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Beyond price prediction: sentiment, emotional framing, and thematic focus in cryptocurrency newspaper coverage

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Abstract

This study presents a large-scale analysis of English-language newspaper coverage of cryptocurrency across a seventeen-year period (2009–2026). Drawing on 66,173 articles from multiple publications, annotated using GPT-4o-mini, we examine the distribution of sentiment, emotional framing, and thematic focus in newspapers covering cryptocurrency topics. The findings show that the coverage sentiment is mixed, with positive coverage slightly outweighing negative coverage. Sentiment is strongly impacted by theme of an article. Adoption and technology articles are overwhelmingly positive, while security and fraud, and market volatility coverage is predominantly negative. A chi-square test confirms a large, statistically significant topic–sentiment association. In addition, Optimism is the dominant emotion and account for about one third of the article, while Concern and Cautious Optimism together account for nearly one third of the articles. An OLS regression reveals a small but significant positive trend in sentiment over time, consistent with the gradual normalization of cryptocurrency in mainstream financial journalism.

Keywords: cryptocurrency, sentiment analysis, large language models

Introduction

The emergence of Bitcoin in 2009, followed by the proliferation of thousands of alternative cryptocurrencies, has generated one of the most intensively covered financial stories of the twenty first century. Media framing theory holds that the way an issue is presented including which aspects are emphasized, which emotions are evoked, and which narratives are privileged, shapes audience perception, investor behavior, and ultimately policy outcomes (Entman, 1993; McCombs & Shaw, 1972). Despite a growing body of literature on cryptocurrency sentiment derived from social media platforms such as Twitter and Reddit (Kraaijeveld & De Smedt, 2020; Abraham et al., 2018), systematic large-scale analysis of mainstream newspaper coverage remains comparatively sparse. Newspaper journalism is subject to editorial gatekeeping and represents a more deliberate and institutionally mediated form of public discourse than social media, yet its affective structure has not been characterized at scale.

Existing research on cryptocurrency media coverage is fragmented across time windows, platforms, and methodologies. Most sentiment studies focus on social media postings during specific market episodes, such as the 2017–2018 bubble, the COVID-19 pandemic, or the 2022 FTX collapse, and treat sentiment as

an instrumental price-prediction variable rather than as a substantive object of inquiry in its own right. The institutional press, which reaches broader and more diverse audiences than cryptocurrency forums or Twitter, remains largely unexamined. This study addresses that gap by characterizing the affective structure of mainstream newspaper coverage across the seventeen-year lifecycle of cryptocurrency as a public phenomenon.

We analyze a corpus of 66,173 newspaper articles spanning 2009 to 2026, annotated for sentiment polarity, sentiment intensity, emotional tone, and thematic focus using GPT-4o-mini. The study pursues three primary research questions:

RQ1: What is the overall distribution of sentiment in newspaper coverage of cryptocurrency, and how has it evolved over time?

RQ2: How does thematic framing relate to sentiment and emotional tone?

RQ3: Are there meaningful differences in sentiment across distinct market cycles, from the early adoption period through the Post FTX era?

The remainder of this paper is organized as follows: First, it reviews the relevant literature and describes the methodology. Next, it presents the results of the analysis, along with the findings and implications. Finally, the paper concludes with a discussion of limitations and directions for future research.

Literature Review

Cryptocurrency Sentiment and Social Media

The dominant research paradigm treats cryptocurrency sentiment as an instrumental signal for price prediction, drawing primarily on social media data. Kim et al. (2017) mine Bitcoin forum discussions to predict price and transaction volume, establishing that online discourse carries statistically meaningful market information. Valencia et al. (2019) demonstrate that Twitter-derived sentiment combined with market data can predict daily price movements across multiple currencies using neural network classifiers. Washington et al. (2023) deploy a CNN-LSTM hybrid on pandemic-era Twitter data, achieving an F1 score of 0.92. Ferretti and Furini (2024), analyzing tweets surrounding the USTC stablecoin collapse, find only moderate correlation between sentiment and market value, cautioning against overreliance on social media signals during structural market failures. Agosto et al. (2022) extend this framework using news-derived sentiment alongside Google Search Indices to detect speculative bubbles. Kraaijeveld and De Smedt (2020) demonstrate that public Twitter sentiment carries predictive power for several major cryptocurrencies beyond Bitcoin, though the effect size varies substantially across coins and time windows. A consistent limitation unites these studies: sentiment is treated as a price predictor rather than as a substantive object of inquiry, and the affective structure of coverage is never characterized at scale.

NLP Methods for Cryptocurrency Text

NLP applied to cryptocurrency discourse has evolved from rule based lexical approaches toward sophisticated neural architectures. Habek et al. (2022) propose a bidirectional CNN-RNN architecture achieving 93.77% accuracy on Twitter data. Tiwari et al. (2025) advance this with an attention-augmented

CNN-LSTM model achieving 98.7% classification accuracy and a mean absolute error of 0.0315 for Bitcoin price prediction. At the frontier, Nicholls et al. (2024) deploy large language models to characterize illicit transaction patterns in the Bitcoin blockchain. The advent of large language models such as GPT-4o-mini (OpenAI, 2024) offers an alternative to bespoke architecture design: a general-purpose instruction tuned model can be prompted to perform multidimensional annotation, including sentiment polarity, emotional tone, and thematic classification, in a single pass at scale without domain specific fine tuning. A critical limitation unites earlier advances: all models are trained on social media corpora. The structured, editorially mediated language of newspaper journalism differs fundamentally from Twitter or Reddit discourse, and architectures optimized for social media cannot be assumed to transfer to institutional press coverage.

Media Framing, Institutional Coverage, and Research Gaps

Framing theory holds that the selection and organization of information in news discourse shapes audience interpretation (Entman, 1993), and agenda-setting theory further suggests that media salience influences public perception of issue importance (McCombs & Shaw, 1972). Applied to cryptocurrency, these frameworks predict that the thematic frame within which an article situates its subject such as investment vehicle, regulatory concern, technological innovation, or criminal risk, will systematically influences the emotional tone of the coverage. Despite the theoretical importance of this relationship, the existing literature provides no study that examines it rigorously across a large newspaper corpus. Social media research treats sentiment as a price predictor; while the few studies incorporating news-based sentiment use it as an instrumental variable (Agosto et al., 2022). In addition, existing studies predominantly analyze one-to-five-year windows anchored to specific market events; no published study examines newspaper coverage across the full lifecycle of cryptocurrency from 2009 to the present. The present study addresses these gaps by being the first to systematically examine how thematic framing shapes sentiment across a multi-degree newspaper corpus.

Financial Journalism, Editorial Gatekeeping, and Institutional Framing

Traditional financial journalism research has documented that newspapers function as institutional gatekeepers mediating between financial markets and public audiences (Davis, 2005). Unlike social media users who respond impulsively to market events, newspaper journalists operate within editorial constraints that privilege authoritative sources, impose verification standards, and enforce established narrative conventions. Davis's (2005) analysis of financial coverage in the context of the London Stock Exchange demonstrates that elite media outlets preferentially amplify the perspectives of institutional market actors, producing a coverage profile that reflects institutional rather than retail investor concerns.

Soroka’s (2006) asymmetric response hypothesis suggests that negative economic news tends to receive more media attention than equally positive news, a pattern commonly observed in financial journalism. Applied to cryptocurrency, this theory predicts that newspapers may place greater emphasis on market crashes and risks during downturns than on periods of steady price growth. However, because cryptocurrency is also associated with innovation, speculation, and technological excitement, it is unclear whether newspaper coverage overall is dominated by negative sentiment or balanced by positive narratives. This study examines that question directly by analyzing cryptocurrency news coverage over

multiple periods. In doing so, it explores whether the reporting patterns commonly found in traditional financial journalism also apply to this emerging and controversial asset class.

Methodology

The articles were extracted via ProQuest TDM Studio, a cloud-based text and data mining platform providing institutional access to licensed newspaper content. Analysis was conducted within the platform's Jupyter Notebook environment; full-text content cannot be exported under the platform's licensing terms, but analyzed data and derived outputs may be exported. All English-language articles whose titles contained at least one of the terms cryptocurrency, crypto, or blockchain were extracted. The initial retrieval yielded 67,654 articles. During annotation, 427 articles were excluded because they were flagged by GPT-4o-mini's content filtering policy for sexual or violent material. The final working corpus comprises 66,173 articles from 1,065 unique publications spanning January 2009 through May 2026.

Annotation and Analytical Variables

Each article was annotated across four dimensions using GPT-4o-mini. deployed within a Python-based pipeline. The model assigned: (1) a sentiment label (Positive, Negative, Neutral, or Mixed); (2) a continuous sentiment score from −1.0 to +1.0; (3) a dominant emotion (e.g., Optimism, Concern, Fear); and (4) a primary topic, normalized into eight canonical categories: Investment & Finance, Regulation & Policy, Market Volatility, Adoption & Use, Security & Fraud, Innovation & Technology, Environmental Impact, and Social Impact. To verify the accuracy and consistency of the model outputs, the author manually reviewed a random sample of 50 articles. The validation results indicate strong agreement between the author's assessment and the AI model's classifications, with only five disagreements.

The analyses examined relationships between categorical variables using chi-square tests, measured the strength of those relationships using Cramér's V, compared sentiment differences across groups using Kruskal-Wallis tests, and evaluated long-term sentiment trends over time using OLS regression. All tests use a two-tailed $\alpha = .05$ threshold. Analyses were conducted in Python 3.12 using pandas, scipy, statsmodels, and matplotlib. The study period is divided into five phases that reflect major turning points in the development of cryptocurrency markets and regulation:

- **Early Adoption (2009–2016):** Characterized by limited media attention and the emergence of Bitcoin, including its first rise above $1,000 in 2013.
- **First Boom (2017–2018):** Marked by rapid public interest and speculative trading, culminating in Bitcoin reaching nearly $20,000.
- **Consolidation (2019–2020):** Followed the market crash and featured reduced speculation alongside growing institutional interest.
- **Institutional Era (2021–2022):** Defined by mainstream adoption, the NFT boom, sovereign adoption of Bitcoin, and Bitcoin's peak near $69,000.
- **Post FTX (2023–2026):** Shaped by the collapse of FTX, increased regulatory scrutiny, and the approval of spot cryptocurrency ETFs.

Results/Findings

Newspapers Overview and Temporal Distribution

The working corpus spans 1,065 unique newspaper titles across major global financial and media centers including London, New York, Mumbai, Singapore, and Sydney. Article volume exhibits a strongly uneven temporal distribution that closely mirrors the price history of major cryptocurrencies (Figure 1). Coverage surges dramatically in 2017 (n = 4,619) and 2018 (n = 8,019), corresponding to the first mass-market speculative bubble, then reaches its peak in 2021 (n = 13,832) and 2022 (n = 12,117). Post FTX coverage stabilizes at approximately 5,000–6,000 articles per year. This volume concentration around price extremes is consistent with the intermittent coverage dynamic in financial journalism, whereby media attention is driven by event salience rather than underlying technological developments (Soroka, 2006).

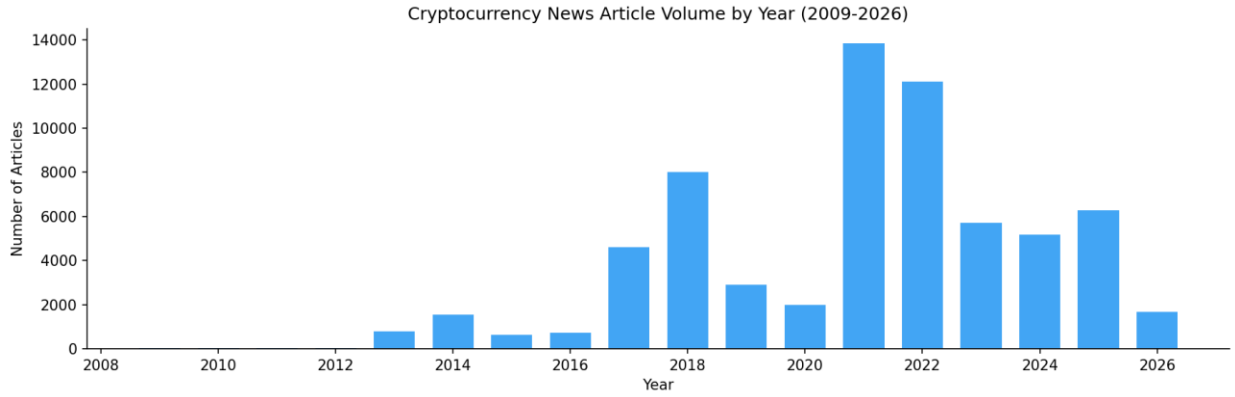

Figure 1. Annual article volume (2009–2026)

The fifteen most prolific publications account for approximately 40% of total corpus volume (Figure 2). Business Insider leads with 5,133 articles (7.8%), followed by Barron's Online (n = 3,153; 4.8%) and Express Online (n = 2,746; 4.2%). The presence of both specialist financial outlets—Barron's, Investor's Business Daily—and general-interest digital newspapers—Business Insider, Express Online—suggests that cryptocurrency has penetrated both the financial press and the mainstream media ecosystem. The geographic diversity of contributing titles, with significant representation from the United Kingdom, India, Australia, and Singapore alongside the United States, reflects the cross-border character of cryptocurrency as a global asset class. No single national or regional media environment dominates the corpus, which strengthens the generalizability of the sentiment and framing findings reported in subsequent sections.

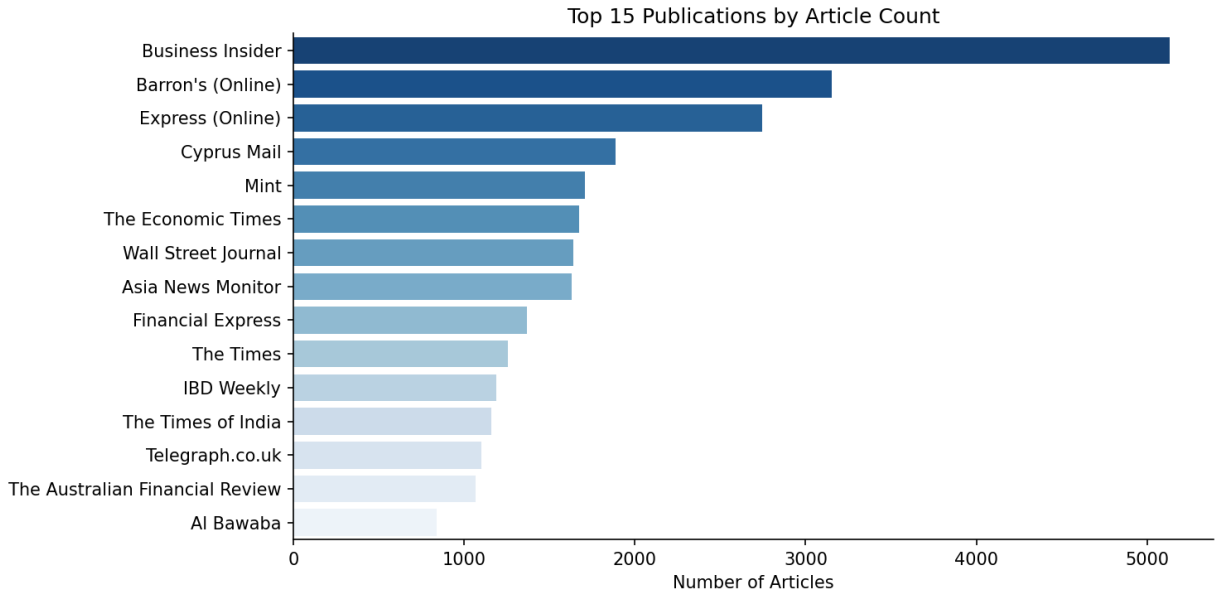

Figure 2. Top fifteen publications by article volume

Sentiment Analysis

Positive sentiment articles constitute the largest share of the corpus (n = 26,507; 40.1%), followed by negative (n = 23,377; 35.3%) and neutral (n = 16,240; 24.5%) articles (Figure 3). The mean continuous sentiment score is +0.040 on a scale ranging from −1 to +1, indicating a slightly positive overall tone that remains close to neutrality. This pattern is consistent with research on financial journalism suggesting that media coverage often balances promotional enthusiasm with critical attention to risk and public interest concerns (Davis, 2005). The relatively small 4.8 percentage point difference between positive and negative articles, together with the near-zero average sentiment score, suggests that the corpus reflects a broadly balanced emotional tone rather than a strong optimistic or skeptical bias.

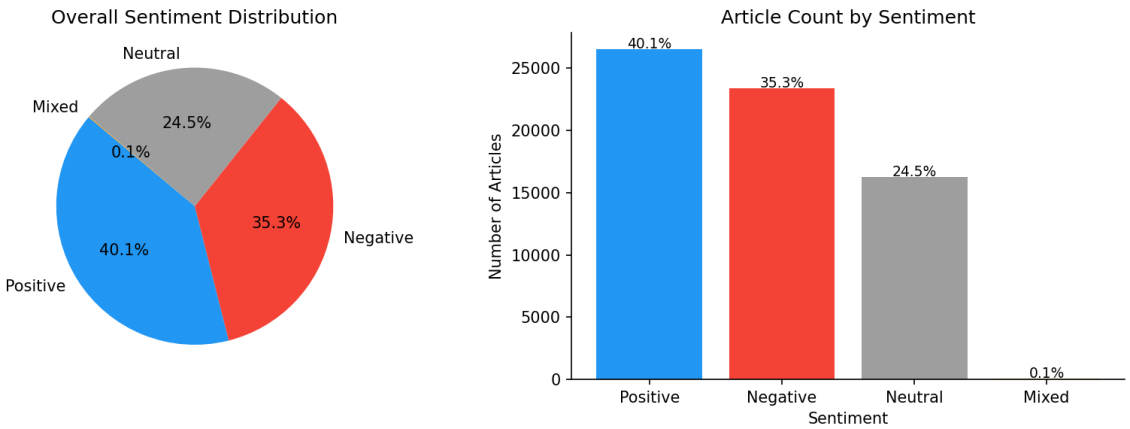

Figure 3. Overall sentiment label distribution across the full corpus (n = 66,173)

Sentiment by Time Period

The twelve-month rolling mean reveals cyclical fluctuations that broadly track cryptocurrency market performance (Figure 4). Periods of higher positive sentiment coincide with bull markets, particularly in 2017 and 2020–2021, while lower sentiment scores align with post-crash downturns in 2018 and 2022. However, the rolling mean rarely falls substantially below zero, suggesting that even during market contractions, newspaper coverage tends to remain closer to neutral than strongly negative.

An OLS regression of annual mean sentiment score on year identifies a small but statistically significant positive linear trend ($\beta = 0.007$, SE = 0.002, $p = .006$, $R^2 = .41$). This finding suggests that cryptocurrency coverage has gradually become more positive over time, consistent with the increasing normalization and legitimization of cryptocurrency in mainstream financial journalism.

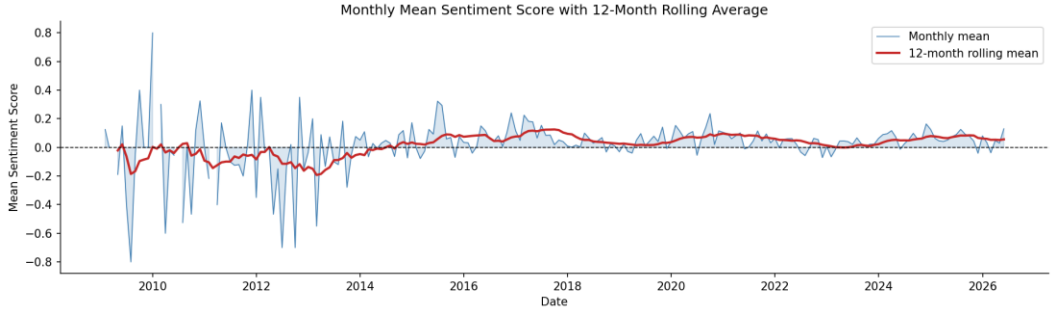

Figure 4. Twelve-month rolling mean sentiment score (2009–2026)

Figure 5 presents the annual distribution of sentiment categories for each year, complementing the rolling mean analysis with a year-by-year view of sentiment composition. The year 2017 stands out as exceptionally positive, with 46.3% of articles classified as positive, reflecting the euphoric atmosphere of the first cryptocurrency boom. In contrast, 2022 shows the highest share of negative articles (38.2%), corresponding to the collapse of FTX and the broader cryptocurrency market downturn that wiped out roughly two trillion dollars in market value. Despite these fluctuations, positive articles remain the largest category in every year of the sample period. Even during severe market downturns, cryptocurrency coverage at the corpus level retains a slightly positive overall tone. This persistent predominance of positive coverage does not fully support a simple negativity bias explanation and instead suggests that underlying thematic patterns in cryptocurrency reporting continue to sustain positive sentiment regardless of short term market conditions.

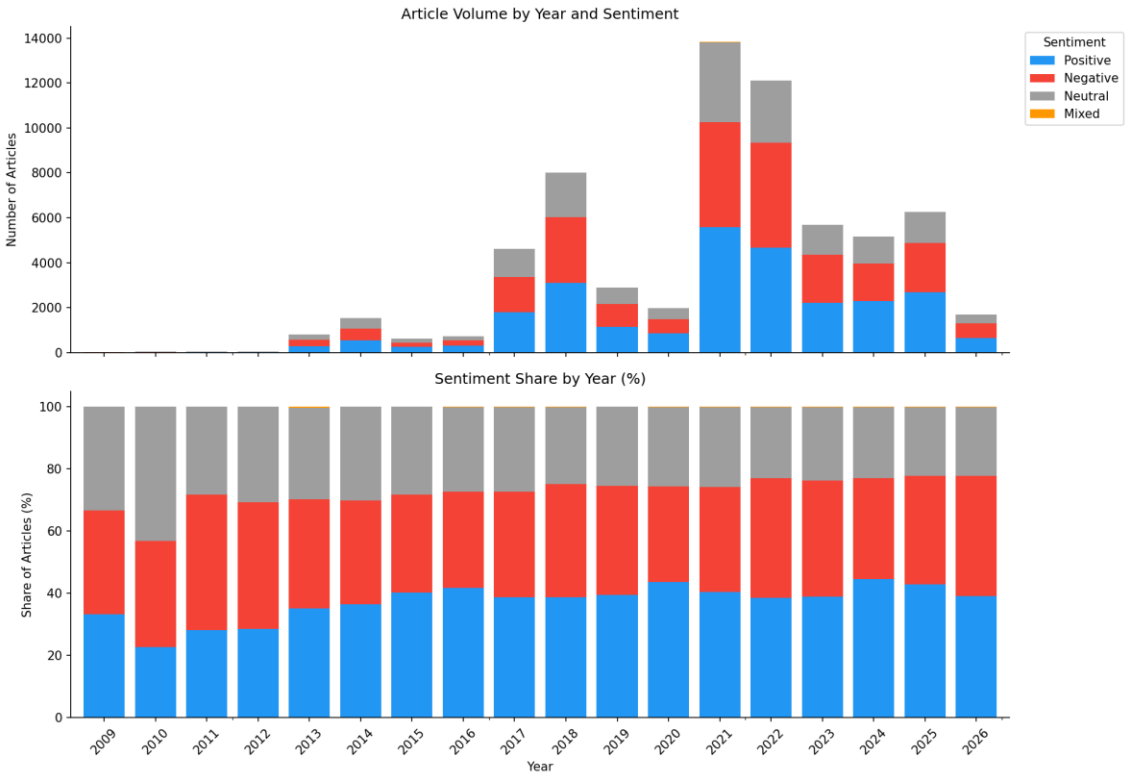

Figure 5. Annual sentiment label shares by year (2009–2026)

Sentiment by Market Period

Across the five market periods, the share of positive articles ranges from 37.4% during the Early Adoption phase to 41.8% in the Post FTX era, while the share of negative articles varies only modestly between 33.3% and 35.9% (Table 1). A chi square test indicates that these differences across periods are statistically significant ($\chi^2(12) = 111.20$, $p < .001$), although the effect size is very small (Cramér's $V = 0.024$). This relative stability in sentiment proportions across major market cycles suggests that the overall emotional tone of cryptocurrency journalism is shaped more by underlying topic composition than by short term market conditions.

A notable pattern is the steady decline in neutral coverage, which falls from 29.2% in the Early Adoption period to 22.8% in the Post FTX era. This trend suggests that journalists have become increasingly willing to express clearer evaluative positions as the cryptocurrency sector has matured. During the early years, the novelty of cryptocurrency may have limited the availability of established interpretive frameworks, leading to a higher proportion of neutral or noncommittal reporting. As the industry developed a longer market history, greater regulatory attention, and more established institutional structures, journalists appear to have adopted more explicit positive or negative perspectives, consistent with the normalization of coverage surrounding emerging financial assets.

Table 1. Sentiment Distribution by Market Period

Period	Positive (%)	Negative (%)	Neutral (%)	Mixed (%)
2009–2016 (Early Adoption)	37.4	33.3	29.2	0.1
2017–2018 (First Boom)	38.8	35.5	25.7	0.0
2019–2020 (Consolidation)	41.2	33.3	25.4	0.1
2021–2022 (Institutional Era)	39.6	35.9	24.4	0.1
2023–2026 (Post FTX)	41.8	35.4	22.8	0.0

Thematic Framing

The corpus is dominated by two approximately equal topic frames: Investment & Finance (n = 18,505; 28.0%) and Regulation & Policy (n = 18,056; 27.3%), together accounting for more than half of all articles. Market Volatility is the third most common frame (16.1%), followed by Adoption & Use (10.6%), Security & Fraud (8.2%), and Innovation & Technology (7.6%). Environmental Impact (1.2%) and Social Impact (0.4%) together constitute less than 2% of the corpus (Figure 6). The dominance of financial and regulatory frames over technology and adoption frames is noteworthy: it indicates that newspaper coverage has consistently prioritized the economic and governance dimensions of cryptocurrency over its technical underpinnings or societal applications.

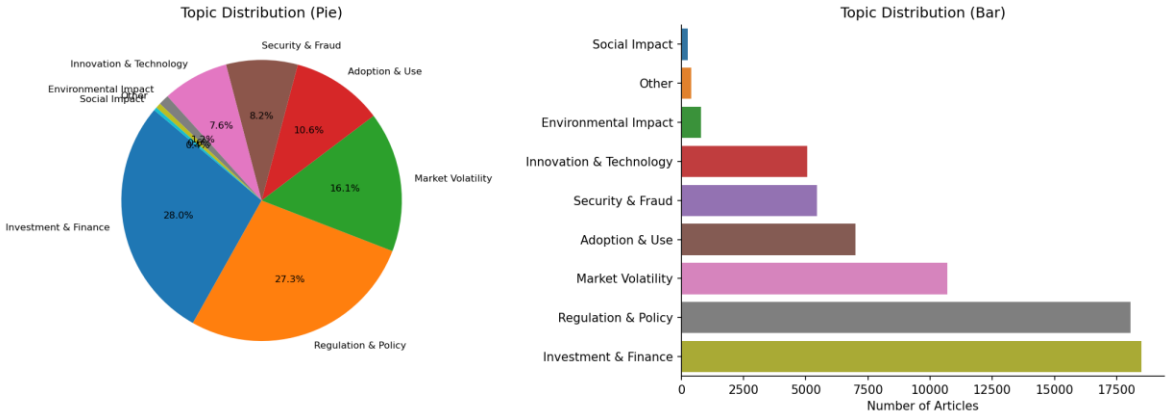

Figure 6. Distribution of articles across the eight canonical topic frames.

Topic Evolution over Time

Examination of topic shares over time (Figure 7) reveals several important shifts in the thematic focus of cryptocurrency coverage. Regulatory framing increases substantially after 2019, reflecting the growing importance of global regulatory debates following the 2018 market correction. Coverage related to security and fraud rises sharply in 2022 after the collapse of FTX, widely regarded as the largest fraud case in cryptocurrency history, and remains elevated in 2023 as legal investigations and court proceedings continued to attract media attention. Environmental coverage becomes more prominent beginning in 2021, coinciding with Ethereum's transition to proof of stake and increasing public concern over energy consumption associated with proof of work mining. Coverage related to adoption and practical use, although relatively limited overall, shows a gradual increase after 2019, consistent with the expanding use of blockchain technologies in financial services, payments, and supply chain management.

These changes in topic composition have important implications for overall sentiment trends. Regulatory and security related themes generally carry negative or near neutral emotional tones, and their growing presence over time partially offsets the broader positive trend identified in the OLS regression analysis. As a result, the aggregate sentiment trend may understate the degree of normalization occurring within more positively framed topics, such as innovation, adoption, and investment.

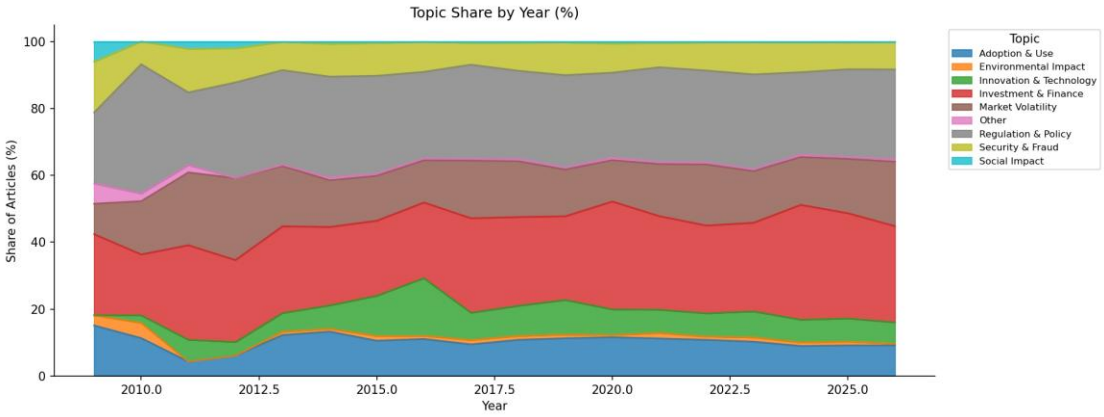

Figure 7. Topic share by year (2009–2026)

Key Terms by Topic

Figure 8 presents the distinctive keywords associated with each thematic frame. Security and Fraud articles are characterized by terms such as scam, theft, hack, and laundering, reflecting themes of criminal activity and financial loss. Market Volatility articles frequently contain words such as crash, loss, drop, and decline, while Investment and Finance articles emphasize terms including profit, returns, fund, and portfolio. Regulation and Policy coverage is associated with words such as legislation, ban, compliance, and enforcement. Innovation and Technology articles are dominated by terms such as blockchain, protocol, network, and platform, highlighting technological infrastructure rather than financial value. Environmental Impact articles focus on terms including energy, carbon, mining, and sustainability.

These vocabulary patterns provide additional support for the validity of the topic classifications. Security and Fraud as well as Market Volatility articles contain very little positive language, whereas Adoption and Use and Innovation and Technology articles contain relatively little negative language. This pattern suggests that once journalists adopt a particular thematic frame, both the vocabulary and emotional tone of the article become highly predictable. The finding is consistent with framing theory (Entman, 1993), which argues that media frames shape interpretation through the selective emphasis of certain ideas and perspectives, reflected here through distinct word choices that signal evaluative stance.

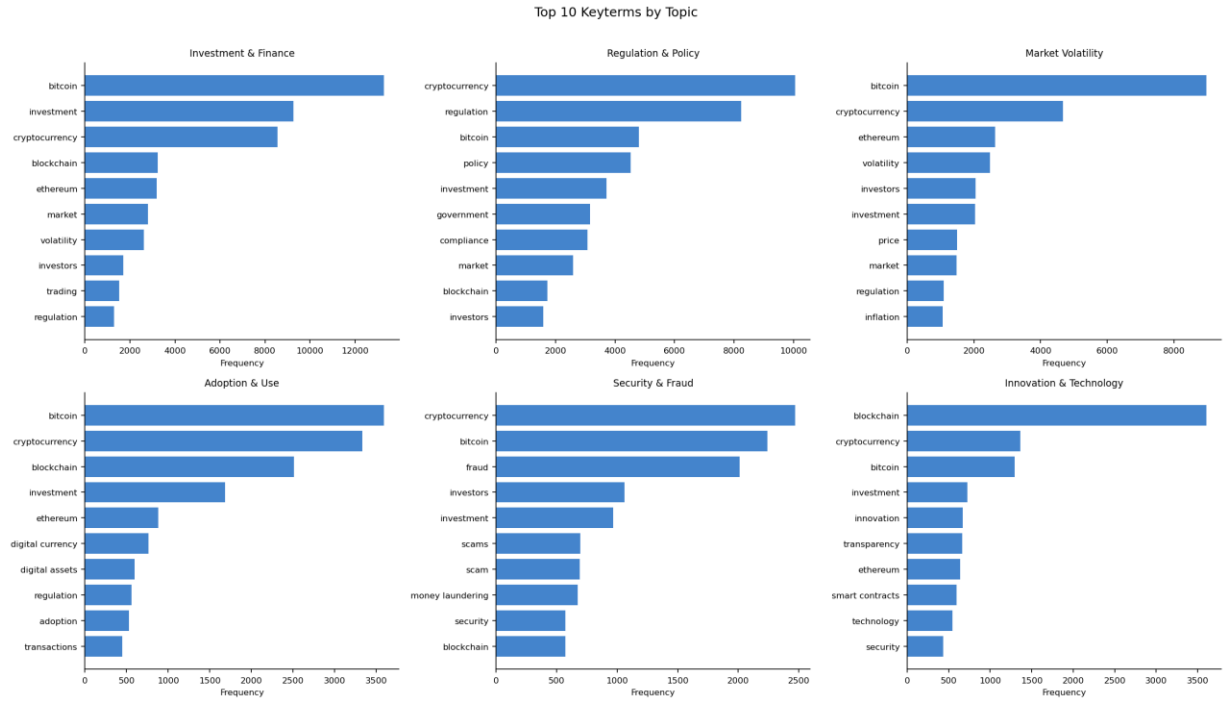

Figure 8. Top key terms by topic frame

Topic–Sentiment Relationships

The relationship between thematic framing and sentiment polarity is both statistically strong and substantively meaningful. A chi square test shows a highly significant association between topic category and sentiment classification ($\chi^2(24) = 41{,}418.23$, $p < .001$), with a large effect size (Cramér's $V = 0.457$). Similarly, the Kruskal Wallis test on continuous sentiment scores is highly significant ($H = 34{,}640.27$, $df = 8$, $p < .001$). Together, these findings indicate that the topic of an article is the strongest predictor of its sentiment within the corpus (Figure 9).

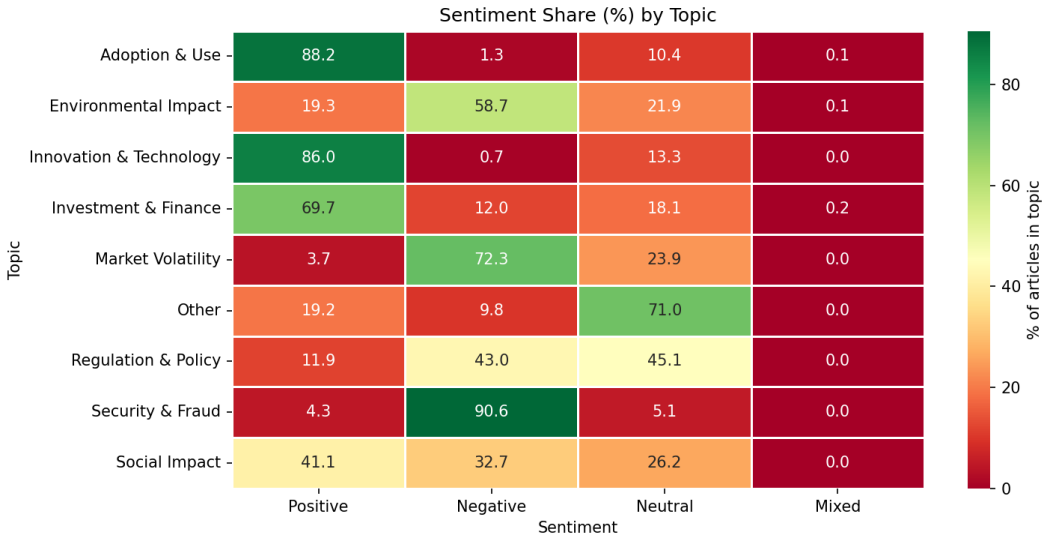

Figure 9. Sentiment label proportion heatmap by topic

The direction of these relationships is also consistent with theoretical expectations (Table 2). Adoption and Use articles are overwhelmingly positive, with 88.2% classified as positive and an average sentiment score of +0.630. Innovation and Technology articles show a similarly positive profile, with 86.0% positive articles and a mean score of +0.634. Investment and Finance coverage is also predominantly positive (69.7%; mean score +0.415). In contrast, Security and Fraud articles are strongly negative, with 90.6% classified as negative and an average score of −0.642, while Market Volatility articles are 72.3% negative with a mean score of −0.478. Regulation and Policy articles display a more balanced profile, consisting of 43.0% negative, 45.1% neutral, and only 11.9% positive articles. This pattern is consistent with framing research suggesting that regulatory coverage often emphasizes restriction, uncertainty, and conflict (Scheufele, 1999).

Table 2. Sentiment Distribution and Mean Sentiment Score by Topic

Topic	Positive (%)	Negative (%)	Neutral (%)	Mixed (%)	Mean Score
Innovation & Technology	86.0	0.7	13.3	0.0	+0.634
Adoption & Use	88.2	1.3	10.4	0.1	+0.630
Investment & Finance	69.7	12.0	18.1	0.2	+0.415
Social Impact	41.1	32.7	26.2	0.0	+0.071
Regulation & Policy	11.9	43.0	45.1	0.0	−0.213
Environmental Impact	19.3	58.7	21.9	0.1	−0.264
Market Volatility	3.7	72.3	23.9	0.0	−0.478
Security & Fraud	4.3	90.6	5.1	0.0	−0.642

The continuous sentiment score distributions by topic (Figure 10) reveal additional structure within the polarity labels. Innovation & Technology and Adoption & Use articles show highly concentrated distributions tightly clustered near +0.65, indicating strong affective consistency within these frames. Security & Fraud and Market Volatility distributions are similarly tight but in the negative range, reflecting the near-universal negativity of crash and fraud narratives. By contrast, Regulation & Policy and Social Impact distributions are broader and centered near zero, indicating greater within-topic variation in affective framing. This heterogeneity in regulatory coverage likely reflects the genuinely contested nature of regulatory discourse: articles framing new rules as enabling innovation produce positive scores, while those framing regulation as constraint or enforcement action produce negative scores.

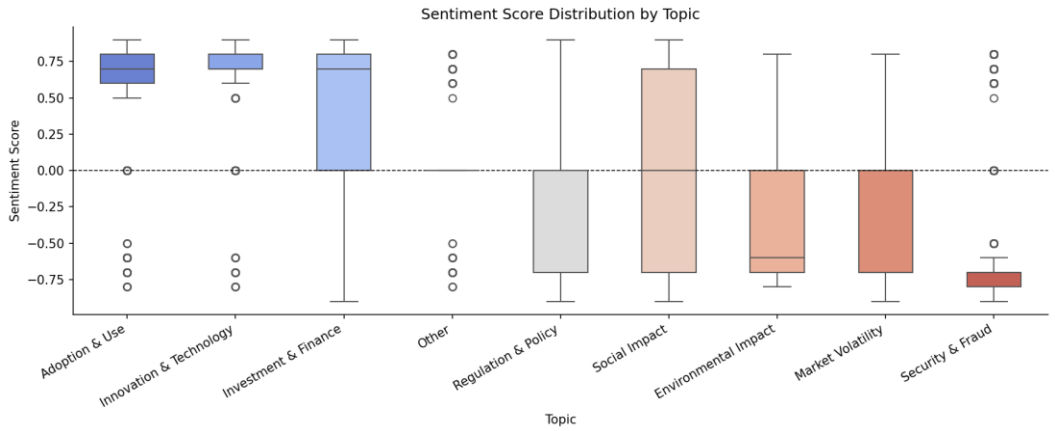

Figure 10. Continuous sentiment score distributions by topic

Emotion Analysis

Optimism is the most common emotion in the corpus (n = 18,410; 27.8%), consistent with the overall predominance of positive sentiment (Figure 11). However, Concern (18.6%) and Cautious Optimism (13.2%) together account for nearly one third of all articles, suggesting that cryptocurrency coverage is characterized more by measured or qualified optimism than by unreserved enthusiasm. On the negative side of the emotional spectrum, Fear (4.2%), Frustration (3.3%), and Skepticism (3.0%) appear less frequently, while Fraud related sentiment (1.9%) reflects the morally charged tone commonly associated with security and fraud coverage. Approximately 14% of articles fall into a residual category whose emotional tone does not clearly match the primary labels. This pattern is consistent with the restrained style of institutional financial journalism, which often avoids overt emotional expression even when reporting on highly significant or volatile market events.

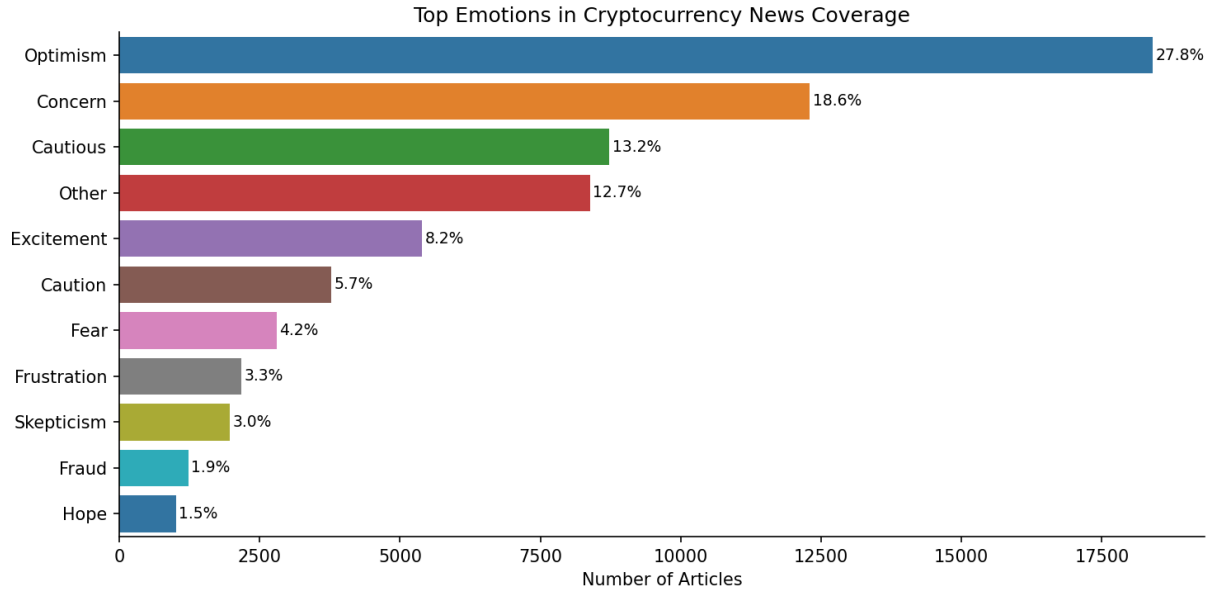

Figure 11. Distribution of emotional labels across the full corpus.

Emotion by Time

The temporal patterns of the top five emotions (Figure 12) show that Optimism remained the dominant emotional tone throughout the sample period, while Concern closely tracked peaks in media coverage volume. In 2021, the year with the highest volume of cryptocurrency coverage, both Optimism and Concern reached their highest levels simultaneously. This pattern suggests that periods of intense market activity generated not a unified emotional response, but a divided discourse in which highly positive and highly anxious narratives coexisted. The gap between Optimism and Concern remained relatively stable over time, indicating that the predominance of optimistic framing is not a recent phenomenon but a persistent characteristic of cryptocurrency journalism across different market phases.

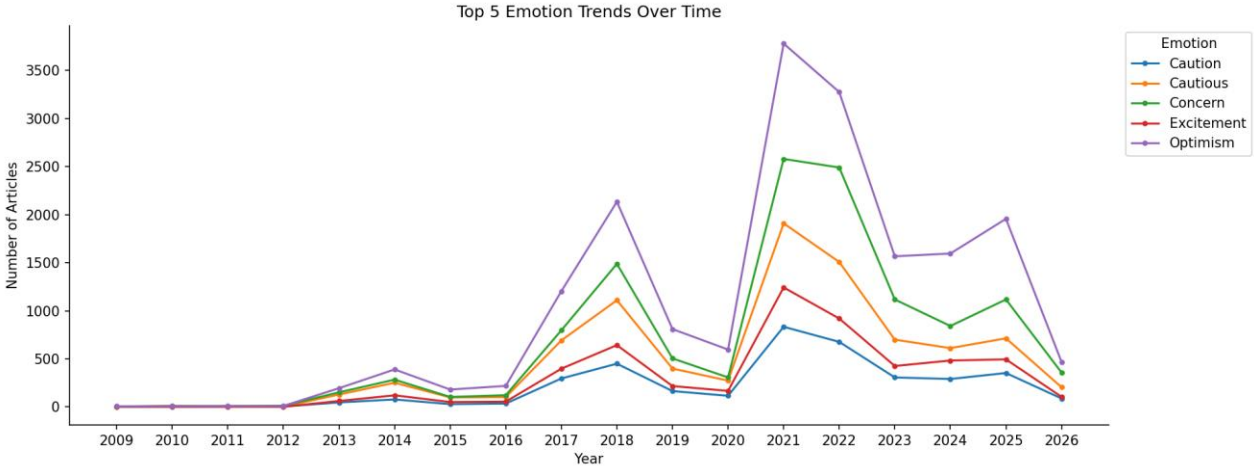

Figure 12. Top 5 emotion trends over time

Discussion of the Results

The most important finding of this study is that sentiment in cryptocurrency news coverage is driven primarily by thematic framing rather than by the time period in which an article was published. The relationship between topic and sentiment shows a large effect size (Cramér's V = 0.457), far stronger than the relationship between market period and sentiment (Cramér's V = 0.024). This indicates that knowing what an article is about provides much more information about its emotional tone than knowing when it was published. Articles focused on cryptocurrency adoption and technological innovation are consistently positive, whereas articles centered on security failures, fraud, and market crashes are consistently negative, regardless of broader market conditions. This pattern suggests that thematic framing is not simply associated with sentiment, but serves as the primary mechanism through which emotional tone is produced in newspaper coverage of cryptocurrency.

This finding has direct implications for applied sentiment analysis in financial research. Raw aggregate sentiment metrics derived from cryptocurrency news are essentially proxies for topic distribution rather than independent signals of investor mood or market outlook. A spike in positive media sentiment may

reflect an increase in adoption and technology coverage rather than a genuine shift in journalistic assessment of market conditions.

In addition, the prominence of both Optimism and Concern highlights the fundamentally ambivalent position of cryptocurrency in mainstream economic discourse. On one hand, cryptocurrency is portrayed as an innovative financial technology with the potential to transform and democratize financial markets. On the other hand, it is frequently associated with speculation, fraud, volatility, and systemic risk. The persistence of this dual framing, even after the institutional legitimization signaled by the approval of spot Bitcoin ETFs in January 2024, suggests that this ambivalence is a stable characteristic of cryptocurrency journalism rather than a temporary stage of uncertainty. Importantly, the coexistence of Optimism and Concern is not limited to different time periods but occurs simultaneously within the broader media discourse. This pattern indicates that newspaper coverage of cryptocurrency is characterized by a persistent emotional divide rather than by a single dominant narrative.

Finally, the OLS trend results and the steady decline in neutral sentiment over time are consistent with the gradual normalization of cryptocurrency journalism. The reduction in neutral coverage may reflect growing journalist confidence in making evaluative assessments as the asset class matures. As cryptocurrency has developed a longer price history, a more established regulatory environment, and recognizable institutional structures, journalists have increasingly evaluated it through conventional financial frameworks, leading to less uncertain or withheld-judgment coverage. Normalization does not imply uniformly positive coverage; the continued prominence of concern and negative framing in security and regulatory reporting indicates ongoing contestation. Rather, normalization suggests that cryptocurrency has evolved into a recognized, though still contested, financial asset class whose media coverage increasingly follows stable thematic conventions.

Conclusion, Limitation and Future Research

This study provides a systematic, empirically grounded account of how mainstream newspapers have framed cryptocurrency across its first seventeen years of public existence. Three headline findings emerge. First, aggregate coverage is modestly net positive, but this reflects the near cancellation of strongly positive investment and technology frames by strongly negative security, volatility, and regulatory frames. Second, thematic frame is the dominant predictor of sentiment, not market period or year of publication in isolation. Third, a small but statistically significant positive temporal trend in sentiment is consistent with the gradual normalization of cryptocurrency as a recognized, if contested, financial asset class.

These findings provide a foundation for future research examining how the evolving regulatory landscape—particularly the post-2022 movement toward comprehensive digital asset regulation in the United States and the European Union—continues to shape the thematic and emotional structure of cryptocurrency journalism. As cryptocurrency evolves from a largely speculative asset into a more regulated financial product, the dominant tension between Optimism and Concern may gradually shift toward a more stable institutional framing, or it may remain a defining feature of coverage surrounding a continuously contested

financial innovation. Longitudinal analysis using the indicators developed in this study provides a rigorous empirical framework for evaluating these future developments.

Several limitations warrant acknowledgment. The sentiment, emotion, and topic annotations were generated by GPT-4o-mini; while outputs were manually reviewed for validity, no formal inter-rater reliability assessment against independent human coders is available. ProQuest's newspaper holdings skew toward English-language markets, potentially underrepresenting cryptocurrency articles published in other languages.

Future research could expand this analysis in several important directions. Multilingual corpora would allow cross cultural comparisons of how cryptocurrency is framed across different national media environments. Event study approaches could also examine how specific market moving events, such as regulatory rulings, exchange failures, or ETF approvals, affect media sentiment within defined time windows. In addition, the annotation framework could be refined to distinguish between regulatory coverage that emphasizes enabling policies and coverage focused on restrictive regulation, which are currently grouped together within the single Regulation and Policy category in the existing eight category topic taxonomy.

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