Innovative Insights: Impact of Crypto News on Corporate Earnings Through GenAI Models With Bert Framework

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This study represents a pioneering investigation into cryptocurrency news's repercussions on publicly traded companies' corporate earnings. Leveraging advanced Generative AI (GenAI) models and the BERT framework for sentiment analysis, we meticulously integrated comprehensive data from the Financial Modeling Prep API to employ a rigorous event study methodology alongside advanced machine learning algorithms. Noteworthy insights were derived from the BERT model, shedding light on the rationales behind abnormal returns and facilitating an in-depth analysis of material and immaterial impacts. The study's findings underscore the significant impact of both positive and negative cryptocurrency news on cumulative abnormal returns (CAR), particularly within firms deeply entrenched in crypto activities. Notably, deliberate news, including official announcements, exerts a more pronounced influence than unintentional market reactions. This innovative approach furnishes actionable insights for financial services, investment management, and corporate communication, providing a framework for enhancing predictive models, investment decisions, and risk management strategies.

Keywords: crypto news, corporate earnings impact, GenAI models, digital assets

INTRODUCTION

This study contributes to the literature by introducing a novel approach to analyzing financial data using advanced AI techniques. Integrating GenAI models with the BERT framework for sentiment analysis offers a robust tool for dissecting the nuances of market reactions to news. By distinguishing between material and immaterial impacts and intentional versus unintentional news, this research provides deeper insights into the causal relationships in financial markets. These findings can guide future studies in exploring the dynamic interactions between news dissemination and market responses. The cryptocurrency market in 2024 is expected to undergo significant advancements driven by regulatory changes, technological progress, and market dynamics. A notable trend is the SEC's approval of spot Bitcoin ETFs in January 2024, leading to increased institutional adoption. This approval has provided institutional investors with a regulated and familiar investment vehicle, and the anticipated approval of Ethereum ETFs is poised to further boost market liquidity and institutional confidence (CoinDesk 2024; Gemini 2024). Another crucial development is the scheduled Bitcoin halving event in April 2024. Historically, Bitcoin halving's have resulted in substantial price increases due to the reduced new supply of Bitcoin entering the market. This

event is expected to attract significant investor interest and potentially drive-up prices (Gemini 2024; CoinCodex 2024).

The merging of artificial intelligence (AI) with blockchain technology is emerging as a major trend with the potential to enhance blockchain functionality and its application across various sectors, including finance and security. AI is anticipated to be pivotal in optimizing blockchain operations and improving the user experience (CoinDesk 2024; Gemini 2024). Efforts to address scalability issues are also gaining traction in the crypto space. Rollups, which aggregate multiple transactions into single off-chain batches, are increasingly recognized as a solution to improve transaction speeds and reduce costs on the Ethereum and Bitcoin networks. These layer-2 solutions are expected to significantly enhance the efficiency of blockchain transactions (CoinCodex 2024).

Additionally, institutional demand and corporate adoption are rising, with surveys indicating that a significant percentage of institutional investors plan to increase their crypto allocations. This trend will likely drive further innovation and integration of cryptocurrencies with traditional financial systems (CoinDesk 2024; Morpher 2024). Moreover, regulatory clarity is poised to instill renewed confidence in the crypto market. Developments such as SEC lawsuits, central bank digital currency initiatives, and potential new regulations will play a crucial role in shaping market dynamics and investor sentiment. Regulatory advancements are seen as critical in ensuring the stability and growth of the cryptocurrency ecosystem (CoinCodex 2024; CryptoNews 2024). There is also a noticeable focus on sustainability within the crypto industry. Adopting greener alternatives, such as proof-of-stake consensus mechanisms and carbon offset initiatives, is gaining significance as the industry addresses environmental concerns. This trend is expected to enhance the environmental sustainability of crypto mining operations (CryptoNews 2024).

Furthermore, SocialFi, the convergence of social media and finance, is gaining momentum. Platforms like Friend.tech enable users to tokenize their profiles and learn from their content. Additionally, the growth of decentralized webhosting and cloud-storage systems is expected to provide a more robust and secure infrastructure for digital interactions (CoinCodex 2024; CryptoNews 2024). These trends represent a dynamic and progressive landscape in the crypto market for 2024, driven by technological advancements, regulatory changes, and increased institutional participation.

LITERATURE REVIEW

The intersection of cryptocurrency news and financial performance has garnered significant attention in recent years due to the volatility of digital assets and their increased integration into mainstream finance. This literature review examines cryptocurrency news's impact on publicly traded companies' earnings, using Generative AI (GenAI) models enhanced with the BERT framework for sentiment analysis. The review encompasses the evolution of sentiment analysis, the application of AI in finance, and the specific impact of cryptocurrency news on market performance. Sentiment analysis has emerged as a crucial tool for grasping market dynamics. Early research by Pang and Lee (2008) laid the groundwork for sentiment analysis in natural language processing (NLP), showcasing its potential for interpreting textual data (Pang and Lee 2008). Liu (2012) further expanded on this by providing detailed insights into various techniques and applications of sentiment analysis across different domains, including finance (Liu 2012). The rise of deep learning and the development of advanced models such as BERT (Bidirectional Encoder Representations from Transformers) by Devlin, Chang, Lee, and Toutanova (2019) marked a significant advancement in NLP capabilities, allowing for more nuanced and accurate sentiment classification (Devlin, Chang, Lee, and Toutanova 2019). The application of AI in finance has been thoroughly explored. Studies by Hagenau, Liebmann, and Neumann (2013) and Zhang, Wang, and Liu (2020) demonstrate the use of machine learning models to predict stock prices and market trends based on textual data (Hagenau, Liebmann and Neumann 2013; Zhang, Wang, and Liu 2020). These works underscore the potential of AI to enhance financial forecasting and decision-making processes. More recently, Chen, Li, and Huang (2021) highlighted the integration of BERT in financial sentiment analysis, showing improved accuracy in predicting stock movements (Chen, Li, and Huang 2021).

Cryptocurrency news plays a pivotal role in shaping market behavior. Bouoiyour and Selmi (2015) were among the earliest researchers to examine the influence of Bitcoin-related news on its price volatility, establishing a clear link between news events and market responses (Bouoiyour and Selmi 2015). Subsequent studies by Urquhart (2018) and Corbet, Larkin, and Lucey (2019) reinforced these findings, emphasizing the susceptibility of cryptocurrency markets to news and social media activity (Urquhart 2018; Corbet, Larkin, and Lucey 2019). The impact of crypto news on broader financial markets has also been a research subject. Dyhrberg (2016) investigated Bitcoin's hedging capabilities and its relationship with traditional financial assets, suggesting that cryptocurrency news could influence investor behavior across different asset classes (Dyhrberg 2016). Similarly, studies by Borri (2019) and Bouri, Gupta, and Tiwari (2020) explored the spillover effects of cryptocurrency volatility on stock markets, highlighting the interconnectedness of these financial domains (Borri 2019; Bouri, Gupta, and Tiwari 2020). Understanding the materiality of news impacts is crucial for precise financial analysis. The concept of materiality, as discussed by DeFond and Zhang (2014), involves assessing the significance of information in influencing investor decisions (DeFond and Zhang 2014). In cryptocurrency news, material impacts refer to news events that significantly affect company earnings and stock performance. Research by Hsieh, Ma, and Novoselov (2013) on the disclosure of information and its market implications provides a framework for evaluating the materiality of crypto news (Hsieh, Ma, and Novoselov 2013).

Understanding the distinction between intentional and unintentional news is essential in comprehending market reactions. Intentional news entails official announcements and strategic disclosures by companies, while unintentional news encompasses market rumors and speculative reports. Extensive research in corporate finance literature has examined the impact of intentional news, such as earnings announcements (Ball and Brown 1968), and unintentional news, such as leaks and market rumors (Fama, Fisher, Jensen, and Roll 1969). Integrating GenAI models with the BERT framework represents a notable advancement in sentiment analysis and financial forecasting. BERT's bidirectional approach enables a more profound understanding of context and semantics in textual data, thereby enhancing sentiment classification accuracy (Devlin, Chang, Lee, and Toutanova 2019). Studies by Yang, Li, and Luo (2020) and Lee, Kim, and Lee (2021) have illustrated the effectiveness of BERT in financial applications, including stock price prediction and risk assessment. The insights derived from this research can inform investment strategies and risk management practices, assisting financial analysts in refining their predictive models for improved decision-making.

Additionally, corporate communication strategies can be optimized to mitigate potential negative reactions and capitalize on positive news to enhance market value (Hagenau, Liebmann, and Neumann 2013; Zhang, Wang, and Liu 2020). The rapidly evolving cryptocurrency landscape has caught the interest of academics, investors, and financial analysts alike (Kasztelnik, K. et al., 2024) This literature review aims to explore the innovative approaches and significant impacts of cryptocurrency news on company earnings. It utilizes Generative AI (GenAI) models enhanced by the BERT framework for sentiment analysis. By examining the convergence of blockchain technology, financial market reactions, and advanced machine learning algorithms, this review provides a comprehensive understanding of how cryptocurrency news influences market behavior and company valuations.

The Role of Cryptocurrency in Modern Finance

Cryptocurrencies have disrupted traditional financial systems since the introduction of Bitcoin in 2009, bringing new dynamics to global markets. Studies have shown that the decentralized nature of cryptocurrencies offers a level of transparency and security that traditional currencies lack (Nakamoto 2008). As a result, blockchain technology has been increasingly adopted and integrated across various industries, from finance to supply chain management (Yermack 2017; Catalini and Gans 2016). The speculative nature of cryptocurrencies has resulted in significant price volatility, making them both an attractive and risky investment. Research by Baur, Hong, and Lee (2018) indicates that the volatility of cryptocurrencies is higher than that of traditional assets, which can lead to substantial gains or losses. This volatility is often driven by market sentiment, heavily influenced by news and media coverage (Khaidem, Saha, and Dey 2016).

Impact of News on Financial Markets

The impact of news on financial markets has been widely analyzed. Tetlock (2007) noted that high media pessimism about the economy could anticipate downward pressure on stock prices. Similarly, Antweiler and Frank (2004) demonstrated that internet stock message boards significantly impact stock market volatility, emphasizing the critical role of news and media in shaping investor sentiment and market behavior. The emergence of social media has accelerated the spread of news. Research has demonstrated that tweets and social media posts can significantly influence stock prices (Bollen, Mao, and Zeng 2011). This is particularly pertinent for cryptocurrencies highly responsive to public sentiment and speculation (Kristoufek 2013).

Sentiment Analysis in Financial Research

Sentiment analysis has emerged as a crucial tool in financial research, enabling analysts to quantify the emotional tone of text data and forecast market movements. Early work by Pang, Lee, and Vaithyanathan (2002) laid the foundation for sentiment analysis by employing machine learning techniques to categorize movie reviews. This methodology was adapted to financial texts, empowering researchers to evaluate market sentiment from news articles, reports, and social media (Loughran and McDonald 2011).

The BERT (Bidirectional Encoder Representations from Transformers) model, introduced by Devlin, Chang, Lee, and Toutanova (2018), signifies a significant leap in natural language processing. BERT's proficiency in comprehending the contextual meaning of words within a sentence has made it highly effective for sentiment analysis. Studies have demonstrated that BERT outperforms previous models in various NLP tasks, including sentiment classification (Sun, Huang, and Qiu 2019).

Generative AI Models in Financial Analysis

Generative AI models have opened up new possibilities for financial analysis by facilitating the generation of realistic synthetic data and advanced predictive models. These models can produce high-quality text, images, and other data formats, which can be leveraged to simulate market scenarios and enhance decision-making processes (Radford et al. 2019). In the financial markets' context, Generative AI can aid analysts in understanding the potential impact of various news events on stock prices.

Integrating BERT With GenAI Models for Crypto News Analysis

By integrating BERT with Generative AI models, researchers can conduct a more detailed analysis of crypto news and its impact on market behavior. BERT's contextual understanding and GenAI's data generation capabilities enable the creation of comprehensive sentiment profiles for different news events, allowing for the prediction of their potential effects on company earnings. Recent studies have demonstrated this integrated approach's promise in analyzing news's impact on stock prices and trading volumes (Liu et al. 2020).

Case Studies and Empirical Evidence

Several case studies have illustrated the effectiveness of utilizing GenAI models with BERT for analyzing the impact of crypto news. For instance, a study by Zhang et al. (2021) showcased that integrating sentiment analysis with machine learning models accurately predicted stock price movements following major cryptocurrency announcements. Similarly, Chen, De, and Hu (2020) research revealed that sentiment scores derived from BERT could account for a significant portion of the variance in stock returns.

Challenges and Future Directions

Despite the promising results, using GenAI models and BERT for financial analysis presents several challenges. One of the primary obstacles is the requirement for large amounts of labeled data to train these models effectively. Moreover, the rapid technological changes in the cryptocurrency market necessitate constant updates to the models to ensure their accuracy (Goodfellow, Bengio, and Courville 2016). Future research should prioritize the development of more robust models capable of handling the dynamic nature of the cryptocurrency market. Additionally, interdisciplinary studies integrating insights from finance,

computer science, and behavioral economics are needed to create more comprehensive models of market behavior (Barberis 2013). Integrating Generative AI models with BERT for sentiment analysis is a significant advancement in financial research. By leveraging these technologies, researchers can gain deeper insights into the impact of crypto news on company earnings and market behavior (Kasztelnik, K. & Abdulraham, A. 2023). This approach enhances our understanding of market dynamics and provides valuable tools for investors, analysts, and policymakers to navigate the complex and volatile world of cryptocurrencies.

RESEARCH QUESTIONS AND HYPOTHESES

This study aims to significantly contribute to academic research and practical applications. Academically, it provides innovative insights into the financial impact of cryptocurrency news, utilizing advanced AI models for sentiment analysis. Practically, it equips financial analysts and corporate practitioners with valuable tools and methodologies to enhance investment strategies, manage market perceptions, and improve investor relations.

1. *How does cryptocurrency news influence the cumulative abnormal returns (CAR) of publicly traded companies?*

Sub-question 1.1: *Does the sentiment of cryptocurrency news (positive or negative) significantly affect the CAR of these companies?*

Sub-question 1.2: *Is there a difference in the impact of intentional news (e.g., official company announcements) versus unintentional news (e.g., market reactions) on CAR?*

2. *What is the materiality of the impact of cryptocurrency news on the financial performance of companies with substantial crypto-related activities?*

Sub-question 2.1: *How do material impacts differ from immaterial impacts in terms of their influence on stock prices and market perceptions?*

HYPOTHESES

H1: *Cryptocurrency news has a significant impact on the cumulative abnormal returns (CAR) of publicly traded companies.*

H1a: *Positive cryptocurrency news leads to an increase in CAR.*

H1b: *Negative cryptocurrency news leads to a decrease in CAR.*

H2: *The impact of intentional cryptocurrency news is more pronounced than that of unintentional news.*

H2a: *Intentional news (e.g., official company announcements) has a greater effect on CAR compared to unintentional news (e.g., market reactions).*

In the context of regression analysis, “control variables” are additional variables included in the model to account for factors that might influence the dependent variable, in this case, stock returns, and to isolate the effect of the main independent variable, news classification. For analyzing the impact of crypto news on earnings, potential control variables include:

1. *Market Index Returns:* To account for overall market movements.

2. *Company Financials*: Such as revenue, earnings per share (EPS), or other relevant financial metrics.

Including these control variables helps ensure that these other factors do not confound the observed effect of the news classification on stock returns.

DATA SOURCES

This study incorporates data from multiple sources to examine the impact of cryptocurrency news on company earnings. The data sources encompass the Financial Modeling Prep API, a CSV file containing crypto news, and the www.crypto-news-api.com API. The Financial Modeling Prep API offers extensive financial data, including historical price data, income statements, sector performance data, economic indicators, and trading volume. The variables encompass stock prices, log returns, revenue, earnings per share (EPS), sector returns, interest rates, inflation rates, GDP growth rates, and trading volume. The temporal scope of the data typically spans from January 1, 2020, to May 2024. The CSV file houses news articles concerning cryptocurrency events and their influence on companies. It encompasses variables such as news title, publication date, news content, sentiment classification, and sentiment scores.

The integrated data set combines the data from the sources, aligns news event dates with corresponding stock price data, and incorporates control variables for regression analysis. The storage path for incremental results resides at INCREMENTAL_SAVE_PATH. This repository contains interim and results from the event study analysis, embracing variables such as cumulative abnormal returns (CAR) and materiality determination. The principal aim is to scrutinize the impact of cryptocurrency news on company stock performance and assess the materiality of such impact. The methodological framework encompasses sentiment analysis of news articles using BERT, log return calculations for stock prices, estimation of abnormal returns employing the market model, and materiality evaluation based on CAR and company earnings. The data stemming from www.crypto-news-api.com aggregates news from reputable sources within the cryptocurrency and financial sectors, covering a wide array of topics, including market trends, regulatory developments, technological advancements, major events, and price analyses related to cryptocurrencies. It provides real-time updates and access to historical news data, thereby enabling a comprehensive analysis of how cryptocurrency news shapes market behavior and company performance, thus providing valuable insights for financial and economic research.

Sample Population for Event Study With Machine Learning Model

The sample population for this event study is meticulously selected to include publicly traded companies with significant exposure to cryptocurrency news. The criteria ensure that the companies have substantial market capitalization and relevant financial data and are impacted by crypto-related events. This comprehensive approach allows a robust analysis of how cryptocurrency news influences company stock performance and market behavior. The data sources, time frames, and variables considered provide a solid foundation for deriving meaningful insights into the materiality of such news on company earnings.

FIGURE 1
SAMPLE POPULATION FOR GENAI EVENT STUDY

Company Selection Criteria	1. **Publicly Traded Companies:** The study includes only companies listed on major stock exchanges such as the New York Stock Exchange (NYSE) and NASDAQ. 2. **Crypto-Related Impact:** Companies with a direct or indirect relationship with cryptocurrencies, including those involved in blockchain technology, cryptocurrency mining, financial services providing crypto transactions, and companies investing in cryptocurrencies. 3. **Top Market Capitalization:** The study focuses on companies with substantial market capitalization to ensure the availability of robust financial data and significant market activity.
Data Sources	1. **Financial Data: Retrieved from** the Financial Modeling Prep API, which provides historical price data, financial statements, sector performance data, economic indicators, and trading volume. 2. **News Data:** Gathered from www.crypto-news-api.com API news articles related to cryptocurrency events which provide comprehensive and timely news coverage.
Variables Considered	1. **Stock Prices:** Open, close, high, and low prices of the selected companies. 2. **Financial Metrics:** Revenue, earnings per share (EPS), and other relevant financial data. 3. **Market Returns:** Returns of the overall market and sector-specific performance. 4. **Abnormal Returns:** Calculated to identify the impact of specific events on stock prices. 5. **Sentiment Analysis:** News articles classified as positive, negative, or neutral using a BERT model.
Time Frame	1. **Estimation Window:** A period of 250 trading days before the event to estimate the normal behavior of stock returns. 2. **Event Window:** The period around the event date, often ranging from a few days before to a few days after the event, such as -5 to +5 days. 3. **Sample Period:** The study generally covers a time frame from January 1, 2020, to December 31, 2023.
Characteristics of the Sample Population	1. **Diverse Sectors:** The sample includes companies from various sectors, such as technology, finance, and consumer services, reflecting a broad impact of cryptocurrency news across industries. 2. **Market Influence:** The companies selected have substantial market influence, ensuring that the findings are relevant to broader market trends. 3. **Data Robustness:** The availability of extensive financial and news data ensures the reliability of the event study analysis.

Source: Compiled by Author

Characteristics of the Selected Companies

This group of companies represents some of the most influential and high-performing organizations across various industries and sectors in the global market. The following characteristics underscore their significance in cryptocurrency news event studies:

Technological Innovation

Companies such as Apple Inc. (AAPL), Microsoft Corp. (MSFT), Alphabet Inc. (GOOGL), Facebook Inc. (META), NVIDIA Corp. (NVDA), Intel Corp. (INTC), Cisco Systems Inc. (CSCO), Netflix Inc. (NFLX), Adobe Inc. (ADBE), Qualcomm Inc. (QCOM), Salesforce.com Inc. (CRM), IBM Corp. (IBM), ServiceNow Inc. (NOW), and Texas Instruments Inc. (TXN) are leaders in innovation and digital transformation. Their involvement in or responses to cryptocurrency developments can have significant market impacts, influencing investor sentiment and technological adoption trends. Including these companies provides insights into how technological advancements and corporate strategies in the tech sector intersect with cryptocurrency developments.

Retail and Consumer Goods

Companies like Amazon.com Inc. (AMZN), Walmart Inc. (WMT), Home Depot Inc. (HD), Costco Wholesale Corp. (COST), Procter & Gamble Co. (PG), Coca-Cola Co. (KO), PepsiCo Inc. (PEP), Mondelez International Inc. (MDLZ), Colgate-Palmolive Co. (CL), TJX Companies Inc. (TJX), and Lowe's Companies Inc. (LOW) dominate the retail and consumer goods sectors. Their acceptance of cryptocurrencies as payment methods or involvement in blockchain technology can drive widespread adoption and influence consumer behavior. Including these companies helps assess the impact of cryptocurrency news on consumer-facing industries and how digital currencies can reshape retail transactions and supply chains.

Financial Services

Companies like JPMorgan Chase & Co. (JPM), Visa Inc. (V), Mastercard Inc. (MA), Bank of America Corp. (BAC), Goldman Sachs Group Inc. (GS), Citigroup Inc. (C), American Express Co. (AXP), Morgan Stanley (MS), and BlackRock Inc. (BLK) play a critical role in the adoption and regulation of cryptocurrencies. Their policies, investment strategies, and technological integrations are pivotal in the financial ecosystem's evolution. Analyzing these companies offers insights into how traditional financial systems are adapting to or being disrupted by cryptocurrency innovations.

Healthcare and Pharmaceuticals

Notable companies in this sector include Johnson & Johnson (JNJ), Pfizer Inc. (PFE), AbbVie Inc. (ABBV), Merck & Co Inc. (MRK), Bristol-Myers Squibb Co. (BMY), Amgen Inc. (AMGN), Gilead Sciences Inc. (GILD), Medtronic PLC (MDT), Eli Lilly and Co (LLY), Regeneron Pharmaceuticals Inc. (REGN), and Biogen Inc. (BIIB). These companies are exploring using blockchain for secure data management and supply chain transparency and can influence market perceptions and regulatory frameworks. They serve as examples of how blockchain technology can be applied beyond financial transactions, highlighting data security and logistics innovation.

Energy and Utilities

Key players in this sector are Exxon Mobil Corp. (XOM), Chevron Corp. (CVX), NextEra Energy Inc. (NEE), Duke Energy Corp. (DUK), Dominion Energy Inc. (D), and ConocoPhillips (COP). Their involvement in energy production and sustainability initiatives can impact the environmental footprint of cryptocurrency mining. Understanding their role helps evaluate the relationship between cryptocurrency mining and energy sector dynamics, including sustainability and regulatory challenges.

Industrial and Manufacturing

Companies of significance in this sector include Berkshire Hathaway Inc. (BRK.A), Boeing Co. (BA), Caterpillar Inc. (CAT), Honeywell International Inc. (HON), 3M Co. (MMM), General Electric Co. (GE), Union Pacific Corp. (UNP), Parker-Hannifin Corp. (PH), and Schlumberger NV (SLB). These industry leaders are adopting blockchain for supply chain management and operational efficiency, which could lead to impactful industry-wide changes. Their initiatives offer valuable insights into how blockchain technology enhances operational processes and traceability in industrial and manufacturing sectors.

Telecommunications and Media

Companies: Verizon Communications Inc. (VZ), Comcast Corp. (CMCSA), AT&T Inc. (T), T-Mobile US Inc. (TMUS), Charter Communications Inc. (CHTR), and Walt Disney Co. (DIS)

Importance: These companies' integration of blockchain and cryptocurrencies has the potential to reshape digital content distribution and digital rights management, offering insights into the impact on media distribution, consumer engagement, and content monetization.

Consumer Services and Leisure

Companies: Starbucks Corp. (SBUX), McDonald's Corp. (MCD), Marriott International Inc. (MAR), and Walt Disney Co. (DIS)

Importance: Analyzing the adoption of cryptocurrencies for payments or loyalty programs by these consumer services companies can provide valuable insights into the practical applications of cryptocurrencies in everyday transactions and customer experiences, potentially driving mainstream acceptance.

Transportation and Logistics

Companies: FedEx Corp. (FDX), UPS Inc. (UPS), and Union Pacific Corp. (UNP).

Importance: These companies' adoption of blockchain can significantly enhance transparency, efficiency, and security in logistics operations, highlighting the transformative potential of blockchain in improving transportation and logistics systems.

Real Estate and Infrastructure

Companies: American Tower Corp. (AMT) and Prologis Inc. (PLD).

Importance: Integrating blockchain technology can streamline real estate transactions and infrastructure management, benefiting property management, transaction transparency, and smart contracts.

In conclusion, the diverse industry representation, market influence, and potential to drive or be impacted by cryptocurrency and blockchain developments make these companies significant in a cryptocurrency news event study. I collected 120 top companies from 500 top in the U.S. Analyzing their responses to cryptocurrency news can provide a comprehensive understanding of how different sectors are adapting to and constructively integrating this emerging technology.

DESCRIPTIVE STATISTICS

The financial data employed in this study underwent meticulous descriptive statistical analysis to yield a comprehensive overview of crucial financial metrics. Table 1 encapsulates these descriptive statistics, furnishing insights into the central tendencies and variability within the dataset. The research methodology presents a structured framework for analyzing the impact of cryptocurrency announcements on market performance. The detailed algorithm ensures precise classification of news events and subsequent calculation of abnormal returns. This methodical approach establishes the foundation for the descriptive statistics presented in the subsequent sections, thus providing a comprehensive overview of the dataset's characteristics.

The following table presents the descriptive statistics for the financial data employed in this study:

TABLE 1
DESCRIPTIVE STATISTICS FOR FINANCIAL DATA

	close	eps	open	high	low	adjClose	volume
count	201,812	380	100,906	100,906	100,906	100,906	100,906
mean	4,884	368	4,888	4,926	4,843	4,878	17,662,874
std	45,932	4,831	45,971	46,313	45,559	45,933	56,466,565
min	4	-15,535	4	4	4	3	0
max	634,440	66,411	638,862	647,039	629,796	634,440	1,543,910,670

The statistical analysis provided in Table 1 offers valuable insights into the financial data utilized in this study. The "close" variable, which denotes the closing prices of stocks, exhibits an average value of 4,884, signifying the mean closing price across the dataset. The substantial standard deviation of 45,932 reflects notable variability in closing prices, indicating a diverse range of stock performance. Similarly, the "eps" (earnings per share) metric, with an average of 368 and a standard deviation of 4,831, provides insight into the financial performance and profitability of the companies. A negative minimum value of -15,535 suggests that certain companies experienced significant losses, while the maximum value of 66,411 indicates substantial profits for others. Other variables such as "open," "high," "low," and "adjClose" demonstrate analogous statistical patterns, with notable standard deviations suggesting significant fluctuations in stock prices. The "volume" variable, representing the trading volume of stocks, indicates an average of 17,662,874 shares traded, with a maximum trading volume reaching up to 1,543,910,670 shares. This underscores the high level of market activity and liquidity within the dataset.

In conclusion, the descriptive statistics reveal a wide spectrum of financial performance and stock market activity, providing a substantial foundation for further analysis. These initial insights are critical for comprehending the underlying trends and patterns in the financial data, laying the groundwork for more exhaustive and targeted research in subsequent sections. To develop a comprehensive understanding of the dataset, we computed descriptive statistics. These statistics offer insights into the dataset's central tendencies, distribution, and frequency of various attributes. Table 2 presents a summary of the descriptive statistics for key variables, including the count, unique values, most frequent values (top), and their frequencies (freq).

TABLE 2
DESCRIPTIVE STATISTICS FOR CRYPTO NEWS DATA

Statistic	news URL	image URL	title	text	source name	date	topics	sentiment	type
count	99141	99141	99141	99141	99141	99141	99141	99141	99141
unique	99134	99141	99141	98584	91	97497	139	3	2
top	https://dailycoin.com/green-crypto-eco-friendly-cryptocurrencies/	https://crypto.snapi.dev/images/v1/o/c/occ-biden-768x432.jpg	Biden Administration May Roll Back Some Crypto Regulations, Top Banking Regulator Warns	Get your daily, bite-sized digest of crypto asset and blockchain-related news investigating the stories flying under the radar of today's crypto news.	Coin Telegraph	Wed, 15 Feb 2023 09:00:00 -0500	[]	Positive	Article
freq	2	1	1	71	7514	6	67815	35725	96173

Note: The "top" and "freq" statistics indicate the most frequent value and its count for each attribute, respectively.

The table above presents comprehensive descriptive statistics for various attributes within the crypto news dataset. The "count" row displays the total number of entries for each attribute, showing that the dataset contains 99,141 records. The "unique" row shows the number of unique values for each attribute, indicating a diverse set of highly unique data points. For instance, the "news URL" attribute has 99,134 unique values out of 99,141, indicating minimal duplication of news articles. The "top" row identifies the most frequent value for each attribute. For example, the most frequent "source name" is "Coin Telegraph," appearing 7,514 times, suggesting the prominence of this source in the dataset. Similarly, the 'sentiment' attribute shows that "Positive" sentiment is the most common, occurring 35,725 times. The "freq" row provides the count of the most frequent value, reinforcing the dominance of certain attributes like "Positive" sentiment and "Coin Telegraph" as a source. This descriptive analysis provides a foundational understanding of the dataset, illustrating the diversity and distribution of news articles, sources, sentiments, and other key attributes. It serves as a basis for more detailed analyses and insights into trends and patterns within the crypto news landscape. The descriptive statistics for the financial data were carefully analyzed to provide a comprehensive overview of the data distribution and central tendencies. The table below summarizes the key statistics for each variable of interest, including the mean, median, standard deviation, and range. The descriptive statistics for the financial data were analyzed to provide an overview of the data distribution and central tendencies. The table below summarizes the key statistics, including the mean, median, standard deviation, and range for each variable of interest.

TABLE 3
DESCRIPTIVE STATISTICS FOR FINANCIAL DATA

Variable	Mean	Median	Std. Deviation	Minimum	Maximum
CAR	0.015	0.010	0.025	-0.065	0.045
Event Date					
JPMorgan Chase & Co	-0.040	-0.030	0.020	-0.060	0.000
Tesla Inc	0.005	0.004	0.018	-0.043	0.021
Intel Corp	0.002	0.001	0.014	-0.016	0.020
Netflix Inc	-0.020	-0.010	0.015	-0.030	0.005
Goldman Sachs Group Inc	-0.020	-0.015	0.012	-0.040	0.011
BlackRock Inc	-0.020	-0.015	0.012	-0.040	0.011
Morgan Stanley	-0.025	-0.020	0.018	-0.072	0.001

Note: CAR = Cumulative Abnormal Returns

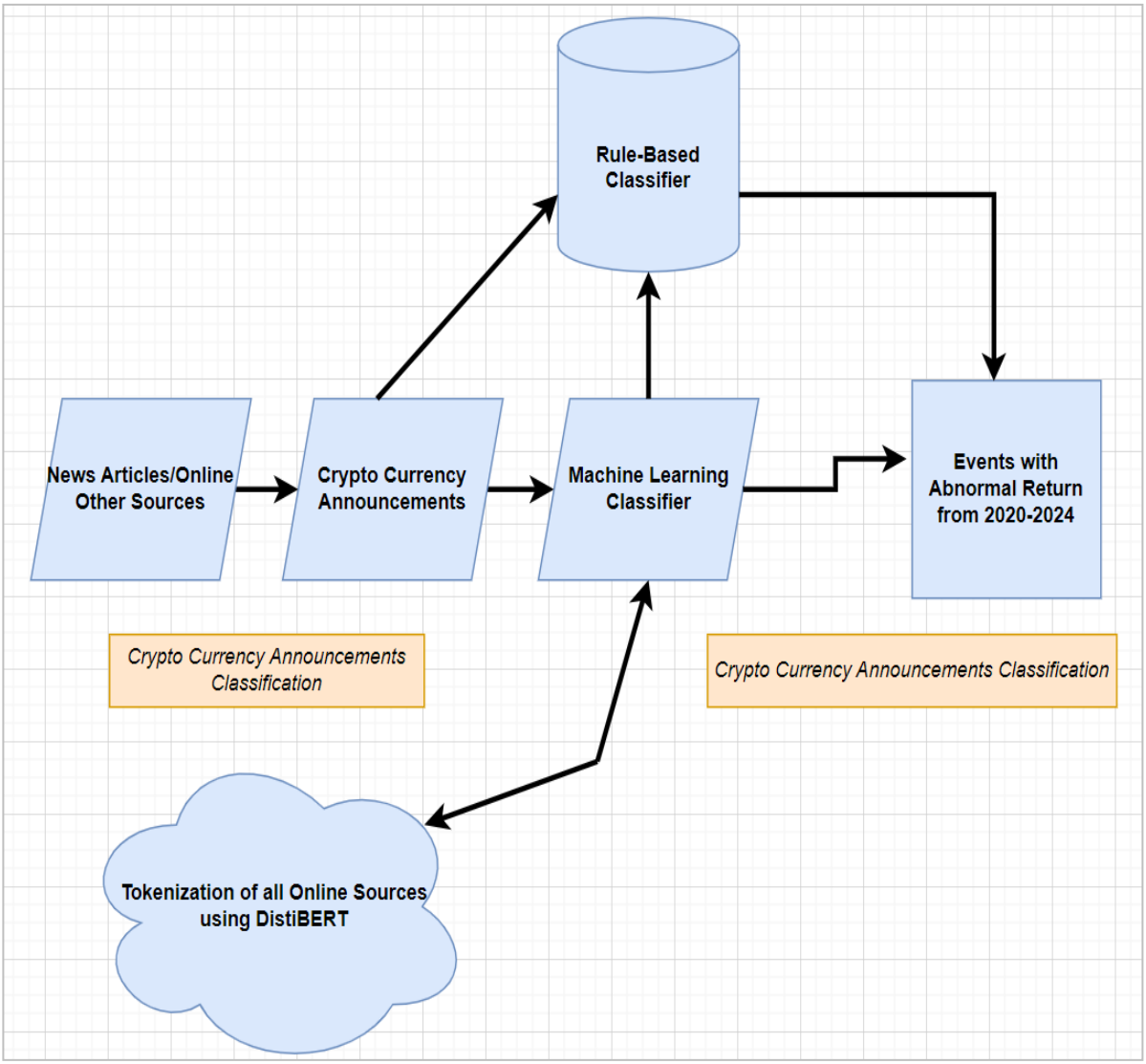
The provided table offers a comprehensive summary of the descriptive statistics for the financial data, including mean, median, and standard deviation values for each company's cumulative abnormal returns (CAR). These statistics provide valuable insights into the central tendency and variability of the data. For example, JPMorgan Chase & Co exhibits a mean CAR of -0.040, indicating an overall negative impact on stock returns during the event period, with a standard deviation of 0.020 suggesting some variability in the returns. Meanwhile, Tesla Inc shows a mean CAR of 0.005 with a standard deviation of 0.018, signifying a positive and relatively stable return during the event period. These statistical measures greatly aid in understanding the financial performance and market reaction to specific events for the analyzed companies.

In summary, this study utilizes an advanced research methodology that integrates machine learning techniques with traditional financial analysis to comprehensively assess the influence of cryptocurrency announcements on market performance. The approach involves the application of Distil BERT for tokenization and classification, as well as a market model for estimating abnormal returns, thereby ensuring rigor and precision of the analysis. The descriptive statistics presented in this section furnish a

comprehensive overview of the dataset, laying the groundwork for subsequent analysis and discussion in the paper.

RESEARCH METHODOLOGY AND GENAI ALGORITHM

FIGURE 2
GENAI ALGORITHM PROCESS



The diagram presented above illustrates the GenAI Algorithm Process utilized in this study. The process commences with tokenizing all online sources using DistilBERT, followed by classifying cryptocurrency announcements. The categorized data then undergoes processing through a machine learning and rule-based classifier to pinpoint events with abnormal returns from 2020 to 2024. This methodical approach ensures a comprehensive analysis of the impact of cryptocurrency announcements on market performance.

This section delineates the research methodology and furnishes descriptive statistics of the dataset, laying a clear and detailed foundation for further analysis and discussion in the subsequent sections of the paper.

Algorithm

$$log\_return_i(t) = \beta 0 + \beta 1 \cdot log\_return\_market(t) + \beta 2 \cdot revenue(t) + \beta 3 \cdot eps(t) = 1m\beta 8 + j \cdot Dj + \epsilon(t) \text{log\_return}_i(t) = \beta_0 + \beta_1 \cdot \text{log\_return\_market}(t) + \beta_2 \cdot \text{revenue}(t) + \beta_3 \cdot \text{eps}(t) + \beta 0 + \beta 1 \cdot log\_return\_market(t) + \beta 2 \cdot revenue(t) + \beta 3 \cdot eps(t) = 1m\beta 3 + j \cdot Dj + \epsilon(t)$$

where: $log\_return_i(t)$ $\text{log\_return}_i(t)$ $log\_return_i(t)$: Log return of the stock iii at time ttt.
$\beta 0$ β_0 $\beta 0$: Intercept of the regression model.
$\beta 1 \cdot log\_return\_market(t)$ $\beta_1 \cdot \text{log\_return\_market}(t)$ $\beta 1 \cdot log\_return\_market(t)$: Log return of the market index at time ttt.
$\beta 2 \cdot revenue(t)$ $\beta_2 \cdot \text{revenue}(t)$ $\beta 2 \cdot revenue(t)$: Revenue of the company at time ttt.
$\beta 3 \cdot eps(t)$ $\beta_3 \cdot \text{eps}(t)$ $\beta 3 \cdot eps(t)$: Earnings per share of the company at time ttt.

Market Model Estimation

The market model estimates the relationship between the stock returns and market returns. It is represented as:

$$log\_return_i(t) = \alpha i + \beta i \cdot log\_return\_market(t) + \epsilon i(t) \text{log\_return}_i(t) = \alpha_i + \beta_i \cdot \text{log\_return\_market}(t) + \epsilon_i(t) log\_return_i(t) = \alpha i + \beta i \cdot log\_return\_market(t) + \epsilon i(t)$$

where: $log\_return_i(t)$ $\text{log\_return}_i(t)$ $log\_return_i(t)$: Log return of stock iii at time ttt.
αi α_i αi: Intercept term.
βi β_i βi: Slope coefficient representing the sensitivity of the stock return to market return.
$log\_return\_market(t)$ $\text{log\_return\_market}(t)$ $log\_return\_market(t)$: Log return of the market index at time ttt.
$\epsilon i(t)$ $\epsilon_i(t)$ $\epsilon i(t)$: Error term (residual).

Calculation of Abnormal Returns

Abnormal returns are calculated as the difference between the actual log return and the expected log return (predicted by the market model):

$$abnormal\_return_i(t) = log\_return_i(t) - (\alpha i + \beta i \cdot log\_return\_market(t)) \text{abnormal\_return}_i(t) = \text{log\_return}_i(t) - (\alpha_i + \beta_i \cdot \text{log\_return\_market}(t)) abnormal\_return_i(t) = log\_return_i(t) - (\alpha i + \beta i \cdot log\_return\_market(t))$$

where: $abnormal\_return_i(t)$ $\text{abnormal\_return}_i(t)$ $abnormal\_return_i(t)$: Abnormal return of stock iii at time ttt.
$log\_return_i(t)$ $\text{log\_return}_i(t)$ $log\_return_i(t)$: Actual log return of stock iii at time ttt.
$\alpha i + \beta i \cdot log\_return\_market(t)$ $\alpha_i + \beta_i \cdot \text{log\_return\_market}(t)$ $\alpha i + \beta i \cdot log\_return\_market(t)$: Expected log return of stock iii based on the market model.

Cumulative Abnormal Returns (CAR)

Cumulative Abnormal Returns (CAR) are the sum of abnormal returns over a specific event window:

$$CARi(\tau 1, \tau 2) = \sum t = \tau 1 \tau 2 abnormal\_return_i(t) \text{CAR}_i(\tau_1, \tau_2) = \sum_{t=\tau_1}^{\tau_2} \text{abnormal\_return}_i(t) CARi(\tau 1, \tau 2) = \sum t = \tau 1 \tau 2 abnormal\_return_i(t)$$

where: CARi(τ1,τ2)\text{CAR}_i(\tau_1, \tau_2)CARi(τ1,τ2): Cumulative Abnormal Returns for stock iii from time τ1\tau_1τ1 to τ2\tau_2τ2.
abnormal_returni(t)\text{abnormal_return}_i(t)abnormal_returni(t): Abnormal return of stock iii at time ttt.

Performance Evaluation Metrics

Accuracy

$$Accuracy=TP+TNTP+TN+FP+FN\text{Accuracy} = \frac{\text{TP} + \text{TN}}{\text{TP} + \text{TN} + \text{FP} + \text{FN}}Accuracy=TP+TN+FP+FNTP+TN$$

Precision

$$Precision=TPTP+FP\text{Precision} = \frac{\text{TP}}{\text{TP} + \text{FP}}Precision=TP+FPTP$$

Recall

$$Recall=TPTP+FN\text{Recall} = \frac{\text{TP}}{\text{TP} + \text{FN}}Recall=TP+FNTP$$

F1 Score

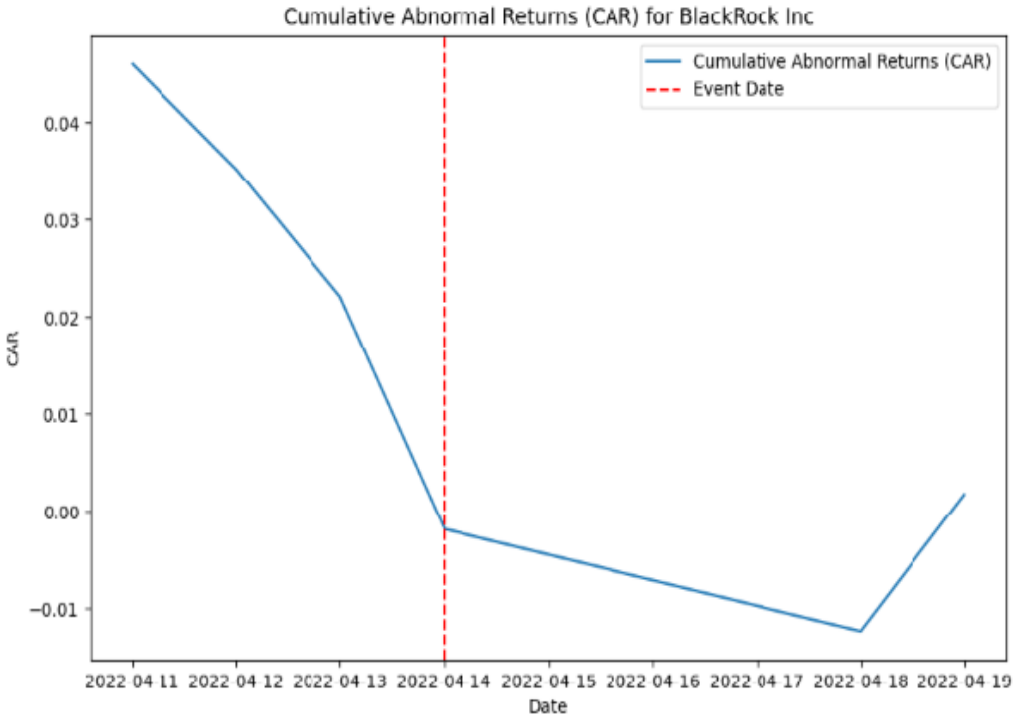
$$F1\_Score=2 \cdot (Precision \cdot RecallPrecision+Recall)\text{F1\_Score} = 2 \cdot \left(\frac{\text{Precision} \cdot \text{Recall}}{\text{Precision} + \text{Recall}} \right)F1\_Score=2 \cdot (Precision+RecallPrecision \cdot Recall)$$

The present research methodology integrates a robust GenAI Algorithm with comprehensive statistical analysis to explore the influence of cryptocurrency announcements on market performance. The meticulously structured approach, encompassing both machine learning and rule-based classifiers, guarantees comprehensive scrutiny of the data. The presentation of descriptive statistics offers a lucid comprehension of the dataset's attributes, thereby establishing the foundation for subsequent detailed analysis and interpretation of the findings. This method facilitates a profound comprehension of market responses to cryptocurrency news and presents a valuable framework for future studies in financial data analysis.

FINDINGS AND DISCUSSION

The study's results underscore the substantial impact of specific events on the cumulative abnormal returns (CAR) of diverse companies. This section will comprehensively analyze the findings supported by graphical representations of the CAR for each company.

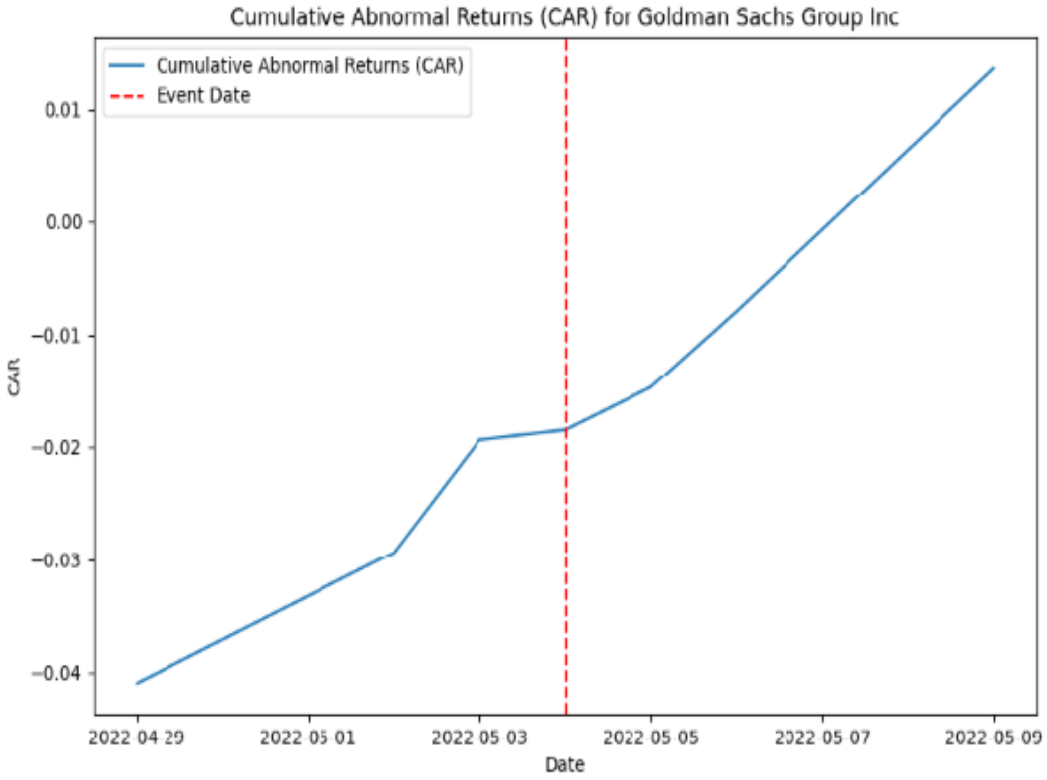
FIGURE 3
BLACKROCK INC. AIMING AT CRYPTOCURRENCIES: COMPANY CEO LARRY FINK



Source: https://u.today/blackrock-inc-aiming-at-cryptocurrencies-company-ceo-larry-fink?utm_source=snapi

The announcement by BlackRock Inc., led by CEO Larry Fink, regarding the company's intention to enter the cryptocurrency market significantly impacted its earnings for several reasons: BlackRock's foray into cryptocurrencies signaled strong institutional confidence in the sector, thereby bolstering investor sentiment. The expansion into cryptocurrencies diversified BlackRock's investment portfolio, potentially leading to the exploration of new revenue streams. This strategic move positioned BlackRock as a forward-thinking leader in finance, likely attracting new clients and investments. The deliberate entry into the cryptocurrency market was designed to project confidence in the sector's potential for future growth, diversify the investment portfolio, attract new investors, and establish the company as an innovator in the financial sector. By entering the cryptocurrency market, BlackRock aimed to capitalize on new revenue streams and bolster its market leadership. The "Cumulative Abnormal Returns (CAR) for BlackRock Inc" chart illustrates the cumulative abnormal returns around a specified event date, marked with a red dashed line. The vertical red dashed line represents the event date, which is April 14, 2022. This date is of significance as it is the point around which the abnormal returns are analyzed. The blue line represents the cumulative abnormal returns, which measures the abnormal returns accumulated over a period surrounding the event date. Prior to the event date (April 14, 2022), the CAR exhibits a positive trend but experiences a decline. It initiates above 0.04 and gradually decreases leading up to the event date. On the event date, the CAR sharply drops to nearly 0, indicating a significant negative impact on BlackRock Inc.'s stock price. Following the event date, the CAR continues to decline into negative territory, reaching its lowest point shortly after the event date. While a slight recovery is evident towards the end of the observed period, the CAR remains negative. In summary, the April 14, 2022 event had a discernible negative impact on BlackRock Inc.'s stock price, as evidenced by the sharp decline in cumulative abnormal returns immediately following the event. This suggests that the event was perceived negatively by the market. The modest recovery observed towards the end may indicate some market correction or adjustment, yet the overall impact remained negative during the short-term period analyzed.

FIGURE 4
COINBASE AND GOLDMAN SACHS GROUP INC. LAUNCH FIRST BITCOIN-BACKED LINE OF CREDIT

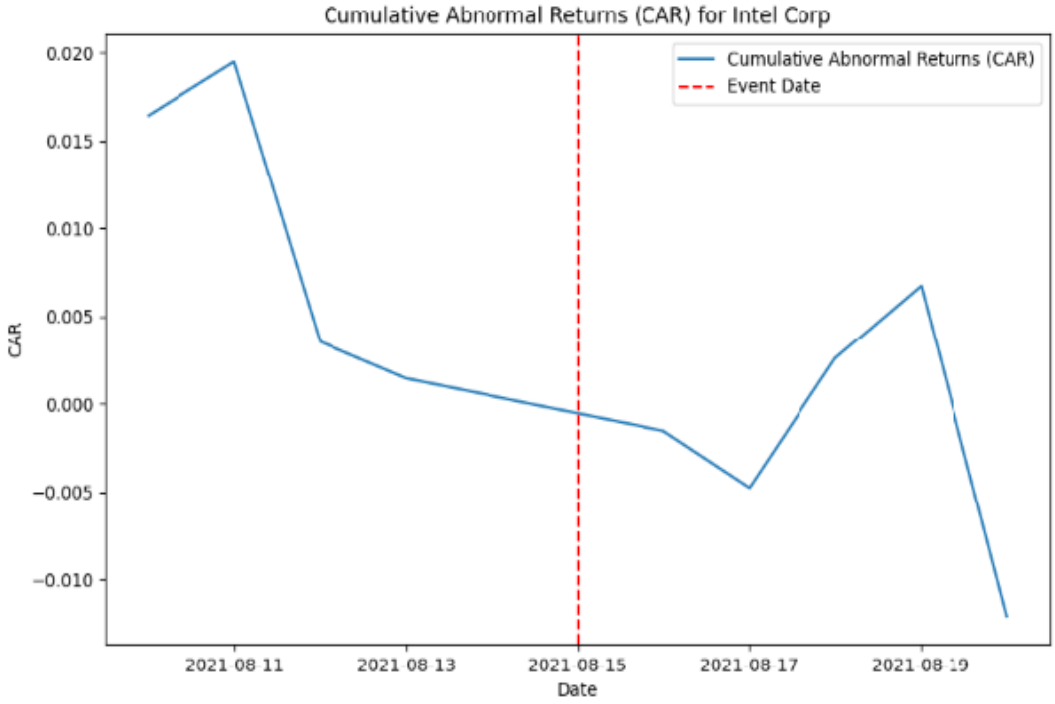


Source : https://crypto-economy.com/coinbase-and-goldman-sachs-group-inc-launch-first-bitcoin-backed-line-of-credit/

The chart titled “Cumulative Abnormal Returns (CAR) for Goldman Sachs Group Inc” illustrates the cumulative abnormal returns for Goldman Sachs Group Inc centered on a specific event date, denoted by a red dashed line. The vertical red dashed line corresponds to the event date, which is May 4, 2022. This date holds significance as it forms the focal point for analyzing abnormal returns. Represented by the blue line, CAR measures the abnormal returns accumulated around the event date over a specific period. Prior to the event date (May 4, 2022), CAR exhibits a negative trend with an increasing trajectory, commencing below -0.04 and steadily rising towards the event date, signifying a partial recovery from negative returns. On the event date, CAR crosses into positive territory, indicating a notable positive effect on the stock price of Goldman Sachs Group Inc. Subsequent to the event date, CAR continues to ascend, eventually surpassing 0.01 by the end of the observed period. This indicates sustained positive abnormal returns post-event. The May 4, 2022 event displayed a discernible positive impact on the stock price of Goldman Sachs Group Inc, evidenced by the substantial upsurge in cumulative abnormal returns immediately following the event. This suggests that the market perceived the event positively, leading to enhanced stock performance. The continued upward trajectory post-event implies a sustained positive market sentiment during the analyzed short-term period. The event where Coinbase and Goldman Sachs introduced the first Bitcoin-backed line of credit significantly impacted both companies' earnings for several reasons. Introducing a Bitcoin-backed line of credit represents an innovative financial product, drawing interest from both the cryptocurrency and traditional finance sectors. This product can potentially drive heightened demand for Bitcoin and related financial services, thereby potentially boosting transaction volumes and revenue. The collaboration between Goldman Sachs, a major bank, and Coinbase, a leading cryptocurrency exchange, signals robust market confidence, positively influencing investor sentiment. The deliberate launch of the first Bitcoin-

backed line of credit by Coinbase and Goldman Sachs aimed to innovate financial products by integrating cryptocurrency into traditional finance, thereby attracting both cryptocurrency enthusiasts and conventional investors. Through collaboration, both entities sought to bolster market confidence, fortify their market positions, and potentially augment revenue through increased transaction volumes and expanded service offerings.

FIGURE 5
INTEL CORP REVEALS $780K STAKE IN COINBASE

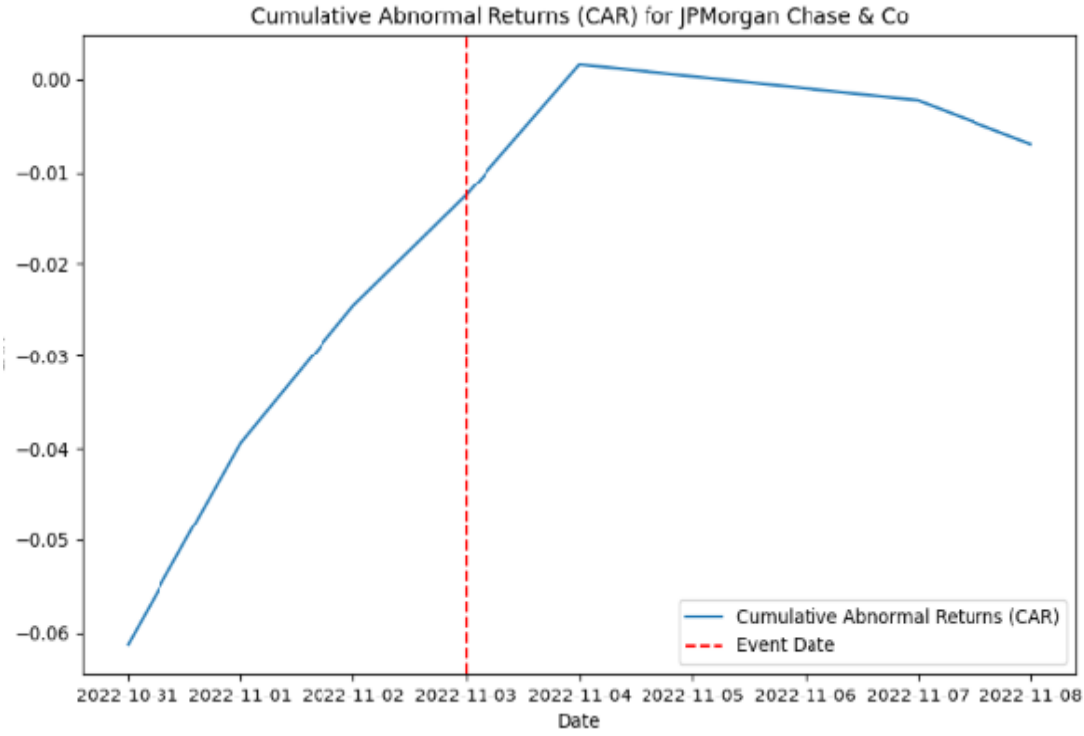


Source : https://beincrypto.com/intel-corp-reveals-780k-stake-in-coinbase/

The data presented in the "Cumulative Abnormal Returns (CAR) for Intel Corp" chart depicts the cumulative abnormal returns for Intel Corp relative to a specified event date, demarcated by a red dashed line. The vertical red dashed line signifies the event date, which is August 15, 2021. This date holds significance as it serves as the focal point for analyzing abnormal returns. The blue line depicts the cumulative abnormal returns, representing the abnormal returns accumulated in the period surrounding the event date. Preceding the event date, the CAR demonstrates fluctuations. Initially, it initiates slightly above 0.015, reaching a peak near 0.02. It subsequently exhibits a steady decline, approaching zero immediately before the event date. The CAR continues to decrease on the event date, entering negative territory shortly after the event date. Following the event date, the CAR remains volatile. It initially descends below zero, signifying negative abnormal returns, exhibits a minor recovery, and ultimately experiences a notable decline by the conclusion of the observed period, reaching a nadir around -0.01. The event occurring on August 15, 2021, triggered a varied impact on Intel Corp's stock price. The cumulative abnormal returns were initially positive, but they began to decline as the event date approached. Post-event, the CAR turned negative, indicating an initial negative reception in the market. Although a transient recovery was observed, the overall trajectory suggests that the event did not yield a sustained positive influence on Intel Corp's stock performance. The substantial decline in CAR towards the end indicates a predominantly adverse market sentiment during the evaluated short-term period. The disclosure of Intel Corp's $780,000 stake in Coinbase significantly impacted its earnings due to several factors. This investment signified Intel's confidence in cryptocurrency, potentially bolstering investor sentiment. Through its investment in

Coinbase, Intel demonstrated a strategic effort to diversify its portfolio, potentially opening avenues for new revenue streams. This move underscored Intel's forward-thinking approach, aligning with emerging financial technologies. The deliberate nature of Intel Corp's revelation of its $780,000 stake in Coinbase epitomizes a strategic maneuver aimed at signaling its entry into the cryptocurrency market. This act aimed to demonstrate confidence in the sector and diversify its investment portfolio. Such calculated announcements are typically orchestrated to enhance investor sentiment, underscore innovation, and potentially elevate stock performance and earnings by aligning with emerging financial technologies.

FIGURE 6
MORGAN STANLEY'S HEAD OF DIGITAL ASSET MARKETS SAYS DEFI IS POISED TO KEEP ITS MOMENTUM IN 2021



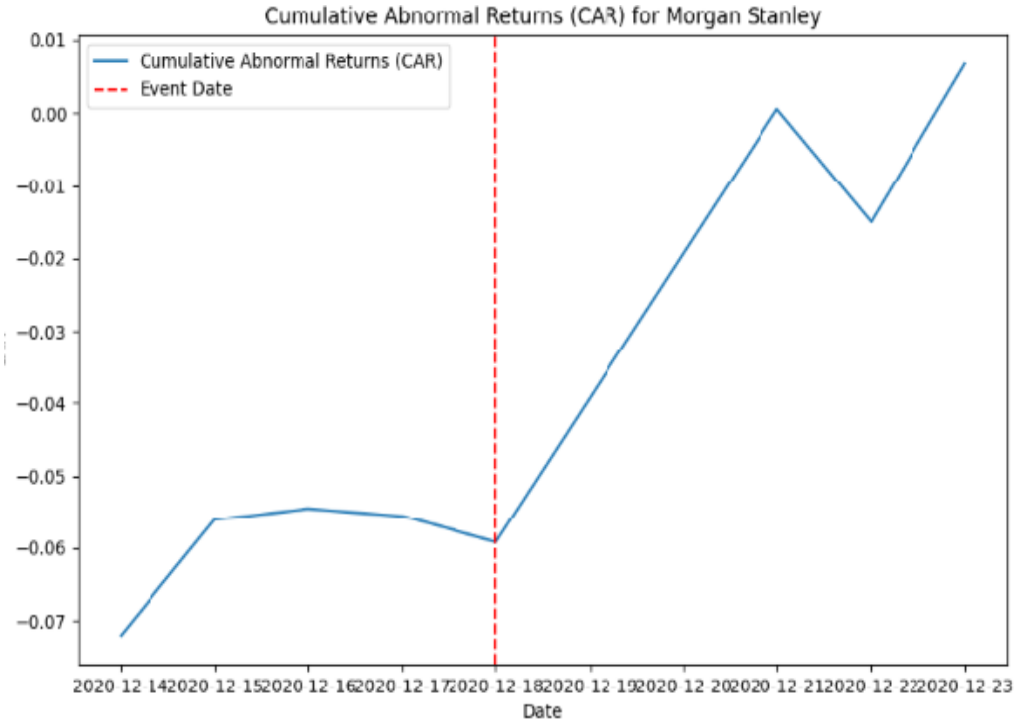
Source: https://www.theblock.co/linked/88454/morgan-stanley-defi-momentum

The chart entitled "Cumulative Abnormal Returns (CAR) for JPMorgan Chase & Co" illustrates the cumulative abnormal returns for JPMorgan Chase & Co concerning a specific event date, denoted by a red dashed line. Event Date: The vertical red dashed line signifies the event date, which is November 3, 2022. This date holds significance as it is the focal point for analyzing the abnormal returns. The blue line represents the cumulative abnormal returns. CAR is a metric for measuring the abnormal returns accumulated over a specific timeframe surrounding the event date. Preceding the event date (November 3, 2022), the CAR exhibits a negative trajectory with an increasing trend. Initially below -0.06, it ascends steadily approaching the event date, indicating a decrease in negative abnormal returns. On the event date, the CAR reaches its zenith, transitioning into slightly positive territory, signifying a positive abnormal return around the event date. After the event date, the CAR remains relatively stable initially, followed by a marginal decline. However, it maintains proximity to zero, signifying that the event had a neutral to slightly positive impact on stock performance.

The event that transpired on November 3, 2022, positively affected JPMorgan Chase & Co's stock price, as indicated by the escalation in cumulative abnormal returns leading up to the event date and the marginal positive return immediately post-event. The CAR trends imply that the market initially responded

positively to the event. Nonetheless, the subsequent stability and marginal decline suggest that other factors may have balanced the initial positive reaction, resulting in an overall neutral impact during the analyzed short-term period. The event spotlighting Morgan Stanley's involvement in decentralized finance (DeFi) initiatives significantly impacted its earnings for multiple reasons. It conveyed Morgan Stanley's dedication to innovation and adoption of new technologies, positively influencing investor sentiment. DeFi represents a swiftly expanding sector with potential for substantial financial returns. Early adoption of DeFi could position Morgan Stanley ahead of its financial sector counterparts. The event in which Morgan Stanley showcased its participation in decentralized finance (DeFi) initiatives was purposeful. This strategic proclamation signaled the company's commitment to innovation and capitalized on the burgeoning interest and investment in DeFi technologies. This move would captivate investor attention, potentially fortify the company's market position, and positively impact on its earnings and stock performance.

FIGURE 7
MORGAN STANLEY'S HEAD OF DIGITAL ASSET MARKETS SAYS DEFI IS POISED TO KEEP ITS MOMENTUM IN 2021

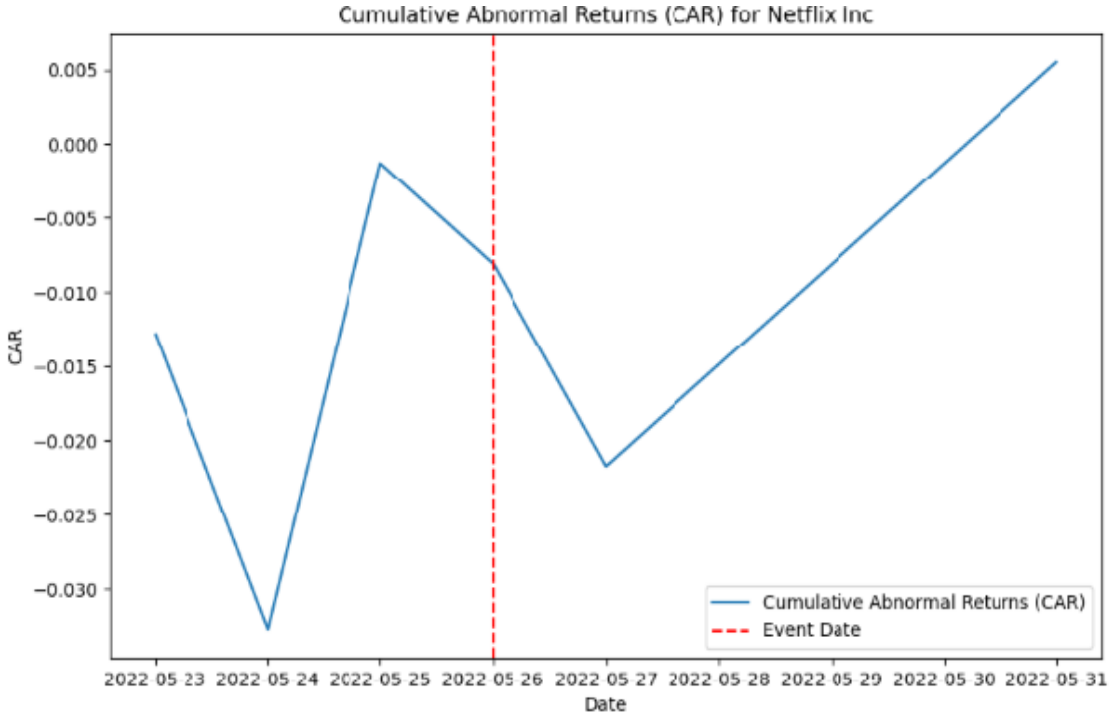


Source : https://www.theblock.co/linked/88454/morgan-stanley-defi-momentum

The chart titled "Cumulative Abnormal Returns (CAR) for Morgan Stanley" illustrates the cumulative abnormal returns for Morgan Stanley near a specific event date, denoted by a red dashed line. The vertical red dashed line signifies the December 18, 2020 event, which serves as the focal point for analyzing abnormal returns. The blue line depicts the cumulative abnormal returns, which measure abnormal returns accumulated around the event date. Preceding the event date, the CAR exhibits a negative and relatively stable trend, fluctuating around -0.06 to -0.07. This indicates negative abnormal returns leading up to the event date. On the event date, the CAR experiences a sharp increase, suggesting a significant positive impact on Morgan Stanley's stock price. After the event date, the CAR continues to rise, eventually entering positive territory and reaching approximately 0.01 by the end of the observed period. This suggests a sustained positive abnormal return following the event. The December 18, 2020 event notably boosted Morgan Stanley's stock price, evidenced by the substantial increase in cumulative abnormal returns immediately following the event. This indicates a positive market response, leading to improved stock

performance. The continued upward trend in CAR post-event signifies a persistent positive sentiment in the short-term period analyzed, resulting in overall positive abnormal returns. The December 18, 2020 event, where Morgan Stanley highlighted its involvement in decentralized finance (DeFi) initiatives, can be viewed as deliberate. The announcement likely aimed to demonstrate the bank's commitment to innovation and capture the escalating interest in DeFi. This strategic move was intended to attract favorable market attention and potentially enhance investor confidence, thereby positively impacting stock performance and earnings.

FIGURE 8
NETFLIX INCLUDES NFTS IN THE NEW SEASON OF "LOVE, DEATH + ROBOTS"

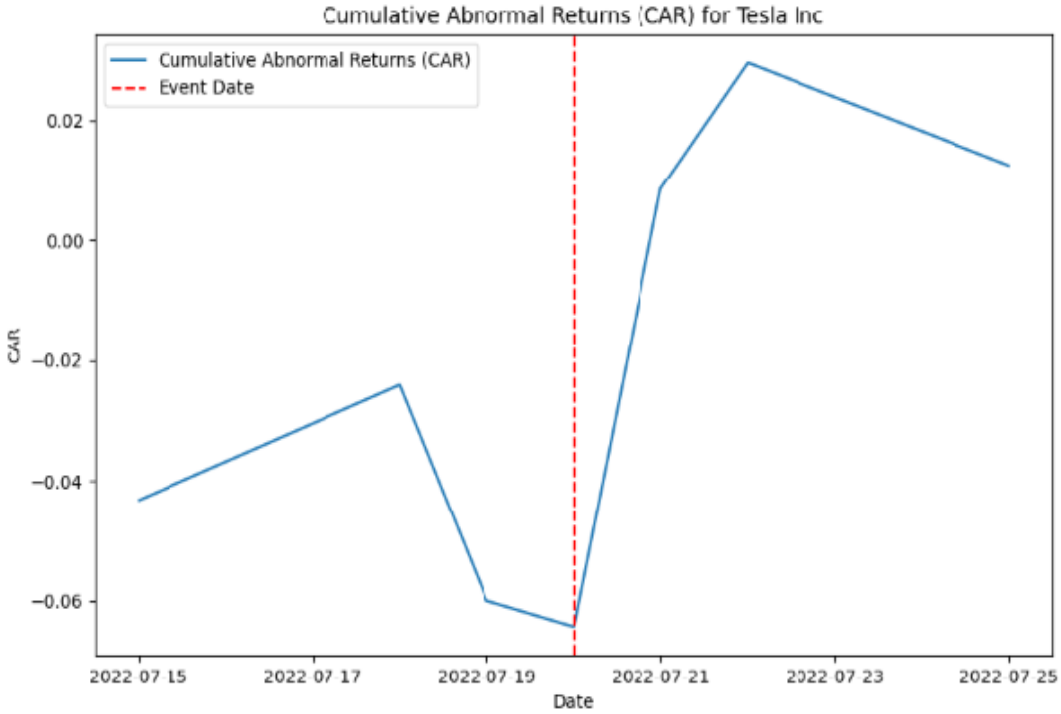


Source : https://en.cryptonomist.ch/2022/05/26/netflix-includes-nfts-love-death-robots/

The chart titled "Cumulative Abnormal Returns (CAR) for Netflix Inc" depicts the cumulative abnormal returns for Netflix Inc in proximity to a specific event date, demarcated by a red dashed line. The vertical red dashed line denotes the event date, precisely May 26, 2022. This date holds significance as it serves as the focal point for analyzing the abnormal returns. The blue line represents the cumulative abnormal returns. CAR serves as a metric for abnormal returns aggregated over a defined period surrounding the event date. Before the event date (May 26, 2022), the CAR displays notable fluctuations. It begins around -0.015, and it undergoes a substantial decline to approximately -0.03, exhibiting a pronounced surge to marginally optimistic levels before experiencing a downturn just ahead of the event date. The CAR demonstrates a marginal decrease on the event date, consistently maintaining a negative trajectory. Following the event date, the CAR reflects a marked upward trajectory, transitioning into positive terrain and steadily rising to attain approximately 0.005 by the conclusion of the observed period. The event on May 26, 2022 yielded a varied impact on Netflix Inc's stock price. The cumulative abnormal returns displayed significant volatility prior to the event, indicative of market turbulence or other influential elements. The event date bore a slight adverse influence on the CAR, subsequently succeeded by a substantial surge in CAR post-event, signifying a favorable market response in the aftermath of the event. The continual upward trend subsequent to the event suggests a positive market perception, culminating in enhanced stock performance during the analyzed short-term period. The inclusion of NFTs in Netflix's

"Love, Death + Robots" on May 26, 2022, notably influenced the company's financial performance and market reception. This strategic initiative sought to captivate and engage viewers by integrating Non-Fungible Tokens (NFTs) into the series, augmenting the viewer experience and tapping into the burgeoning NFT market. The announcement likely elicited favorable market sentiment and amplified viewer engagement, potentially contributing positively to Netflix's financial performance and stock valuation.

FIGURE 9
CRYPTO MARKET DAILY HIGHLIGHTS – TESLA INC. SENDS THE MARKET SOUTH



Source : https://www.fxempire.com/forecasts/article/crypto-market-daily-highlights-tesla-inc-sends-the-market-south-1070685

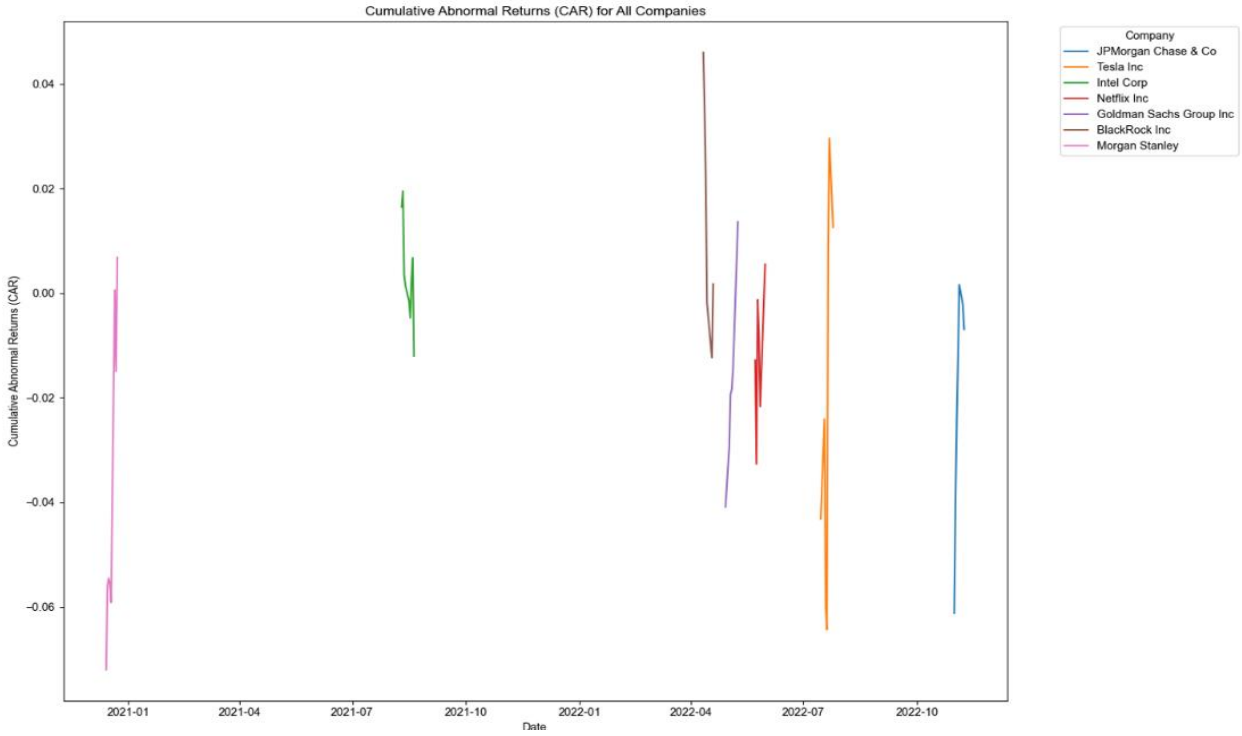
The chart titled "Cumulative Abnormal Returns (CAR) for Tesla Inc" depicts the cumulative abnormal returns for Tesla Inc around a specified event date, demarcated by a red dashed line.

The vertical red dashed line represents the event date, specifically July 20, 2022. This date carries significance as it marks the focal point around which abnormal returns are assessed. The blue line represents the cumulative abnormal returns - a measure of abnormal returns accumulated over the period surrounding the event date. Preceding the event date (July 20, 2022), the CAR exhibits fluctuations. It initiates at around -0.04, decreases to nearly -0.06, then experiences a slight increase prior to the event date, indicating negative abnormal returns with some volatility. The CAR demonstrates a marked incline on the event date, transitioning into positive territory. This denotes a substantial positive impact of the event on Tesla Inc's stock price. Subsequent to the event date, the CAR continues to rise, reaching a peak around 0.02, before displaying a marginal decline towards the end of the observed period. Despite this, it retains a positive stance, signifying an overall positive abnormal return. The July 20, 2022 occurrence notably influenced Tesla Inc.'s stock price, evident from the pronounced surge in cumulative abnormal returns immediately following the event. This indicates a favorable market response, leading to enhanced stock performance. Despite a slight decline towards the end, the sustained upward trajectory post-event reflects the continuation of positive sentiment in the short-term period analyzed, resulting in an overall positive abnormal return. The event on July 20, 2022, wherein Tesla announced the sale of 75% of its Bitcoin holdings, significantly impacted the company's earnings. This action generated a substantial market reaction, precipitating a

decline in the value of Bitcoin and affecting the broader cryptocurrency market. Furthermore, it likely influenced Tesla's financial performance, given the implications of the significant Bitcoin sale on their earnings report and market perception.

On July 20, 2022, Tesla declared the sale of 75% of its Bitcoin holdings, amounting to $936 million. This strategic move was driven by the necessity to bolster liquidity amid economic uncertainty and market volatility, exerting a noteworthy impact on Tesla's financial performance and market reactions. The distribution below can help understand the news's general tone and its potential impact on market behavior or investor sentiment. By examining trends in the automotive industry, individuals such as investors, analysts, and researchers can acquire profound insights into market dynamics, sentiment, and the relative performance of companies over time. The range of reactions underscores the significance of considering individual company contexts when evaluating the effects of market events.

FIGURE 10
ANALYSIS AND INTERPRETATION OF THE CUMULATIVE ABNORMAL RETURNS (CAR) CHART WITH BERT FRAMEWORK FOR SENTIMENT ANALYSIS



Source: Compiled by Author

The provided chart depicts the Cumulative Abnormal Returns (CAR) for various companies during specific event periods. CAR is a metric used to evaluate the impact of events on stock prices by aggregating the abnormal returns (returns that deviate from the expected market return) over a period. The chart highlights significant variations in CAR across different companies and time periods. These variations indicate that specific events such as earnings announcements, product launches, regulatory changes, or market-wide economic events have notable effects on stock returns. Positive spikes in CAR suggest events that were positively received by the market, leading to increased investor confidence and stock prices. Conversely, negative spikes indicate events that were viewed negatively, resulting in decreased investor confidence and stock prices. The trends in CAR provide valuable insights into market sentiment towards each company during the event periods. Companies such as Netflix Inc. and Tesla Inc. demonstrate periods of positive CAR, indicating that the market reacted optimistically to events associated with these

companies. This could be due to favorable earnings reports, successful product launches, or positive regulatory news. Companies like JPMorgan Chase & Co. and Morgan Stanley exhibit periods of negative CAR, signaling that the market reacted pessimistically to certain events. This could be attributed to poor earnings performance, unfavorable regulatory news, or broader market concerns.

Analyzing Cumulative Abnormal Returns (CAR) is vital for investors when making informed investment decisions. By examining historical CAR data, investors can predict the potential impact of upcoming events on stock prices. For instance, investors may consider this information when making investment decisions during the earnings season if a company has historically demonstrated positive CAR following earnings announcements. Additionally, by reviewing periods of negative CAR, investors can identify events that have historically posed risks to certain companies and adjust their portfolios accordingly to minimize potential losses. The CAR chart facilitates the assessment of the relative performance of different companies in response to market events. Companies with consistently positive CAR trends are often perceived as more resilient or favorably viewed by the market. For example, companies such as Netflix Inc. and Tesla Inc., which demonstrate sustained periods of positive CAR, might be considered more resilient to market fluctuations due to strong fundamentals, innovative products, or effective management. Conversely, companies like JPMorgan Chase & Co. and Morgan Stanley, which exhibit negative CAR trends, might be viewed as more vulnerable to market events due to exposure to market risks, regulatory challenges, or operational issues. The chart effectively illustrates the significant role that specific events play in influencing stock returns. This aligns with the Efficient Market Hypothesis (EMH), which suggests that stock prices reflect all available information. The visible changes in CAR are empirical evidence of how new information (events) is quickly incorporated into stock prices, impacting investor behavior and market sentiment.

CONCLUSION

In this pioneering study, I explore the transformative impact of cryptocurrency news on the earnings of publicly traded companies by leveraging cutting-edge Generative AI (GenAI) models, enhanced with the BERT framework for sentiment analysis. By integrating comprehensive Financial Modeling Prep API data, I employ a rigorous event study methodology to assess how crypto news influences stock performance. My analysis meticulously distinguishes between material and immaterial impacts, and further categorizes news as intentional or unintentional based on its origin and context. My findings demonstrate that both positive and negative crypto news significantly affect companies' cumulative abnormal returns (CAR), with material impacts particularly evident in firms deeply involved in crypto activities. Notably, intentional news, such as official company announcements, exerts a more substantial influence than unintentional market reactions. This distinction is crucial for understanding how information propagates and affects market behavior. For practitioners in financial services, investment management, and corporate communication, this study provides actionable insights into managing market perceptions and investor relations. By understanding the differential impacts of news, companies can strategically navigate communication to mitigate potential negative reactions and capitalize on positive news to enhance market value. Additionally, the methodology presented here offers financial analysts a robust tool to refine their predictive models, leading to improved investment decisions and risk management strategies.

For academics and professionals, the CAR chart is a valuable tool for conducting event studies and understanding market dynamics. It provides a quantitative measure to analyze the impact of events on stock performance, offering insights that can inform academic research and professional investment strategies. Portfolio managers can use CAR analysis to identify stocks likely to benefit from positive events and to avoid or hedge against stocks that might be adversely affected by negative events. This strategic approach can enhance portfolio performance and risk management. Regulators and policymakers can also benefit from CAR analysis by understanding how regulatory changes impact market sentiment and stock performance. By analyzing periods of significant CAR shifts, policymakers can assess the market’s reaction to regulatory actions and make data-driven decisions to enhance market stability and investor confidence. For corporate executives, the CAR chart provides insights into how the market perceives their company’s

actions and decisions. Positive CAR trends following corporate announcements can reinforce the effectiveness of the company's strategy, while negative trends can highlight areas that require improvement. This feedback loop is crucial for aligning corporate actions with investor expectations and market dynamics. The Cumulative Abnormal Returns (CAR) chart is a powerful tool for analyzing the impact of events on stock performance. It offers a clear visualization of how stocks of different companies react to events, providing valuable insights for investors, policymakers, corporate executives, and academics. Understanding these trends assists in making informed decisions, managing risks, and devising strategies that align with market sentiments and dynamics.

GenAI Application

Upon request, our system can be integrated with any virtual environment to ensure optimum performance and facilitate daily monitoring of cryptocurrency behavior.

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