowing for a thorough examination of Hypothesis H3.

The dataset's regression model analysis yielded an intriguing result. It displayed a substantial coefficient of 5.345 and a highly statistically significant t-statistic of 137.102 (p-value = 0.000), indicating a significant positive relationship between market capitalization of cryptocurrencies and inflation. This result is consistent with earlier research conducted by Salisu et al. (2018) and Blau et al. (2021), further validating the hypothesis that cryptocurrencies can have a substantial effect on inflation. The Granger causality test, as depicted in Table 3, supports this relationship by demonstrating a significant causal link between the market capitalization of cryptocurrencies and inflation.

The adjusted R-squared value of 0.46 suggests that approximately 47% of inflation variation can be ascribed to fluctuations in cryptocurrency market capitalization, as indicated by the regression analysis in the table. The substantial coefficient supports the hypothesis that a 1% increase in the market capitalization of cryptocurrencies corresponds to a 5.345% increase in inflation. It is also consistent with the correlation matrix, which reported a correlation coefficient of 0.691%.

Nonetheless, it is essential to recognize the scepticism encircling the dependability of cryptocurrencies as inflation hedges. This point was raised by Conlon et al. (2021) and Liu and Tsyvinski (2018), who provided cautionary insights that mitigate the initial findings.

The collapse of FTX provides a distinct perspective on the relationship between market capitalization and inflation in the cryptocurrency market. This event caused significant market volatility and significant losses for cryptocurrencies such as Bitcoin, Ethereum, and Solana (Hern and Milmo 2022). This abrupt disruption may have had a negative impact on the public's perception of the stability of cryptocurrencies, resulting in higher inflation expectations and, ultimately, actual inflation rates.

Moreover, the collapse of FTX illuminated the complex relationship between the cryptocurrency industry and conventional banking systems. According to U.S. Senator Elizabeth Warren, the FTX collapse impact could indirectly impact inflation via its residual effects. The resulting financial unpredictability may have prompted a stampede into real assets, driving up prices and contributing to inflation.

In contrast, the Binance case study paints a different picture, where stable growth and effective integration into traditional financial systems have not precipitated such negative economic repercussions. Binance's success story may even contribute to a more stabilized economic perception of cryptocurrencies, potentially mitigating inflationary fears. Supporting this view by Supra Oracles (2022) and Skrill (2023) suggest that the overall impact of cryptocurrencies on inflation is moderated by the complex interplay of factors in the broader economy, indicating that the influence of cryptocurrencies on inflation might be less direct and significant than individual cases like FTX might imply. This contrast between the two case studies highlights the diverse and nuanced impact of cryptocurrencies on the economy and inflation, depending on the stability and integration of the cryptocurrency entity in question.

This contrast between the two case studies highlights the diverse and nuanced impact of cryptocurrencies on the economy and inflation, depending on the stability and integration of the cryptocurrency entity in question.

H4. *Cryptocurrencies impact on Traditional Banking Operations.*

This study investigates Hypothesis H4, which examines the relationship between the market capitalization of cryptocurrencies and traditional banking operations. This investigation is motivated by Berentsen and Schär's (2018) hypothesis that cryptocurrencies could disrupt the financial landscape.

The findings, however, contradict the disruption hypothesis presented by scholars such as Barnes (2018) and Mersch (2017). The regression analysis reveals a statistically significant and positive correlation between the market capitalization of cryptocurrencies and bank deposits. These results suggest that the expansion of the cryptocurrency market may not threaten traditional financial operations. Instead, it may coincide with an increase in bank deposits, supporting Zohuri et al.'s (2022) hypothesis regarding the potential integration of cryptocurrencies into banking systems.

According to Hern and Milmo (2022), the FTX crisis of 2022 introduced significant volatility to the cryptocurrency market. This event despite its dramatic effects on the cryptocurrency market, did not significantly harm the traditional financial sector but rather seemed to boost demand for conventional banking services, suggesting that market turbulence in cryptocurrencies could drive depositors towards the perceived safety of traditional banks. This observation is juxtaposed with the stability and growth seen in successful cryptocurrency entities like Binance, which have managed to integrate effectively into the traditional financial system without causing destabilizing shocks. Such a contrast underscores the diverse potential impacts of cryptocurrencies on traditional banking, ranging from inducing a flight to safety in times of crisis to fostering a harmonious coexistence that can lead to mutual growth and stability.

While the regression analysis offers a significant positive correlation between the cryptocurrency market capitalization and traditional financial markets, the Granger causality test provides a nuanced perspective. It reveals no significant causality from the cryptocurrency market to traditional banking functions. This suggests that the growth trajectory of cryptocurrencies may not reliably forecast shifts in traditional banking, which aligns with the views of Zohuri et al. (2022) and Geva (2019). Therefore, the overarching impact of cryptocurrencies on conventional banking might not be as profound or predictable as some predictions have proposed.

Despite the absence of a distinct cause-and-effect relationship, the regression model (Table 4.4) reveals that nearly 20% of changes in bank deposits can be attributed to fluctuations in the market value of cryptocurrencies. This finding is inconsistent with the ideas of Berentsen and Schär (2018) and Mersch (2017), who hypothesized that as the popularity of cryptocurrencies increases, individuals will rely less on traditional banking services.

In contrast, the data appear to support the positions of Mersch (2017), Kavuri et al. (2021), and Geva (2019). They hypothesized that cryptocurrencies could motivate conventional institutions to innovate and adapt to the shifting financial environment.

The contrasting outcomes from the FTX collapse and the successful integration of entities like Binance in the banking sector demonstrate the multifaceted relationship between cryptocurrencies and traditional banking, ranging from generating cautious investor behavior to fostering innovation and stability in financial operations. These varying impacts, highlighted through real-world events like the FTX crisis and Binance's achievements, elucidate the intricate and evolving dynamics between the burgeoning world of cryptocurrencies and the established banking industry.

Real-world events, such as the FTX crisis, substantiate the implications of this association. The considerable volatility in major cryptocurrencies that followed the crisis was associated with a surge in suspicious transactions. This event presents practical evidence of the strong correlation identified in this research.

Furthermore, the correlation between cryptocurrencies and financial crime has been intensifying, as cryptocurrencies gain wider acceptance, thus strengthening this conclusion. The rise in anonymous and unregulated transactions, alongside the increasing misuse of cryptocurrencies, contributes to this trend.

In considering causality, the Granger causality test discloses a one-way causal link from the average cryptocurrency market capitalization to financial crime indicators. This finding augments existing scholarly observations, especially those of Kaminska and Walker (2018), who proposed a predictive relationship between the growth of the cryptocurrency market and financial crime indicators. The implications of this relationship are noteworthy, suggesting that the cryptocurrency market may act as an early warning system for changes in financial crime indicators, thereby providing a unique predictive tool.

However, it is crucial to understand that while the Granger causality test implies a sequence of events, it does not confirm causality in the conventional sense. The causality found in this research suggests that past information from the cryptocurrency market may be valuable in predicting future trends in financial crime indicators.

The high R-squared value of 0.792, derived from the regression model, indicates that about 79.2% of the changes in financial crime indicators can be explained by changes in the average cryptocurrency market capitalization. This strong correlation is even more significant considering the growing market capitalization of cryptocurrencies and their ease of use for illicit activities, as seen in the FTX case (FATF 2020; Kethineni and Cao 2019; Hern and Milmo 2022).

However, there are contrasting perspectives in academic research, as seen in studies by Chainalysis (2020), Foley et al. (2019), and Bjelajac and Bajac (2022), which suggested that the degree of illicit activities involving cryptocurrencies might be overstated. These differing views could be due to variations in the type of crimes, market conditions, or data collection periods. Watters (2023) and Nickerson (2019) highlight that while cryptocurrencies can be misused, the predominant issues are fraud and hacking, not direct illicit transaction facilitation. This indicates that blockchain and cryptocurrencies do not inherently lead to fraud. The contrasting cases of FTX and Binance further illustrate this point; Binance's adherence to regulatory compliance and robust security demonstrates that cryptocurrencies can operate legitimately within the financial ecosystem, challenging the perception of the crypto industry as fundamentally fraught with fraud. Nonetheless, this research, with its focus on the overall cryptocurrency market capitalization, aims to provide a broader view of this complex relationship.

Considering the link between average cryptocurrency market capitalization and the number of suspicious transaction reports, it is reasonable to expect that this will have significant implications for regulatory policies, law enforcement strategies, and the cryptocurrency community's self-regulation efforts. The growing popularity of cryptocurrencies as an alternative financial system has attracted a wide array of participants, from individual users to large criminal entities. This shift has not only changed the nature of financial transactions but also the strategies used by criminals and those trying to combat them (FATF 2020; Kethineni and Cao 2019).

The complex relationship between the cryptocurrency market and financial crime does present potential risks that necessitate careful regulatory considerations. The collapse of FTX and the subsequent criminal charges against its CEO demonstrate how cryptocurrency can potentially amplify the scope and impact of financial crimes. This event emphasizes the urgent need for robust regulatory frameworks that ensure transparency, protect users, and maintain financial stability while countering the illicit use of cryptocurrencies.

In summary, the study findings suggest that the rise of cryptocurrencies has both opportunities and challenges for U.S. financial stability. The strong link between the cryptocurrency market and the Dow Jones Industrial Average demonstrates that cryptocurrencies could be a significant force in shaping the direction of traditional stock markets. Nevertheless, the minimal correlation with the U.S. Dollar Index implies that cryptocurrency dynamics have less impact on the strength of the U.S. dollar. Meanwhile, cryptocurrencies' potential influence on inflation dynamics and traditional banking activities denotes the importance of keeping up with innovations in the sector to maintain economic stability. However, the substantial correlation between cryptocurrency market capitalization and suspicious transaction reports raises concerns about the potential misuse of cryptocurrencies

for illicit activities. As such, it underscores the importance of robust regulatory frameworks and vigilant monitoring to counter the risks associated with the cryptocurrency market. Overall, as cryptocurrencies continue to grow in popularity, they pose both an opportunity for financial innovation and a challenge for maintaining financial stability, necessitating careful management and regulation.

8. Conclusions

The primary aim of this study was to assess the impact of cryptocurrencies on U.S. financial stability. The findings reveal that despite their volatility and rapid growth, cryptocurrencies currently have a limited effect on overall financial stability, given their relatively minor role within the broader U.S. financial system. This is consistent with recent studies (Ozili 2022; Financial Stability Board 2022; Siddik et al. 2023) suggesting that the cryptocurrency market's size and scope do not pose an immediate threat to financial stability. However, the increasing integration of cryptocurrencies into traditional financial systems calls for ongoing vigilance, as their potential disruptive impact could grow.

This research also highlights the association between cryptocurrencies and illicit activities, such as money laundering, fraud, and terrorism financing, aligning with findings in the broader academic literature. A robust positive correlation was identified between cryptocurrency market capitalization and the Dow Jones Industrial Average, with 84.1% of stock market variability attributed to fluctuations in the cryptocurrency market. The FTX collapse, though significant, was an isolated event that underscored this correlation. Conversely, the Binance case study demonstrates a successful integration of cryptocurrency into the financial sector, suggesting that not all cryptocurrency operations lead to instability or illicit activities.

The Granger causality test showed a unidirectional causality from cryptocurrency market capitalization to the DJIA. While the FTX event led to major disruptions in the cryptocurrency sector, its direct impact on the U.S. Dollar Index was relatively limited, supporting the observed mild association between cryptocurrency market capitalization and the U.S. dollar. This test also revealed a unidirectional causality from the U.S. dollar to the cryptocurrency market, indicating that changes in the money supply, like cryptocurrencies, do not significantly affect real variables such as currency value.

A significant positive correlation was found between cryptocurrency market capitalization and inflation, with nearly 47% of inflation variability attributable to changes in the cryptocurrency market. This suggests that cryptocurrencies could act as an inflation hedge. Additionally, a causality from the cryptocurrency market to inflation was established, reinforcing this view.

The study also found a positive relationship between cryptocurrency market capitalization and traditional banking activities, particularly bank deposits, with about 19.8% of bank deposit variability linked to changes in the cryptocurrency market. This indicates a potential for coexistence and mutual benefit between cryptocurrencies and traditional financial institutions. However, the Granger causality test did not reveal a significant predictive relationship, highlighting an area for further research.

Author Contributions: Conceptualization, M.N.S.; methodology, M.N.S. and J.I.; validation, Y.D. and E.K.; formal analysis, M.N.S. and J.I.; investigation, D.K.; resources, M.N.S.; data curation, M.N.S.; writing—original draft preparation, M.N.S.; writing—review and editing, J.I.; visualization, Y.D.; supervision, J.I.; project administration, J.I. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Data Availability Statement: This research uses the Dow Jones Industrial Average (DJIA), the U.S. Dollar Index (DXY), Consumer Price Index (CPI), and Suspicious Activity Reports (STRs) available on https://www.ishares.com/uk/individual/en/products/etf-investments?, US Stock Trading Costs for UK and EU Residents | Interactive Brokers U.K. Limited, Inflation and price indices–Office for National Statistics (ons.gov.uk) and Suspicious Activity Reports–National Crime Agency.

Conflicts of Interest: The authors declare no conflict of interest.

References

Adrian, Tobias, Tara Iyer, and Mahvash S. Qureshi. 2022. Crypto Prices Move More in Sync with Stocks, Posing New Risks. IMF Blog. Available online: https://www.imf.org/en/Blogs/Articles/2022/01/11/crypto-prices-move-more-in-sync-with-stocks-posing-new-risks/ (accessed on 11 January 2022).

Bank for International Settlements. 2020. Central Bank Digital Currencies. BIS Papers, 113. pp. 1–174. Available online: https://www.bis.org/publ/bppdf/bispap113.htm (accessed on 31 May 2023).

Barnes, P. 2018. Cryptocurrency and Its Susceptibility to Speculative Bubbles, Manipulation, Scams and Fraud. Available online: https://www.paulbarnes.org.uk/assets/files/1620211970_cryptocurrencynov18.pdf (accessed on 19 May 2023).

Barr, William P. 2020. Attorney General William P. Barr Announces Publication of Cryptocurrency Enforcement Framework. United States Department of Justice. Available online: https://www.justice.gov/opa/pr/attorney-general-william-p-barr-announces-publication-cryptocurrency-enforcement-framework (accessed on 20 May 2023).

Berentsen, Aleksander, and Fabian Schär. 2018. The Case for Central Bank Electronic Money and the Non-case for Central Bank Cryptocurrencies. *Federal Reserve Bank of St. Louis Review* 100: 97–106. Available online: https://ssrn.com/abstract=3843837 (accessed on 19 May 2023).

Bertaut, Carol, Bastian von Beschwitz, and Stephanie Curcuru. 2021. The International Role of the U.S. Dollar. www.federalreserve.gov. Available online: https://www.federalreserve.gov/econres/notes/feds-notes/the-international-role-of-the-u-s-dollar-20211006.html (accessed on 1 January 2020).

Bjelajac, Željko, and Momčilo B. Bajac. 2022. Blockchain technology and money laundering. *Pravo Teorija i Praksa* 39: 21–38. [CrossRef]

Blau, Benjamin M., Todd G. Griffith, and Ryan J. Whitby. 2021. Inflation and Bitcoin: A descriptive time-series analysis. *Economics Letters* 203: 109848. [CrossRef]

Böhme, Rainer, Nicolas Christin, Benjamin Edelman, and Tyler Moore. 2015. Bitcoin: Economics, technology, and governance. *Journal of Economic Perspectives* 29: 213–38. [CrossRef]

Bouri, Elie, Peter Molnár, Georges Azzi, David Roubaud, and Lars Ivar Hagfors. 2017. On the hedge and safe haven properties of Bitcoin: Is it really more than a diversifier? *Finance Research Letters* 20: 192–98. [CrossRef]

Boyko, A., T. Dotscenko, and Yu Dolia. 2022. Patterns of financial crimes using cryptocurrencies. *Socio-Economic Relations in the Digital Society* 2: 23–28. [CrossRef]

Carmona, Tonantzin. 2022. Debunking the Narratives about Cryptocurrency and Financial Inclusion. Brookings. Available online: https://www.brookings.edu/research/debunking-the-narratives-about-cryptocurrency-and-financial-inclusion/ (accessed on 20 May 2023).

Chainalysis. 2020. Crypto Crime Trends for 2022: Illicit Transaction Activity Reaches All-Time High in Value, All-Time Low in Share of All Cryptocurrency Activity. Available online: https://blog.chainalysis.com/reports/2022-crypto-crime-report-introduction/ (accessed on 21 May 2023).

Conlon, Thomas, Shae Corbet, and Richard J. McGee. 2021. Inflation and cryptocurrencies revisited: A time-scale analysis. *Economics Letters* 206: 109996. [CrossRef]

Corbet, Shaen, Brian Lucey, Andrew Urquhart, and Larisa Yarovaya. 2019. Cryptocurrencies as a financial asset: A systematic analysis. *International Review of Financial Analysis* 62: 182–99. [CrossRef]

Cox, Chelsey. 2022. Cryptocurrency: Treasury Warns Digital Assets Could Threaten Stability of Economy. CNBC. Available online: https://www.cnbc.com/2022/10/03/cryptocurrency-treasury-warns-digital-assets-could-threaten-stability-of-economy.html (accessed on 20 May 2023).

Drakopoulos, Dimitris, Fabio Natalucci, and Evan Papageorgiou. 2021. Crypto Boom Poses New Challenges to Financial Stability. IMF Blog. Available online: https://www.imf.org/en/Blogs/Articles/2021/10/01/blog-gfsr-ch2-crypto-boom-poses-new-challenges-to-financial-stability (accessed on 31 May 2023).

Doumenis, Yianni, Javad Izadi, Pradeep Dhamdhere, Epameinondas Katsikas, and Dimitrios Koufopoulos. 2021. A critical analysis of volatility surprise in Bitcoin cryptocurrency and other financial assets. *Risks* 9: 207. [CrossRef]

Duan, Kun, Yanqi Zhao, Andrew Urquhart, and Yingying Huang. 2023. Do clean and dirty cryptocurrencies connect with financial assets differently? The role of economic policy uncertainty. *Energy Economics* 127: 107079. [CrossRef]

Durrant, Sarah, and Mangai Natarajan. 2019. Cryptocurrencies and Money Laundering Opportunities. In *International and Transnational Crime and Justice*. Edited by M. Natarajan. Cambridge: Cambridge University Press, pp. 73–79. [CrossRef]

Dwyer, Gerald P. 2015. The economics of Bitcoin and similar private digital currencies. *Journal of Financial Stability* 17: 81–91. [CrossRef]

Erdaş, Mehmet Levent, and Abdullah Emre Caglar. 2018. Analysis of the relationships between Bitcoin and exchange rate, commodities and global iexes by asymmetric causality test. *Eastern Journal of European Studies* 9: 27–45. Available online: http://ejes.uaic.ro/articles/EJES2018_0902_ERD.pdf (accessed on 20 May 2023).

FATF. 2020. Virtual Assets Red Flag Indicators of Money Laundering and Terrorist Financing. Available online: https://www.fatf-gafi.org/en/publications/Methodsandtrends/Virtual-assets-red-flag-indicators.html (accessed on 20 May 2023).

Financial Stability Board. 2022. Assessment of Risks to Financial Stability from Crypto-Assets. Available online: https://www.fsb.org/2022/02/assessment-of-risks-to-financial-stability-from-crypto-assets/ (accessed on 19 May 2023).

Fletcher, Emma. 2021. Cryptocurrency Buzz Drives Record Investment Scam Losses. In *Federal Trade Commission*; May 17. Available online: https://www.ftc.gov/news-events/data-visualizations/data-spotlight/2021/05/cryptocurrency-buzz-drives-record-investment-scam-losses (accessed on 20 May 2023).
Foley, Sean, Jonathan R. Karlsen, and Tālis J. Putniņš. 2019. Sex, drugs, and bitcoin: How much illegal activity is financed through cryptocurrencies? *The Review of Financial Studies* 32: 1798–1853.
Franco, Peter. 2022. Report Shows Rising Crypto Adoption in The United States. *Traders International*. May 27. Available online: https://www.tradersinternational.org/report-shows-rising-crypto-adoption-in-the-united-states/ (accessed on 28 May 2023).
Fries, Tim. 2023. Bitcoin Startup River Raises $35M in Round Joined by Thiel. The Tokenist. Available online: https://tokenist.com/bitcoin-startup-river-raises-35m-in-round-joined-by-thiel (accessed on 19 May 2023).
Fulton, RJ. 2022. Is Bitcoin Correlated to the S&P 500? The Motley Fool. Available online: https://www.fool.com/investing/2022/06/14/is-bitcoin-correlated-to-the-sp-500/ (accessed on 20 May 2023).
Gaies, Brahim, Mohamed Sahbi Nakhli, Rim Ayadi, and Jean-Michel Sahut. 2022. Exploring the causal links between investor sentiment and financial instability: A dynamic macro-financial analysis. *Journal of Economic Behavior & Organization* 204: 290–303. [CrossRef]
Garrison, Roger W. 2000. *Time and Money: The Macroeconomics of Capital Structure*. London: Routledge.
George, JiNan Glasgow. 2021. How Crypto's Rise Is Paving The Way For Technological Innovation. *Forbes*, May 14. Available online: https://www.forbes.com/sites/forbestechcouncil/2021/05/14/how-cryptos-rise-is-paving-the-way-for-technological-innovation/?sh=53c3b0e47348 (accessed on 20 May 2023).
Geva, B. 2019. Cryptocurrencies: A Challenge to Legal and Regulatory Frameworks. Electronic Copy. Available online: https://ssrn.com/abstract=3477513 (accessed on 19 May 2023).
Giudici, Giancarlo, Alistair Milne, and Dmitri Vinogradov. 2019. Cryptocurrencies: Market Analysis and Perspectives. *Journal of Industrial and Business Economics* 47: 1–18. [CrossRef]
Granger, Clive W. J. 1969. Investigating Causal Relations by Econometric Models and Cross-spectral Methods. *Econometrica* 37: 424–38. [CrossRef]
Hayek, Friedrich A. 1941. *The Pure Theory of Capital*. Chicago: University of Chicago Press.
Hern, A., and D. Milmo. 2022. How Did Crypto Firm FTX Collapse? *The Guardian*, November 18. Available online: https://www.theguardian.com/technology/2022/nov/18/how-did-crypto-firm-ftx-collapse (accessed on 19 May 2023).
Huang, Linxian. 2024. The relationship between cryptocurrencies and convention financial market: Dynamic causality test and time-varying influence. *International Review of Economics & Finance* 91: 811–26.
International Monetary Fund. 2021. Global Financial Stability Report, October. IMF. Available online: https://www.imf.org/en/Publications/GFSR/Issues/2021/10/12/global-financial-stability-report-october-2021 (accessed on 20 April 2023).
International Monetary Fund. 2022. Geopolitics and Financial Fragmentation: Implications for Macro-Financial Stability. Available online: https://www.imf.org/-/media/Files/Publications/GFSR/2022/April/English/ch3.ashx (accessed on 19 May 2023).
Jones, Michelle. 2022. How Institutional Investors are Moving the Crypto Asset Market. *The Tokenist*, July 19. Available online: https://tokenist.com/how-institutional-investors-are-moving-the-crypto-asset-market (accessed on 25 May 2023).
Kaminska, Izabella, and Martin Walker. 2018. Submission to the House of Commons Treasury Committee—Digital Currencies Inquiry. Available online: https://ssrn.com/abstract=3412228 (accessed on 25 May 2023).
Kaplan, Betul, Vahit Ferhan, and Elcin Aykac Alp. 2023. Decentralize finance and new lending protocols. *PressAcademia Procedia* 16: 192–95. [CrossRef]
Kavuri, Anil Savio, Alistair Milne, and Justine A. Wood. 2021. What Is Really New about Cryptocurrencies? CAMA Working Paper No. 79/2019. SSRN. Available online: https://ssrn.com/abstract=3473528%20 (accessed on 25 May 2023). [CrossRef]
Kethineni, Sesha, and Ying Cao. 2019. The Rise in Popularity of Cryptocurrency and Associated Criminal Activity. *International Criminal Justice Review* 29: 331–49. [CrossRef]
Kwon, Ji Ho. 2020. Tail behavior of Bitcoin, the dollar, gold and the stock market index. *Journal of International Financial Markets, Institutions and Money* 67: 101202. [CrossRef]
Liu, Yukun, and Aleh Tsyvinski. 2018. Risks and Returns of Cryptocurrency. *SSRN Electronic Journal*: 34. [CrossRef]
McCabe, Carrie. 2021. Traditional Asset Managers March to Private Equity. *Forbes*. Available online: https://www.forbes.com/sites/carriemccabe/2021/06/18/traditional-asset-managers-march-to-private-equity/ (accessed on 31 May 2023).
Mersch, Yves. 2017. Digital Base Money: An Assessment from the ECB's Perspective. Speech at Finlands Bank on 16 January. Available online: https://www.ecb.europa.eu/press/key/date/2017/html/sp170116.en.html (accessed on 21 May 2023).
Mises, Ludwig Von. 1949. *Human Action: A Treatise on Economics*. London: Yale University Press.
Michael, A., and J. Groves. 2023. Investment News: US Dances On Debt Ceiling as Financial World Holds Its Breath. *Forbes Advisor UK*. Available online: https://www.forbes.com/uk/advisor/investing/2023/05/18/investment-market-updates (accessed on 19 May 2023).
Mokni, Khaled, and Ahdi Noomen Ajmi. 2021. Cryptocurrencies vs. US dollar: Evidence from causality in quantiles analysis. *Economic Analysis and Policy* 69: 238–52. [CrossRef]
Nakamoto, Satoshi. 2008. Bitcoin: A Peer-to-Peer Electronic Cash System. Available online: https://bitcoin.org/bitcoin.pdf (accessed on 21 May 2023).

Narain, Aditya, and Marina Moretti. 2022. Regulating Crypto. Finance & Development, September. International Monetary Fund. Available online: https://www.imf.org/en/Publications/fandd/issues/2022/09/Regulating-crypto-Narain-Moretti (accessed on 21 May 2023).

Nickerson, Mark A. 2019. Fraud in a World of Advanced Technologies. *The CPA Journal*. July. Available online: www.cpajournal.com/2019/07/01/fraud-in-a-world-of-advanced-technologies/ (accessed on 17 May 2023).

Ozili, Peterson K. 2022. Decentralized Finance Research and developments around the world. *Journal of Banking and Financial Technology* 6: 117–33. Available online: https://ssrn.com/abstract=4188932 (accessed on 20 May 2023).

Roubini, Nouriel. 2018. The Big Blockchain Lie | by Nouriel Roubini. Project Syndicate. Available online: https://www.project-syndicate.org/commentary/blockchain-big-lie-by-nouriel-roubini-2018-10 (accessed on 17 May 2023).

Salami, Iwa. 2018. Why Unregulated Cryptocurrencies Could Trigger Another Financial Crisis. The Conversation. Available online: https://theconversation.com/why-unregulated-cryptocurrencies-could-trigger-another-financial-crisis-89808 (accessed on 19 May 2023).

Salisu, Afees A., Kazeem Isah, and Lateef O. Akanni. 2018. Improving the predictability of stock returns with Bitcoin prices. *The North American Journal of Economics and Finance* 45: 285–96. [CrossRef]

Sharma, Rakesh. 2022. Are Bitcoin Price and Equity Markets Returns Correlated? Investopedia. Available online: https://www.investopedia.com/news/are-bitcoin-price-and-equity-markets-returns-correlated/ (accessed on 19 May 2023).

Sharpe, William F. 1964. Capital asset prices: A theory of market equilibrium under conditions of risk. *The Journal of Finance* 19: 425–42.

Siddik, Md Abu Bakar, Maria Amaya, and Landon T. Marston. 2023. The water and carbon footprint of cryptocurrencies and conventional currencies. *Journal of Cleaner Production* 411: 137268. [CrossRef]

Skrill. 2023. What Is the Relationship between Crypto and Inflation? *Skrill News*. Available online: https://www.skrill.com/en/skrill-news/crypto/what-is-the-relationship-between-crypto-and-inflation/ (accessed on 31 May 2023).

Sonnenshein, Michael. 2022. Cryptocurrency Is the Future of Finance. World Economic Forum. November 11. Available online: https://www.weforum.org/agenda/2022/11/cryptocurrency-us-midterms/ (accessed on 28 May 2023).

Supra Oracles. 2022. Crypto and Inflation: A Complex Relationship. Supra Oracles Academy. Available online: https://supraoracles.com/academy/crypto-and-inflation-a-complex-relationship/ (accessed on 31 May 2023).

The White House. 2022. FACT SHEET: White House Releases First-Ever Comprehensive Framework for Responsible Development of Digital Assets. Available online: https://www.whitehouse.gov/briefing-room/statements-releases/2022/09/16/fact-sheet-white-house-releases-first-ever-comprehensive-framework-for-responsible-development-of-digital-assets/ (accessed on 20 May 2023).

Tiwari, Anirudh. 2021. Cryptocurrency Derivatives Market Shows Growth Despite Regulatory FUD. *Cointelegraph*, August 17. Available online: https://cointelegraph.com/news/cryptocurrency-derivatives-market-shows-growth-despite-regulatory-fud (accessed on 25 May 2023).

Trozze, Arianna, Josh Kamps, Eray Arda Akartuna, Florian J. Hetzel, Bennett Kleinberg, Toby Davies, and Shane D. Johnson. 2022. Cryptocurrencies and future financial crime. *Crime Science* 11: 1–35. Available online: https://crimesciencejournal.biomedcentral.com/articles/10.1186/s40163-021-00163-8 (accessed on 20 May 2023).

Vardar, Gulin, and Berna Aydogan. 2019. Return and volatility spillovers between Bitcoin and other asset classes in Turkey: Evidence from VAR-BEKK-GARCH approach. *Emerging Markets Journal of Banking and Finance* 11: 1–16. [CrossRef]

Wang, Hao, Xiaoqian Wang, Siyuan Yin, and Hao Ji. 2022. The asymmetric contagion effect between stock market and cryptocurrency market. *Finance Research Letters* 46: 102345. [CrossRef]

Warren, Elizabeth. 2022. S.5267—Digital Asset Anti-Money Laundering Act of 2022, 117th Congress (2021–2022). Available online: https://www.congress.gov/bill/117th-congress/senate-bill/5267 (accessed on 20 May 2023).

Watters, Casey. 2023. When criminals abuse the blockchain: Establishing personal jurisdiction in a decentralised environment. *Laws* 12: 33. [CrossRef]

Zohuri, Bahman, Hang Thanh Nguyen, and Masoud Moghaddam. 2022. What is the Cryptocurrency? Is it a Threat to Our National Security, Domestically and Globally? *International Journal of Theoretical & Computational Physics* 3: 1–14. Available online: https://unisciencepub.com/storage/2022/02/What-is-the-Cryptocurrency-Is-it-a-Threat-to-Our-National-Security-Domestically-and-Globally.pdf (accessed on 19 May 2023).