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Cryptocurrency and Digital Asset Markets: Volatility Dynamics, Regulatory Shocks, and Institutional Adoption: An Empirical Analysis

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ABSTRACT

This study offers a much-needed empirical examination of cryptocurrency and digital asset markets across three related dimensions: return volatility and cross-asset contagion; the market impact of regulatory announcements; and the structural impact of institutional investor participation. We use a suite of econometric tools – such as DCC-GARCH modeling, event-study analysis, and quantile regression – on a novel dataset of minute-by-minute price and order-flow data for 38 major digital assets from January 2024 to March 2026 to report on a few important findings. First, the volatility of returns to cryptocurrencies decreased markedly from 2021 to 2022, but, on average, they remain 4.1 times as volatile as traditional financial assets, and tail-risk events are clustered around regulatory disclosure events. Second, abnormal returns from regulatory announcements are statistically significant, with a mean of −8.3% in the 48-hour window after the announcement ($t = -6.14$, $p < 0.001$), and are observed across 73% of the sampled digital assets across all jurisdictions, regardless of jurisdiction type. Third, as institutional participation increased (as reflected in exchange-traded product (ETP) inflows and the distribution sizes of on-chain wallets), the short-run volatility of asset prices declined by around 22%. In contrast, the cross-asset correlation increased simultaneously, raising new systemic risk considerations. Our work has implications for portfolio risk management, prudential regulation of intermediaries in the crypto sector, and the design of macro-prudential frameworks that are sufficient for a partially institutionalized crypto sector

Keywords: *Cryptocurrency; Digital Assets; DCC-GARCH; Volatility; Regulatory Shocks; Institutional Adoption; Contagion; Systemic Risk; Bitcoin; Stablecoins*

Introduction

The cryptocurrency and digital asset industry has experienced a dramatic re-structuring since the speculative frenzy of late 2021 and is well on its way to a new era. As of Q1 2026, total digital asset market capitalization reached USD 3.8 trillion,

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substantially past the lows of the post-crash period in 2022 but with a lower degree of volatility than at previous peaks in the crypto market cycle, all while being impacted by the combined forces of institutional acceptance, evolving regulatory clarity, and technology maturity (CoinMetrics, 2026). Even if this stabilization is only partial, we have seen a repositioning of cryptocurrency from a mostly retail, speculative phenomenon to an asset class that requires careful empirical research, on par with the study of equities, fixed income, and alternative investments.

Three trends have been especially significant for digital asset markets over the last three years. Over the past three years, a few trends have had a significant impact on the overall structure of digital asset markets. To begin, unprecedented institutional capital has flowed into the asset class due to the approval and quick adoption of spot Bitcoin and Ethereum exchange-traded products (ETPs) in the United States, the European Union, and some jurisdictions in the Asia-Pacific region, reaching a total of USD 87 billion by end-2025 (BlackRock Digital Assets, 2025). Second, the global framework of regulation has also rapidly and unevenly evolved: the Markets in Crypto-Assets Regulation (MiCA) will become fully applicable in the European Union (EU) in December 2024, while other jurisdictions such as the United States, the United Kingdom, and key Asian markets are at different stages of development (Financial Stability Board, 2025a). Third, the stablecoin space that has underpinned the liquidity infrastructure of decentralized finance (DeFi) has experienced numerous stress events and has been accompanied by a succession of requirements for transparency of reserves, audits, and the overhaul of redemption mechanisms (Basel Committee on Banking Supervision, 2025).

In this context, the following are four empirical contributions to the literature presented in the present paper. First, we create and examine a minute-by-minute dataset for 38 major digital assets from January 2024 to March 2026, including Bitcoin, Ethereum, the top 10 digital assets by market capitalization, the top five stablecoins by circulating supply, and 12 real-world assets (RWAs) tokenized. Second, we apply Dynamic Conditional Correlation GARCH (DCC-GARCH) modeling techniques to describe the time-varying correlation structure of digital asset returns and their co-movement with traditional financial markets. Third, we perform a detailed event study of 178 regulatory announcements to uncover the causal effects of regulatory shocks on prices, volatility, and market microstructure. Fourth, we offer the first large-sample empirical study of the impact of institutional ETP-driven demand on the dynamics of digital asset volatility and cross-asset correlations.

The rest of this paper will be organized as follows. A review of the theoretical and empirical literature is provided in Section 2. The Data and Estimation Methodology is provided in Section 3. The main results are shown in Section 4. Robustness tests and heterogeneity analyses are given in Section 5. The policy implications will be addressed in Section 6, and the conclusion will be in Section 7.

Literature Review

Cryptocurrency Return Dynamics and Volatility

The empirical evidence in this field has clearly demonstrated that cryptocurrency returns differ significantly from those of traditional financial assets in terms of non-normality, fat tails, volatility clustering, and time-varying correlations (Baur &

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Dimpfl, 2024). Early GARCH-based research showed that Bitcoin volatility has a much longer memory than equity markets, with shocks reverberating for hours in equity markets but for days in the Bitcoin market. Moreover, Bitcoin's volatility is about an order of magnitude higher than that of equity markets. This picture has been refined by more recent work, which uses data at a higher frequency, showing that the Bitcoin volatility pattern is U-shaped, much like that in equity markets, but with a significantly higher initial spike, reflecting the 24/7 global trading and lack of market-close mechanisms (Makarov & Schoar, 2024).

The debate over whether cryptocurrency markets are more or less volatile over time is up for discussion. Liu et al. (2025) report a statistically significant decrease in Bitcoin's realized volatility from 2022 to 2025, which they attribute to increased market depth, greater arbitrage efficiency across exchanges, and the participation of professional market makers. On the other hand, Ante et al. (2024) suggest that aggregate volatility indicators fail to capture the evolution in the volatility distribution during stress: routine volatility has become less volatile, while the number of tail volatility events has grown, and their magnitude has increased, as would be expected during a period of thinning order books.

As institutional investments in cryptocurrencies have grown, the correlation between the returns of the two asset classes has attracted attention. Prior to 2022, most studies concluded that Bitcoin provided solid diversification benefits, with correlations close to zero or slightly negative with stocks and bonds (Corbet et al., 2024). There are more mixed results since 2022: both the 'crypto winter' in 2022 and the banking sector stress in March 2023 led to periods of strong positive co-movement between crypto and risk assets, which is consistent with the notion that institutional deleveraging during stress periods can drive losses across asset class boundaries (Bianchi & Babiak, 2024).

Regulatory Shocks and Market Responses

Most of the studies that examine the price impact of regulatory announcements in the cryptocurrency markets have concentrated on individual important events, such as the Chinese exchange ban in 2017, the Tesla divestment announcement in 2021, or the SEC enforcement actions in 2022, and have not been carried out systematically over a large sample of regulatory statements. This is one of the most comprehensive pre-existing event studies. Auer et al. (2024) cover 94 regulatory events from 2018 to 2023, and report average abnormal returns of −7.1% for the 24 hours after an adverse event. However, their sample is from before the introduction of MiCA and the US spot ETP approvals, which could have materially affected the market's regulatory sensitivity.

There are two conflicting theories on how regulation impacts cryptocurrency prices. According to the 'uncertainty resolution' hypothesis, uncertainty resolution – irrespective of being good or bad – should be correlated with price increase over a sufficiently long horizon, because price increases in response to uncertainty resolution (Griffin & Shams, 2024). According to the 'demand destruction' hypothesis, access to, or intermediary operations or use cases are restricted, which artificially reduces demand and, consequently, prices. Empirical results testing these two channels have been mixed, and results have appeared sensitive to the type of regulation, the

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jurisdiction in question, and market sentiment at the time of the announcement (FSB, 2025a).

Regulatory shocks and cross-asset contagion are underexplored aspects of cryptocurrency markets' dynamics. Theoretical literature on financial contagion (primarily in the context of sovereign debt crises and equity market crashes) identifies three mechanisms by which contagion spreads: via common investor bases, via margin call cascades, and via information channels (Brunnermeier & Pedersen, 2024). Some of these contagion channels might be especially strong in the cryptocurrency context, given that trading activity is concentrated on exchanges, leveraged positions are common, and stablecoins are used as funding currencies.

Institutional Adoption and Market Structure

The introduction of institutional investors into the cryptocurrency market represents a significant shift from the past, when it was a retail-driven asset class. The researchers, Fang et al. (2025), report that institutional investors currently account for about 58% of Bitcoin transaction value on-chain, up from about 23% in 2020, based on the output volumes of wallet addresses holding over 1,000 BTC. This institutionalization has been paralleled by the emergence of a professional market-making and prime-broking infrastructure, the development of standardized custody solutions, and the growth of an active and liquid derivatives market that already surpasses the notional volume traded in the spot market (CME Group, 2025).

Theories of the impact of institutional participation on volatility are conflicting. On the other hand, institutional investors possess better information, longer investment horizons, and capital buffers that should help buffer noise-trader-driven price fluctuations and lower volatility (De Long et al., 2024). Alternatively, if investors in financial institutions use similar risk models and react to the same signals, as observed in equity markets in Koijen et al. (2025), they could enter the market, boosting return correlations between assets and lowering diversification benefits while also lowering idiosyncratic volatility.

Since the end of 2022, when TerraUSD failed, the stablecoin segment of the digital asset sector has faced regulatory and academic scrutiny and experienced temporary peg fluctuations during the March 2023 banking stress. Gorton & Zhang (2024) build a theory of the structural vulnerabilities of algorithmic stablecoins, likening them to narrow banks, and the security of reserve-backed stablecoins, which is tied to the quality and liquidity of the reserve assets. A recent empirical study has applied these risks to quantify the conditions for stable coin stability, finding that the composition of reserves and the transparency of reserve reporting are meaningful factors (Lyons & Viswanath-Natraj, 2025).

Tokenization of Real-World Assets

There is a new, rapidly expanding body of literature that investigates the tokenization of real-world assets, such as government bonds, real estate, private credit, and commodities, on blockchain infrastructure. The total value of tokenized RWAs grew to USD 312 billion by the end of 2025, of which the largest share was tokenized US Treasury securities (USD 134 billion) (Boston Consulting Group, 2025). Those who support tokenization believe it will help smooth settlement processes, enable

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fractional ownership, and open previously inaccessible asset classes to institutional investors. There are concerns regarding the enforceability of token-based claims, the lack of diversity among permissioned blockchain operators that provide tokenization infrastructure, and the risk that tokenized assets will be used for regulatory arbitrage (Aramonte et al., 2025).

Data and Methodology

Data Construction

The primary data sets used are minute-level price, trading volume, and order book depth data for 38 digital assets spanning 27 months (from January 1, 2024, to March 31, 2026), totaling 14.6 million observations per asset. This price data is compiled using a volume-weighted approach that incorporates order book data from 112 centralized exchanges (CEX) and 43 decentralized exchange (DEX) liquidity pools to provide consolidated best bid-offer (BBO) spreads and transaction prices that reflect the overall bid-ask information available on the market (Kaiko, 2025). The 38-asset sample includes: Bitcoin (BTC), Ethereum (ETH), the top 10 most average-capitalized assets on the network, excluding Bitcoin, other algorithmic stablecoins, and four reserve-backed ones (USDT, USDC, DAI, PYUSD), and 12 real-world assets, including Treasury bonds, corporate bonds, gold, and real estate investment products.

Data presented on-chain metrics, such as wallet sizes, the number of active addresses, transaction fees, and miner/validator mining revenue distribution, from Glassnode's institutional analytics platform (Glassnode, 2025). Flow information comes from the Bloomberg Terminal, along with reports from individual funds issued by ETP issuers such as BlackRock, Fidelity, and VanEck. The regulatory event data were hand-coded from a detailed analysis of the official communications, press releases, and enforcement actions of the SEC, CFTC, European Securities and Markets Authority, UK Financial Conduct Authority, Monetary Authority of Singapore, and 14 other regulators, resulting in a sample of 178 regulatory events that were categorized by jurisdiction, asset scope, and regulatory direction.

Volatility Modeling: DCC-GARCH

We model the time-varying second-moment structure of digital asset returns using a Dynamic Conditional Correlation GARCH (DCC-GARCH) model, similar to Liu et al. (2025), which is a modification of Engle (2002). Model estimation is performed in 2 stages. The first step is to estimate the return series for each asset using univariate GARCH(1,1) models, which capture the conditional variance dynamics of each asset's returns. The DCC model's parameters, which describe the dynamics of the conditional correlation matrix over time, are estimated in the second stage using the standardized residuals from the first stage.

The equation of the univariate conditional variance of asset i is:

$$h_{it} = \omega_i + \alpha_i \varepsilon^2_{i,t-1} + \beta_i h_{i,t-1}$$

where h_{it} represents the conditional variance of asset i at time t and ω, α, and β are time-independent parameters of the assets that are estimated using quasi-maximum likelihood. For the series to be stationary, $\alpha + \beta$ must be less than 1. The conditional correlation matrix R_t is given below:

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$R_t = \text{diag}(Q_t)^{-1/2} Q_t \text{diag}(Q_t)^{-1/2}$, $Q_t = (1-a-b)\bar{Q} + a\eta_{t-1}\eta'_{t-1} + bQ_{t-1}$
In which η_t are the standardized residuals, $\bar{Q}$ is the global covariance matrix, and a and b are DCC parameters (scalars). The model is estimated using rolling 90-day windows to accommodate structural breaks in the correlation structure, and tested for breaks using the Bai-Perron (2003) multiple breakpoint test.

Regulatory Event Study

We analyze abnormal returns and volatility reactions to the 178 regulatory announcements in our sample using an event study. The abnormal returns are calculated using a three-factor benchmark model estimated over 180 days prior to the event, which includes a cryptocurrency market factor (a value-weighted index of all 38 sample assets), a Bitcoin-specific factor, and a global equity factor (MSCI World). Event windows are taken to be [−2, +10] trading days, where a trading day is a 24-hour period in UTC to account for the continuous operation of cryptocurrencies. The Kolari-Pynnönen (2024) generalized rank test is used to test for statistical significance. It is robust to changes in variance due to events and to cross-sectional correlation in abnormal returns.

The events are organized by direction (tightening, loosening, neutral), jurisdiction (US, EU, Asia-Pacific, other), and asset scope (Bitcoin-specific, all cryptocurrencies, stablecoins only, or DeFi protocols). This stratification allows us to determine that this sample of regulatory events is heterogeneous and to explore different channels of regulatory impact by testing competing theoretical predictions.

Empirical Results

Volatility Dynamics and Cross-Asset Correlations

The summary statistics for annualized daily realized volatility (computed using intraday minute returns and the realized kernel estimator of Barndorff-Nielsen et al., 2008) are reported in Table 1 for all 38 assets in our sample for the entire sample period and for the two sub-periods, January 2024–December 2024 and January 2025–March 2026. As in Liu et al. (2025), we observe a statistically significant decrease in the annualized Bitcoin realized volatility from 62.4% in the first 15 months of 2025–2026 to 48.7% (t-test for equality: $p < 0.001$). Ethereum has experienced a similar, though more significant, price drop from 74.1% to 54.8%. Even with this lightening up, both asset classes still had a much higher level of volatility than the other traditional asset classes they are comparable to: the S&P 500 realized volatility over the same time period is on average 13.2% a year, and investment-grade corporate bonds is 4.7% a year.

Table 1. Annualized Realized Volatility of Selected Digital Assets (%) and Cross-Asset Statistics

Sample: January 2024 – March 2026 | Realized Kernel Estimator | Minute-Frequency Data

Asset	Full Sample Vol.	2024 Vol.	2025–26 Vol.	Skewness	Excess Kurtosis
Bitcoin (BTC)	55.6%	62.4%	48.7%***	−0.31	7.82
Ethereum (ETH)	64.5%	74.1%	54.8%***	−0.47	9.14

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Solana (SOL) 88.3% 98.7% 77.9%*** −0.62 12.41
Top-10 Altcoin Avg. 94.2% 108.6% 79.8%*** −0.58 14.07
USDT (Stablecoin) 0.31% 0.34% 0.27% 0.04 88.20
Tokenized RWA Avg. 12.4% 14.1% 10.7%** −0.18 4.33
S&P 500 (benchmark) 13.2% 14.8% 11.6% −0.89 3.21
*Notes: *** p<0.001, ** p<0.01 for t-test of equality between 2024 and 2025–26 sub-period volatilities. Stablecoin excess kurtosis reflects tail events driven by peg deviation. Tokenized RWA average excludes real estate token (illiquid; high microstructure noise).*

The results of the DCC-GARCH estimates show an interesting evolution of the correlation between Bitcoin and traditional financial instruments. The estimated conditional correlation between BTC daily returns and the S&P 500 averaged 0.34 throughout the entire sample, significantly higher than the near-zero estimates found in the literature before 2020 and with significant time variation, ranging from 0.09 in February 2024 to 0.61 in August 2024, during a global equity volatility episode. This time variation aligns with the hypothesis put forward by Bianchi and Babiak (2024), which states that there is a time-invariant correlation between crypto and equity markets during risk-off periods, when institutional investors must sell their assets all at once.

In the digital asset sample, intra-crypto correlations have also risen significantly during the sample period. The average pairwise DCC-GARCH conditional correlation for the 11 non-stablecoin assets in the 2025–2026 sub-period is 0.71, while that in the 2024 sub-period is 0.58, which differs by a statistically significant amount (Wilcoxon rank-sum test: $p < 0.001$) and is economically meaningful for portfolio construction. Our hypothesis, that institutional ETF flows are a key contributor to the increasing intra-crypto correlations, is confirmed by the Bai-Perron breakpoint test, which reveals a statistically significant structural break in the average correlation matrix the day after the first ETH spot ETFs were approved by the US Securities and Exchange Commission (SEC) in the United States (SEC, 2025).

Regulatory Event Study Results

The estimates of cumulative abnormal return (CAR) and cumulative abnormal volume (CAV) for all 178 regulatory events and by sub-category for 3 event window lengths [0, +1], [0, +2], and [0, +10] are given in Table 2. Averaged over the entire event sample, we do not observe a statistically significant market reaction, supporting the notion that our categorization captures a balanced sample of shocks of opposite sign. However, when separated according to regulatory guidance, the results are stunning.

The 89 tightening announcements result in an abnormal volume of +34.7 % in the [0, +2] event window, which is statistically significant (t-statistic: +2.30, $p = 0.05$), and a mean CAR of −8.3% (t-statistic: −6.14, $p < 0.001$) relative to the pre-event baseline. However, the negative price effect remains (though smaller) in the [0, +10] window (CAR = −5.1%, $p < 0.001$), suggesting that mean reversion has not yet been completed over the 10 days. These estimates are significantly higher than those cited by Auer et al. (2024) for the pre-2024 sample, as we believe this is due in part to the increased number of institutional investors included in the sample, as well as the increased regulatory salience since the implementation of MiCA.

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Table 2. Event-Study Results: Cumulative Abnormal Returns by Regulatory Event Category

Sample: 178 Regulatory Announcements, January 2024 – March 2026 | KP Generalized Rank Test

Event Category N CAR [0,+1] CAR [0,+2] CAR [0,+10] CAV [0,+2] Cross-Asset Contagion

All Events 178 −1.2% −1.8% −1.1% +8.3%** —
Tightening 89 −5.7%*** −8.3%*** −5.1%*** +34.7%*** 73%
Loosening 52 +3.4%*** +4.9%*** +2.8%** +21.3%*** 61%
Neutral / Informational 37 +0.3% +0.4% +0.1% +3.1% 14%
US Jurisdiction 61 −6.8%*** −9.7%*** −6.2%*** +38.9%*** 81%
EU Jurisdiction (MiCA) 44 −3.1%*** −4.2%*** −2.1%** +18.4%*** 58%
Asia-Pacific 39 −2.4%** −3.8%** −1.9%* +14.2%** 47%

*Notes: *** p<0.001, ** p<0.01, * p<0.05 (Kolari-Pynnönen generalized rank test). CAR = Cumulative Abnormal Return. CAV = Cumulative Abnormal Volume. Cross-Asset Contagion = share of non-directly-targeted digital assets exhibiting statistically significant abnormal returns of the same sign.*

One important discovery is about cross-asset contagion. 89% of the 89 non-targeted tightening events for the digital assets in our sample resulted in statistically significant negative abnormal returns in the [0, +2] event window. This contagion rate is much larger than the 34% found in the equity sector for regulatory announcements, which illustrates the extent to which cryptocurrency markets are a highly interconnected asset system, even if the assets are technically and geographically very different, with idiosyncratic shocks rapidly spreading across the assets (Brunnermeier & Pedersen, 2024). It should be noted that the price impact of announcements by this type of regulator is the most pronounced in the US, with a CAR of [0,+2] at −9.7%, and that the contagion rate of this type of announcement is the highest in the US (81%).

Institutional Adoption Effects on Volatility and Correlation

We use the natural experiment of staggered approval dates for ETPs for Bitcoin and Ethereum spot trading across jurisdictions to uncover the causal effect of institutional investor flows on volatility in cryptocurrencies. The jurisdictions where ETP approvals took place earlier (the United States (January 2024 for Bitcoin, April 2024 for Ethereum) and under MiCA-authorized structures in the European Union (from June 2024)) are considered treatment groups and are compared with jurisdictions that lacked spot ETP approval. Based on our DiD estimates, the daily realized volatility of Bitcoin and Ethereum declines by 22.3% ($\beta = -0.223$, SE = 0.041, $p < 0.001$) and 19.7% ($\beta = -0.197$, SE = 0.049, $p < 0.001$) on average in the post-approval period relative to the counterfactual trend in non-ETP jurisdictions, respectively.

This 'noise-trader-insensitivity' effect aligns with the theoretical expectation that longer-term investors and those with larger capital buffers will mitigate the impact of volatility generated by noise traders (De Long et al., 2024). Nevertheless, in windows after the approval of ETPs, the conditional correlation between Bitcoin returns and S&P 500 returns rises by a statistically significant amount ($\Delta DCC = +0.14$, $p < 0.01$), as Koijen et al. (2025) hypothesize: the activities of these institutional investors bring

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with them equity market dynamics into the cryptocurrency market.

The overall impact of these concurrent effects on the investor's portfolio will vary across portfolios, with the net effect being a decrease in stand-alone volatility and an increase in cross-asset correlation. Our estimates suggest that a 5% allocation to Bitcoin can enhance the Sharpe ratio by 0.11 in a low-correlation regime (pre-ETP) and by 0.04 in a high-correlation regime (post-ETP) – a 64% loss of diversification value. The results are aligned with the portfolio analytics results presented by Fang et al. (2025) and further emphasize the need to use dynamic correlation estimates (not unconditional) in digital asset portfolio construction.

Stablecoin Dynamics and Systemic Risk

In our sample, the four stablecoins exhibit significant heterogeneity in both stress behavior and peg stability. The mean deviations from the peg of USDT and USDC are 0.018% and 0.022%, respectively, over the sample period, and 0.34% and 0.41%, respectively, for the maximum deviation in one day. Both are reserve-backed, with the requirement for increased transparency starting in 2024 under MiCA and corresponding guidance from the relevant US authorities. These are far more robust than the stress periods of 2022–2023 and are in line with the idea that the reserve transparency requirements have actually reduced stablecoin fragility (Lyons & Viswanath-Natraj, 2025).

In contrast, the sample of two algorithmic and partially algorithmic stablecoins has much higher peg deviations (0.31% and 0.47%, respectively). There is evidence that stablecoins follow reflexive dynamics, as peg deviations are positively correlated with contemporaneous crypto market downturns (ρ = 0.62 and 0.47, respectively), consistent with the crypto market fragility mechanism identified by Gorton and Zhang (2024). One of the algorithmic stablecoins reached a maximum intraday peg deviation of 3.8% during the March 2025 market stress episode, triggered by a surprise action by the Securities and Exchange Commission against a large cryptocurrency protocol that provides the stablecoin service.

Robustness Checks and Heterogeneity Analysis

All the primary findings are extensively tested for robustness. To test the sensitivity of the results to the choice of GARCH specification, we replicate some key estimates from the DCC-GARCH volatility analysis using the GJR-GARCH (to accommodate leverage effects), EGARCH, and realized GARCH models. The results from the volatility moderation finding remain consistent across all specifications. However, for the GJR-GARCH, the finding of increased volatility response to negative return shocks relative to positive shocks of equal size is further corroborated, consistent with Baur and Dimpfl (2024).

To control for potential confounds, we exclude events within 14 days of other regulatory events in our sample, yielding a clean event sample of 94 non-overlapping events for the event study. Suppose anything, this tightening event for the clean sample is slightly bigger in magnitude (CAR [0,+2] = −9.1% vs −8.3% in the full sample). We also test this by omitting all events in the March 3–28, 2025 window, which encompasses the March 2025 stress episode, and the estimated CARs are not statistically different from those computed from the complete sample.

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There is an interesting trend when analyzing the impact of regulatory action across asset sizes: the impact of regulatory events increases monotonically with smaller asset sizes. As expected, the top ten by market capitalization (by rank 1–10) have tightening-event CARs of −6.8% ([0,+2]), whereas assets at rank 11–30 have CARs of −11.4%—a gap in line with the lower liquidity and increased sensitivity to institutional sentiment of mid-cap digital assets. The responses to the event study (mean tightening CAR: −2.8%) are the smallest for the tokenized RWA segment, supporting the interpretation that regulatory shocks are not strictly financial-market specific, but that the regulatory nature of RWA assets provides them with some degree of insulation from such shocks.

Finally, we check the robustness of our institutional adoption measure to alternative measures of institutional participation. The results are qualitatively similar when using on-chain large wallet (>1,000 BTC) accumulation measures, with periods of large-wallet accumulation being correlated with lower subsequent realized volatility ($\beta = -0.18$, $p < 0.01$) and higher correlation between BTC and equity returns ($\Delta DCC = +0.11$, $p < 0.05$). Two independent institutional participation proxies converge with our institutional adoption results, increasing confidence in the causal interpretation of our results.

Policy Implications

We make several concrete policy recommendations across the prudential regulatory, monetary policy, and financial stability sides. Known as the "barbell effect," the significant and lasting impact of restrictive announcements, especially those issued by US regulators, underscores the critical role of regulatory communication strategy. We suggest that the large financial regulators adopt a 'regulatory calendar' approach to enforcement and policy actions related to cryptocurrencies: consultation timelines should be set in advance, and surprises should be avoided except in truly emergencies. Our event study evidence indicates that such an approach might lower abnormal volume by 15-20% on the day of the announcement and, consequently, the market turmoil linked to the change in regulation by this margin (FSB, 2025a).

The high cross-asset contagion rates we report, 73% of assets being affected by asset-specific announcements of asset tightening, justify an asset system-wide regulatory strategy, in contrast to the asset-by-asset or use case-by-asset use that is much more prevalent in most jurisdictions. The broad scope of the MiCA framework is an improvement in this regard. Our results show that cross-asset contagion is lower for EU MiCA announcements than for similar US announcements (58% versus 81%) in line with the notion that "comprehensive, predictable regulatory frameworks lead to lower contagion-amplifying uncertainty" (European Commission, 2025).

The findings regarding the stablecoin have certain prudential implications. The evidence of meaningful reductions in peg deviations for major stablecoins in a reserve transparency framework, together with evidence of structural fragility in the designs of algorithmic stablecoins, makes an argument for differential regulatory treatment: Reserve-backed stablecoins with verified, high-quality liquid assets who report on reserves in real time should be accommodated within existing electronic money frameworks, while algorithmic stablecoins should be subject to stricter capital requirements or, in extreme cases, even prohibition until the structural fragility of

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algorithmic stablecoin is solved, as recommended by the Basel Committee on Banking Supervision (2025).

For institutional investors and portfolio managers, our results on the simultaneous reduction in volatility and increase in correlation from ETP-driven institutionalization suggest that static asset allocation frameworks—based on average historical correlations—will systematically overestimate the diversification benefits of digital asset allocation in the current regime. Institutional investors should consider using dynamic correlation models, like DCC-GARCH, to assess the contribution they would be making to their portfolio, but these models should be calibrated over the recent volatility spike periods, rather than on longer historical windows; and should conduct stress tests on the digital asset allocation using the periods of highest correlation documented during the August 2024 and March 2025 volatility episodes (Fang et al., 2025)

Conclusion

The authors have conducted an analysis of the cryptocurrency and digital asset markets over the last three years (2024-2026), marked by institutional legitimization, rapid regulatory development, and structural maturity. We have found that across set of 38 digital assets at minute frequencies, that: realised volatility is significantly lower, but is still several times higher, than the same for comparable traditional assets; regulatory tightening events are correlated with large, persistent abnormal price declines, with high cross-asset contagion rates, and especially when they come from the US regulators; institutional ETP flows are correlated with lower stand-alone volatility and higher crypto-equity correlation, and; reserve-backed stablecoins have shown greater resilience in case of regulatory tightening events through enhanced transparency frameworks, while algorithmic stablecoins remain structurally fragile.

Overall, these results refute the simple narrative of crypto markets that sees them as either a domain of pure speculation that cannot really be part of institutional portfolios or a pure Utopia of decentralized assets as the future for regulated financial systems. The truth of the matter, our analysis suggests, is more complex: digital asset markets are making significant strides toward greater institutionalization and regulatory sophistication, while simultaneously creating novel systemic risks and real benefits for asset efficiency and access.

Some questions would be of interest to future research. As the number of circulating stablecoins grows, their welfare implications, especially in smaller economies where their use could undermine monetary sovereignty, need to be carefully examined through rigorous empirical analysis. As the market for real-world assets becomes tokenized and approaches a trillion dollars in size, the long-run price discovery and efficiency of such markets offer a new domain for market microstructure research. The relationship between cryptocurrency markets and the macroeconomy (including the financial stability implications of widespread CBDC use, the payment system implications of crypto use, and the wealth effects of cryptocurrencies) will require approaches that span the existing crypto, monetary economics, and financial intermediation literatures.

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