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**Bitcoin Market Activity and Public Attention to Central  
Bank Digital Currencies (2017-2024)**

Master's Thesis

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Study programme: Master in Economic Research

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Year of the defense: 2026

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In Prague on December 22, 2025.

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## **References**

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## **Abstract**

This thesis examines the dynamic interaction between Bitcoin market activity and public attention to central bank digital currencies (CBDCs). Using weekly data from September 2017 to November 2024, the analysis focuses on Bitcoin returns, Bitcoin trading volume, and a global CBDC Attention Index constructed from large-scale international news text data. A tri-variate vector autoregression framework is employed to model dynamic interactions and feedback effects among these variables. Short-run dynamics are evaluated using impulse response functions and forecast error variance decompositions, including an ordering-invariant generalized approach for robustness. The results reveal a clear asymmetry in the interaction between decentralized and centralized digital monetary systems. CBDC-related attention does not exert a strong or persistent influence on Bitcoin returns, which are largely driven by own shocks. In this vein, Bitcoin trading volume exhibits high persistence and responds significantly to past returns, affirming the strong internal market dynamics. In contrast, increased Bitcoin market activity is followed by subsequent rises in CBDC-related public and media attention. Overall, the findings suggest that the interaction between Bitcoin and CBDC-related discourse currently operates primarily through informational feedback channels rather than direct short-run price effects.

## **Abstrakt**

Tato diplomová práce zkoumá dynamickou interakci mezi aktivitou na trhu s bitcoinem a veřejnou pozorností věnovanou digitálním měnám centrálních bank (CBDC). Analýza využívá týdenní data za období od září 2017 do listopadu 2024 a zaměřuje se na výnosy bitcoinu, objem obchodování s bitcoinem a globální index pozornosti vůči CBDC, který je konstruován na základě rozsáhlých mezinárodních zpravodajských textových dat. K modelování dynamických interakcí a zpětných vazeb mezi těmito proměnnými je použit třírozměrný vektorový autoregresní model. Krátkodobá dynamika je hodnocena pomocí impulzních odezvoových funkcí a dekompozice rozptylu chyb predikce, včetně zobecněného přístupu invariantního vůči pořadí proměnných pro účely robustnosti. Výsledky odhalují výraznou asymetrii v interakci mezi decentralizovanými a centralizovanými digitálními měnovými systémy. Pozornost věnovaná CBDC nemá silný ani trvalý vliv na výnosy bitcoinu, které jsou do značné míry určovány vlastními šoky. V tomto smyslu vykazuje objem obchodování s bitcoinem vysokou perzistenci a významně reaguje na minulé výnosy,

což potvrzuje silnou vnitřní dynamiku trhu. Naproti tomu zvýšená aktivita na trhu s bitcoinem je následována růstem veřejné a mediální pozornosti věnované CBDC. Celkově výsledky naznačují, že interakce mezi bitcoinem a diskurzem o CBDC v současnosti probíhá především prostřednictvím informačních zpětnovazebních kanálů, nikoli prostřednictvím přímých krátkodobých cenových efektů.

## **Keywords**

Central Bank Digital Currencies; Bitcoin; Digital Money; Attention; Financial Markets

## **Klíčová slova**

Digitální měny centrálních bank; bitcoin; digitální peníze; pozornost; finanční trhy

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## Table of Contents

Introduction .....	8
1. Background.....	11
1.1 CBDC Uncertainty and Cryptocurrency Volatility .....	12
1.2 CBDC Attention and Cryptocurrency Markets .....	14
1.3 Market Behavior During CBDC Introductions .....	16
1.4 Positioning of the Present Study.....	17
1.5 Institutional and Design Differences Between CBDCs and Bitcoin.....	18
2. Data.....	23
2.1 Data Sources and Sample Period.....	23
2.2 Variables Construction .....	24
2.3 Descriptive Statistics .....	25
2.4 Correlation Analysis .....	27
3. Methodology.....	28
3.1 Model Specification.....	29
3.2 Lag Length Selection.....	30
3.3 Estimation and Identification.....	30
3.4 Impulse Response Analysis .....	31
3.5 Forecast Error Variance Decomposition .....	32
4. Results .....	32
4.1 Baseline VAR Estimation.....	33
4.1.1 Bitcoin Returns Equation .....	34
4.1.2 Log Trading Volume Equation.....	35
4.1.3 CBDC Attention Index Equation.....	37
4.2 Impulse Response Functions .....	37
4.3 Forecast Error Variance Decomposition .....	39

4.4 Ordering Robustness .....	41
4.5 Ordering-Invariant Connectedness Analysis .....	41
5. Discussion.....	42
5.1 CBDC Attention and Bitcoin Returns .....	43
5.2 Market Activity as a Transmission Channel.....	43
5.3 Feedback from Bitcoin Markets to CBDC Attention .....	44
5.4 Robustness and Interpretation .....	45
5.5 Limitations and Scope .....	45
Conclusion.....	47
Summary.....	48
List of References.....	50
List of Appendices.....	52
Appendix no. 1: Unit Root Tests for Model Variables (Table).....	52
Appendix no. 2: Lag Length Selection (Tables).....	52
Table A: Extended Lag Length Selection Criteria .....	52
Table B: Lag Length Selected by Information Criterion.....	53
Appendix no. 3: VAR Coefficient Estimates by Equation (Tables).....	53
Table A: VAR(3) Coefficient Estimates - Bitcoin Returns Equation .....	53
Table B: VAR(3) Coefficient Estimates - Log Trading Volume Equation.....	54
Table C: VAR(3) Coefficient Estimates - CBDC Attention Index Equation.....	54
Appendix no. 4: Alternative Forecast Error Variance Decompositions (Tables).....	55
Table A: FEVD - Bitcoin Returns .....	55
Table B: FEVD - Log Trading Volume.....	55
Table C: FEVD - CBDC Attention Index .....	55
Appendix no. 5: Connectedness and Spillover Measures (Tables) .....	56
Table A: Generalized FEVD Connectedness Matrix (12-week horizon).....	56
Table B: Directional and Total Connectedness Measures.....	56

## **Introduction**

The ongoing digitalization of monetary systems is reshaping questions about the future of money, monetary sovereignty, and the role of public and private actors in providing payment instruments. Alongside developments in financial technology, particularly blockchain and distributed ledger technologies, cryptocurrencies have emerged as decentralized alternatives to conventional monetary systems. Cryptocurrencies have gained market relevance as they have become integrated into global financial markets, with increasing adoption by institutional investors and trading alongside traditional assets on international exchanges. Meanwhile, central banks worldwide have begun exploring the issuance of central bank digital currencies (CBDCs) in response to the changes in payment technologies and the declining use of cash (Bank for International Settlements, 2023). These developments raise important questions about the interaction between centralized and decentralized digital monetary systems and the extent to which they influence one another.

Bitcoin, introduced in 2009 by the pseudonymous Satoshi Nakamoto, represents the first large-scale implementation of a decentralized, peer-to-peer monetary system. Bitcoin relies on cryptographic verification, a distributed ledger, and a predetermined supply schedule; it was designed to operate without centralized intermediaries (Nakamoto, 2008). Its emergence coincided with heightened skepticism toward traditional financial institutions in the aftermath of the global financial crisis. This historical context was explicitly encoded into Bitcoin's genesis block, the first block in the Bitcoin blockchain. The newspaper headline "The Times 03/Jan/2009 Chancellor on brink of second bailout for banks," was embedded within this first block, directly referencing contemporaneous bank rescues during the global financial crisis (Joseon Blockchain Explorer, 2009). This symbolic design choice placed Bitcoin within the broader cypherpunk movement, which is a long-standing cryptographic and digital-libertarian movement advocating for privacy, censorship resistance, and reduced reliance on centralized monetary and political authorities (Hughes, 1993; Assange et al., 2012). It has since evolved into a globally traded financial asset with substantial market capitalization, high trading volumes, and high liquidity across international exchanges. While Bitcoin was initially conceived as an alternative payment system, it has increasingly been analyzed in economic research as a speculative asset and a potential store of value.

Research has increasingly focused on Bitcoin's behavior as a financial asset rather than solely as a payment technology as its market has matured (Baur & Dimpfl, 2021). Empirical studies examine Bitcoin's return dynamics, volatility clustering, trading volume, and interaction with macroeconomic and financial variables (Baur et al., 2018; Dyhrberg, 2016). This shift reflects Bitcoin's growing integration into global financial markets, where it is actively traded on major exchanges and increasingly referenced in discussions of portfolio diversification, speculative behavior, and market sentiment. This increased adoption notably includes participation by institutional investors such as BlackRock and Fidelity Investments, particularly following the approval and launch of spot Bitcoin exchange-traded funds (ETFs) in the United States (BlackRock, 2024; Fidelity Investments, 2024). Understanding Bitcoin's market dynamics is therefore central to assessing how decentralized digital assets interact with institutional developments in the broader monetary system.

At the same time, central banks have accelerated research and experimentation related to CBDCs. Key motivations for central banks to develop CBDCs include declining cash usage, innovations in payment technologies, and concerns over monetary sovereignty and the role of public money in an increasingly digital economy (Bank for International Settlements, 2020; Allen et al., 2022; Georgieva, 2022). Many monetary authorities now view CBDCs as a potential complement to existing forms of central bank money (Bank for International Settlements, 2020). According to recent surveys, a majority of central banks are either actively researching or piloting CBDC designs (Bank for International Settlements, 2023). Unlike cryptocurrencies, CBDCs are centrally issued and represent a liability of the central bank. As such, CBDCs and cryptocurrencies embody fundamentally different approaches to digital money, revealing distinct trade-offs between centralization and decentralization, as well as differing degrees of monitoring and control. This competition does not necessarily imply direct substitution or zero-sum outcomes. Rather, it reflects a broader tension between alternative institutional arrangements for issuing, governing, and transacting with digital money. From this perspective, Bitcoin and CBDCs can be viewed as competing frameworks that differ in their approach to monetary authority, transaction validation, and system design, while coexisting within the same global financial environment.

Attention plays a central role in financial markets by shaping expectations, information diffusion, and investor behavior. In environments characterized by uncertainty and frequent innovation, public and media attention can amplify or dampen market reactions even in the

absence of direct policy action (Barber & Odean, 2008; Tetlock, 2007). In the case of CBDCs attention may influence how market participants interpret future regulatory trajectories and institutional responses. At the same time, heightened activity in cryptocurrency markets may itself attract policy attention, as authorities respond to developments in private digital money.

The coexistence of centralized and decentralized forms of digital money has prompted a growing empirical literature on the interaction between CBDC-related developments and cryptocurrency markets. Several studies document that news, uncertainty, or attention surrounding CBDCs is associated with short-run movements in cryptocurrency prices or volatility (Akin et al., 2023; Helmi et al., 2023; Wang et al., 2022). At the same time, the existing evidence remains mixed and is often based on relatively short samples that end around 2021. Moreover, while many empirical analyses focus on the transmission of CBDC-related information to cryptocurrency markets, comparatively less emphasis is placed on examining potential feedback effects from cryptocurrency market activity to CBDC-related public and policy discourse. As a result, the direction and persistence of dynamic interactions between these variables remain an open empirical question. Understanding whether interactions run primarily from CBDC-related discourse to cryptocurrency markets, from cryptocurrency markets to policy attention, or in both directions is essential for interpreting claims about competition between centralized and decentralized digital monetary systems.

Accordingly, this thesis asks whether and how public attention to CBDCs interacts dynamically with Bitcoin market activity, and in which direction these interactions primarily operate. This thesis contributes to the literature by empirically examining the dynamic interaction between Bitcoin market activity and public attention to CBDCs using an updated dataset constructed from large-scale news text data and a flexible time-series framework. Rather than privileging one direction of influence a priori, the analysis treats Bitcoin returns, Bitcoin trading volume, and a global CBDC Attention Index symmetrically within a vector autoregression (VAR) framework, allowing for endogenous feedback among variables. This also allows the data to inform the direction and persistence of dynamic interactions without imposing strong assumptions about causal ordering.

The results indicate that Bitcoin returns are largely driven by internal market dynamics,

while CBDC-related attention does not exert a strong or persistent influence on prices. Instead, heightened Bitcoin market activity is associated with subsequent increases in CBDC-related public and media attention, suggesting that interaction currently operates primarily through informational channels rather than direct price effects. This thesis contributes to the literature by providing updated post-2021 evidence on the interaction between Bitcoin markets and CBDC-related attention, showing that while CBDC discourse does not systematically influence Bitcoin returns, cryptocurrency market activity feeds back into policy-related attention. These findings refine existing attention-based results by highlighting an asymmetric and predominantly informational interaction.

The remainder of the thesis is organized as follows. Section 1 reviews the background and relevant literature. Section 2 describes the data and variable construction. Section 3 outlines the econometric methodology. Section 4 presents the empirical results. Section 5 discusses the findings, and the Conclusion summarizes.

## **1. Background**

The interaction between central bank digital currencies (CBDCs) and cryptocurrency markets (particularly Bitcoin) has attracted attention from both academic researchers and policymakers. As central banks advance digital currency initiatives and cryptocurrencies continue to occupy a significant role in financial markets, questions have emerged regarding how these two forms of digital money interact. Existing research has primarily examined the influence of CBDC-related news, uncertainty, and attention on cryptocurrency prices, volatility, and broader financial market dynamics. However, the empirical literature remains relatively young, and findings vary depending on the methodological framework, data frequency, and measures of CBDC-related information employed.

A key challenge in this literature is that CBDC-related developments are multifaceted and slow moving. Many CBDC initiatives progress through research reports, speeches, consultations, and pilots rather than discrete implementation events. This creates ambiguity about the relevant information signal and its timing. Empirical studies therefore rely on proxies such as attention and uncertainty indices, but these measures capture salience rather than policy action. This motivates a focus on dynamic interactions, because both

cryptocurrency markets and CBDC-related discourse can evolve endogenously as part of the same information environment.

The existing literature can be broadly categorized into three strands. The first examines the relationship between CBDC-related uncertainty and cryptocurrency volatility. The second focuses on the role of CBDC-related attention in shaping cryptocurrency market outcomes. The third analyzes market behavior surrounding specific CBDC announcements or launches using event-based approaches (Wang et al., 2022; Helmi et al., 2023; Mzoughi et al., 2022). Together, these strands provide a foundation for understanding the informational and market-based channels through which CBDC developments may interact with cryptocurrency markets.

The coexistence of cryptocurrencies and emerging central bank digital currencies reflects a broader transformation of monetary and financial systems driven by digitalization, platformization, and changing payment habits. While both Bitcoin and CBDCs rely on digital infrastructures, they arise from fundamentally different institutional logics. Cryptocurrencies emerged as private, decentralized responses to perceived limitations of existing monetary arrangements, whereas CBDCs represent an extension of sovereign money into digital form. Understanding how these two systems interact therefore requires careful attention to institutional design, governance structures, and the informational environments in which they operate.

### **1.1 CBDC Uncertainty and Cryptocurrency Volatility**

From a theoretical perspective, uncertainty related to CBDC design and implementation may affect cryptocurrency markets by altering expectations about future monetary regimes, regulatory constraints, and the relative attractiveness of private digital assets. This is in part due to the forward-looking nature of financial markets, in which expectations typically influence demand for alternative stores of value, hedges against policy risk, or speculative assets, in this case perceptions about the credibility of public money. As a result, volatility-based responses may emerge even in the absence of concrete policy action. Wang et al. (2022) represent a foundational contribution to the empirical study of CBDCs and cryptocurrency markets through the construction of the CBDC Attention Index (CBDCAI) and the CBDC Uncertainty Index (CBDCUI). These indices are derived from approximately

660 million news articles in the LexisNexis database and cover the period from 2015 to 2021. Using a DCC-GJR-GARCH framework, the authors document that both CBDC-related attention and uncertainty are associated with increased volatility in cryptocurrency markets, with asymmetric effects indicating stronger responses to uncertainty than to attention alone. While Wang et al. (2022) rely on a DCC-GJR-GARCH framework that emphasizes conditional correlations and volatility spillovers, Helmi et al. (2023) adopt a TVP-VAR approach that allows for evolving transmission mechanisms over time. The work of Helmi et al. found that CBDC-related uncertainty affects Bitcoin returns mainly during periods of elevated market stress, with limited effects outside such episodes. This highlights the sensitivity of results to model specification.

The distinction between attention and uncertainty is important for interpretation. Uncertainty indices typically capture language reflecting risk, disagreement, or ambiguity regarding policy design and implementation. Such signals can affect volatility even when expected returns are unchanged, because volatility responds to dispersion in beliefs and shifting risk perceptions. In this sense, the uncertainty based findings in Wang et al. and Helmi et al. are consistent with a channel operating through risk and hedging demand rather than through sustained shifts in valuation. This helps explain why volatility responses may be more detectable than return responses in reduced form settings.

These findings suggest that cryptocurrency markets, including Bitcoin, are sensitive to policy-related uncertainty surrounding CBDCs. In particular, heightened CBDC uncertainty is associated with increased volatility, affirming the importance of policy-related information in shaping market expectations. These results further highlight uncertainty as a key transmission channel through which CBDC developments may influence decentralized digital assets.

Related work by Lucey et al. (2021) introduces the Cryptocurrency Policy Uncertainty Index (UCRY Policy) and the Cryptocurrency Price Uncertainty Index (UCRY Price), constructed using text-based analysis of approximately 726.9 million media records. These indices capture broader sources of uncertainty affecting cryptocurrency markets, including political and macroeconomic events. By aggregating these measures into a composite Cryptocurrency Uncertainty Index (UCRY), the authors established that major political events, such as the

Brexit referendum, significantly affect cryptocurrency-related uncertainty independent of contemporaneous price movements.

Building on these indices, Helmi et al. (2023) use a nonlinear, time-varying framework with the CBDCUI and UCRY Policy Index to study cryptocurrency market responses to CBDC-related uncertainty. Using time-varying parameter VAR (TVP-VAR) models, they find that Bitcoin prices respond negatively to CBDC-related uncertainty during periods of heightened market stress, particularly in 2018 and 2021. These effects are especially pronounced during episodes of global financial and geopolitical instability, including the COVID-19 pandemic.

While Helmi et al. (2023) provide valuable insights into the role of uncertainty in shaping short-term cryptocurrency market dynamics, their analysis is constrained by a relatively short sample period ending in 2021. As a result, recent developments in both CBDC initiatives and cryptocurrency markets are not captured. Moreover, subsequent evidence in Wang et al. (2023) suggests that the influence of CBDC-related indices on cryptocurrency prices is largely confined to short horizons, with limited explanatory power beyond several weeks. These findings indicate that CBDC-related uncertainty may generate transitory market responses rather than sustained long-run effects.

This emphasis on horizon also aligns with the intuition that policy related signals have diminishing marginal impact as time passes and new information arrives. When market conditions shift rapidly, short lived effects can be overwhelmed by macro financial shocks, regulatory developments outside the CBDC domain, or crypto specific events. A longer sample that includes post 2021 episodes therefore provides a useful test of whether earlier findings remain robust as both CBDC experimentation and Bitcoin market structure evolve.

## **1.2 CBDC Attention and Cryptocurrency Markets**

A second strand of the literature focuses on CBDC-related attention rather than uncertainty. Attention-based measures capture the intensity of public and media discourse surrounding CBDCs and reflect the informational salience of policy developments. Unlike uncertainty indices, attention indices do not necessarily convey negative sentiment but instead measure the prominence of CBDCs in public discussion.

Akin et al. (2023) examine the relationship between CBDC indices and major cryptocurrencies using a DCC-GARCH framework over the period 2017–2022. Their results indicate that the CBDC Uncertainty Index is negatively correlated with Bitcoin returns, consistent with the findings of Helmi et al. (2023). In contrast, the CBDC Attention Index is found to be positively correlated with Bitcoin returns. The authors interpret this result as evidence that increased attention to CBDCs coincides with positive cryptocurrency market performance because it reflects broader interest in digital currencies as a category.

A practical implication is that attention effects can be difficult to interpret without a clear mechanism. A rise in CBDC attention may reflect optimism about innovation in payments, concern about surveillance and control, or geopolitical debate about monetary sovereignty. These distinct narratives can coexist in the same media stream. As a result, attention indices can correlate with market outcomes even when the underlying causal channel is indirect. This motivates assessing whether attention is a meaningful shock transmitter in a multivariate system or whether it mainly reflects broader shifts in market conditions.

Wang et al. (2023) extend this line of inquiry by employing TVP-VAR-based spillover models to analyze both short-term (1–4 weeks) and longer-term (> 4 weeks) effects of the CBDC Attention Index on cryptocurrency markets. Using weekly data from April 2020 to July 2022, they examine spillover effects between the CBDCAI and the ten largest cryptocurrencies by market capitalization. Their findings indicate that CBDC attention generates significant short-term spillovers to Bitcoin and Ethereum returns, while longer-term effects remain limited. The authors conclude that market reactions to CBDC attention are primarily immediate and informational in nature. Although attention indices capture the salience of CBDCs in public discourse, they do not distinguish between positive, neutral, or negative coverage, nor do they directly reflect policy credibility or implementation likelihood. As such, attention-based effects may reflect informational amplification rather than structural changes in monetary expectations.

Another limitation is aggregation. Global attention measures combine heterogeneous jurisdictions that differ in institutional credibility, financial development, regulatory stance, and baseline crypto adoption. A strong attention spike driven by one major economy may dominate the index even if it has limited relevance for actual Bitcoin trading activity

elsewhere. For this reason, attention based estimates should be interpreted as capturing a global information environment rather than a single policy regime. This is consistent with studying Bitcoin, which is globally traded and whose price is formed on international exchanges.

Together, these studies suggest that CBDC-related attention may influence cryptocurrency markets through short-run informational channels rather than through persistent structural effects. Importantly, attention-based measures capture fluctuations in public discourse rather than concrete policy implementation, emphasizing the role of expectations and perception in shaping market behavior. This distinction brings to light that attention-based measures capture informational salience rather than risk or disagreement, and therefore need not imply persistent effects on expected returns.

### **1.3 Market Behavior During CBDC Introductions**

A smaller body of literature adopts event-based approaches to study cryptocurrency market reactions to specific CBDC announcements or launches. Mzoughi et al. (2022) conduct an event study examining Bitcoin's response to the launch of the Bahamas' SAND Dollar in 2020 and Nigeria's eNaira in 2021. Their results indicate a significant negative abnormal return following the SAND Dollar launch, while the market response to the eNaira launch is statistically insignificant.

The authors attribute these differences to contextual factors such as pre-existing cryptocurrency adoption, institutional trust, and policy design. Cryptocurrency adoption and market development were more advanced in Nigeria than in the Bahamas, which may contribute to differing responses (Triple-A, 2024; Crypto.com, 2024). They argue that differences in public confidence and adoption strategies may have also influenced how markets responded to the CBDC introductions. However, these interpretations are necessarily context-specific and may also reflect broader macroeconomic conditions at the time of the launches, including the COVID-19 pandemic. This is especially true for the case of the Bahamas as the CBDC rollout occurred during the initial outbreak.

Event studies provide useful insights into short-term market reactions but are limited in their ability to capture broader dynamic interactions or feedback effects. By construction, event-

study designs assume that market responses are temporally localized, which may obscure slower-moving expectation adjustments that unfold over several weeks or months following CBDC announcements. Moreover, CBDC launches remain relatively rare and heterogeneous, making it difficult to generalize findings across countries or time periods. This limitation is unavoidable at present, given that CBDC development and piloting remain ongoing across jurisdictions.

Event study evidence also illustrates why identifying clean treatment effects is difficult. CBDC launches rarely occur in isolation. They coincide with macroeconomic shocks, domestic regulatory changes, and shifts in global risk sentiment. In addition, the economic relevance of a CBDC introduction depends on adoption and usage rather than the announcement date alone. A statistically insignificant abnormal return does not imply that the introduction had no institutional relevance, only that short horizon market pricing did not respond in a detectable way given contemporaneous noise. These issues reinforce the value of complementary approaches that focus on dynamic interactions rather than single event windows.

#### **1.4 Positioning of the Present Study**

The existing literature demonstrates that CBDC-related uncertainty and attention are relevant for understanding cryptocurrency market dynamics, particularly over short horizons. Prior studies often rely on nonlinear or high-frequency approaches, limited sample periods, or event-specific analyses. Furthermore, while several studies document statistically significant spillovers, the economic magnitude and persistence of these effects remain subjects of debate.

A further point is that statistical significance does not automatically imply economic relevance. Several studies document detectable spillovers at short horizons, yet the share of return variation explained by CBDC-related measures is often small relative to own shocks and market internal drivers (Akin et al., 2023; Wang et al., 2023). This distinction creates a motive to focus on variance decompositions and connectedness measures in addition to impulse responses. These tools allow the analysis to quantify whether CBDC attention constitutes a quantitatively important component of Bitcoin market dynamics rather than merely producing occasional statistically significant coefficients.

A recurring theme in the existing literature is that the influence of CBDC-related information on cryptocurrency markets is highly horizon-dependent. Several studies document statistically detectable effects at short horizons, while finding limited persistence beyond a few weeks. This pattern suggests that CBDC-related attention and uncertainty primarily operate through short-run informational channels rather than through sustained structural shifts in valuation. The present study explicitly accounts for this feature by focusing on short-run dynamics and variance decomposition within a weekly time-series framework.

Unlike nonlinear frameworks that emphasize regime-dependent responses, a standard VAR framework facilitates transparent interpretation of impulse responses and forecast error variance decompositions, making it well suited for assessing relative directional importance. Moreover, incorporating Bitcoin trading volume allows the analysis to distinguish between price-based reactions and shifts in market participation, which may respond differently to policy-related attention. Including trading volume is particularly useful because attention in financial markets frequently maps into participation rather than immediate repricing. Market participants may react to salient information by entering the market, increasing turnover, or reallocating holdings even when average returns remain unpredictable. Volume therefore provides an empirical bridge between informational salience and market behavior. This is relevant in cryptocurrency markets, where participation surges often coincide with heightened public discussion and policy scrutiny.

This thesis builds on the attention-based strand of the literature by examining the dynamic interaction between Bitcoin market activity and CBDC-related attention within a standard vector autoregression framework. By using an extended weekly sample through late 2024 and focusing on both returns and trading volume, the analysis provides updated evidence on whether CBDC-related attention constitutes a meaningful driver of Bitcoin market dynamics or primarily reflects broader informational feedback from cryptocurrency markets to policy discourse.

### **1.5 Institutional and Design Differences Between CBDCs and Bitcoin**

To interpret the empirical patterns documented in the literature and to motivate the expected direction of dynamic interactions, it is useful to briefly contrast the institutional and design

characteristics of CBDCs and Bitcoin. Central bank digital currencies and Bitcoin represent fundamentally different approaches to digital money, reflecting distinct institutional objectives, governance structures, and design constraints (Bank for International Settlements, 2020; Allen et al., 2022). While both are frequently discussed under the broad label of “digital currencies,” their underlying architectures differ in ways that have important implications for how information, attention, and market dynamics propagate across these systems. Understanding these differences is essential for interpreting empirical results on the interaction between CBDC-related discourse and cryptocurrency markets.

CBDCs are centrally issued liabilities of the central bank and are embedded within existing monetary, legal, and institutional frameworks (Bank for International Settlements, 2020). Their development is motivated by policy objectives such as maintaining monetary sovereignty, improving the efficiency and resilience of payment systems, supporting financial inclusion, and preserving the role of public money in an increasingly digital economy (Georgieva, 2022). As emphasized by the Bank for International Settlements (2020), CBDC design is inherently policy driven. Core features including access conditions, remuneration, privacy safeguards, programmability, and interoperability with existing financial infrastructure are determined by public authorities and may evolve over time in response to political, regulatory, or macroeconomic considerations. Consequently, CBDCs are not a single, uniform instrument but rather a class of policy tools whose characteristics vary across jurisdictions and stages of development.

Bitcoin, by contrast, is a decentralized digital asset governed by a predefined protocol rather than by a central authority. Its monetary policy is encoded directly in software, with a fixed supply schedule capped at twenty-one million Bitcoin (Nakamoto, 2008). Transaction validation and network security are maintained through a decentralized proof-of-work consensus mechanism that relies on cryptographic verification and economic incentives rather than institutional trust (Nakamoto, 2008). Governance in the Bitcoin ecosystem is informal and dispersed, emerging from interactions among developers, miners, node operators, and market participants rather than from explicit policy decisions. While protocol changes are possible, they require broad consensus and are typically slow, contested, and incremental. As a result, Bitcoin’s core monetary and operational rules are highly predictable and largely invariant to short-term policy discourse.

These institutional differences have direct implications for how each system responds to information and public attention. CBDC-related developments are inherently forward-looking and discursive. Policy speeches, consultation papers, pilot announcements, and international coordination efforts signal potential future changes in payment systems and regulatory environments, even when no immediate implementation occurs (Bank for International Settlements, 2023). CBDC-related attention therefore reflects shifts in policy priorities, institutional experimentation, and public debate rather than contemporaneous changes in monetary conditions (Wang et al., 2022; Wang et al., 2023). Fluctuations in attention may influence expectations, regulatory narratives, and institutional positioning without necessarily implying binding commitments or immediate effects on private financial markets.

Bitcoin markets are primarily driven by internal market dynamics as a feature of its decentralization (Baur et al., 2018; Dyrberg, 2016). Price movements reflect trading activity, liquidity conditions, speculative behavior, global macro-financial factors, and shifts in investor sentiment. Since Bitcoin's supply mechanism and validation rules are fixed and widely known, incremental policy-related information similar to discussions about CBDC design does not directly alter Bitcoin's fundamental protocol (Nakamoto, 2008; Allen et al., 2022). As a result, Bitcoin prices may be relatively insensitive to CBDC-related attention in the short run, even when such attention intensifies. This does not imply that policy developments are irrelevant for Bitcoin markets, but rather that their influence is unlikely to operate through immediate price substitution in the absence of concrete regulatory action or implementation.

Differences in privacy, control, and permissioning further reinforce this distinction. CBDCs are typically designed to operate within regulatory frameworks that allow varying degrees of transaction monitoring, identity verification, and conditionality. While specific designs differ across jurisdictions, CBDCs generally permit some level of centralized oversight and potential programmability, reflecting their role as instruments of public policy (Center for Latin American Monetary Studies, 2020). Bitcoin, by contrast, is permissionless and pseudonymous, allowing participation without formal identification and limiting the ability of any single authority to censor or reverse transactions. These features contribute to Bitcoin's appeal as an alternative monetary system, but they also imply that its valuation is

more closely linked to network usage and market participation than to policy announcements alone.

These institutional differences also imply differences in the timing of adjustment. CBDC-related discourse tends to evolve gradually as central banks communicate, test pilot designs, and coordinate with stakeholders. Market reactions to such discourse may be delayed, nonlinear, or dependent on whether communication is interpreted as credible movement toward implementation. Bitcoin market variables, in contrast, adjust continuously and can incorporate new information rapidly. This timing asymmetry provides an additional reason to treat the variables as jointly endogenous in a dynamic framework and to emphasize short horizon propagation mechanisms rather than static correlations.

To clarify the institutional and design contrasts underlying the empirical analysis, Table 1.5.1 summarizes key differences between CBDCs and Bitcoin across several dimensions. The table presents stylized characteristics commonly discussed in the literature, recognizing that CBDC designs vary across jurisdictions and implementation strategies. The comparison highlights differences in monetary governance, control, privacy, and programmability that shape how information and attention may propagate between centralized and decentralized digital monetary systems.

**Table 1.5.1: Key Institutional and Design Characteristics of CBDCs and Bitcoin**

<b>Dimension</b>	<b>CBDCs</b>	<b>Bitcoin</b>
Issuing Authority	Issued and governed by a central bank; represents a liability of the central bank	No issuing authority; supply governed by protocol rules
Monetary Policy	Supply, remuneration, and design features determined by monetary authorities and subject to policy discretion	Fixed supply rule (twenty-one million coins) encoded in protocol; not subject to discretionary policy
Governance Structure	Centralized governance with legal and institutional oversight	Decentralized governance through open-source protocol and network consensus

<b>Dimension</b>	<b>CBDCs</b>	<b>Bitcoin</b>
Access and Permissioning	Access conditions may depend on identification, regulatory compliance, or institutional design choices	Permissionless access; participation does not require identification
Transaction Validation	Validated through centralized or permissioned infrastructure	Validated through decentralized proof-of-work consensus
Privacy Design	Privacy features depend on design choices; transaction data may be accessible to authorized institutions	Transactions are pseudonymous and recorded on a public ledger
Programmability	May incorporate programmable features depending on policy objectives	Limited programmability; transaction rules defined by protocol
Legal Status	Legal tender or official digital money within issuing jurisdiction	Legal status varies by jurisdiction; generally treated as an asset
Policy Objectives	Payment efficiency, financial inclusion, monetary sovereignty, regulatory compliance	Store of value, decentralized transfer of value, censorship resistance
Typical Use Cases	Retail payments, government transfers, financial system integration	Investment, speculative trading, cross-border transfers

**Note:** Author's own elaboration based on Bank for International Settlements (2020), Allen et al. (2022), and Nakamoto (2008).

The institutional and design differences summarized in Table 1.5.1 indicate that CBDCs and Bitcoin are not close substitutes in a narrow transactional or pricing sense (Cong & Mayer, 2022). While CBDCs evolve through policy discourse, institutional design, and regulatory considerations, Bitcoin's core protocol features are largely invariant to such discussions. As a result, CBDC-related developments are more likely to influence public discourse and expectations about the future monetary landscape than to induce immediate substitution effects in Bitcoin prices. This asymmetry provides a conceptual rationale for the empirical results presented later, in which CBDC-related attention responds to market developments but does not exert a strong or persistent influence on Bitcoin returns.

This conceptual framing is consistent with interpreting the empirical evidence as a test of informational relevance rather than adoption substitution. If CBDC-related attention were a major driver of Bitcoin market outcomes, it would be expected to account for a material share of return or volume variation over the forecast horizon. Conversely, if attention mainly reflects reactions to market developments, the system should display stronger transmission from Bitcoin activity to attention measures. The subsequent results align with the second pattern.

## **2. Data**

This thesis examines the dynamic relationship between Bitcoin market activity and public attention to central bank digital currencies (CBDCs) using weekly time-series data. The empirical analysis focuses on three endogenous variables: Bitcoin returns, Bitcoin trading volume, and a global CBDC Attention Index (CBDCAI). The choice of weekly frequency reflects a balance between capturing short-run market dynamics and reducing high-frequency noise that is particularly strong in cryptocurrency markets. Weekly aggregation is standard practice in empirical studies combining financial market variables with text-based attention measures and ensures temporal consistency across data sources.

### **2.1 Data Sources and Sample Period**

Bitcoin price and trading volume data are obtained from a CoinMarketCap export. In the downloaded dataset, non-missing trading volume observations begin in September 2017. As a result, the empirical analysis is restricted to the period from September 2017 to November 2024, corresponding to the maximum overlap with the CBDC Attention Index. Weekly observations are constructed using Monday-based weeks. The weekly Bitcoin price corresponds to the last available closing price within each week, while weekly trading volume is computed as the sum of daily trading volumes over the same period.

The CBDC Attention Index (CBDCAI) is sourced from Wang et al. (2022) and measures the intensity of global public and media attention devoted to central bank digital currencies using large-scale text analysis. The index is constructed from approximately 663.9 million news articles drawn from the LexisNexis News & Business database, covering a broad range of international newspapers, financial publications, and media outlets (Wang et al., 2022;

LexisNexis, 2024). It captures the frequency and prominence of CBDC-related terminology in global news coverage and is aggregated at a weekly frequency, facilitating alignment with cryptocurrency market data.

Importantly, the CBDCAI reflects the salience of CBDCs in public discourse rather than the sentiment or credibility of specific policy announcements. As such, it serves as a proxy for information flow and attention related to CBDC policy discussions, pilot programs, and regulatory developments, rather than direct measures of implementation or policy outcomes. This makes the index particularly suitable for analyzing short-run informational and expectation-based channels through which CBDC-related discourse may interact with cryptocurrency market activity.

The raw article counts within the CBDCAI are standardized and normalized to account for changes in overall news volume over time. As a result, fluctuations in the index reflect changes in CBDC-specific attention rather than general variations in media activity. The index is reported at a weekly frequency, making it well suited for joint analysis with weekly financial market data. Although CBDCAI data are available from 2015 onward, the sample is restricted to the post-2017 period to ensure consistency across all variables. The final dataset consists of 371 weekly observations spanning September 2017 to November 2024.

## 2.2 Variables Construction

The empirical analysis uses three core variables:

1. **Bitcoin Returns:** Weekly Bitcoin returns are computed as the logarithmic difference of weekly closing prices,  
$$r_t = \log(P_t) - \log(P_{t-1}),$$
where  $P_t$  denotes the weekly closing price of Bitcoin. This transformation is standard in empirical financial analysis and a standard transformation in empirical finance that typically yields a stationary series.
2. **Bitcoin Trading Volume:** Weekly Bitcoin trading volume is constructed by summing CoinMarketCap's reported daily Bitcoin trading volume within each Monday-based week. The weekly series is then transformed using the natural logarithm to reduce skewness and stabilize variance.
3. **CBDC Attention Index (CBDCAI):** The CBDCAI measures the intensity of public attention to central bank digital currencies. Higher values indicate increased

discussion and attention related to CBDCs. The index is included in levels and treated as an endogenous variable in the VAR framework, reflecting potential feedback between cryptocurrency market activity and policy-related attention. The CBDCAI is included in levels to preserve its interpretation as an attention intensity measure, which is consistent with prior literature.

All variables are aligned to a common weekly timeline prior to estimation. No additional filtering, detrending, or smoothing procedures are applied beyond the transformations described above.

### 2.3 Descriptive Statistics

Table 2.1 reports summary statistics for the three variables over the analysis sample.

Bitcoin returns exhibit substantial volatility, with a mean close to zero and a wide range reflecting the pronounced price fluctuations characteristic of cryptocurrency markets. Logged Bitcoin trading volume displays significant variation over time, consistent with periods of heightened market activity and shifts in market participation.

The CBDC Attention Index is relatively persistent but exhibits episodic spikes and meaningful variation, indicating episodic fluctuations in public and media attention to central bank digital currencies over time. These summary statistics provide an initial overview of the data properties and serve as descriptive context for the subsequent time-series analysis.

**Table 2.1 — Summary Statistics (Weekly Data, 2017-2024)**

<b>Variable</b>	<b>N</b>	<b>Mean</b>	<b>Std. Dev</b>	<b>Min</b>	<b>Max</b>
Bitcoin Returns	371	0.0078	0.1004	-0.4079	0.3111
Log Trading Volume	371	24.8316	1.6127	20.9124	27.3653
CBDC Attention Index	371	101.0386	1.4645	99.5788	109.5838

Figure 2.1 below plots the evolution of the weekly Bitcoin price over the sample period, illustrating major boom-and-bust cycles.

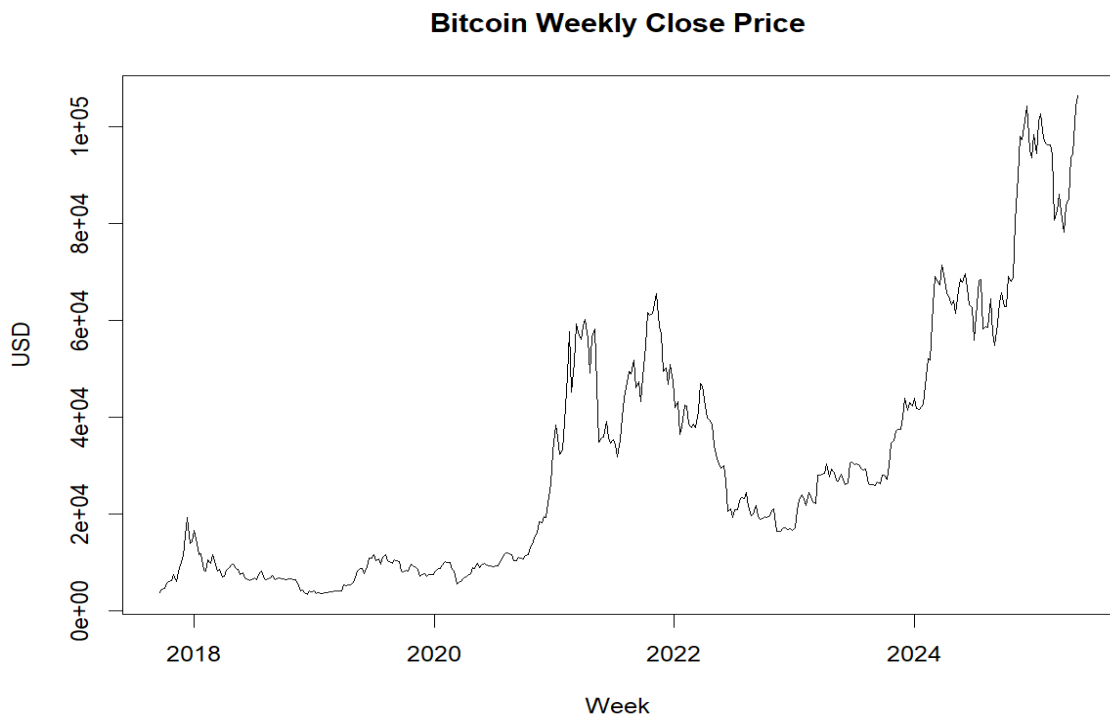


Figure 2.2 displays weekly Bitcoin returns, highlighting their high volatility and lack of persistent trends.

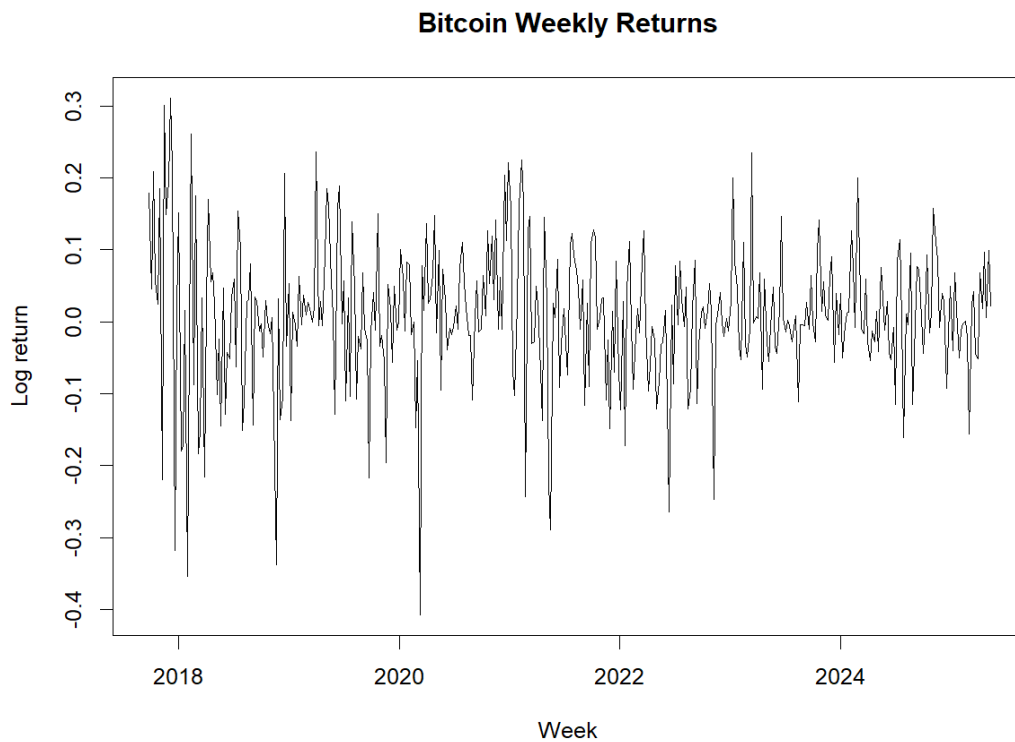


Figure 2.3 shows logged weekly Bitcoin trading volume, which exhibits pronounced persistence and structural shifts over time.

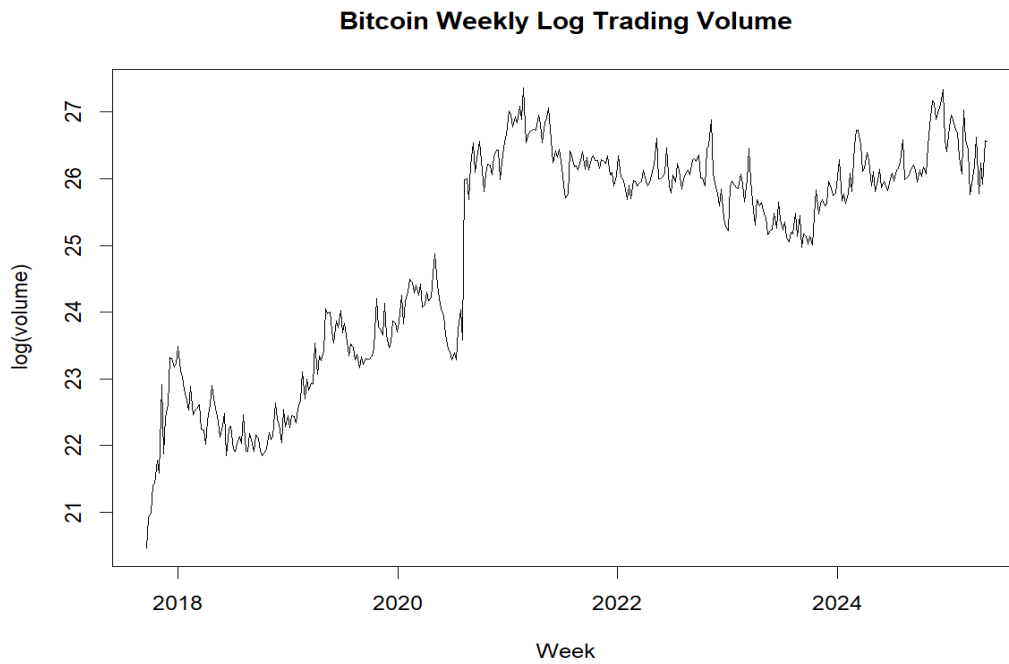
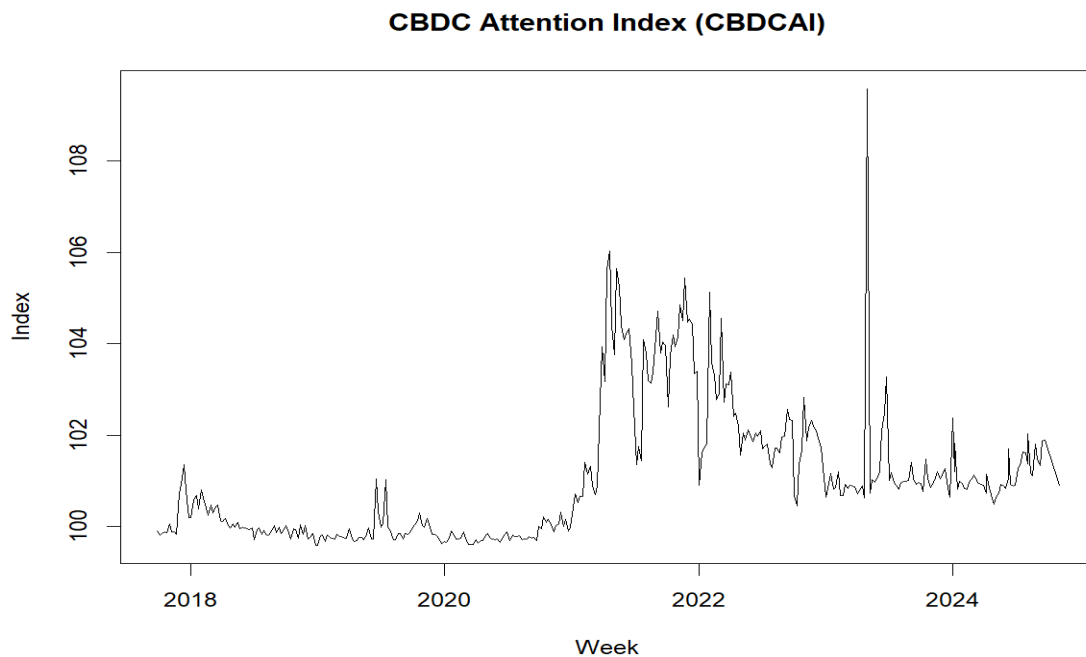


Figure 2.4 plots the CBDC Attention Index, revealing distinct spikes corresponding to periods of intensified global attention to CBDC developments.



## 2.4 Correlation Analysis

Table 2.2 reports the contemporaneous correlation matrix for the three variables using weekly data over the 2017–2024 sample period. Bitcoin returns exhibit weak correlations with both trading volume and the CBDC Attention Index, indicating limited unconditional

co-movement at the weekly frequency. In contrast, Bitcoin trading volume displays a moderate positive correlation with CBDC-related attention. This unconditional association suggests that periods of heightened cryptocurrency market activity tend to coincide with increased public and media focus on CBDCs. However, simple correlations do not account for dynamic interactions, lagged effects, or potential feedback mechanisms between variables. Consequently, the subsequent analysis employs a multivariate time-series framework to examine the direction, persistence, and relative importance of these relationships more rigorously.

**Table 2.2 — Correlation Matrix**

	<b>BTC Return</b>	<b>Log Volume</b>	<b>CBDCAI</b>
Bitcoin Returns	1.000	0.007	-0.097
Log Trading Volume	0.007	1.000	0.595
CBDCAI	-0.097	0.595	1.000

### **3. Methodology**

This study employs a vector autoregression (VAR) framework to examine the dynamic interactions between Bitcoin market activity and public attention to central bank digital currencies. The VAR approach is well suited to this setting, as it allows all variables in the system to be treated as endogenous and captures feedback effects without imposing strong a priori restrictions on causal ordering. Given the absence of a well-established theoretical model governing the direction of causality between CBDC-related attention and cryptocurrency market outcomes, a reduced-form time-series approach is appropriate.

From an empirical perspective, the VAR framework is particularly well suited to environments characterized by evolving institutional arrangements and informational feedback, such as the interaction between emerging digital monetary initiatives and cryptocurrency markets. In contrast to structural models, which require strong identifying assumptions and a well-defined transmission mechanism, the reduced-form VAR allows the data to reveal whether interactions operate primarily through price dynamics, market participation, or informational channels. This flexibility is especially important given that CBDC-related developments often take the form of announcements, consultations, and pilot programs rather than immediate policy implementation.

### 3.1 Model Specification

The baseline empirical model is a tri-variate VAR consisting of weekly Bitcoin returns, logged Bitcoin trading volume, and the CBDC Attention Index. Let

$$Y_t = [BTC_{ret_t}; \log(Volume_t); CBDCAI_t]$$

denote the vector of endogenous variables at time  $t$ . The VAR of order  $p$  is specified as:

$$Y_t = \mathbf{c} + \sum_{i=1}^p \mathbf{A}_i \mathbf{y}_{t-i} + \varepsilon_t$$

where  $\mathbf{c}$  is a vector of intercepts,  $\mathbf{A}_i$  are 3 x 3 coefficient matrices capturing the dynamic interactions among the variables at lag  $i$ , and  $\varepsilon_t$  is a vector of reduced-form innovations with zero mean and finite variance. All variables enter the system symmetrically, reflecting the absence of a clear theoretical hierarchy among Bitcoin prices, market participation, and CBDC-related public attention. Bitcoin returns may influence trading activity and attract policy attention, while heightened discourse around CBDCs may shape expectations without necessarily affecting prices contemporaneously. Treating all variables as endogenous allows these feedback mechanisms to be captured without imposing directional restrictions *ex ante*.

Bitcoin returns are constructed as weekly log differences of prices, and this transformation typically yields a stationary return series and is standard in empirical finance. Trading volume is expressed in logarithms to stabilize variance and reduce skewness. The CBDC Attention Index is included in levels, consistent with its interpretation as an attention measure rather than a price or growth rate and in line with prior empirical studies using this index. All variables are treated as endogenous, allowing for bidirectional dynamic interactions among Bitcoin returns, market participation, and CBDC-related attention.

Prior to estimation, Augmented Dickey–Fuller tests were conducted to assess the time-series properties of the variables. The null hypothesis of a unit root is rejected for Bitcoin returns at conventional significance levels. For logged trading volume and the CBDC Attention Index, the ADF tests do not reject the unit root null, indicating high persistence rather than clear evidence of stationarity. Given the focus on short-run dynamics and standard practice in reduced-form VAR analysis, the baseline model is estimated in levels. Estimating the VAR in levels preserves the co-movement structure among the variables and avoids removing potentially meaningful variation in attention measures that do not naturally admit a growth-rate interpretation. Detailed unit root test results are reported in Appendix 1.

### 3.2 Lag Length Selection

The optimal lag length of the VAR is determined using standard information criteria. Specifically, the Akaike Information Criterion (AIC), Hannan–Quinn criterion (HQ), Schwarz criterion (SC), and the Final Prediction Error (FPE) are evaluated for lag orders up to twelve weeks. The results of the lag selection procedure are reported in Table 3.1. Both the AIC and FPE select a lag length of three, while the HQ and SC favor specification with fewer parameters. Given the weekly frequency of the data, a three-week lag structure provides sufficient flexibility to capture short-run information transmission and delayed market responses without excessive parameterization. Accordingly, a VAR(3) specification is adopted as the baseline model in all subsequent analyses. Extended lag selection results across all information criteria and lag orders up to twelve weeks are reported in Appendix 2.

The choice of a three-week lag length is also economically plausible in this context. Information related to cryptocurrency markets and policy discourse typically diffuses over several days rather than instantaneously, particularly when attention is measured through aggregated media coverage. A VAR(3) specification allows for delayed responses and short-run adjustment dynamics while maintaining parsimony, which is especially important given the sample size and the weekly frequency of the data.

**Table 3.1 — VAR(3) Lag Length Selection Criteria**

Lag	AIC	HQ	SC	FPE
1	-7.660	-7.608	-7.530	4.71e-04
2	-7.824	-7.733	-7.596	4.00e-04
<b>3</b>	<b>-7.835</b>	<b>-7.706</b>	<b>-7.510</b>	<b>3.96e-04</b>
4	-7.809	-7.641	-7.387	4.06e-04

*Note: Lag length selection is based on standard information criteria. A lag length of three is adopted for the baseline VAR.*

### 3.3 Estimation and Identification

The VAR model is estimated using ordinary least squares (OLS) applied equation by

equation. Under standard assumptions, OLS yields consistent estimates in a reduced-form VAR, as each equation includes the same set of regressors and the error terms may be contemporaneously correlated but are uncorrelated with lagged variables. To analyze the dynamic effects of shocks within the system, impulse response functions (IRFs) and forecast error variance decompositions (FEVDs) are computed. Identification of shocks in the baseline analysis relies on a Cholesky decomposition of the estimated residual covariance matrix. The baseline ordering places Bitcoin returns first, followed by logged Bitcoin trading volume and the CBDC Attention Index. This ordering reflects the assumption that financial market variables may respond contemporaneously to information shocks, while broader public and media attention adjusts with a short delay, consistent with the weekly frequency of the data.

This ordering does not imply a structural causal interpretation but serves as a convenient benchmark for tracing orthogonalized shocks under minimal timing assumptions. Additionally, since Cholesky-based identification may be sensitive to variable ordering, robustness checks are conducted using an ordering-invariant identification strategy based on the generalized forecast error variance decomposition framework of Diebold and Yilmaz (2012). This approach does not require orthogonalization of shocks and allows each variable to respond contemporaneously to shocks originating in other variables, weighted by the observed variance–covariance structure of the innovations. All eigenvalues of the companion matrix lie inside the unit circle, confirming VAR stability.

### **3.4 Impulse Response Analysis**

Impulse response functions are used to trace the dynamic responses of each endogenous variable to a one-standard-deviation shock in another variable while holding all other shocks constant. The impulse responses are computed over a twelve-week horizon, which is appropriate given the weekly frequency of the data and the selected lag length. Statistical uncertainty is assessed using bootstrap confidence intervals based on 1,000 replications. The analysis focuses on three primary relationships: the response of Bitcoin returns to shocks in CBDC-related attention, the response of Bitcoin returns to shocks in trading volume, and the response of CBDC attention to shocks in Bitcoin returns. Interpretation emphasizes the direction, magnitude, and persistence of responses rather than short-horizon statistical significance alone, recognizing the high volatility characteristic of cryptocurrency markets.

The impulse response results are presented graphically in Section 4.2. Emphasis is placed on economically meaningful persistence and sign patterns rather than isolated short-horizon significance, reflecting the inherently volatile nature of cryptocurrency markets.

### **3.5 Forecast Error Variance Decomposition**

While impulse response functions illustrate the dynamic effects of isolated shocks, forecast error variance decomposition provides complementary information by quantifying the relative importance of different shocks in explaining the variability of each variable over time. FEVD decomposes the  $h$ -step-ahead forecast error variance of each endogenous variable into components attributable to shocks in each variable in the system.

This study reports FEVD results over a twelve-week forecast horizon. Two decomposition methods are employed. First, FEVD based on the Cholesky identification is used to maintain consistency with the baseline impulse response analysis. Second, an ordering-invariant generalized FEVD is computed following Diebold and Yilmaz (2012). The generalized approach avoids sensitivity to variable ordering and is particularly well suited to financial market data, where strict causal ordering assumptions are difficult to justify.

Forecast error variance decomposition is particularly informative in this setting because it allows assessment of relative importance rather than statistical significance alone. While impulse responses trace the dynamic effects of isolated shocks, FEVD quantifies how much of the overall variability in each variable can be attributed to shocks originating elsewhere in the system. This distinction is especially relevant for evaluating whether CBDC-related attention constitutes a quantitatively meaningful driver of Bitcoin market dynamics. In addition to variance shares, the generalized framework facilitates the analysis of directional spillovers and overall system connectedness, which are used to assess the role of CBDC-related attention within the broader Bitcoin market system. FEVD and connectedness results are presented and discussed in Section 4.3 and Section 4.5, respectively.

## **4. Results**

This section presents the empirical results from the vector autoregression analysis examining the dynamic relationships between Bitcoin returns, Bitcoin trading volume, and public attention to central bank digital currencies as measured by the CBDC Attention Index (CBDCAI). By analyzing impulse responses, forecast error variance decompositions, and

connectedness measures, the empirical evidence distinguishes between externally driven attention effects and internally generated market dynamics. The results are organized as follows: section 4.1 reports the baseline VAR coefficient estimates, section 4.2 outlines the impulse response functions, section 4.3 reports forecast error variance decompositions, section 4.4 examines robustness to alternative identification schemes, and section 4.5 summarizes the ordering-invariant connectedness analysis.

The results consistently point to an asymmetric interaction between Bitcoin markets and CBDC-related attention. Across coefficient estimates, impulse responses, and variance decompositions, CBDC attention does not emerge as a quantitatively important driver of Bitcoin returns. Instead, internal market dynamics dominate price behavior, while market activity feeds back into policy-related attention. This section highlights this asymmetry and shows that observed interactions operate primarily through informational channels rather than direct price effects.

Importantly, the results should be interpreted as characterizing short-run dynamic relationships at a weekly frequency rather than long-run structural effects. The analysis focuses on how information and market activity propagate over time, not on permanent changes in valuation or adoption. This distinction is central when interpreting the absence of strong return effects from CBDC-related attention, which may reflect the informational nature of policy discourse rather than its irrelevance for longer-term monetary competition.

#### **4.1 Baseline VAR Estimation**

Table 4.1 reports the estimated coefficients from the baseline VAR(3) model, with Panels A–C corresponding to the Bitcoin returns, log trading volume, and CBDC Attention Index equations, respectively. The coefficient estimates provide insight into conditional mean dynamics within the system and should be interpreted jointly with the impulse response and variance decomposition analyses. Individual coefficient significance is not, by itself, sufficient to characterize dynamic interactions in a multivariate time-series framework. Instead, the estimates serve as a foundation for understanding how shocks propagate through the system over time. Full VAR(3) coefficient estimates by equation are reported in Appendix 3.

##### **Table 4.1a: VAR(3) Estimates**

### Panel A: Bitcoin Returns Equation

Variable	Coefficient	Std. Error
BTC returns (t-1)	0.0656	(0.0530)
BTC returns (t-2)	-0.0051	(0.0540)
BTC returns (t-3)	0.0358	(0.0531)
Log trading volume (t-1)	0.0103	(0.0188)
Log trading volume (t-2)	-0.0190	(0.0218)
Log trading volume (t-3)	0.0160	(0.0188)
CBDC Attention Index (t-1)	-0.0097	(0.0070)
CBDC Attention Index (t-2)	0.0045	(0.0075)
CBDC Attention Index (t-3)	-0.0076	(0.0070)
Constant	1.1191*	(0.4433)

**Notes:** This panel reports OLS estimates from the Bitcoin returns equation of the VAR(3) model. Bitcoin returns are defined as weekly log differences of Bitcoin prices. Trading volume is expressed in logarithms, and the CBDC Attention Index is included in levels. Standard errors are reported in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.

#### 4.1.1 Bitcoin Returns Equation

The Bitcoin returns equation exhibits limited predictability. Lagged Bitcoin returns are not statistically significant, and the overall pattern is weak and not stable across lags, consistent with the broader view that short-horizon cryptocurrency returns are difficult to forecast. Lagged trading volume coefficients are small and statistically insignificant, indicating that past trading activity does not exert a systematic effect on contemporaneous returns once other dynamics are controlled for.

Lagged values of the CBDC Attention Index do not enter significantly into the returns equation. This finding suggests that fluctuations in CBDC-related public and media attention do not translate into predictable movements in Bitcoin returns in the conditional mean. Overall, the results indicate that Bitcoin returns are largely driven by contemporaneous shocks rather than lagged information from either market activity or CBDC-related attention. From an economic perspective, these results reinforce the view that Bitcoin prices are dominated by contemporaneous shocks and speculative dynamics rather than by lagged

policy-related information. At a weekly frequency, incremental changes in public discourse surrounding CBDCs do not appear to alter return expectations in a systematic way. This finding is consistent with the institutional characteristics of Bitcoin, whose supply mechanism and validation rules are fixed by protocol and are not directly affected by policy discussions alone.

**Table 4.1b: VAR(3) Estimates**

**Panel B: Log Trading Volume Equation**

Variable	Coefficient	Std. Error
BTC returns (t-1)	<b>0.5861***</b>	(0.1504)
BTC returns (t-2)	0.2672	(0.1531)
BTC returns (t-3)	0.2748*	(0.1504)
Log trading volume (t-1)	<b>0.6210***</b>	(0.0533)
Log trading volume (t-2)	<b>0.2221***</b>	(0.0617)
Log trading volume (t-3)	<b>0.1397**</b>	(0.0532)
CBDC Attention Index (t-1)	0.0188	(0.0199)
CBDC Attention Index (t-2)	-0.0279	(0.0212)
CBDC Attention Index (t-3)	0.0024	(0.0199)
Constant	1.1154	(1.2569)

**Notes:** This panel reports OLS estimates from the log trading volume equation of the VAR(3) model. Trading volume is expressed in logarithms. Bitcoin returns are defined as weekly log differences of Bitcoin prices, and the CBDC Attention Index is included in levels. Standard errors are reported in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.

#### 4.1.2 Log Trading Volume Equation

In contrast, the trading volume equation exhibits strong dynamic structure. Lagged trading volume terms are positive and statistically significant, indicating substantial persistence in Bitcoin market activity. Lagged Bitcoin returns enter positively and significantly, suggesting that price movements play an important role in shaping subsequent trading intensity. Lagged

CBDC attention terms are not statistically significant in the trading volume equation. This implies that, after controlling for past returns and volume, CBDC-related attention does not directly influence aggregate Bitcoin trading activity in the short run.

The strong response of trading volume to past returns highlights the role of market participation and investor engagement as key transmission mechanisms within the Bitcoin market. Price movements appear to attract attention and trading activity, reinforcing short-run momentum without necessarily generating persistent return predictability. In this sense, trading volume acts as an internal amplification channel rather than as an independent source of price shocks.

**Table 4.1c: VAR(3) Estimates**

**Panel C: CBDC Attention Index Equation**

Variable	Coefficient	Std. Error
BTC returns (t-1)	0.5332	(0.3954)
BTC returns (t-2)	-0.2374	(0.4024)
BTC returns (t-3)	0.1378	(0.3954)
Log trading volume (t-1)	<b>0.2883*</b>	(0.1402)
Log trading volume (t-2)	-0.2605	(0.1622)
Log trading volume (t-3)	0.0638	(0.1399)
CBDC Attention Index (t-1)	<b>0.4437***</b>	(0.0524)
CBDC Attention Index (t-2)	<b>0.2457***</b>	(0.0557)
CBDC Attention Index (t-3)	<b>0.1611**</b>	(0.0524)
Constant	<b>12.8315***</b>	(3.3040)

**Notes:** This panel reports OLS estimates from the CBDC Attention Index equation of the VAR(3) model. The CBDC Attention Index is included in levels as a measure of public and media attention. Bitcoin returns are defined as weekly log differences of Bitcoin prices, and trading volume is expressed in logarithms. Standard errors are reported in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.

### **4.1.3 CBDC Attention Index Equation**

The CBDC Attention Index equation displays pronounced persistence, with lagged CBDCAI coefficients highly statistically significant. This reflects the gradual evolution of public and media attention and the tendency for attention shocks to dissipate slowly over time. Lagged trading volume enters positively and significantly in the CBDCAI equation, indicating that periods of heightened Bitcoin market activity are associated with subsequent increases in CBDC-related attention. Lagged Bitcoin returns are not statistically significant predictors of CBDC attention.

These results suggest that while CBDC attention does not directly drive Bitcoin market outcomes, Bitcoin market activity contributes to variations in CBDC-related public discourse. In combination with the trading volume equation, these results indicate a transmission pattern in which Bitcoin price movements influence subsequent market participation, which in turn feeds into CBDC-related public and media attention, rather than CBDC attention exerting a direct influence on Bitcoin returns. This pattern is consistent with CBDC-related attention responding endogenously to developments in cryptocurrency markets rather than serving as an exogenous driver of those markets.

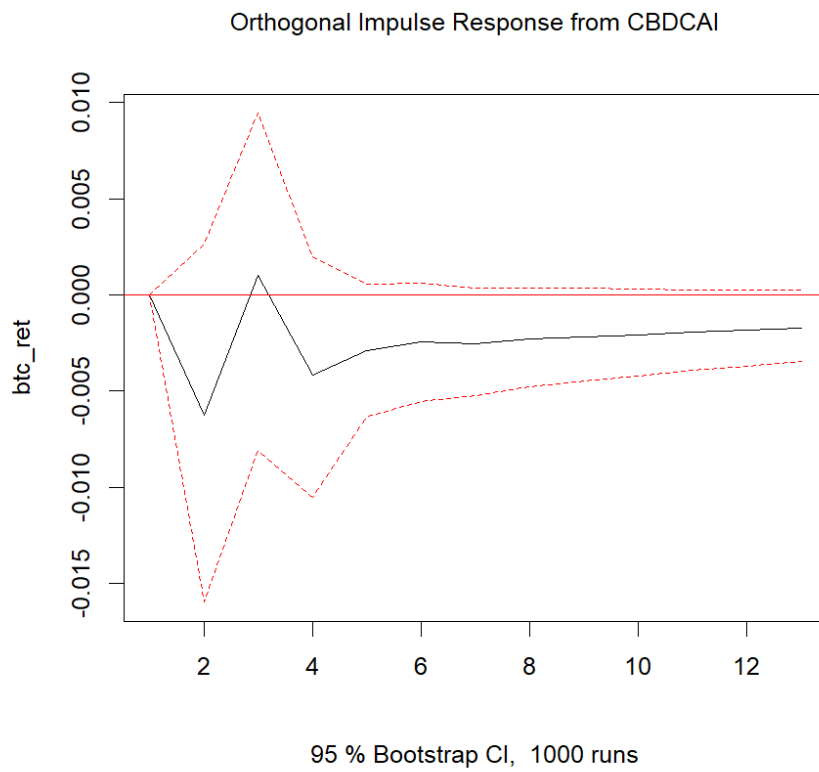
### **4.2 Impulse Response Functions**

Figure 4.1 shows the response of Bitcoin returns to a one-standard-deviation shock in the CBDC Attention Index. The response is small and short-lived, with confidence intervals covering zero at most horizons, indicating no statistically meaningful or persistent effect on returns.

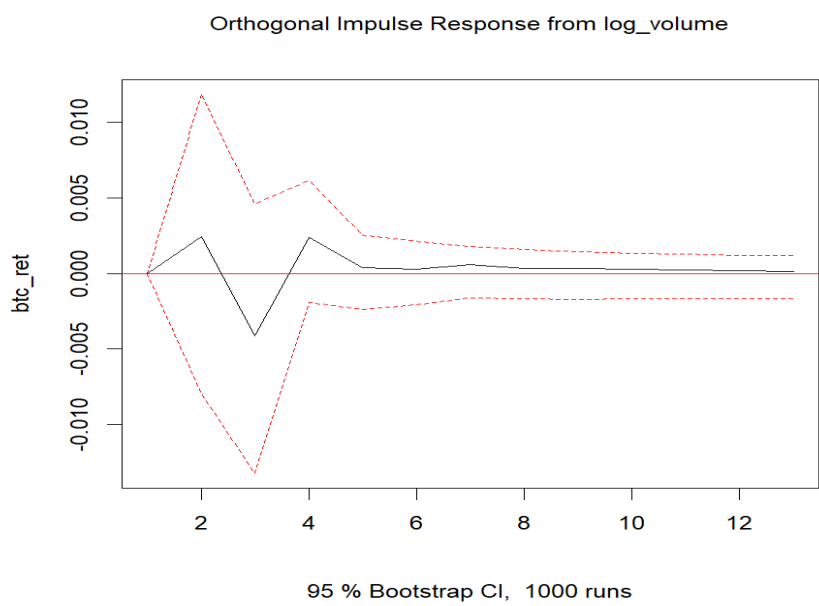
Figure 4.2 reports the response of Bitcoin returns to a shock in trading volume. Increases in trading volume are followed by modest positive movements in returns at short horizons, although these effects dissipate quickly. This pattern is consistent with trading volume capturing market participation and liquidity rather than driving sustained price changes.

Figure 4.3 presents the response of CBDC attention to a shock in Bitcoin returns. Positive return shocks are associated with a temporary increase in CBDC-related attention, which gradually fades over time, suggesting limited but observable feedback from Bitcoin market activity to public and media discourse.

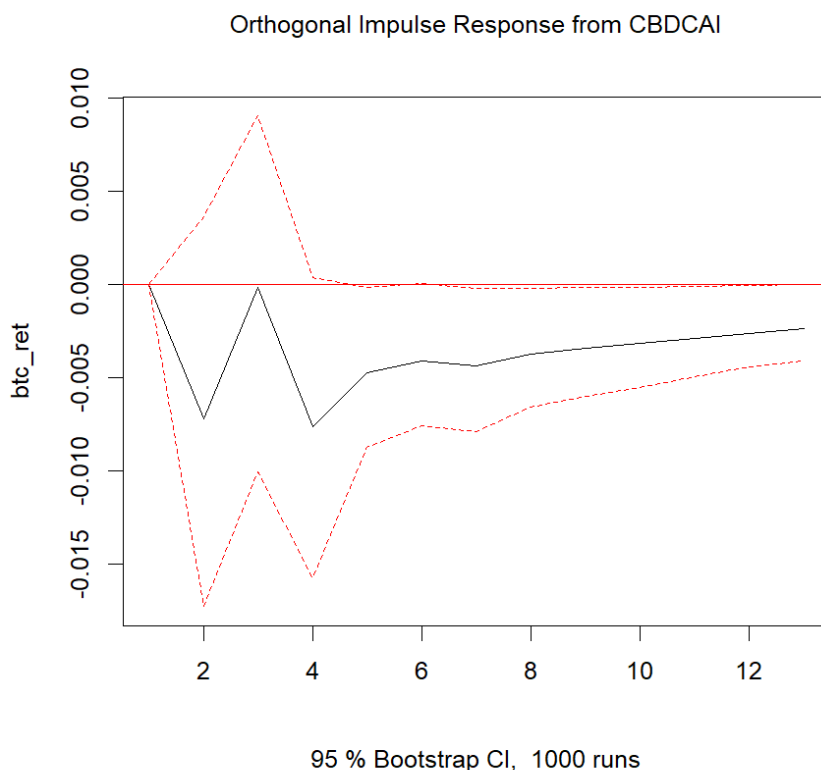
**Figure 4.1 Impulse Responses to a CBDC Attention Shock**



**Figure 4.2: Impulse Responses to a Trading Volume Shock**



**Figure 4.3 Impulse Responses to a Bitcoin Returns Shock**



Figures 4.1–4.3 report orthogonal impulse response functions from the estimated VAR(3) model, with 95% bootstrap confidence intervals based on 1,000 replications. Overall, the impulse response analysis indicates weak transmission from CBDC attention to Bitcoin returns, while feedback from Bitcoin market activity to CBDC attention is present but economically modest. The results suggest that CBDC-related attention functions primarily as an informational backdrop rather than as a driver of short-run Bitcoin price dynamics.

**4.3 Forecast Error Variance Decomposition**

Table 4.3 reports the generalized forecast error variance decomposition at a twelve-week horizon. Panel A shows the percentage of each variable’s forecast error variance explained by shocks to itself and to the other variables, while Panel B aggregates own and cross shock contributions to summarize relative importance.

**Table 4.3 Generalized Forecast Error Variance Decomposition**

**Panel A: FEVD by Receiving Variable (Percent)**

Receiving Variable	BTC Returns	Log Trading Volume	CBDC Attention
<b>BTC Returns</b>	91.8	6.5	1.7
<b>Log Trading Volume</b>	18.9	76.4	4.7
<b>CBDC Attention Index</b>	22.6	14.3	63.1

**Note:** Rows indicate the variable whose forecast error variance is decomposed; columns indicate the source of shocks.

**Panel B: Own vs Cross Shock Contributions (Percent)**

Variable	Own Shock (%)	Cross Shocks (%)
<b>BTC Returns</b>	91.8	8.2
<b>Log Trading Volume</b>	76.4	23.6
<b>CBDC Attention Index</b>	63.1	36.9

**Note:** Table 4.3 reports generalized FEVDs at a 12-week horizon from the estimated VAR(3). Entries denote percentage contributions of shocks to forecast error variance. The generalized FEVD is invariant to variable ordering and allows contemporaneous correlation among shocks.

The FEVD results indicate that the overwhelming majority of the forecast error variance of Bitcoin returns is explained by own shocks. Shocks to trading volume and the CBDC Attention Index account for only a small fraction of return variability, underscoring the dominance of idiosyncratic factors in driving Bitcoin price fluctuations. In contrast, trading volume exhibits meaningful exposure to shocks originating from Bitcoin returns. This result reinforces the importance of price dynamics in shaping subsequent market participation. CBDC attention contributes only marginally to the variance of trading volume. For the CBDC Attention Index, own shocks explain the largest share of forecast variance. However, shocks to Bitcoin returns and trading volume together account for a non-trivial portion of CBDC attention variability, consistent with the view that heightened market activity coincides with increased public and media focus on digital currency developments. The dominance of own shocks in Bitcoin returns, combined with the comparatively larger contribution of returns and trading volume to CBDC attention variance, further reinforces the view that informational spillovers predominantly run from cryptocurrency markets to

policy-related attention rather than in the opposite direction.

The variance decomposition results are particularly informative because they quantify the relative importance of different shocks. Even when statistically significant interactions exist, their economic relevance may be limited. In this case, the dominance of own shocks in Bitcoin returns indicates that external informational variables such as CBDC attention explain only a negligible share of return variability, reinforcing the conclusion that internal market forces dominate short-run price dynamics.

#### **4.4 Ordering Robustness**

To assess the sensitivity of the results to identifying assumptions, the FEVD analysis is repeated under alternative Cholesky orderings of the variables. Across all orderings, the qualitative conclusions remain unchanged. CBDC-related attention consistently explains only a small share of Bitcoin return variance, while log Bitcoin trading volume plays a more prominent role in transmitting shocks within the system. These findings suggest that the baseline results are not driven by arbitrary ordering choices and are robust to alternative identification schemes. This supports the interpretation that the observed asymmetry reflects the data rather than identification choices. Alternative forecast error variance decompositions under Cholesky identification are reported in Appendix 4, Tables A–C.

#### **4.5 Ordering-Invariant Connectedness Analysis**

As a further robustness check, an ordering-invariant connectedness analysis is conducted using the generalized FEVD framework of Diebold and Yilmaz (2012). The connectedness measures confirm the earlier findings. Bitcoin returns are largely driven by own shocks, while trading volume acts as a relative transmitter of shocks within the system. The CBDC Attention Index primarily functions as an information receiver, with limited spillover effects on Bitcoin market outcomes. Overall system connectedness is moderate, indicating that while interactions exist among Bitcoin returns, trading activity, and CBDC-related attention, attention shocks do not dominate the dynamics of Bitcoin market variables.

From a system-wide perspective, the connectedness analysis confirms that Bitcoin markets are primarily self-driven, with trading activity acting as a conduit for information transmission. CBDC-related attention remains peripheral in terms of driving market outcomes, functioning mainly as a receiver of information. This pattern is consistent with

the view that policy discourse reacts to cryptocurrency market developments rather than directing them in the short run. Detailed connectedness and spillover tables are reported in Appendix 5.

## **5. Discussion**

This thesis investigates the dynamic relationship between Bitcoin market activity and public attention to central bank digital currencies using a multivariate time-series framework. It is important to note that competition is interpreted here in an informational and institutional sense, not as short-run price substitution. The empirical results provide several insights into how CBDC-related attention interacts with Bitcoin returns and trading activity, while also clarifying the limits of such interactions. Overall, the evidence points toward CBDC-related attention operating mainly through informational channels.

There is established a clear directional pattern of interaction. Bitcoin returns influence subsequent trading volume, reflecting shifts in market participation and investor engagement, and heightened market activity then feeds into CBDC-related public and media attention. By contrast, shocks to CBDC attention do not generate economically meaningful or persistent effects on Bitcoin returns. This asymmetry suggests that attention-based measures primarily respond to developments within cryptocurrency markets rather than acting as an independent driver of short-run price dynamics. In this sense, CBDC-related discourse appears to function as an informational mirror of cryptocurrency market activity rather than a source of binding constraints or competitive pressure.

From a broader perspective, these findings underscore the distinction between informational competition and functional substitution in digital monetary systems. While Bitcoin and CBDCs are often framed as competing forms of digital money, the empirical evidence suggests that this competition currently manifests more strongly through narratives, expectations, and institutional discourse than through direct price-level interactions. At the examined frequency, Bitcoin markets appear to process a wide range of global information, of which CBDC-related attention constitutes only a small component. As a result, policy discourse surrounding CBDCs does not materially alter short-run return dynamics, even though it remains salient in public debate.

### **5.1 CBDC Attention and Bitcoin Returns**

Across all specifications, the results indicate that fluctuations in CBDC-related public and media attention do not exert a strong or persistent influence on Bitcoin returns. Neither the baseline VAR coefficients nor the impulse response functions provide evidence of systematic return predictability following shocks to the CBDC Attention Index. Forecast error variance decompositions further confirm that CBDC attention accounts for only a small fraction of Bitcoin return variability, with the overwhelming majority explained by own shocks.

These findings suggest that, at a weekly frequency, CBDC-related information does not operate as a primary driver of short-term Bitcoin price dynamics. While CBDC announcements and policy discussions may attract public interest, their effects do not appear to translate into predictable price movements once broader market dynamics are taken into account. This result is consistent with the view that Bitcoin prices are dominated by idiosyncratic factors, speculative behavior, and global macro-financial conditions rather than by incremental changes in policy-related attention.

Importantly, the absence of strong return effects does not imply that CBDC developments are irrelevant for Bitcoin markets. Rather, it indicates that their influence is not easily captured through short-run conditional mean dynamics at a weekly horizon. This result is also consistent with the global and decentralized nature of Bitcoin markets. Bitcoin prices incorporate information from a diverse set of sources, including macroeconomic developments, technological events, regulatory actions across jurisdictions, and speculative sentiment. In this environment, attention related to CBDCs—often gradual, consultative, and forward-looking—may lack the immediacy required to shift return expectations over short horizons. The absence of detectable return effects therefore reflects not a failure of information transmission, but rather the relative scale and timing of CBDC-related signals within the broader information set facing market participants.

### **5.2 Market Activity as a Transmission Channel**

In contrast to the weak link between CBDC attention and returns, the results highlight a strong dynamic relationship between Bitcoin returns and trading volume. Lagged returns significantly predict subsequent trading activity, and shocks to trading volume generate

modest short-run responses in returns. These patterns are consistent with trading volume reflecting market participation, liquidity conditions, and investor engagement. The FEVD results reinforce this interpretation. Trading volume explains a non-trivial share of return variability relative to CBDC attention, while returns themselves account for a meaningful portion of volume fluctuations. This bidirectional relationship suggests that internal market dynamics, rather than external attention shocks, constitute the primary transmission mechanism within the Bitcoin market system. Interpreting trading volume as a transmission channel highlights the importance of participation dynamics in cryptocurrency markets. Increases in returns tend to attract new entrants, intensify trading activity, and amplify market visibility, even in the absence of persistent price predictability. This mechanism aligns with behavioral and market microstructure perspectives in which trading activity reflects shifts in investor attention and engagement rather than fundamental revaluation alone. Within this framework, volume acts as a bridge between price movements and broader informational spillovers, linking internal market dynamics to external discourse.

### **5.3 Feedback from Bitcoin Markets to CBDC Attention**

The results are consistent with an informational transmission mechanism running from cryptocurrency markets to CBDC-related attention rather than the reverse. As discussed in Section 1.5, CBDCs and Bitcoin differ fundamentally in institutional design and governance, implying that CBDC-related developments mostly reflect evolving policy discourse rather than immediate changes in monetary conditions. Bitcoin's protocol-level features are largely invariant to such discourse. Consequently, market activity rather than policy attention emerges as the key driver in the short run. Increases in Bitcoin returns stimulate trading volume, reflecting heightened participation and market salience, which in turn attracts greater public and media attention to CBDCs as policymakers and commentators respond to developments in cryptocurrency markets.

While CBDC attention does not significantly affect Bitcoin returns, the reverse relationship is more pronounced. Both the VAR estimates and the impulse response analysis indicate that heightened Bitcoin market activity, most prominently increases in trading volumes, is associated with subsequent increases in CBDC-related attention. The CBDC Attention Index also displays strong persistence, reflecting the gradual evolution of public discourse and media narratives.

These findings suggest that CBDC-related attention responds, at least in part, to developments within cryptocurrency markets. Periods of elevated trading activity and market volatility may intensify policy discussions, regulatory scrutiny, and media coverage of central bank digital currencies, indicating that Bitcoin markets influence the informational environment surrounding CBDCs rather than the reverse. This responsiveness reflects institutional incentives facing policymakers and central banks, as heightened volatility, rapid price appreciation, or surges in trading activity can elevate concerns related to financial stability and monetary sovereignty. Accordingly, CBDC-related attention appears to function primarily as a reactive policy signal shaped by observable market outcomes rather than as a proactive instrument influencing decentralized market behavior.

#### **5.4 Robustness and Interpretation**

The robustness of these conclusions is supported by the ordering-invariant generalized FEVD and connectedness analysis. Across alternative identification schemes, CBDC attention consistently emerges as an information receiver rather than a dominant shock transmitter. Overall system connectedness is moderate, indicating the presence of dynamic interactions without evidence of CBDC attention driving market-wide outcomes. The results portray CBDC-related attention as part of the broader informational backdrop against which Bitcoin markets operate, rather than as a direct causal force shaping prices. Bitcoin market dynamics appear to be primarily self-driven, with external attention responding to, rather than leading, market developments.

The robustness of this interpretation across alternative identification strategies strengthens confidence in the central empirical conclusion. Even when allowing for contemporaneous correlations and removing reliance on variable ordering, CBDC-related attention does not emerge as a dominant driver within the system. This suggests that the observed asymmetry is not an artifact of modeling choices but a structural feature of the data over the sample period. Consequently, any competitive interaction between CBDCs and Bitcoin appears to be mediated primarily through informational and institutional channels rather than through direct short-run market responses.

#### **5.5 Limitations and Scope**

The findings should be interpreted in light of several limitations. While the results are robust across specifications, they should be interpreted cautiously given the aggregate nature of the

attention measure. First, the analysis focuses on weekly data and short- to medium-term dynamics; longer-run structural effects of CBDC adoption or regulatory implementation may not be captured. Second, the CBDC Attention Index measures aggregate global attention and does not distinguish between positive, negative, or heterogeneous policy signals. Finally, the VAR framework captures linear dynamics and may not fully reflect nonlinear or regime-dependent responses. Despite these limitations, the analysis provides an empirical assessment of the interaction between Bitcoin markets and CBDC-related attention using a well-established econometric framework.

Future research could exploit cross-country variation in the timing and design of CBDC pilots using a difference-in-differences framework. Comparing countries with broadly similar macroeconomic conditions and cryptocurrency adoption patterns, where one jurisdiction introduces a CBDC while a comparable control group does not, would help isolate causal effects beyond short-run informational dynamics. Such approaches would be particularly useful for assessing whether CBDC rollouts influence cryptocurrency usage, trading intensity, or substitution behavior over longer horizons. Complementary country-level case studies could further illuminate institutional details, policy design choices, and market responses that are difficult to capture in aggregate time-series data. Together, these extensions would allow for a richer understanding of how centralized digital currency initiatives interact with decentralized cryptocurrency markets across different institutional contexts.

## **Conclusion**

This thesis examined the short-run dynamic interaction between Bitcoin market activity and public and media attention to central bank digital currencies using weekly data from September 2017 to November 2024. A tri-variate VAR framework was used to model feedback among Bitcoin returns, logged Bitcoin trading volume, and a global CBDC Attention Index derived from large-scale news text data.

The evidence points to an asymmetric relationship. First, CBDC-related attention does not meaningfully explain Bitcoin returns: return variation is overwhelmingly driven by own shocks, and attention shocks have small and short-lived effects. Second, internal Bitcoin market dynamics are central: returns predict subsequent trading volume, and volume is highly persistent, indicating that participation dynamics respond to market conditions rather than to CBDC discourse. Third, feedback in the opposite direction is stronger: higher Bitcoin market activity, especially trading volume, is followed by increased CBDC-related attention, consistent with policy and media discourse responding to developments in cryptocurrency markets. These findings imply that, at a weekly frequency and in the current pre-implementation phase of CBDC development, interaction between decentralized and centralized digital monetary systems operates primarily through informational and institutional channels rather than through direct short-run price substitution. CBDC discourse appears to reflect evolving narratives and policy attention that are influenced by cryptocurrency market developments, while Bitcoin return dynamics remain largely self-driven.

The analysis has limitations. The focus on weekly data targets short-run dynamics and does not capture long-run effects of CBDC adoption or regulatory implementation. The attention index measures salience rather than sentiment and aggregates heterogeneous jurisdictions. The VAR framework is linear and may not capture regime-dependent responses during extreme market stress. Future research should exploit cross-country variation in CBDC timing and design. Difference-in-differences designs comparing similar countries where one implements or pilots a CBDC while a comparable control does not would be a stronger strategy for identifying causal impacts on cryptocurrency activity. Complementary country case studies would also be useful for connecting institutional design choices to observed

market behavior.

## Summary

This thesis studies the interaction between Bitcoin market activity and public and media attention to central bank digital currencies (CBDCs). Using weekly data from September 2017 to November 2024, the analysis focuses on Bitcoin returns, Bitcoin trading volume, and a global CBDC Attention Index derived from large-scale news text data. A tri-variate vector autoregression (VAR) framework is employed to capture dynamic interactions and feedback effects among these variables. The results reveal an asymmetric relationship. CBDC-related attention does not exert a strong or persistent influence on Bitcoin returns, which are largely driven by own shocks. In contrast, Bitcoin trading volume is highly persistent and responds strongly to past returns, reflecting the importance of internal market dynamics. Evidence of feedback operates mainly in the opposite direction: increased Bitcoin market activity, particularly higher trading volume, is followed by rising CBDC-related attention. Therefore, the findings suggest that interactions between decentralized cryptocurrencies and centralized digital monetary initiatives currently operate primarily through informational and institutional channels rather than through short-run price substitution.

## Shrnutí

Tato diplomová práce zkoumá interakci mezi aktivitou na trhu s bitcoinem a veřejnou a mediální pozorností věnovanou digitálním měnám centrálních bank (CBDC). Analýza využívá týdenní data z období od září 2017 do listopadu 2024 a zaměřuje se na výnosy bitcoinu, objem obchodování s bitcoinem a globální index pozornosti vůči CBDC odvozený z rozsáhlých zpravodajských textových dat. Pro zachycení dynamických interakcí a zpětných vazeb mezi těmito proměnnými je použit trivariátní vektorový autoregresní (VAR) model. Výsledky odhalují asymetrický vztah. Pozornost věnovaná CBDC nemá výrazný ani přetrvávající vliv na výnosy bitcoinu, které jsou z velké části určeny vlastními šoky. Naproti tomu objem obchodování s bitcoinem je vysoce perzistentní a silně reaguje na minulé výnosy, což odráží význam vnitřní tržní dynamiky. Důkazy o zpětné vazbě se projevují převážně opačným směrem: zvýšená aktivita na trhu s bitcoinem, zejména vyšší objem obchodování, je následována nárůstem pozornosti věnované CBDC. Z toho plyne, že

interakce mezi decentralizovanými kryptoměny a centralizovanými digitálními měnovými iniciativami se v současnosti odehrávají především prostřednictvím informačních a institucionálních kanálů, nikoli prostřednictvím krátkodobé cenové substituce.

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## List of Appendices

### Appendix no. 1: Unit Root Tests for Model Variables (Table)

Augmented Dickey–Fuller Unit Root Tests

Variable	ADF p-value
Bitcoin Returns	0.010
Log BTC Trading Volume	0.455
CBDC Attention Index	0.484

*Notes:* The table reports p-values from Augmented Dickey–Fuller tests. The null hypothesis is the presence of a unit root. Bitcoin returns reject the unit root null at conventional significance levels, while log BTC trading volume and the CBDC Attention Index exhibit high persistence and do not reject the unit root null at conventional levels.

### Appendix no. 2: Lag Length Selection (Tables)

**Table A: Extended Lag Length Selection Criteria**

Lag	AIC	HQ	SC	FPE
1	-7.6597	-7.6081	-7.5299	4.71e-04
2	-7.8237	-7.7333	-7.5965	4.00e-04
3	-7.8347	-7.7057	-7.5102	3.96e-04
4	-7.8089	-7.6412	-7.3871	4.06e-04
5	-7.77976	-7.57329	-7.26055	4.18e-04
6	-7.74836	-7.50318	-7.13179	4.32e-04
7	-7.7472	-7.4633	-7.03327	4.32e-04

Lag	AIC	HQ	SC	FPE
8	-7.71204	-7.38943	-6.90076	4.48e-04
9	-7.68366	-7.32234	-6.77503	4.61e-04
10	-7.65704	-7.257	-6.65105	4.73e-04
11	-7.61981	-7.18106	-6.51647	4.91e-04
12	-7.6107	-7.1332	-6.4100	4.96e-04

**Note:** This table reports information criteria values for VAR lag orders up to twelve. Lower values indicate preferred specifications.

**Table B: Lag Length Selected by Information Criterion**

Criterion	Selected Lag
AIC	3
HQ	2
SC	2
FPE	3

**Note:** The baseline VAR(3) specification is selected based on the Akaike Information Criterion (AIC) and the Final Prediction Error (FPE).

### Appendix no. 3: VAR Coefficient Estimates by Equation (Tables)

**Table A: VAR(3) Coefficient Estimates - Bitcoin Returns Equation**

Variable	Estimate	Std. Error	t-value	Pr(> t )
BTC returns (t-1)	0.0656	(0.0530)	1.236	0.217
BTC returns (t-2)	-0.0051	(0.0540)	0.095	0.924
BTC returns (t-3)	0.0358	(0.0531)	0.674	0.501
Log trading volume (t-1)	0.0103	(0.0188)	0.548	0.584
Log trading volume (t-2)	-0.0190	(0.0218)	-0.875	0.382
Log trading volume (t-3)	0.0160	(0.0188)	0.855	0.393
CBDC Attention Index (t-1)	-0.0097	(0.0070)	-1.387	0.166

<b>CBDC Attention Index (t-2)</b>	0.0045	(0.0075)	0.605	0.545
<b>CBDC Attention Index (t-3)</b>	-0.0076	(0.0070)	-1.081	0.280
<b>Constant</b>	1.1191*	(0.4433)	2.525	0.012

*Notes: This table reports OLS estimates from the Bitcoin returns equation of the VAR(3) model. Bitcoin returns are defined as weekly log differences of Bitcoin prices. Trading volume is expressed in logarithms, and the CBDC Attention Index is included in levels. Standard errors are reported in parentheses. The table is provided for completeness; interpretation is discussed in Section 4.1.1.*

**Table B: VAR(3) Coefficient Estimates - Log Trading Volume Equation**

<b>Variable</b>	<b>Estimate</b>	<b>Std. Error</b>	<b>t-value</b>	<b>Pr(&gt; t )</b>
<b>BTC returns (t-1)</b>	<b>0.5861***</b>	(0.1504)	3.8968	0.0001
<b>BTC returns (t-2)</b>	0.2672	(0.1531)	1.7451	0.0818
<b>BTC returns (t-3)</b>	0.2748*	(0.1504)	1.8270	0.0685
<b>Log trading volume (t-1)</b>	<b>0.6210***</b>	(0.0533)	11.6434	0.0000
<b>Log trading volume (t-2)</b>	<b>0.2221***</b>	(0.0617)	3.6009	0.0004
<b>Log trading volume (t-3)</b>	<b>0.1397**</b>	(0.0532)	2.6262	0.0090
<b>CBDC Attention Index (t-1)</b>	0.0188	(0.0199)	0.9416	0.3470
<b>CBDC Attention Index (t-2)</b>	-0.0279	(0.0212)	-1.3155	0.1892
<b>CBDC Attention Index (t-3)</b>	0.0024	(0.0199)	0.1226	0.9025
<b>Constant</b>	1.1154	(1.2569)	0.8874	0.3755

*Notes: This table reports OLS estimates from the log trading volume equation of the VAR(3) model. Trading volume is expressed in logarithms. Bitcoin returns are defined as weekly log differences of prices, and the CBDC Attention Index is included in levels. Standard errors are reported in parentheses. Coefficient interpretation is provided in Section 4.1.2.*

**Table C: VAR(3) Coefficient Estimates - CBDC Attention Index Equation**

<b>Variable</b>	<b>Estimate</b>	<b>Std. Error</b>	<b>t-value</b>	<b>Pr(&gt; t )</b>
<b>BTC returns (t-1)</b>	0.5332	(0.3954)	1.3486	0.1783
<b>BTC returns (t-2)</b>	-0.2374	(0.4024)	-0.5900	0.5555
<b>BTC returns (t-3)</b>	0.1378	(0.3954)	0.3485	0.7277

<b>Log trading volume (t-1)</b>	<b>0.2883*</b>	(0.1402)	2.0564	0.0405
<b>Log trading volume (t-2)</b>	-0.2605	(0.1622)	-1.6067	0.1090
<b>Log trading volume (t-3)</b>	0.0638	(0.1399)	0.4560	0.6486
<b>CBDC Attention Index (t-1)</b>	<b>0.4437***</b>	(0.0524)	8.4680	0.0000
<b>CBDC Attention Index (t-2)</b>	<b>0.2457***</b>	(0.0557)	4.4073	0.0000
<b>CBDC Attention Index (t-3)</b>	<b>0.1611**</b>	(0.0524)	3.0770	0.0023
<b>Constant</b>	<b>12.8315***</b>	(3.3040)	3.8836	0.0001

**Notes:** This table reports OLS estimates from the CBDC Attention Index equation of the VAR(3) model. The CBDC Attention Index is included in levels as a measure of public and media attention. Bitcoin returns are defined as weekly log differences of prices, and trading volume is expressed in logarithms. Standard errors are reported in parentheses. Discussion of persistence and feedback effects is provided in Section 4.1.3.

#### Appendix no. 4: Alternative Forecast Error Variance Decompositions (Tables)

**Table A: FEVD - Bitcoin Returns**

<b>Shock source</b>	<b>Contribution (%)</b>
Bitcoin returns	97.61
Log trading volume	0.29
CBDC Attention Index	2.10

**Notes:** This table reports the Cholesky-based forecast error variance decomposition of Bitcoin returns at a 12-week horizon. Entries denote the percentage of forecast error variance explained by shocks to each variable in the VAR(3) system.

**Table B: FEVD - Log Trading Volume**

<b>Shock source</b>	<b>Contribution (%)</b>
Bitcoin returns	20.45
Log trading volume	78.32
CBDC Attention Index	1.23

**Notes:** This table reports the Cholesky-based forecast error variance decomposition of log Bitcoin trading volume at a 12-week horizon. Entries denote the percentage of forecast error variance explained by shocks to each variable in the VAR(3) system.

**Table C: FEVD - CBDC Attention Index**

<b>Shock source</b>	<b>Contribution (%)</b>
Bitcoin returns	1.68
Log trading volume	4.84

<b>Shock source</b>	<b>Contribution (%)</b>
CBDC Attention Index	93.48

**Notes:** This table reports the Cholesky-based forecast error variance decomposition of the CBDC Attention Index at a 12-week horizon. Entries denote the percentage of forecast error variance explained by shocks to each variable in the VAR(3) system.

## Appendix no. 5: Connectedness and Spillover Measures (Tables)

**Table A: Generalized FEVD Connectedness Matrix (12-week horizon)**

<b>Receiving ↓ / Shock →</b>	<b>BTC returns</b>	<b>Log trading volume</b>	<b>CBDC Attention</b>
BTC returns	95.71	2.20	2.09
Log trading volume	19.76	79.43	0.81
CBDC Attention Index	1.82	5.29	92.89

**Notes:** Entries are generalized FEVD-based variance shares (percent) at a 12-week horizon. The generalized framework is invariant to variable ordering.

**Table B: Directional and Total Connectedness Measures**

<b>Measure</b>	<b>Value (%)</b>
Spillovers <b>from others</b> → <b>BTC returns</b>	4.29
Spillovers <b>from others</b> → <b>log volume</b>	20.57
Spillovers <b>from others</b> → <b>CBDC Attention</b>	7.11
<b>Total Connectedness Index (TCI)</b>	10.66

**Notes:** Directional spillovers and the total connectedness index are derived from the generalized FEVD at a 12-week horizon.