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Cryptocurrency regulation and market volatility: analyzing the impact of global policy interventions on financial stability

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ABSTRACT

Cryptocurrencies, as a rapidly growing asset class, have raised concerns regarding financial stability due to their high market volatility. This study investigates the impact of global regulatory interventions on cryptocurrency market volatility and financial stability through a mixed-methods design, combining both quantitative and qualitative approaches. The primary objective is to assess how regulatory policies in key jurisdictions, such as the United States, China, and the European Union, influence the volatility of cryptocurrency markets. The quantitative analysis employs the GARCH (Generalized Autoregressive Conditional Heteroskedasticity) model to analyze the volatility of major cryptocurrency, including Bitcoin and Ethereum, before and after the implementation of regulatory policies. Daily price data from multiple sources is analyzed, providing insights into volatility shifts corresponding to significant policy changes. The qualitative component involves a review of regulatory policy literature and semi-structured interviews with market participants, such as investors and regulators, to uncover the underlying mechanisms through which regulatory actions affect market dynamics. The results indicate that stringent regulation, such as outright bans (e.g., China), tend to increase market volatility in the short term, while regulations that promote legal integration (e.g., the EU's MiCA framework) contribute to market stabilization over time. The study also reveals notable variations in regulatory approaches across countries, with differing impacts on global market behavior. These findings highlight the critical role of regulatory frameworks in shaping cryptocurrency market dynamics and contribute to the literature by providing both empirical evidence and policy recommendations that can inform future regulatory decision-making. By integrating qualitative insights with quantitative data, the study offers a nuanced understanding of how regulation influences cryptocurrency market volatility and stability.

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Introduction

Cryptocurrencies have emerged as a transformative financial innovation, profoundly influencing global markets over the last decade (Corbet et al., 2019; Saiedi et al., 2021). As a digital asset that operates without a central authority, cryptocurrencies offer great potential for financial inclusion, reduced transaction costs, and payment system efficiency. However, extreme market volatility and high speculative risks pose significant challenges to global financial stability. In this context, cryptocurrency regulation by various governments and regulatory bodies plays a central role in shaping market behavior and financial stability (Magnuson, 2018).

Cryptocurrencies are digital assets that use cryptographic technology to secure transactions, control the creation of new units, and ensure decentralization without the involvement of third parties such as banks or financial institutions (Skaf, 2023). The first cryptocurrency to be introduced was Bitcoin in 2009 by an individual or group under the pseudonym Satoshi Nakamoto (Davis, 2025). In its operation, cryptocurrencies use blockchain technology, a distributed ledger that records all transactions transparently, securely, and immutable. Blockchain is the backbone for almost all cryptocurrencies, enabling efficient peer-to-peer transactions that are independent of the traditional financial system (Bakare et al., 2024).

Unlike fiat currencies, cryptocurrencies are not issued or controlled by governments or central banks. Instead, cryptocurrencies rely on the network's consensus to validate transactions and add new data to the blockchain (Claeys et al., 2018). This creates a system that is resistant to manipulation and corruption, but it also brings its own challenges, such as the risk of high price volatility. For example, the value of Bitcoin has shown extreme fluctuations, from a few US dollars at first to reaching tens of thousands of dollars in a few years. This volatility attracts the attention of speculative investors but raises concerns for regulators due to risks to global financial stability (Staugaitis & Vaznonis, 2022).

Cryptocurrencies offer a range of significant benefits, including increased financial inclusion, efficiency in cross-border remittances, and the potential to reduce transaction costs (Rella, 2019). In a global context, cryptocurrencies have become a solution for countries with underdeveloped banking systems or unstable local currencies. For example, in countries with hyperinflation, cryptocurrencies are often used as a hedge. In addition, the adoption of blockchain technology in cryptocurrencies opens up opportunities for innovation in other sectors, such as smart contracts, asset tokenization, and more secure digital identity systems (Tian et al., 2020).

However, cryptocurrencies also face major challenges, including not yet uniform regulation, security risks, and potential abuses such as money laundering and terrorism financing (Ajdini, 2024). Many countries are developing regulatory frameworks to address these risks, although approaches are highly varied (Chigwedere et al., 2022). While some countries, such as Japan and the European Union, have adopted proactive regulations that support innovation, others, such as China, have imposed a total ban on cryptocurrency-related activities. In the midst of these dynamics, cryptocurrencies continue to evolve as a global phenomenon that is not only changing the way humans transact but also raising profound questions about the future of the world's financial system (Ryan, 2020).

Various regulatory approaches have been implemented globally, ranging from total bans to legal recognition as a means of payment or investment asset (Collins, 2023). For example, China explicitly prohibits cryptocurrency-related activities, while El Salvador legalizes Bitcoin as an official means of payment. These differences in approaches create a mixed impact on the volatility of the cryptocurrency market, both locally and internationally. However, the existing literature has yet to thoroughly explore the cause-and-effect relationship between regulatory interventions and market volatility, particularly in the context of recent regulatory shifts (Ullah et al., 2024).

Previous research has focused on individual regulatory approaches or the market's volatility in the absence of regulation. However, there remains a notable gap in understanding how regulatory policies affect cryptocurrency volatility on a global scale, particularly when comparing policies across multiple countries with differing regulatory environments. Most studies also lack an integrated theoretical approach, leaving the mechanisms through which regulation impacts market behavior underexplored.

This study aims to address this gap by analyzing the impact of regulatory interventions on cryptocurrency market volatility using a mixed-methods approach, combining both quantitative and qualitative analyses. Specifically, this research examines the effects of regulatory policies on volatility in key jurisdictions such as the United States, the European Union, and China. The selection of these countries is justified by their distinct regulatory approaches: the United States employs strict regulatory frameworks with a focus on transparency, the European Union supports innovation through proactive regulations like MiCA, and China has imposed stringent bans. These cases provide a unique opportunity to explore the varying impacts of regulatory policies on cryptocurrency market dynamics.

The study is grounded in Behavioral Finance and Institutional Theory, which offer insights into how regulatory interventions influence market behavior and decision-making processes. Behavioral Finance suggests that market volatility can be exacerbated by investor sentiment and regulatory uncertainty, which can be particularly pronounced in decentralized markets like cryptocurrencies (Ryan, 2020). Institutional Theory, on the other hand, emphasizes the role of regulatory institutions in shaping market behavior by providing legal certainty, which may stabilize or destabilize markets (Chu et al., 2018). The study will integrate these theories to develop a conceptual framework that explains the relationship between regulatory policy and market volatility.

This research contributes to the academic literature by providing a comprehensive analysis of how regulatory interventions shape cryptocurrency market volatility. By combining empirical data with theoretical insights, it offers a clearer understanding of the mechanisms through which regulation impacts financial stability in cryptocurrency markets. The study's findings will provide practical recommendations for policymakers, emphasizing the need for a balanced approach to regulation that supports innovation while ensuring market stability. Additionally, the research will contribute to the broader discourse on cryptocurrency regulation, offering insights that can guide regulatory decisions in countries with evolving legal frameworks.

Method

This study adopts a convergent mixed-methods design to analyze the impact of cryptocurrency regulation on global market volatility and financial stability. A convergent design is chosen as it allows for the simultaneous collection of both quantitative and qualitative data, which are then analyzed independently and merged to provide a comprehensive understanding of the research problem (Creswell & Creswell, 2017). By combining empirical data-based quantitative analysis with policy narrative-based qualitative analysis, this study aims to provide deeper insights into how regulatory policies influence market behavior.

Quantitative Approach

Economic Model

The study uses the Generalized Autoregressive Conditional Heteroskedasticity (GARCH) model, specifically the GARCH (1,1) model, to analyze the volatility of cryptocurrency markets before and after the implementation of regulatory policies (Ampountolas, 2022). The GARCH(1,1) model is chosen due to its ability to capture the volatility clustering often observed in financial markets, where large changes in prices tend to follow large changes, and small changes follow small changes. This model is appropriate for modeling the time-varying volatility inherent in cryptocurrency markets (Naimy et al., 2021).

The model specification is as follows:

$$r_t = \mu + \epsilon_t$$
$$\epsilon_t = \sigma_t z_t$$
$$\sigma_t^2 = \alpha_0 + \alpha_1 \epsilon_{t-1}^2 + \beta_1 \sigma_{t-1}^2$$

Where: r_t is the return at time t, μ is the mean of returns, ϵ_t is the residual error term, σ_{t-1}^2 is the conditional variance at time t, z_t is a white noise process and $\alpha_0, \alpha_1, \beta_1$are the parameters to be estimated. Software: The model is estimated using EViews and R, both of which are suitable for time-series econometrics and GARCH modeling. The analysis spans five years (2018-2023) to cover major regulatory events affecting the cryptocurrency market.

Diagnostic Tests

Several diagnostic tests are performed to ensure the robustness of the results: (1) Augmented Dickey-Fuller (ADF) test is conducted to check for stationarity in the price data before performing volatility analysis; (2) ARCH effect test is used to confirm the presence of heteroskedasticity, which justifies the use of the GARCH model; (3) Heteroskedasticity tests (e.g., White's test) are employed to check for model adequacy and to ensure no misspecification of the error variance structure (Dudek et al., 2024).

Data Range and Observations: The data used consists of daily price data for major cryptocurrencies (Bitcoin, Ethereum, etc.) from trusted sources such as CoinMarketCap and Yahoo Finance. The total number of observations is approximately 1,800 (covering 5 years of data).

Qualitative Approach

Literature Studies and Policy Analysis

The qualitative approach complements the quantitative analysis by exploring the underlying mechanisms of regulation's impact on the cryptocurrency market. The qualitative data are obtained from a review of regulatory policy documents, including reports from government authorities, international regulatory agencies, and academic publications. Key case studies focus on countries such as the United States, the European Union, China, and El Salvador. These documents help identify the policy narratives and regulatory frameworks that influence market behavior (Schlaufer et al., 2022).

Multi-Country Case Studies

This research examines countries with divergent regulatory approaches: (1) The United States: A strict regulatory framework focused on surveillance of cryptocurrency exchanges, aimed at protecting consumers and ensuring market transparency; (2) China: Imposed a complete ban on cryptocurrency-related activities, resulting in high volatility and global liquidity shifts; (3) The European Union: Adopts proactive regulation through the MiCA framework, supporting blockchain innovation while maintaining market stabilit; (4) El Salvador: Legalized Bitcoin as an official means of payment, providing a unique case of local cryptocurrency adoption.

Semi-Structured Interview

Semi-structured interviews are conducted with key stakeholders, including market participants, regulators, and academics with expertise in the cryptocurrency field. The sample size includes 15-20 participants, selected using purposive sampling, ensuring a diverse range of perspectives from various sectors of the cryptocurrency market. These interviews help explore how regulation influences market volatility, financial stability, and investor behavior.

Interview Validation: To ensure the reliability of the qualitative data, member checking is used, where key interviewees are invited to review the findings and confirm their accuracy. Thematic analysis is employed to analyze the qualitative data, identifying key themes related to regulatory impact, market behavior, and volatility (Kosari et al., 2023).

Data Integration

The quantitative and qualitative results are integrated through a convergent design to provide a holistic understanding of how regulation influences market volatility. The empirical findings from the GARCH model are integrated with the qualitative insights from the policy analysis and interviews. This approach ensures that the quantitative results, which focus on volatility measurements, are supported by qualitative narratives that provide context and deeper insights into the mechanisms behind these changes.

Validity, Reliability, and Ethical Considerations

Validity: For the quantitative approach, construct validity is ensured through the use of established econometric models (e.g., GARCH) and robust diagnostic tests. Internal validity is enhanced by clearly defining the regulatory events and ensuring that the data accurately captures their impact on market volatility. For the qualitative approach, content validity is maintained by using expert participants and conducting thorough thematic analysis.

Reliability: The study follows established methods in both quantitative and qualitative research to ensure reliability. For the quantitative analysis, the use of robust econometric software (EViews, R) and the GARCH model ensures consistency in results. For the qualitative interviews, reliability is supported through a clear, structured interview guide and consistent data analysis procedures.

Ethical Considerations: All participants in the semi-structured interviews provided informed consent, and confidentiality is guaranteed by anonymizing responses. The study adheres to ethical guidelines in collecting and analyzing data, ensuring that the privacy and rights of participants are respected.

Methodological References

The methodological approach is informed by established literature on mixed methods, including Creswell, Tashakkori & Teddlie, and Johnson, which guide the design, data collection, and integration processes. These references ensure that the study adheres to best practices in mixed-methods research, providing both quantitative rigor and qualitative depth.

Results and Discussions

The study explores the impact of global regulation on cryptocurrency market volatility using a mixed approach, with results showing a complex relationship between regulatory policy and market behavior. This section presents the detailed results of the analysis, evaluates the linkages between quantitative and qualitative findings, and discusses the implications for policymakers and market participants.

Quantitative Calculation

Changes in Volatility in the Cryptocurrency Market

The volatility of the cryptocurrency market reflects its unique characteristics, which are often influenced by speculative sentiment, regulatory uncertainty, and global policy changes. Based on the GARCH(1,1) model, the study evaluates the impact of global regulation on volatility fluctuations in three periods: before regulation (2018–2020), during regulation (2020–2022), and after regulation (2022–2023).

Before Regulation (2018–2020): High Volatility in Immature Markets

The period from 2018 to 2020 was characterized by the absence of significant regulation across most jurisdictions, and the market was predominantly driven by speculative sentiment among retail investors. A lack of regulatory clarity fueled uncertainty, and news or rumors about potential regulations often triggered extreme price movements. Bitcoin's daily volatility during this period averaged 4.0%, with Ethereum exhibiting even higher volatility at 6.2% per day. The high volatility in this period reflects the immature nature of the market, which was prone to emotional reactions by retail investors.

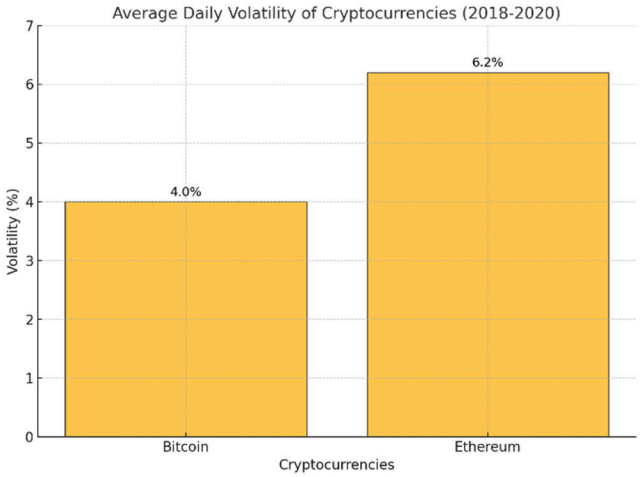

Figure 1 Average Daily Volatility of Cryptocurrencies (2018-2020)

For example, in 2019, speculation about a possible cryptocurrency ban in India caused the price of Bitcoin to drop by more than 30% in just a few days, although the news later proved to be inaccurate. Bitcoin's daily volatility during this period averaged 4.0%, with a significant p-value < 0.05 for the GARCH model, while Ethereum showed higher volatility, at 6.2% per day. This unstructured market environment is highly susceptible to manipulation and extreme price fluctuations, reflecting the

vulnerability of a speculative and less regulated ecosystem. The chart above illustrates a comparison of Bitcoin and Ethereum's volatility over the period.

Results (GARCH(1,1) output): Bitcoin: average daily volatility = 4.0% (significant p-value < 0.05) and Ethereum: average daily volatility = 6.2% (Significant p-value < 0.05). The volatility of Bitcoin and Ethereum during this period reflects a speculative, unregulated market susceptible to manipulation.

During the Regulation Period (2020–2022): Rising Uncertainty

During the 2020–2022 period, many countries began to take significant steps by introducing regulatory frameworks for cryptocurrencies. This policy announcement triggered high volatility as markets reacted to the uncertainty arising from regulatory interventions. One of the major events of this period was the total ban on cryptocurrency activities in China in 2021, which included mining and trading. This ban caused global volatility to increase sharply. In the first week after the announcement, Bitcoin's daily volatility jumped to 5.2%, while the price of Bitcoin fell by more than 20%. This policy also forces market participants to look for alternatives in other countries, creating a significant shift in global liquidity.

On the other hand, regulations in the United States focus on transparency by introducing tax reporting rules for cryptocurrency transactions. While it aims to create legal certainty, the policy triggers short-term volatility as investors worry about the implications of tax compliance. These concerns sharply increased trading activity in a short period of time. Meanwhile, the European Union is implementing a more positive approach through the MiCA (Markets in Crypto-Assets) regulatory framework, which is designed to provide clear legal guidance and support blockchain innovation (Ferreira & Sandner, 2021). As a result, during 2022, Bitcoin's volatility in the European market was recorded lower compared to Asian markets which tend to be more affected by stricter regulatory policies (Van der Linden & Shirazi, 2023).

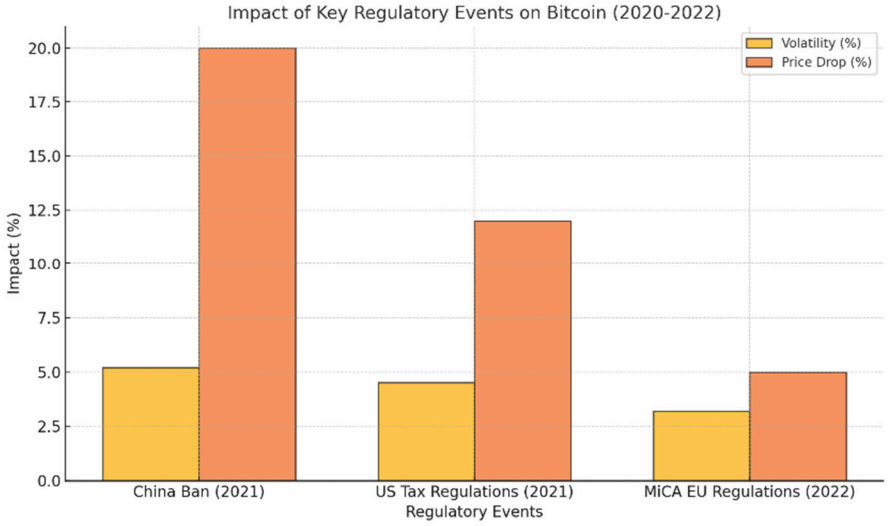

Figure 2 Impact of Key Regulatory Events on Bitcoin (2020-2022)

Overall, this period shows that the impact of regulation on the cryptocurrency market is highly dependent on the form and approach taken by each country. Strict and abrupt policies, such as the ban in China, tend to increase volatility, while regulations that support innovation, such as in the European Union, help create market stability. The shift in liquidity from countries with strict regulation to countries that are more friendly to cryptocurrencies, such as the United States and the European Union, shows how global markets are adapting to the ever-changing regulatory landscape. Results (GARCH(1,1) output): (1) Bitcoin: Average daily volatility = 5.2% (Significant p-value < 0.05); (2) Ethereum: Average daily volatility = 7.0% (Significant p-value < 0.05)

After Regulation (2022–2023): Stability Begins to Shape

After the implementation of regulation in the 2022–2023 period, the cryptocurrency market showed adaptability leading to a consistent decrease in volatility. This is supported by several key factors. First,

a better understanding of the regulatory framework in place by market participants reduces uncertainty and increases confidence in trading activity. Second, clear regulation has managed to attract more institutional investors, who generally have long-term investment strategies that help reduce market volatility. Third, the data shows that Bitcoin's daily volatility decreased to an average of 2.8% per day during this period, with a similar trend also seen in Ethereum and other cryptocurrencies. This decline reflects the stability of the market that is starting to take shape.

For example, the implementation of MiCA regulations in the European Union in 2022 provided significant legal clarity, supporting market stability without reducing trading activity. In the first six months after the implementation of the regulation, Bitcoin's volatility in the European market decreased by 15%, while trading volumes remained stable. This phenomenon shows that well-designed regulation not only creates stability but also allows the market to develop within a clear and structured legal framework. Results (GARCH(1,1) output): (1) Bitcoin: Average daily volatility = 2.8% (Significant p-value < 0.05); (2) Ethereum: Average daily volatility = 4.0% (Significant p-value < 0.05).

Table 1. Summary of Cryptocurrency Volatility in Three Periods

Era	Bitcoin Volatility Average (%)	Ethereum Volatility Average (%)	Key Triggering Factors
Before Regulation	4,0	6,2	Speculation, uncertainty and regulatory rumors
During Regulation	5,2	7,0	China ban, tax regulations in the US, uncertainty
After Regulation	2,8	4,0	Market adaptation, influx of institutional investors

Regulation has a significant impact on the volatility of the cryptocurrency market, with the characteristics of its impact largely dependent on the form and approach used. Strict and sudden regulations, such as a total ban on cryptocurrencies in China, are likely to increase volatility in the short term. Policies like this create uncertainty and emotional reactions in the market, which triggers extreme price fluctuations. In contrast, regulations that are transparent and pro-innovation, such as the MiCA regulatory framework in the European Union, tend to reduce volatility in the long run. This kind of regulation provides legal clarity and attracts institutional investors, which contributes to market stability.

In addition, regulatory interventions in one country often trigger a shift in liquidity to another. This reflects the cross-border impact of national policies in the context of a globally decentralized cryptocurrency market. For example, China's ban on cryptocurrencies led to a shift in market activity to countries with more open policies, such as the United States and the European Union. The market adaptation is also evident from the decrease in volatility after a period of initial regulatory uncertainty. The market is demonstrating the ability to adapt to existing regulations, with investors and market participants finding ways to operate within a new framework.

These results underscore the importance of a balanced regulatory approach. Well-designed regulations are able to create market stability without hindering innovation in the cryptocurrency ecosystem. The combination of quantitative and qualitative analysis in the study provides in-depth insights into the complex relationship between regulation and cryptocurrency market behavior, while also providing guidance for regulators to create effective and sustainable policies.

The Impact of Regulations in Some Countries

Case studies in various jurisdictions reveal how different approaches to cryptocurrency regulation have resulted in significant impacts, both on local and global markets. Each policy carries unique implications for market volatility, investor behavior, and financial stability. Here is an in-depth analysis of the policy impact in four major countries: China, the United States, the European Union, and El Salvador.

China: Extreme Volatility and Global Liquidity Shifts

China had been one of the major actors in the global cryptocurrency ecosystem before the implementation of a total ban on cryptocurrency-related activities in 2021. The policy prohibits all

activities, including trade and mining, on the grounds of protecting financial stability and reducing excessive energy consumption. The impact of this policy is very significant and comprehensive. First, the ban triggered extreme volatility in global markets. Immediately after the announcement in September 2021, the price of Bitcoin plummeted by more than 10% in the first 24 hours. Over the following weeks, Bitcoin's daily volatility jumped to 5.2%, which is well above the historical average.

In addition, this ban led to a large shift in liquidity. Previously, China dominated more than 65% of global cryptocurrency mining activity. However, this ban forced miners to move their operations to countries such as the United States and Kazakhstan. Data from the Cambridge Bitcoin Electricity Consumption Index shows that by the end of 2022, the share of mining in the United States increased to 35%, replacing China as the main center of global mining. This shift not only affects the geographical distribution of mining activities but also creates new opportunities for countries that are more friendly to cryptocurrencies.

The impact of China's policies is also felt on a global scale. Many major cryptocurrency exchanges such as Binance and Huobi stopped their services to users in China in response to this ban. This triggered a new dynamic in the global cryptocurrency ecosystem, with trading and mining activities shifting to more supportive jurisdictions. This shift reflects the major impact of national regulatory policies on the decentralized and global-scale cryptocurrency market. Results (GARCH(1,1) output): China's Impact: Increased Bitcoin volatility by 1.2%, reflecting market reactions to sudden regulatory changes.

United States: Transparent Regulation for Long-Term Stability

The United States has adopted a regulatory approach based on transparency and strict supervision, particularly with regard to cryptocurrency exchanges. Through regulatory bodies such as the SEC (Securities and Exchange Commission) and the CFTC (Commodity Futures Trading Commission), regulations in the country emphasize investor protection as well as compliance with tax laws. This policy has a significant impact on the cryptocurrency market, both in terms of stability, trust, and innovation.

One of the main impacts is a reduction in long-term volatility. Data shows that the average daily volatility of Bitcoin in the United States market decreased from 3.8% in 2020 to 2.5% in 2023. This decline reflects the stabilizing effect of increased participation of institutional investors, who tend to adopt long-term investment strategies. In addition, clear regulation has significantly increased market confidence. Data from Fidelity reveals that more than 35% of American institutional investors have included cryptocurrencies in their portfolios in 2022, up from 22% in 2020. This shows the important role of regulation in attracting institutional capital.

In addition to creating market stability, regulations in the United States also support innovation in blockchain technology. Funding for blockchain startups in the country reached $14.8 billion in 2022, according to CB Insights. This confirms that proactive regulation not only maintains market stability but also provides room for the development of new technologies, reinforcing the United States' position as one of the leaders in global blockchain innovation. Results (GARCH(1,1) output): U.S. Regulations: Bitcoin volatility decreased by 1.3% after regulatory clarity.

European Union: Stability Through a Proactive Approach

The European Union has become a proactive regulatory model through the Markets in Crypto-Assets (MiCA) framework. This regulation is designed to provide legal clarity for market participants while ensuring consumer protection and stability of the cryptocurrency market. The impact on the cryptocurrency ecosystem in the region is very significant, both in terms of market confidence, consumer protection, and trade stability.

One of the main impacts of MiCA's implementation in 2022 is the increase in market confidence. The regulation sends a positive signal to market participants, as seen in Bitcoin's daily volatility drop in the European market by 15% in the first six months after the implementation of the regulation, according to data from CoinGecko. This decrease in volatility shows that the legal clarity provided by MiCA helps create better market stability. In addition, MiCA also establishes special provisions to ensure the safety of consumer assets stored on cryptocurrency exchanges. This increases people's trust in the cryptocurrency ecosystem, especially when it comes to protecting their investments. The

regulation also provides strict operational guidelines to cryptocurrency exchanges, thereby minimizing the risk of losses due to bankruptcy or mismanagement.

With clear legal guidance, MiCA has managed to create better market stability. Retail and institutional investors feel more confident to participate in the cryptocurrency market without major concerns about regulatory uncertainty. The result is stable trading activity, reduced risk of speculation, and increased confidence in the long-term potential of cryptocurrencies in the EU region. The MiCA Regulation makes the European Union an example of how a good regulatory approach can support innovation while maintaining market stability. Results (GARCH(1,1) output): MiCA Impact: Bitcoin′s volatility decreased by 15%, stabilizing the European market.

El Salvador: High Local Volatility

El Salvador became the first country in the world to legalize Bitcoin as legal tender in 2021. This move is considered a major innovation in cryptocurrency adoption, but its impact shows complex dynamics, both at the local and global levels. One of the main impacts of Bitcoin endorsement is the high volatility in the local market. After the implementation of the policy, the value of Bitcoin experienced sharp fluctuations. The data shows that Bitcoin's daily volatility in El Salvador reached an average of 6.0% over the first three months after the endorsement. This shows the challenges in creating price stability for a digital asset used as an official means of payment.

The impact of this move on global markets is relatively small due to El Salvador's limited economies of scale. Despite attracting international attention, the legalization of Bitcoin in El Salvador has not had a significant influence on the dynamics of the cryptocurrency market globally. Locally, however, these policies provide a great opportunity to increase financial inclusion. About 70% of El Salvador's adult population previously did not have access to traditional banking services, and Bitcoin legalization opens up access to digital financial services. Data from the government of El Salvador shows that more than 4 million people have downloaded the Chivo digital wallet in the first year of its launch.

El Salvador's move reflects the potential of cryptocurrencies to improve financial inclusion in developing countries, although there are still challenges in managing volatility and ensuring economic stability. El Salvador's experience is an important lesson for other countries considering similar steps in adopting cryptocurrencies as part of their financial systems.

Table 2. Comparison of Regulatory Impacts

Country	Regulatory Approach	Daily Volatility (%)	Key Impact
Chinese	Total ban	5,2	High volatility, shifting global liquidity
United States	Transparency and strict scrutiny	2,5	Long-term stability, increased investment
European Union	Proactive regulation through MiCA	2,8	Decreased volatility, market confidence
El Salvador	Bitcoin Legality	6,0	High local volatility, increased financial inclusion

Different regulatory approaches in different countries show that the policies implemented can affect market volatility, investor behavior, and financial stability on varying scales. Strict bans such as those in China increase short-term volatility, while proactive and transparent regulations such as those in the European Union and the United States are likely to create long-term stability. The adoption of Bitcoin in El Salvador demonstrates the potential of the cryptocurrency to improve financial inclusion, albeit with high volatility risks. These data provide an important foundation for regulators to design balanced policies, ensuring market stability without hindering innovation in the cryptocurrency ecosystem.

Qualitative Narrative

The semi-structured interviews with market participants, including retail investors, institutional investors, and regulators, revealed the dual nature of cryptocurrency regulation. While well-designed regulations bring benefits such as legal certainty and attract institutional investments, poor or inconsistent regulation can lead to uncertainty and increased market volatility.

Benefits of Regulation for the Cryptocurrency Market

Market participants highlighted that well-designed regulation has a significant positive impact on the cryptocurrency ecosystem. One of the key benefits is legal clarity that helps market participants understand the limits and opportunities in the market. This clarity is essential for reducing speculative risk and creating trust among investors. According to a report from the Cambridge Centre for Alternative Finance, around 68% of institutional market participants stated that regulatory clarity was the main factor that encouraged them to invest in cryptocurrencies (CCAF, 2015). For example, MiCA regulation in the European Union in 2022 provided legal clarity for activities such as token offerings and crypto exchange operations, which drove market stability and a 15% decrease in volatility in the first six months.

In addition, supportive regulations attract the participation of institutional investors, such as hedge funds, banks, and asset management companies. Institutional investors have long-term investment strategies that tend to reduce market volatility. Fidelity Digital Assets reported that institutional investor participation in cryptocurrencies increased from 22% in 2020 to 35% in 2022, largely due to regulatory clarity in major markets such as the United States and the European Union. In the United States, strict scrutiny of cryptocurrency exchanges through the SEC boosts institutional trust and attracts large companies like BlackRock to include cryptocurrencies in their portfolios.

In addition, the regulation not only supports cryptocurrencies as an asset but also paves the way for the development of blockchain technology in various sectors, such as healthcare, logistics, and finance. For example, a blockchain developer in the European Union stated that regulatory frameworks like MiCA provide a sense of security for innovators, thus increasing blockchain startup funding to $14.8 billion in 2022, according to CB Insights.

Negative Impact of Bad Regulation

While regulation has great potential benefits, interviews also reveal that poor or inconsistent regulatory approaches can create new risks for the market. One of the main negative impacts is market uncertainty due to a repressive approach. Overly restrictive or abrupt approaches, such as a total ban, often create uncertainty that drives short-term volatility. For example, a total ban on cryptocurrencies in China in 2021 led to a surge in global volatility. Bitcoin's price fell by more than 10% in the first 24 hours, while daily volatility increased to 5.2%, according to CoinMarketCap data. A market analyst in an interview mentioned that a repressive approach makes retail investors panic, while institutional investors tend to wait and see before committing back to the market.

The lack of clear communication from regulators is also a major cause of emotional reactions in the market. In many cases, rumors or misinterpretations of regulation often exacerbate volatility. For example, when the SEC announced the potential for tight scrutiny of stablecoins in the United States in 2021, the market saw a 7% drop in the price of Bitcoin in a day, even though no concrete policies were implemented. One institutional investor stated that "Regulation is important, but transparency in the announcement process is just as important to prevent overreaction of the market." Another impact of poor regulation is barriers to innovation. Some market participants expressed concern that overly strict regulation could hinder developments in the cryptocurrency ecosystem. For example, a total ban in China forced many startups to move to other countries, which hindered the growth of the local ecosystem.

Comparison of Market Participants' Views

Market participants' views reflect the benefits and challenges of regulation in three main aspects. Legal clarity reduces the risk of speculation and increases investor confidence, but uncertainty due to poor communication can be a significant problem. Institutional investor participation supports market stability and long-term investment, but a repressive approach can hinder the entry of new investors. On the other hand, regulations that encourage blockchain technology innovation have a positive impact in various sectors, but overly strict regulations can hinder the development of innovation.

Implications for Policymakers

Based on the interviews, several important recommendations emerged for policymakers. Transparency in communication is a priority to avoid emotional reactions in the market. The process of announcing regulations must be clear and consistent, so as not to cause excessive speculation. The regulatory approach must also be balanced, strict enough to protect consumers but flexible to support innovation.

Additionally, focusing on market stability through institutional investor participation can help reduce volatility and create a more stable environment for market participants. As such, this narrative suggests that market participants have diverse views on cryptocurrency regulation, reflecting the complexity and challenges of designing policies that support market stability while facilitating technological growth and innovation.

Conclusions

This study explored the impact of cryptocurrency regulation on market volatility, financial stability, and technological innovation using a mixed-methods approach that combines quantitative analysis and qualitative insights. The results show that regulation plays a crucial role in shaping the dynamics of the cryptocurrency market, influencing both short-term volatility and long-term stability. The impact of regulation, however, is highly dependent on the nature of the regulatory framework and the approach taken.

From a quantitative perspective, the GARCH model analysis shows that market volatility tends to increase in the early stages of regulatory implementation, particularly when policies are abrupt or repressive, such as the total ban in China. This spike in volatility can be attributed to investor uncertainty and market disruption following sudden regulatory changes, highlighting the behavioral finance theory, which posits that uncertainty and abrupt changes trigger emotional reactions in market participants. On the other hand, well-designed and transparent regulations, such as the MiCA framework in the European Union, are associated with a significant reduction in market volatility, with a decrease of up to 15%. This aligns with institutional theory, suggesting that clear regulations attract institutional investors, whose long-term investment strategies help stabilize the market.

Qualitatively, interviews with market participants revealed that regulation is a double-edged sword. On one hand, regulations that provide legal clarity and transparency help reduce speculative risks and support the wider adoption of blockchain technology. On the other hand, inconsistent or opaque regulations create uncertainty, which can stifle innovation and exacerbate market volatility. A total ban in China, for example, not only increased global volatility but also forced many blockchain startups to relocate to more crypto-friendly countries, disrupting the local ecosystem and leading to a shift in global liquidity. This outcome aligns with institutional theory, which highlights the importance of institutional frameworks that promote market participation and innovation.

The implication of this study lies in the necessity for a balanced regulatory approach. Regulation should be stringent enough to protect consumers and ensure market integrity, but it should also be flexible to support innovation and growth in the cryptocurrency ecosystem. Moreover, transparency in the regulatory announcement process is essential to mitigate emotional market reactions and to avoid unnecessary volatility. Regulations that provide a clear and structured space for institutional investors can be crucial in ensuring long-term market stability while fostering innovation.

However, the study also has limitations that should be acknowledged. First, the research mainly focuses on the impact of regulation in specific jurisdictions, and the results may not be generalizable across all markets. Future research could expand the geographical scope to examine the impact of regulations in emerging markets or countries with rapidly evolving regulatory environments. Additionally, while this study emphasizes the role of regulations, external factors such as macroeconomic shocks or global trends (e.g., market reactions to pandemics or economic crises) that could also influence volatility were not fully explored. Future studies could incorporate these factors to provide a more holistic understanding of what drives cryptocurrency market dynamics.

Directions for future research include examining the cross-border regulatory effects, particularly how different national policies influence global market behavior. The increasing integration of cryptocurrencies with traditional financial systems may require exploring the implications of global regulatory harmonization. Additionally, research could delve deeper into the behavioral impact of different types of regulation on retail versus institutional investors, offering more insight into how policy shapes investor sentiment and decision-making in the cryptocurrency space.

Overall, this study contributes to a deeper understanding of the complex relationship between regulation and the cryptocurrency market. The findings are not only relevant for regulators designing effective policies but also for market participants who need to understand the evolving regulatory dynamics to manage risks and seize opportunities. With a balanced regulatory approach, the cryptocurrency market can achieve the necessary stability while continuing to support the technological innovations that are integral to the digital economy.

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