**Non-Fruitful Token?**

**Market Reactions to NFT Disclosures**

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**Abstract**

In this paper, I measure the market reaction to corporate disclosures submitted to the Securities and Exchange Commission )SEC) that contain the expression “NFT” or “Non-Fungible Token.” I follow the existing literature in differentiating between “Clear” disclosures, which refer to specific trading or sales activity related to NFTs, and “Vague” disclosures, which refer to vague future intentions or plans to enter the NFT field. Both Clear and Vague disclosures are characterized by similar behavior in terms of their effect on the cumulative average abnormal return (CAAR), which is non-significant close to the disclosure but constantly and significantly negative over the subsequent days. Companies with positive cash flow display positive CAAR in the days surrounding the disclosure, but CAAR deteriorates from day 4 onwards. By segmenting the sample according to various characteristics, I identify some differences in CAAR behavior around and after the disclosure. Overall, it appears that the market does not support corporate involvement in NFTs. Companies that are involved in, or plan to be involved in NFTs are viewed negatively, as reflected in the consistently negative CAAR over the 30 days following the publication.

**JEL Classifications**: G12, G15

**Keywords**: NFT, non-fungible token, SEC disclosures, stock returns, abnormal return, cumulative average abnormal return, market model, marked adjusted model

1. **Introduction** 
   1. **NFTs and their Evolution**

Non-fungible tokens, most commonly referred to as NFTs, came to prominence in 2017 with the launch of Crypto Kitties, a blockchain[[1]](#footnote-1)-based game in which players can collect and breed virtual cats. Each CryptoKitty was represented by a unique NFT, which could be bought, sold, and traded on the Ethereum blockchain. Since then, NFTs have expanded beyond the world of gaming and into other industries such as art, music, and sports. NFTs enable creators to verify the ownership and authenticity of their digital assets (including digital images, video and audio files, characters and objects in computer games, and more), making it possible to sell them as unique, identifiable assets. Ownership is recorded using smart contracts on a blockchain. This has opened new revenue streams for creators and created a new market for collectors who are interested in owning unique digital assets.

In early 2021, NFTs gained popularity with several high-profile sales, including a digital artwork by Beeple that sold for $69.3 million at Christie’s. The increased attention on NFTs has led to more companies and individuals exploring their potential uses, sparking a debate about the value of digital ownership and the future of the art and collectibles markets. As of 2023, there are approximately fifty NFT marketplaces, such as OpenSe, one of the most popular among them. According to Laycock (2022), in the United States, 6.6 million people (3% of the population) own an NFT. India leads in NFT adoption rates, with 7% of the population owning these assets. At the other end of the spectrum, only 1% of Germans own an NFT.

* 1. **Market Size and Anticipated Growth**

According to the DappRadar industry report (2022), the NFT market in 2022 generated a value of approximately $24.7 billion in organic trading volume across various blockchain platforms and marketplaces. Trades suspected of being wash trades or manipulated transactions are excluded from this figures, which represents a slight decline compared to 2021. In that year, trading volume in NFTs surged to an estimated $25.1 billion as tokenized collectibles gained wider recognition and became more than a niche interest.

It seems that the NFT market followed a similar trajectory to the cryptocurrency market, which witnessed significant losses throughout 2022 with the collapse in May of that year of the Terra network’s LUNA and UST, as well as the collapse of the crypto exchange FTX in November. According to the DappRadar industry report (2022), there were about 101 million NFT trades during 2022, compared to about 58.6 million NFT trades in 2021. While the number of NFT trades increased over this period, the average value of the trades fell.

Forecasts regarding the growth of the NFT market differ between research groups producing different reports, but they all predict double-digit annual growth in the coming years. For example, BCC Research (2022) estimates an annual growth rate of 27.3% until 2027, with the value of the NFT market reaching over USD 100 billion in 2027; Grand View Research (2022) forecasts that the value of the global NFT market will reach USD 211.72 billion by 2030, growing at a compound annual growth rate (CAGR) of 34.2% from 2023 to 2030; and EMERGEN Research (2022) forecasts a CAGR of 34.2% through 2030.

* 1. **(Lack of) Regulation**

NFT trading operates within a regulatory grey zone, lacking clear guidelines and oversight. Unlike in traditional financial markets, where wash trading is explicitly prohibited, the crypto market currently lacks any such regulatory restrictions. This absence of regulation allows individuals to artificially inflate the value of specific NFT collections by engaging in activities such as opening multiple crypto wallets and conducting transactions between them. Hildobby (2022) characterizes the situation as follows.

The NFT space is quickly evolving and maturing. In 2022 it became ever more competitive, and it has become obvious that capturing trade volume market share is a top priority for platforms. Well-intentioned schemes to incentivize usage quickly emerged as a way to pull ahead in the race to attract this volume and become the most successful marketplace. A byproduct of this has been the rise of wash trading, which is still in a legal gray area and distorts key metrics used by analysts to measure usage and performance. Many widely quoted statistics have therefore been misleading at best, painting a picture of organic usage which hasn’t perfectly matched reality. (Hildobby, 2022, p. xx).

According to Hildobby, over USD 30 billion of NFT trading volume in 2022 resulted from wash trading. The practice peaked in January 2022, when more than 80% of trading volume was attributed to wash trading, accounting for 58% of the entire year’s trading volume. These unresolved issues, such as wash trading and the lack of regulation, highlight the challenges and concerns surrounding NFT trading practices.

Radman (2023) suggests that the true number of wash trading transactions is likely to be even higher than this, noting that the Hildobby review does not include groups of fraudulent actors who artificially inflated the prices of certain NFT projects on Discord[[2]](#footnote-2) or Reddit.[[3]](#footnote-3) These findings regarding the large percentage of wash trades are particularly concerning for investors in the stock market, who may be influenced by news of large trading volumes in NFTs, deceptively inflated in wash trading, when making investment decisions.

China was the first country to take a clear position against the crypto market and its derivatives by imposing a number of regulations banning cryptocurrency transactions and mining activities. In May 2021, China’s State Council prohibited financial institutions from engaging in any crypto transactions, mining, or trading. It cited concerns about the environmental impact of cryptocurrency mining, which requires vast amounts of electricity, as well as apprehensions about the use of cryptocurrencies for illegal activities such as money laundering and tax evasion. China banned all domestic crypto mining in June, 2021 and outlawed cryptocurrencies in September of that year. The ban on cryptocurrency mining in China has had a significant impact on the global cryptocurrency market, as China had been one of the largest producers of Bitcoin and other cryptocurrencies. In addition, because NFTs are often bought and sold using cryptocurrencies, China’s restrictions have made it difficult for Chinese citizens to engage in NFT transactions.

* 1. **Research Rationale**

The future of NFTs is intriguing and is driven by opposing factors. On one hand, the growth of platforms dedicated to creating and minting NFTs, as well as secondary marketplaces, hints at a promising trajectory. As discussed above, forecasts project double-digit annual growth rates in the NFT industry.

However, several factors could potentially impede the market’s expansion. Recent discoveries concerning wash trading within the NFT market have raised concerns and highlighted the need for increased transparency. This is in addition to the introduction of new regulations in China described above which can significantly affect the market.

Considering that the NFT market is characterized by substantial uncertainty, with no prevailing consensus regarding whether it will ultimately prosper or collapse, I sought to explore the reaction of financial markets to corporate disclosures regarding their involvement in NFT trading to ascertain the effect of such activity on their market valuations. I follow recent literature that explores the reaction of financial markets to corporate involvement in new and promising technologies. Cheng et al. (2019), Cahill et al. (2020) and Klöckner et al. (2022), who analyze the contribution of the novel blockchain technology to company value, and Aharon et al. (2022), explore the market reaction to corporate involvement in the virtual world of the metaverse. To the best of my knowledge, this paper is the first to examine the market reaction to NFT disclosures.

By examining the reaction of stock prices to disclosures submitted to the Securities and Exchange Commission (SEC) that contain the expression “NFT” or “Non-Fungible Token,” I seek to provide insights into the potential future of NFT trading and shed light on the potential risks and opportunities associated with investing in the NFT market.

* 1. **Research Method and Overview**

I segmented the sample to analyze the market reaction in terms of various factors such as the characteristics of the disclosure and disclosing company. Disclosure characteristics were analyzed in two ways. First, in line with Cheng et al. (2019), Cahill et al. (2020), Klöckner et al. (2022) and Aharon et al. (2022), I classified disclosures according to their content as “Vague” (announcements of speculative plans to adopt this technology in the future) or “Clear” (announcements stating existing specific involvement in NFTs). Second, I identified companies that focus on the creation and sale of NFTS and that have a long-term approach, by, for example, creating a marketplace for NFTs or a similar platform. Regarding corporate characteristics, I explored potentially relevant factors, such as cash flow, leading versus lagging companies in the industry, and the location of the corporate headquarters, among other factors. Although there are significant differences between the behavior of different sub-samples, as detailed below, the overall picture indicates a negative price reaction following NFT disclosures, with the entire sample experiencing a negative cumulative average abnormal return (CAAR) of -4.93% (t=3.69) in the [2,20] time window.

My findings indicate that, for the time being, the market does not believe that involvement in NFTs is beneficial and “punishes” companies that are engaged, or plan to engage, in NFT-related activities by devaluing their stock prices, which leads to a negative CAAR. Will this perception of NFTs continue in the future? Only time will tell.

The remainder of the paper is organized as follows. In Section 2, I review the relevant literature; in Section 3, I describe the sample construction and the data sources; in Section 4, I describe the methodology; in Section 5, I report the main findings; and in Section 6, I summarize the results.

1. **Literature Review**

Together with media reports, the disclosure of information by companies plays a crucial role in shaping investors’ perceptions and influencing stock prices. In this paper, I present what is, to my knowledge, the first effort to examine the response of stock prices to NFT-related corporate disclosures. I conducted this study using a similar methodology to related studies that explore the reaction of stock markets to companies’ disclosures about their involvement in new and promising technologies. These studies include those by Cheng et al. (2019), Cahill et al. (2020), Yen and Wang (2021) and Klöckner et al. (2022), which explore the stock market reaction to disclosures related to blockchain and/or cryptocurrencies. I also refer to a study conducted by Aharon et al. (2022), who explore the market reaction to companies’ involvement in the virtual world of the metaverse. Below is a chronological overview of some of this research.

Cheng et al. (2019) extracted 82 blockchain-related 8-K disclosures and categorized them into “speculative“ (vague plans) and “existing” (actual products). They found that investors react positively to “speculative” news in the seven-day event window with abnormal returns of 7.5%, with a reverse reaction in the 30 days following the disclosure. They argue that this implies an overreaction by investors to “speculative” disclosures. However, there is almost no market reaction to “existing” disclosures. The reaction is stronger when Bitcoin returns are more positive. However, the effect disappears during market downturns.

Cahill et al. (2020) used a global sample of 713 companies between 2016 and 2018 to explore the market reaction to blockchain-related disclosures. The authors found that corporate disclosures related to blockchain positively affect companies’ stock prices by 5% on the announcement day, indicating a favorable market response. Additionally, the study reveals that the market response is influenced by factors such as company size, the level of prior involvement in blockchain technology and trends in the price of Bitcoin. These findings suggest that companies can benefit from signaling their interest in blockchain technology to investors and stakeholders.

Yen and Wang (2021) examine the impact of 10-K disclosures related to blockchain technology and cryptocurrencies on stock prices. The authors find that disclosures about blockchain technology positively affect stock prices, while disclosures concerning cryptocurrencies had no effect on stock prices. The authors suggest that “blockchain disclosures could be more related to a company’s involvement in blockchain technology. Relatively, cryptocurrency disclosures could be more related to a company’s investment strategy (e.g., investment in cryptocurrencies) or payment solutions (e.g., accepting cryptocurrencies)” (Yen and Wang, 2021, p.xx). Their findings also indicate that the stock price is influenced by factors such as book value, industry classification, and financial performance.

Klöckner et al. (2022) examine the impact of blockchain-related announcements by 175 companies on their market value between 2015 and 2019. Their findings reveal that only 59% of the sample experienced positive abnormal returns on the announcement day, with a positive significant CAAR of 0.3%. There was no significant return for the two days before and two days after the announcement day. They found that the announcement of blockchain applications used to trace physical objects or to share sensitive information is associated with a decrease in abnormal returns, while involvement with an external information technology service provider in a blockchain project is associated with a positive stock market reaction.

Regarding factors affecting the popularity of NTFs, Pinto-Gutiérrez et al. (2022) examined the factors that attracted attention to NFTs between December 2017 and July 2021 and found that Bitcoin and Etherium[[4]](#footnote-5) returns significantly predicted interest in NFTs during the following week, as measured by Google search queries. They concluded that the remarkable increase in major cryptocurrencies may explain the hype around NFTs. Luo et al. (2022) found a positive relationship between the number of tweets mentioning NFTs in social media communities and the price of more than half of the 19 top genuine projects, compared to insufficient causality for most of the copycat projects. Most recently, the research of von Wachter et al. (2022) addresses fraudulent trading activity in the context of blockchain-based assets and examines wash trading behavior in the NFT market. Their study covers the period from January 2018 to mid-November 2021 and focuses on data from the 52 largest NFT collections by volume. Their findings indicate that 3.93% of the addresses,[[5]](#footnote-6) associated with a total of 2.04% of sales transactions, trigger suspicions of market abuse.

1. **Sample Construction**

I compiled a sample of SEC filings (forms 6-K, 8-K, 10-K, 10-Q, and 20-F) that include the terms “NFT” or “Non-Fungible Token” using the EDGAR system available on the SEC website. I collected data spanning the period from 2013 to August 2022. Although blockchain NFTs have existed only since the first NFT—*Quantum—*was minted in 2014, I searched for disclosures starting in 2013 to remove any risk of ignoring previous disclosures. This resulted in a sample of 1916 disclosures, beginning in March 2021. To refine the sample, I manually checked and read each result and employed a screening procedure outlined in Appendix A. I excluded disclosures submitted by trusts, funds, ETFs, OTC companies and private companies. I also filtered out disclosures in which the NFT is used as an abbreviation of other terms such as “non-flow-through,” “no further treatment,” “non-company transmission,” and so on. Furthermore, I excluded disclosures in which the term “NFT” was referenced only in connection with the career experience of corporate officers in the NFT field and disclosures containing only a general mention of the term NFT. Lastly, I removed duplicate disclosures that were submitted multiple times within the same day. The remaining disclosures either indicate the company’s intention or plan for involvement with NFTs or disclose active involvement with NFTs through their sale or creation, or the management of trading marketplace platforms. Following this screening process, a final sample of 331 disclosures from 109 companies remained. The stock daily prices and data from the financial reports were extracted from Yahoo Finance.

I constructed several sub-samples from the original sample and also categorized the sample into groups based on the disclosure content to examine the consistency of results across different sub-samples and groups.

* 1. **Sub-samples**

To construct the sub-samples, I applied the following exclusions and classifications:

*Full excluding financial reports*: I excluded disclosures where the NFT was mentioned as part of an overlapping financial report. This resulted in a sub-sample consisting of disclosures that were not included in financial reports.

*Full excluding repetitive a range of five days*: If multiple disclosures were sent within a 5-day time range, I excluded the later ones to avoid repetition. This led to a sub-sample that excluded duplicate disclosures.

*Full excluding price < USD 1*: For disclosures where the share price was less than USD 1 within the time window of [-10,9], I created a sub-sample excluding such cases.

* 1. **Segmentation by Disclosure Content** 
     1. **Vague and Clear**

In line with the works of Cahill et al. (2020), Cheng et al. (2019), and Aharon et al. (2022), I categorized the disclosures into “Clear” or “Vague” based on the content of the disclosure. “Clear” disclosures refer to explicit information about selling NFTs or available services, such as operating a marketplace, minting capabilities, or any other NFT-related platform. They also include investments in companies through mergers and acquisitions. “Vague” disclosures encompass ambiguous statements about potential future opportunities and statements regarding exploring options, allocating resources for research and development, or general intentions. Examples of “Clear” and “Vague” disclosures can be found in **Appendix B**.

* + 1. **NFT Sales vs. Platform**

I distinguished between companies focusing on the one-time *creation and sale* of NFT collections and companies that are considering a long-term approach to NFTs and are therefore developing and maintaining platforms for NFT minting, trading, or management. Examples of disclosures concerning NFT creation and sales and those concerning NFT platforms are presented in **Appendix C.**

* + 1. **Disclosures With and Without Warnings**

Lastly, I distinguished between disclosures that explicitly include warnings or present uncertainties directly associated with NFTs and disclosures that lack such warnings or messages. The regulatory landscape for blockchain technologies, NFTs, cryptocurrencies, and digital assets is uncertain. Undoubtedly, these uncertainties and new regulations or policies pose risks to the NFT market’s development and value, particularly for those companies heavily reliant on cryptocurrencies, and could have a substantial adverse impact on their future. Other risks may include shifts in consumer preferences and the failure to implement innovations to maintain the competitiveness of products and services.

**Table 1: Sample Characteristics**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Panel A: Disclosure Type** | | | | |
| **Type** | **2021** | | **2022** | **Total** |
| Clear Disclosures | 70 | | 119 | 189 |
| Vague Disclosures | 50 | | 92 | 142 |
| **Total Disclosures** | **120** | | **211** | **331** |
| Platform | 88 | | 130 | 218 |
| Creations & Sales of NFTs | 32 | | 78 | 110 |
| **Total Disclosures** | **120** | | **208** | **328** |
| Disclosures without Warning | 112 | | 178 | 290 |
| Disclosures with Warning | 8 | | 33 | 41 |
| **Total Disclosures** | **120** | | **211** | **331** |
| **Panel B: Companies Headquarters and Industry Segmentation** | | | | |
| **Headquarters** | |  | **Sector** | |
| USA | 75 |  | Communication Services | 30 |
| China | 20 |  | Technology | 29 |
| Europe | 9 |  | Consumer Cyclical | 23 |
| Cayman Islands | 1 |  | Financial Services | 16 |
| Singapore | 1 |  | Industrials | 7 |
| Malaysia | 1 |  | Consumer Defensive | 2 |
| Korea | 1 |  | Basic Materials | 1 |
| Australia | 1 |  | Healthcare | 1 |
| **Total** | **109** |  | Total | **109** |

Note: Panel A lists the number of *Clear* and *Vague* disclosures, *platform* and *creation & sales* disclosures, and disclosures with and without warnings. The figures for 2022 are up to August 2022, as the construction of the sample ended in August 2022. Panel B shows the number of companies by headquarter locations and sector. There are a total of 331 disclosures from 109 companies in 8 sectors. Some disclosures did not fit into either of the “platform” or “creation & sales of NFTs” categories, such as those dealing with the organization of conferences and clients who deal with NFTs; therefore, the total of these two categories does not add up to 331.

**Table 2: Descriptive Statistics**

|  |  |  |  |
| --- | --- | --- | --- |
| **Company Characteristics** | **Mean** | **Median** | **Std. Dev.** |
| Total Assets (thousands of USD) | 3,800,922 | 134,461 | 19,023,417 |
| Market Capitalization (thousands of USD) | 5,043,157 | 162,375 | 19,254,168 |
| Share Price at t=-30 | 24.07 | 7.79 | 48.54 |
| Free Cash Flow (thousands of USD) | 196,212 | -4,538 | 1,341,241 |
| Company Sales Growth | 18.62% | 9.51% | 50.67% |
| Book to Market | 15.58 | 0.80 | 52.64 |
| Leverage | 2.03 | 0.88 | 2.93 |

*Notes*: The table presents financial descriptive statistics for the companies in the sample. Total assets and Free cash flow are for the most recent year before the announcement. Drawing on Cahill et al. (2020), market capitalization is calculated as the number of shares from the most recent quarter prior to the announcement, multiplied by the share price one month prior to the announcement. Following Klöckner et al. (2022), I calculate company growth as the annual percentage change in total sales in the fiscal year prior to the announcement. The book-to-market ratio is the ratio of book value per share to the stock closing price at the announcement date, and leverage ratio is the ratio of total debt to total equity in the fiscal year prior to the announcement.

**Panel A in Table 1** shows the types of disclosures that compose the sample. Of the total 331 disclosures, 189 are classified as Clear while 142 are Vague. A total of 218 disclosures are classified as a platform while only 110 deal with creation & sales of NFTs. During 2021, 120 disclosures were submitted, but the number of disclosures submitted between January and August 2022 reached 211. This is a 2.8-fold increase on an annual basis, which highlights the significant growth and the increasing interest of public companies in the field of NFTs. Only 41 out of 331 disclosures, accounting for 12%, addressed the inherent risks within the NFT field and contained explicit warnings. **Panel B in Table 1** shows that most of the companies in the sample (69%) are headquartered in the United States and 18% in China. Most companies (nearly 55%) are in the communication services or technology industries. Together with the consumer cyclical and financial services industries, these account for 99% of the sample.

**Table 2** displays financial descriptive statistics of the companies included in the sample. The average company has total assets of USD 3,800,922 thousand and a market capitalization of USD 5,043,157 thousand USD. The average (median) share price is USD 24.07 (USD 7.79) and the average (median) financial leverage is 2.03 (0.88). The standard deviation of the examined variables and a comparison of median and mean values suggest that the sample consisted of a wide variety of companies.

1. **Methodology**

For this study, I utilized event study methodology to investigate the effect of NFT disclosures on stock prices around the disclosure day (t=0). To establish the event date (t = 0), I compared the filing date when the form was submitted to the SEC and the date mentioned in the disclosure itself. If the date on the form was earlier and a matching press release was published on the company’s website on that same date, I considered the earlier date as the event date. This is because it signifies the initial public availability of the information. However, if there is no corresponding press release on the company’s website, the filing date was considered the event date.

For each company’s stock “i” on day t, I estimated the abnormal return by subtracting the expected return according to the market model from the real return, as described in Eq. (1) below:

(1)

where is the log daily return of the company stock i on day t, is the log daily return of the S&P 500 index for day t, and are regression estimates for the true parameters using data from 252 historical trading days ending 30 days before the event date. For each stock, I aggregated the abnormal returns for selected time windows [T1, T2] around the event to obtain the cumulative abnormal return (). That is,

(2)

The cumulative average abnormal return () across a subsample of n companies is calculated as follows:

(3)

The cross-sector standard deviation t-test is expressed in Eq. 4.

(4)

where is estimated as follows:

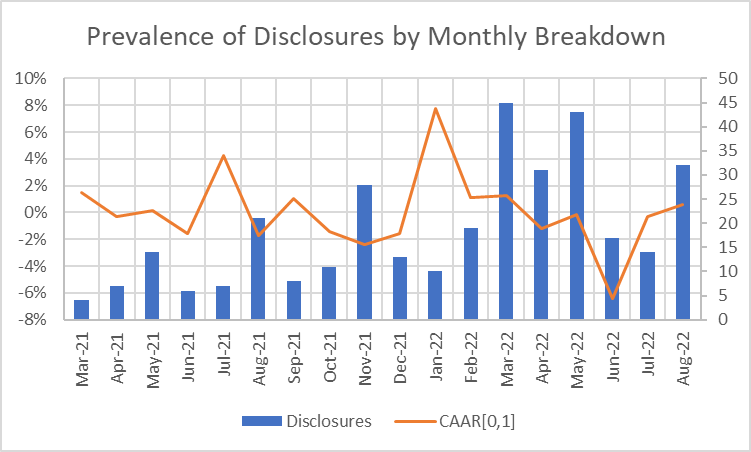
(5)

I computed CAAR using the CAPM and the adjusted market model where is set to 0 and is set to 1.

1. **Empirical Results**

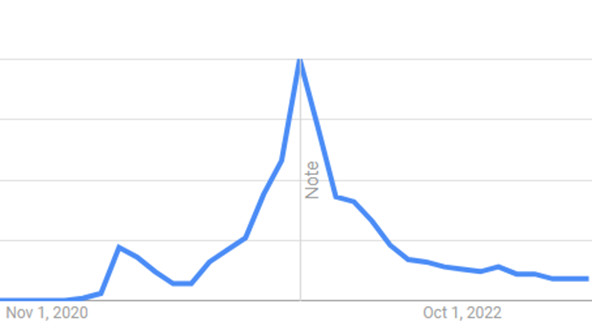
I open the analysis by pointing out a prominent trend observed during and after the sample period concerning the interest in NFTs. **Figure 1** shows the prevalence of monthly disclosures during the sample period along with parallel CARR in the [0,1] time window. The number of corporate NFT-related disclosures reached a peak in March 2022 with 45 disclosures. From then onwards a decline began, although this decline was not monotonic. **Figure 2** shows public interest in NFT as reflected in Google searches. It seems very clear that public interest peaked in January 2022 with 1,447,774 searches. By April 2023, a year after the end of my sample period, this number had declined to less than 140,000. These figures demonstrate the gradual loss of public interest in NFTs.

**Figure 1: The Prevalence of NFT Disclosures.**



Note: Following Aharon et al. (2022), the graph above displays the monthly prevalence of NFT disclosures and the corresponding CAAR [0,1].

**Figure 2: Google Searches of “NFT.”**

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Note: this figure indicates worldwide interest in NFTs according to Google Trends for “What is an NFT?” Interest peaked in January 2022 with 1,447,774 searches then declined sharply to less than 140,000 by April 2023.

**Figure 3: Market Response to NFT disclosures: Sub-Samples and Content Segmentation**

**Panel A:**

**Panel B:**

**Panel C:**

**Panel D:**

Note: These figures present CAAR for the [-3,30] time window around the disclosure day, as estimated by the market model. Panel A shows CAAR for various sub-samples and Panels B to D show CAAR for groups classified by disclosure content.

**Table 3: Market Response to NFT Disclosures – Market Models – Sub-Samples and Content Segmentation**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Panel A: CAAR Market Model** | | | | | **Panel B: CAAR Market Adjusted Model** | | | |
|  | **[-3, -1]** | **[0,1]** | **[2,6]** | **[2,20]** | **[-3, -1]** | **[0,1]** | **[2,6]** | **[2,20]** |
| Full sample | -0.24%  (-0.36) | -0.26%  (-0.40) | -1.96%  (-2.18\*\*) | -4.93%  (-3.69\*\*\*) | -0.99%  (-1.48) | -0.41%  (-0.63) | -2.99%  (-3.32\*\*\*) | -8.89%  (-7.14\*\*\*) |
| N | 331 | 331 | 331 | 331 | 331 | 331 | 331 | 331 |
| Full excluding repetitive 5-day range | -0.12%  (-0.17) | -0.27%  (-0.40) | -2.10%  (-2.23\*\*) | -5.02%  (-3.76\*\*\*) | -0.89%  (-1.27) | -0.43%  (-0.64) | -3.05%  (-3.25\*\*\*) | -9.03%  (-7.06\*\*\*) |
| N | 309 | 309 | 309 | 309 | 309 | 309 | 309 | 309 |
| Full excluding price<$1 | -0.83%  (-1.24) | -0.32%  (-0.51) | -1.95%  (-2.09\*\*) | -4.93%  (-3.64\*\*\*) | -1.52%  (-2.24\*\*) | -0.42%  (-0.67) | -2.89%  (-3.10\*\*\*) | -8.62%  (-6.74\*\*\*) |
| N | 305 | 305 | 305 | 305 | 305 | 305 | 305 | 305 |
| Full excluding financial reports | -0.17%  (-0.14) | 0.50%  (0.46) | -3.27%  (-2.10\*\*) | -9.35%  (-4.69\*\*\*) | -0.63%  (-0.52) | 0.41%  (0.38) | -3.70%  (-2.37\*\*) | -11.57%  (-6.26\*\*\*) |
| N | 133 | 133 | 133 | 133 | 133 | 133 | 133 | 133 |
| Clear plans | -0.15%  (-0.18) | -0.47%  (-0.57) | -2.26%  (-1.82\*) | -4.90%  (-2.96\*\*\*) | -0.88%  (-1.07) | -0.61%  (-0.73) | -3.59%  (-2.87\*\*\*) | -9.51%  (-6.24\*\*\*) |
| N | 189 | 189 | 189 | 189 | 189 | 189 | 189 | 189 |
| Vague plans | -0.37%  (-0.33) | 0.02%  (0.02) | -1.57%  (-1.22) | -4.97%  (-2.25\*\*) | -1.14%  (-1.03) | -0.15%  (-0.14) | -2.19%  (-1.72\*) | -8.06%  (-3.89\*\*\*) |
| N | 142 | 142 | 142 | 142 | 142 | 142 | 142 | 142 |
| Platform | 0.42% (0.57) | -0.85% (-1.15) | -1.11%  (-1.07) | -3.80%  (-2.28\*\*) | -0.54% (-0.71) | -0.98% (-1.31) | -2.49%  (-2.36\*\*) | -8.19%  (-5.2\*\*\*) |
| N | 218 | 218 | 218 | 218 | 218 | 218 | 218 | 218 |
| Creation & Sales of NFT | -1.52%  (-1.12) | 0.98% (0.80) | -3.72%  (-2.13\*\*) | -7.51%  (-3.33\*\*\*) | -1.88% (-1.38) | 0.79% (0.63) | -4.04%  (-2.35\*\*) | -10.60%  (-5.21\*\*\*) |
| N | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 |
| Disclosures without warning | 0.19%  (0.27) | 0.04%  (0.05) | -2.20%  (-2.20\*\*) | -5.88%  (-4.19\*\*\*) | -0.51%  (-0.72) | -0.10%  (-0.14) | -3.16%  (-3.18\*\*\*) | -9.72%  (-7.55\*\*\*) |
| N | 290 | 290 | 290 | 290 | 290 | 290 | 290 | 290 |
| Disclosures with Warning | -3.25%  (-1.59) | -2.32%  (-1.29) | -0.31%  (-0.18) | 1.78% (0.43) | -4.43%  (-2.09\*\*) | -2.62%  (-1.47) | -1.80%  (-0.99) | -3.00%  (-0.73) |
| N | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 |

Note: This Table presents CAAR for the entire sample, selected sub-samples and various sample segmentations based on the disclosure content. For a detailed explanation please refer to Section 3. CAAR was calculated for selected time windows around the event as estimated by both the Market Model and the Market Adjusted Model. The t-stats are in parentheses, and \*\*\*, \*\* and \* denote significance at the 1%, 5% and 10% levels, respectively, using two-tailed tests.

**Figure 3 and Table 3** refer to the same sub-samples and groups classified by the disclosure content and therefore should be read and understood as a set. **Figure 3** shows CAAR for the period [-3,30] days around the disclosure date and **Table 3** presents the market response for selected time windows around the event. **Panels A** and **B** in **Table 3** present CAAR calculated using the CAPM market model and adjusted market model, respectively, as a benchmark. Based on the similarity of the results, I will refer here only to **Panel A**.

**Figure 3a** shows CAAR for the full sample and three sub-sample classifications, as explained in section 3.1: full sample excluding repetitive 5-day ranges, full sample excluding companies whose share price was below $1, and full sample excluding financial reports. As can be seen from the graph and **Table 3**, **Panel A**, the full sample and its sub-samples exhibit similar behavior. There is no significant change in CAAR during days [0,1] with CAAR = -0.26 (t=-0.40) for the entire sample. However, CAAR starts to decrease on day 1 and the decrease continues over the next 30 days. The CAAR for the entire sample is -1.96% (t=-2.18) and -4.93% (t=-3.69) for [2,6] and [2, 20] time windows respectively. CAAR for the sub-sample without financial reports decreases somewhat faster and reaches -3.27% (t=-2.10) and -9.35% (t=-4.69) for [2,6] and [2, 20] time windows respectively. This result is not ambiguous: the market “punishes” companies that are involved in NFTs. This is evident in the significant negative CAAR in the days following the disclosure.

I now turn to the groups that were classified by the disclosure content. It seems that investors do not make a distinction between Clear and Vague disclosures, with the market reacting in a similar way to both, as presented in **Figure 3b** and **Table 3**. CAAR for Clear and Vague disclosures reach a low of -4.9% (t=-2.96) and -4.97% (t=2.25), respectively, in the [2,20] time window.

**Figure 3c** describes the evolution of CAAR for NFT sales disclosures, which are generally associated with one-off events, in contrast to platform disclosures, which indicate a longer-term engagement in NFTs. Both types of disclosures exhibit a significant CAAR decline through the 30 days after disclosure. The CAAR decline for platform disclosures is slower than for sales disclosures. It may be that investors assume that technology that was developed for a platform could later be used in tangential fields, and therefore the decrease in CAAR is more moderate. CAAR reaches a low of -3.80% (t=-2.28) for platform disclosures and -7.51% (t=-3.33) for sales disclosures during the [2,20]-days time window.

The market response to the 41 disclosures that contain warnings (12.4% of the sample) is volatile. It seems that the information about the warning is generally expected, as the market begins to respond at least 3 days before the disclosure, with a low of -6.64% (t=- 2.08) on the 4th day after the disclosure. The market then corrects this overreaction with a constant increase in CAAR until the 25th day when CAAR is 1.01% (t=0.17). CAAR then falls again, reaching a low of -9.23% (t=-1.91) on the 30th day after the disclosure. Disclosures without warning present a constant CAAR decline with -9.72% (t=-7.55) in the [2,20]-days time window, which is similar to the entire sample, see **Figure 3d.**

* 1. **Robustness Tests**

To check the robustness of the results, I recalculated CAAR according to the Fama-French three-factor model (Fama and French, 1993). The results are presented in **Table 4.** As can be seen from the table, the results are very similar to those obtained from the market model and the market adjusted model. The entire sample exhibits CAAR of -5.01% (t=-3.79) for the [2,20] time window. CAAR for the full sample excluding financial reports decreases faster than the entire sample, reaching a low of -9.10% (t=-4.40) in the [2,20] time window. Clear and Vague disclosures both demonstrate a similar decrease in CAAR with -4.67% (t=-2.78) and -5.47% (t=-2.58) respectively in the [2,20] time window. Disclosures of NFT sales exhibit a CAAR of -8.48% (t=-3.78) versus -3.41% (t=-2.08) for platform disclosures in the [2,20] time window. Disclosures without warnings show similar behavior to the entire sample, with a CAAR of -5.86% (t=-4.17), and disclosures that contain warnings exhibit a positive yet insignificant CAAR of 1.04% (t=0.28) in the [2,20]-days time window.

**Table 4: Market Response to NFT Disclosures – Fama-French Three-Factor Model – Sub-Samples and Content Segmentation**

**CAAR Fama-French Three-Factor Model**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **[-3, -1]** | **[0,1]** | **[2,6]** | **[2,20]** |
| Full sample | -0.11%  (-0.16) | -0.53%  (-0.84) | -1.76%  (-1.95\*) | -5.01%  (-3.79\*\*\*) |
| N | 331 | 331 | 331 | 331 |
| Full excluding repetitive 5-day range | 0.02%  (0.03) | -0.49%  (-0.75) | -1.91%  (-2.04\*\*) | -5.25%  (-3.85\*\*\*) |
| N | 309 | 309 | 309 | 309 |
| Full excluding price<$1 | -0.67%  (-1.04) | -0.61%  (-1.02) | -1.67%  (-1.78\*) | -4.8%  (-3.56\*\*\*) |
| N | 305 | 305 | 305 | 305 |
| Full excluding financial reports | 0.18%  (0.15) | 0.10%  (0.10) | -3.26%  (-2.07\*\*) | -9.1%  (-4.40\*\*\*) |
| N | 133 | 133 | 133 | 133 |
| Clear statement | -0.01%  (-0.01) | -0.59%  (-0.71) | -2.10%  (-1.67\*) | -4.67%  (-2.78\*\*\*) |
| N | 189 | 189 | 189 | 189 |
| Vague statement | -0.24%  (-0.23) | -0.46%  (-0.47) | -1.30%  (-1.03) | -5.47%  (-2.58\*\*) |
| N | 142 | 142 | 142 | 142 |
| Platform | 0.66%  (0.91) | -1.10%  (-1.51) | -0.66%  (-0.65) | -3.41%  (-2.08\*\*) |
| N | 218 | 218 | 218 | 218 |
| Creation & Sales of NFT | -1.60%  (-1.25) | 0.70%  (0.58) | -3.93%  (-2.22\*\*) | -8.48%  (-3.78\*\*\*) |
| N | 110 | 110 | 110 | 110 |
| Disclosures without warning | 0.38%  (0.56) | -0.25%  (-0.37) | -2.02%  (-2.02\*\*) | -5.86%  (-4.17\*\*\*) |
| N | 290 | 290 | 290 | 290 |
| Disclosures with Warning | -3.46%  (-1.72\*) | -2.52%  (-1.44) | 0.13%  (0.08) | 1.04%  (0.28) |
| N | 41 | 41 | 41 | 41 |

Note: This table presents CAAR for selected time windows around the event according to the Fama-French (1993) three-factor model. The t-stats are in parentheses, and \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively, using two-tailed tests. For the remaining definitions, please refer to **Table 3**.

* 1. **Further Examinations**

Corporate disclosures serve to bridge the information gap between companies and investors: they increase the transparency of the company and contribute to informed decisions by investors and promote fair and efficient market dynamics. These disclosures provide crucial insights into the company’s operations and prospects. However, the market’s reactions to corporate disclosures are influenced by a combination of factors such as the content of the disclosure, the accuracy of the information provided, and the company’s historical track record. While reading the disclosed information, investors consider both quantitative and qualitative factors when gauging the implications for the company’s future performance and their own investment strategies. I was motivated to examine some of these factors.

* + 1. **Financials and Timing**

Financial data enable investors to evaluate a company’s performance and potential profitability. In this context, I chose to study the market response to NFTs-related disclosures in terms of companies’ *market capitalization* and *free cash flow*. Large companies are likely to be more experienced, possess greater available resources, and have a larger, more diverse product portfolio. These factors are likely to enhance a large company’s potential for future success, as well as attract greater attention from investors. Cash flow is an essential indicator of a company’s financial health. Negative free cash flow can indicate potential financial risks and constraints for a company, whereas positive free cash flow suggests financial stability and the ability to invest or distribute profits.

Thus, I classified companies according to their market capitalization 30 days prior to the NFT disclosure, with two size groups: large-cap (“Big”) and small-cap (“Small”), composed of companies above and below the median size, respectively. I also classified them based on positive or negative free cash flow in the most recent quarter before the disclosure. I assumed that companies with strong financials receive a more positive response from investors, as investors perceive their ability to leverage NFTs more effectively.

*The timing of the disclosure* can also be a critical factor in investors’ response, hence I examined three aspects of timing that may have an impact on the market’s reaction.

1) If a company announces its NFT initiatives during a period of high market optimism or positive sentiment, the reaction may be more favorable. Conversely, if the disclosure occurs during a market downturn or negative sentiment, the reaction is likely to be more negative. The current sample includes two distinct periods: a bullish period from March to December 2021, followed by a bearish and more volatile period from December 2021 to August 2022, when my sample ends.

2) I explore whether the market response differs between disclosures made by Early Adopters – the “*leading*” companies that unveil their NFT information at the very beginning or during the initial wave of NFT disclosures – and disclosures made subsequently by companies considered to be “*lagging.*”

3) In 2021, the Chinese government implemented regulatory measures prohibiting the use of cryptocurrencies, as described in Section 1.3. In May 2021, the country prohibited financial institutions from engaging in any crypto transactions; in June 2021 it banned all domestic crypto mining; and finally outlawed cryptocurrencies outright in September. The Chinese government’s crackdown on cryptocurrency and NFTs caused a drop in prices and trading volumes for both. I chose the date May 21, when the regulatory measures began, as a cut-off point and calculated CAAR before and after the Chinese regulation starting date. It is worth noting that some experts believe that these regulatory measures may ultimately benefit the NFT market in the long run by encouraging more stable and regulated trading practices.

**Panel A:**

**Panel B:**

**Panel C:**

**Panel D:**

**Panel E:**

**Table 5: Market Response to NFT Disclosures – Financials and Timing**

**Panel A: Market Model**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **[-3, -1]** | **[0,1]** | **[2,6]** | **[2,20]** |
| Small Companies | 0.06%  (0.05) | -0.22%  (-0.23) | -1.03%  (-0.66) | -3.47%  (-1.72\*) |
| N | 163 | 163 | 163 | 163 |
| Big Companies | -0.65%  (-0.97) | -0.32%  (-0.36) | -2.92%  (-3.13\*\*\*) | -6.56%  (-3.63\*\*\*) |
| N | 162 | 162 | 162 | 162 |
| Negative Cash Flow | -0.78%  (-0.94) | -0.69%  (-0.93) | -2.23%  (-2.04\*\*) | -4.70%  (-2.98\*\*\*) |
| N | 257 | 257 | 257 | 257 |
| Positive Cash Flow | 1.61%  (2.01\*\*) | 1.25%  (1.03) | -1.03%  (-0.79) | -5.73%  (-2.39\*\*) |
| N | 74 | 74 | 74 | 74 |
| Bull Market Period | -1.18%  (-1.5) | -0.87%  (-0.93) | -2.65%  (-1.86\*) | -11.8%  (-5.04\*\*\*) |
| N | 118 | 118 | 118 | 118 |
| Bear Market Period | 0.28%  (0.3) | 0.09%  (0.1) | -1.58%  (-1.37) | -1.12%  (-0.72) |
| N | 231 | 231 | 231 | 231 |
| Lagging | -0.16%  (-0.14) | -0.64%  (-0.69) | -0.98%  (-0.72) | -0.26%  (-0.15) |
| N | 166 | 166 | 166 | 166 |
| Leading | -0.33%  (-0.45) | 0.14%  (0.15) | -2.95%  (-2.50\*\*) | -9.63%  (-4.89\*\*\*) |
| N | 165 | 165 | 165 | 165 |
| After the Chinese ban | 0.05%  (0.07) | -0.31%  (-0.46) | -1.75%  (-1.85\*) | -4.38%  (-3.16\*\*\*) |
| N | 308 | 308 | 308 | 308 |
| Before the Chinese ban | -4.06%  (-1.98\*) | 0.44%  (0.21) | -4.82%  (-1.97\*) | -12.33%  (-2.59\*\*) |
| N | 23 | 23 | 23 | 23 |

**Panel B: Market Adjusted Model**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **[-3, -1]** | **[0,1]** | **[2,6]** | **[2,20]** |
| Small Companies | -0.78%  (-0.66) | -0.48%  (-0.5) | -2.61%  (-1.65) | -8.84%  (-4.7\*\*\*) |
| N | 163 | 163 | 163 | 163 |
| Big Companies | -1.34%  (-1.92\*) | -0.36%  (-0.39) | -3.45%  (-3.74\*\*\*) | -9.28%  (-5.54\*\*\*) |
| N | 162 | 162 | 162 | 162 |
| Negative CF | -1.52%  (-1.84\*) | -0.84%  (-1.11) | -3.32%  (-3.02\*\*\*) | -8.94%  (-6.07\*\*\*) |
| N | 257 | 257 | 257 | 257 |
| Positive Cash Flow | 0.83%  (0.93) | 1.09%  (0.89) | -1.83%  (-1.46) | -8.70%  (-3.98\*\*\*) |
| N | 74 | 74 | 74 | 74 |
| Bull Market Period | -1.03%  (-1.32) | -0.63%  (-0.67) | -2.44%  (-1.73\*\*) | -10.82%  (-5.2\*\*\*) |
| N | 118 | 118 | 118 | 118 |
| Bear Market Period | -0.97%  (-1.02) | -0.29%  (-0.33) | -3.3%  (-2.84) | -7.81%  (-5.05) |
| N | 231 | 231 | 231 | 231 |
| Lagging | -1.45%  (-1.28) | -1.15%  (-1.23) | -3.03%  (-2.21\*\*) | -8.28%  (-4.69\*\*\*) |
| N | 166 | 166 | 166 | 166 |
| Leading | -0.53%  (-0.74) | 0.34%  (0.38) | -2.96%  (-2.54\*\*) | -9.50%  (-5.42\*\*\*) |
| N | 165 | 165 | 165 | 165 |
| After the Chinese ban | -0.77%  (-1.10) | -0.52%  (-0.77) | -2.92%  (-3.07\*\*\*) | -8.94%  (-6.91\*\*\*) |
| N | 308 | 308 | 308 | 308 |
| Before the Chinese ban | -3.92%  (-1.96\*) | 1.05%  (0.50) | -3.96%  (-1.67) | -8.22%  (-1.82\*) |
| N | 23 | 23 | 23 | 23 |

**Panel C: Fama-French Model Three-Factor Model**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **[-3, -1]** | **[0,1]** | **[2,6]** | **[2,20]** |
| Small Companies | 0.3%  (0.26) | -0.53%  (-0.56) | -0.75%  (-0.48) | -3.67%  (-1.84\*) |
| N | 163 | 163 | 163 | 163 |
| Big Companies | -0.6%  (-0.98) | -0.58%  (-0.67) | -2.85%  (-3.04\*\*\*) | -6.67%  (-3.75\*\*\*) |
| N | 162 | 162 | 162 | 162 |
| Negative Cash Flow | -0.62%  (-0.77) | -1.01%  (-1.38) | -1.94%  (-1.77\*) | -4.79%  (-3.07\*\*\*) |
| N | 257 | 257 | 257 | 257 |
| Positive Cash Flow | 1.67%  (2.17\*\*) | 1.15%  (0.96) | -1.10%  (-0.84) | -5.76%  (-2.46\*\*) |
| N | 74 | 74 | 74 | 74 |
| Bull Market Period | -0.45%  (-0.57) | -0.6%  (-0.68) | -1.64%  (-1.2) | -8.58%  (-3.87\*\*\*) |
| N | 118 | 118 | 118 | 118 |
| Bear Market Period | 0.09%  (0.1) | -0.49%  (-0.58) | -1.82%  (-1.55) | -3.03%  (-1.55) |
| N | 231 | 231 | 231 | 231 |
| Lagging | -0.37%  (-0.35) | -1.11%  (-1.23) | -1.20%  (-0.88) | -2.50%  (-1.44) |
| N | 166 | 166 | 166 | 166 |
| Leading | 0.17%  (0.23) | 0.06%  (0.06) | -2.32%  (-1.96\*\*) | -7.54%  (-3.82\*\*\*) |
| N | 165 | 165 | 165 | 165 |
| After the Chinese ban | 0.15%  (0.23) | -0.58%  (-0.88) | -1.60%  (-1.68\*) | -4.54%  (-3.32\*\*\*) |
| N | 308 | 308 | 308 | 308 |
| Before the Chinese ban | -3.47%  (-1.58) | 0.17%  (0.09) | -3.87%  (-1.63) | -11.26%  (-2.30\*\*) |
| N | 23 | 23 | 23 | 23 |

Note: This table presents CAAR estimations for various time windows and sample segmentations. **Panels A**, **B** and **C** present CAAR that was calculated by the market model, the market adjusted model and the Fama-French three-factor model, respectively. *Small and big* companies are below and above the median of the market capitalization at day t=-30. *Negative and positive cash flow* refer to the most recent quarter before the disclosure date. *Leading* disclosures can be regarded as disclosures by “early adopters” of NFTs, while lagging disclosures are issued by “late adopters.” March 14, 2022, is the determining point for the division of the two groups. The last segmentation relates to the Chinese government’s ban on financial institutions from engaging in any crypto transactions starting on May 21, 2021. The t-stats are in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively, using two-tailed tests.

**Figure 4** and **Table 5** refer to the same groups, segmented by market-cap, cashflow and the timing of the disclosure. Thus, they should be read and understood as a set. **Figure 4** depicts CAAR for the period [-3,30] around the disclosure day and **Table 5** presents the market’s response for selected time windows around the event. **Panels** **A**, **B** and **C** in **Table 5** present CAAR calculated using the CAPM market model, the adjusted market model, and the Fama-French three-factor model, respectively, as a benchmark. Due to the similarity of the results, I will refer here only to **Panel A** of **Table 5** results.

**Figure 4a** indicates a decline in CAAR from day 1 onwards for both groups: small-cap and big-cap companies. Contrary to my assumption that big-cap companies would perform better, they underperform the small companies with a CAAR of -6.56% (t=-3.63) versus -3.47% (t=-1.72) in the [2,20] time window (Table 5, Panel A).

Cash flow appears to be a more prominent factor in its effect on the market’s reaction to disclosures, as can be seen in **Figure 4b**. Companies with positive cash flow experienced an increase in CAAR over the six days from day -3, with a CAAR of 1.61% (t=2.01) in the [-3, -1] time window. From day 3 onwards, CAAR started to decline, turning negative on the 16th day. CAAR for [0,1] time window is 1.25% (t=1.03) for the positive cash flow group, compared with -0.69% (t=-0.93) for the negative cash flow group (Table 5, Panel A). The picture reversed completely in the [2,20] time window, with CAAR of -5.73% (t=-2.39) for the positive cash flow group and -4.70% (t=-2.98) for the negative cash flow group. It is interesting to note that most of the disclosures, 257 out of 331 (78%), were submitted by companies with negative cash flow. To summarize, the positive reaction to disclosures from companies with positive cash flow is short-lived, slowing down the rate of CAAR decline but not preventing it. In the end, investors express their lack of confidence in NFT-related activity, resulting in a negative CAAR. This lends further support to the conclusion that NFT-related activity is received poorly by investors.

I turn now to the segmentation according to the timing of disclosures. As described earlier, the current sample spans the period from March 2021 to August 2022, which is a relatively short period of 18 months. The market was bullish for the first ten months but turned bearish in the last eight months. These periods largely overlap with the classification into leading (the first 12 months) and lagging (the last 6). Therefore, I analyzed both classifications simultaneously. Since the abnormal return is measured versus a market index, investors’ negative reaction to NFT disclosures is more pronounced during a bull market period. This is clear from the fast decline in CAAR during the bullish period relative to the response observed during the bear market period when benchmark indices are already declining. See **Figure 4c.**

The same trend can be seen in **Figure 4d**. The CAAR of leading companies, as mentioned above, is measured largely in the period of the bull market. It deteriorates faster than that of lagging companies (mainly during the bear market period) whose CAAR does not significantly differ from zero. From **Table 5 Panel A**, shows that lagging companies exhibit CAARs of -0.98% (t=-0.72) and -0.26% (t=-0.15) in the time windows [2,6] and [2,20] versus leading companies whose CAAR is -2.95% (t=-2.50) and -9.63% (t=-4.89), for the respective periods.

The last distinction regarding timing refers to the period before and after the Chinese ban on cryptocurrency transactions and mining activities which, like leading and lagging, partly overlap the periods of bullish and bearish market sentiment. As shown in **Figure 4e**, prior to the ban, the CAAR exhibited a faster decline after NFT-related disclosures, reaching a low of -25.22% (t=-3.31) within the [-3, 30] time window around the date of the disclosure. After the ban, the market’s response was less severe, with a decline of -8.78% (t=-4.44) during the same period.

The market reaction is somewhat surprising, as one might have expected a more pronounced negative response following the ban due to increased uncertainty in NFT markets. However, it is important to interpret these results with caution, given that only 23 companies (7%) were included in the sample that submitted disclosures before the ban. Moreover, as mentioned earlier, these periods largely overlapped with bullish and bearish periods in capital markets.

* + 1. **Headquarters and Industry**

More factors worth examining are the location of a company’s *headquarters* and the *industry* to which the company belongs. Headquarter location can influence investor sentiment, as it may provide insights into the regulatory environment, market accessibility, and the company’s strategic positioning. Different industries may vary due to their unique risks and regulations.

**Figure 5**

**Panel A:**

**Panel B:**

**Table 6: Market response to NFT disclosures - Industry and Headquarter Locations**

**Panel A: Market Model**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **[-3, -1]** | **[0,1]** | **[2,6]** | **[2,20]** |
| Communication Services | 0.81%  (0.79) | 1.13%  (1.03) | -3.18%  (-2.47\*\*) | -6.84%  (-2.74\*\*\*) |
| N | 97 | 97 | 97 | 97 |
| Technology | -2.00%  (-1.20) | -1.37%  (-1.03) | -4.59%  (-2.32\*\*) | -4.40%  (-1.63) |
| N | 95 | 95 | 95 | 95 |
| Consumer Cyclical | -0.7%  (-0.62) | -0.38%  (-0.26) | 0.22%  (0.11) | -4.91%  (-1.69\*) |
| N | 79 | 79 | 79 | 79 |
| Financial Services | 1.21%  (0.61) | 0.70%  (0.41) | 2.26%  (0.95) | -1.45%  (-0.41) |
| N | 25 | 25 | 25 | 25 |
| Industrials | -0.50%  (-0.26) | -0.55%  (-0.24) | -1.87%  (-0.63) | -2.66%  (-0.71) |
| N | 18 | 18 | 18 | 18 |
| USA | 0.22%  (0.30) | 0.10%  (0.12) | -1.79%  (-1.80\*) | -5.25%  (-3.23\*\*\*) |
| N | 223 | 223 | 223 | 223 |
| China | 0.22%  (0.22) | -0.69%  (-0.39) | 0.18%  (0.07) | -9.21%  (-2.70\*\*\*) |
| N | 50 | 50 | 50 | 50 |
| Europe | -2.43%  (-2.34\*\*) | -0.32%  (-0.34) | -0.93%  (-0.67) | -3.63%  (-1.65) |
| N | 26 | 26 | 26 | 26 |
| Rest | -2.33%  (-0.53) | -2.02%  (-1.01) | -7.35%  (-1.54) | 2.91%  (0.54) |
| N | 32 | 32 | 32 | 32 |

**Panel B: Market Adjusted Model**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **[-3, -1]** | **[0,1]** | **[2,6]** | **[2,20]** |
| Communication Services | -0.13%  (-0.12) | 0.57%  (0.52) | -4.32%  (-3.42\*\*\*) | -12.04%  (-5.16\*\*\*) |
| N | 97 | 97 | 97 | 97 |
| Technology | -3.07%  (-1.82\*) | -1.65%  (-1.23) | -6.11%  (-3.10\*\*\*) | -9.93%  (-3.74\*\*\*) |
| N | 95 | 95 | 95 | 95 |
| Consumer Cyclical | -0.88%  (-0.79) | 0.05%  (0.03) | -0.17%  (-0.08) | -6.10%  (-2.46\*\*) |
| N | 79 | 79 | 79 | 79 |
| Financial Services | 0.52%  (0.26) | 0.69%  (0.40) | 2.31%  (0.98) | -1.81%  (-0.67) |
| N | 25 | 25 | 25 | 25 |
| Industrials | -1.17%  (-0.57) | -0.98%  (-0.43) | -4.91%  (-1.55) | -9.63%  (-2.58\*\*) |
| N | 18 | 18 | 18 | 18 |
| USA | -0.57%  (-0.79) | -0.06%  (-0.07) | -2.60%  (-2.63\*\*\*) | -9.25%  (-6.17\*\*\*) |
| N | 223 | 223 | 223 | 223 |
| China | -0.21%  (-0.21) | -0.48%  (-0.28) | -1.09%  (-0.45) | -11.80%  (-3.87\*\*\*) |
| N | 50 | 50 | 50 | 50 |
| Europe | -2.94%  (-2.96\*\*\*) | -0.78%  (-0.86) | -1.93%  (-1.34) | -6.91%  (-3.11\*\*\*) |
| N | 26 | 26 | 26 | 26 |
| Rest | -3.59%  (-0.82) | -2.42%  (-1.23) | -9.59%  (-2.03\*) | -3.40%  (-0.63) |
| N | 32 | 32 | 32 | 32 |

**Panel C: Fama-French Three-Factor Model**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **[-3, -1]** | **[0,1]** | **[2,6]** | **[2,20]** |
| Communication Services | 0.95%  (0.98) | 0.68%  (0.63) | -3.10%  (-2.37\*\*) | -6.58%  (-2.65\*\*\*) |
| N | 97 | 97 | 97 | 97 |
| Technology | -1.49%  (-0.93) | -1.86%  (-1.42) | -3.89%  (-1.97\*) | -4.86%  (-1.79\*) |
| N | 95 | 95 | 95 | 95 |
| Consumer Cyclical | -1.03%  (-0.92) | -0.10%  (-0.07) | 0.30%  (0.15) | -5.24%  (-1.87\*) |
| N | 79 | 79 | 79 | 79 |
| Financial Services | 1.18%  (0.61) | 0.38%  (0.23) | 2.39%  (1.05) | -0.51%  (-0.16) |
| N | 25 | 25 | 25 | 25 |
| Industrials | -0.47%  (-0.25) | -0.40%  (-0.17) | -2.17%  (-0.73) | -3.90%  (-0.99) |
| N | 18 | 18 | 18 | 18 |
| USA | 0.28%  (0.42) | -0.14%  (-0.17) | -1.75%  (-1.78\*) | -5.62%  (-3.56\*\*\*) |
| N | 223 | 223 | 223 | 223 |
| China | 0.44%  (0.43) | -0.82%  (-0.49) | 1.31%  (0.59) | -7.37%  (-2.26\*\*) |
| N | 50 | 50 | 50 | 50 |
| Europe | -2.66%  (-2.54\*\*) | -0.57%  (-0.63) | -1.07%  (-0.82) | -4.10%  (-1.9\*) |
| N | 26 | 26 | 26 | 26 |
| Rest | -1.53%  (-0.36) | -2.79%  (-1.32) | -7.11%  (-1.43) | 2.18%  (0.38) |
| N | 32 | 32 | 32 | 32 |

Note: this table presents CAAR based on companies’ segmentation due to their industry and headquarter location. Panel A presents estimations calculated by the market model, Panel B by the market adjusted model, and Panel C by the Fama-French three-factor model. The CAAR is calculated for selected time windows around the event, t-stats are in parentheses, and \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively, using two-tailed tests.

**Figure 5A.** provides a clear visualization of the average market reaction to NFT disclosures across various industries within the sample. Notably, the technology industry, which comprises 29% of the companies in the sample, demonstrates the fastest and largest deterioration of CAAR within the [-3,30] time window, reaching a low of -13.00% (t=-3.70). On the other hand, the financial services industry, which comprises 7.5% of the sample, exhibits a positive yet insignificant CAAR until day 26. Over the [2,20] days’ time window, the communication services industry presents the largest negative CAAR of -6.84% (t=-2.74), followed by the consumer cyclical industry with a CAAR of -4.91% (t=-1.69) and the technology industry with CAAR of -4.40% (t=-1.63). These findings are summarized in Table 6 Panel A.

The role of location is presented in **Figure 5B.** Among the 109 companies, 75 companies (69%) are headquartered in the United States, whereas 25 companies (23%) are based in China, representing a three-fold difference. Chinese companies display the poorest underperformance relative to the market with a CAAR of -9.21% (t=-2.7) for the [2,20] period, versus -5.25% (-3.23) in the U.S and -3.63% (t=-1.65) in Europe. This suggests that Chinese companies are the most affected by the Chinese regulation, and thus exhibit weaker market performance compared to their counterparts.

1. **Summary and Conclusions**

NFTs are a relatively new and evolving concept, and market participants may have varying perceptions and sentiments regarding their value and potential. Examining the market’s response to NFT disclosures can shed light on how investors interpret and evaluate the strategic importance of NFTs for different types of companies. It can also provide insights into market sentiment towards NFT-related developments and their perceived impact on a company’s prospects. This study is the first known effort to examine the market’s reaction to NFT-related disclosures between March 2021 and August 2022 using an event study methodology and employing three benchmarks for calculating the abnormal return: the market model, the market adjusted model, and the Fama-French three-factor model. The overall picture that emerges from the various analyses is unequivocal. There is a constant CAAR decline from day 1 onward with a significant negative CAAR of -4.93% (t=-3.69) during the [2,20] time window for the entire sample.

The message conveyed by these results is clear: the market does not believe that corporate involvement in NFTs is beneficial, thus leading to a negative CAAR in the days following disclosures. Interestingly, despite the decisive reaction in the weeks after the disclosure, the CAAR on the day of the event itself and the subsequent day is not statistically significant.

The delayed response from the market could indicate a lower level of market efficiency which can be attributed to the newness and relatively niche nature of the NFT market. Many investors may not yet possess a comprehensive understanding of NFTs and their implications. However, as investors are given more time to react, they may begin considering other relevant uncertainties associated with NFTs. These uncertainties include the loosely regulated nature of the NFT market and potential legal issues related to intellectual property, contract law, and taxation. Taking these uncertainties into account, it is plausible that the subsequent days could witness a significant negative CAAR as investors weigh these factors and reassess their position.

Factors such as the specific content of the NFT-related disclosures, the characteristics of the sample companies, and broader market conditions have been investigated and appear to play a role in the market’s reaction to NFT-related disclosures.

As the NFT market continues to evolve and investors gain a deeper understanding of its complexities, future studies could extend the period investigated and engage in an in-depth investigation of the factors that may drive the abnormal returns experienced around NFT disclosures. Will the NFT market prove to be a lucrative opportunity for investors, or will it be perceived as a cynical and environmentally detrimental scam? Only time will tell.

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**Appendix A: Sample Screening Procedure**

|  |  |
| --- | --- |
|  | **Observations** |
| Total extractions from the SEC website | **1,916** |
| Less |  |
| Trusts/Funds/EFT’s | 735 |
| Not Relevant | 392 |
| OTC (67 companies) | 369 |
| Multiple identical disclosures sent on the same day | 83 |
| Price data is missing | 6 |
| Final sample | **331** |

Note: This table outlines the process used to create the sample, starting with 1916 disclosures obtained from the SEC website and culminating in the 331 disclosures considered after the filtering process.

**Appendix B** – **Clear and Vague Disclosures**

**Examples for *“Clear”* Disclosures**.

**AeroCentury Corp. (ACY)** Dec 10, 2021

…“AeroCentury” or the “Company” (NYSE American: ACY), today announced that it launched its GameFi business in the metaverse ecosystem through its wholly-owned subsidiary, Mega Metaverse Corp… MEGA plans to release its first NFT game “Mano” in first quarter of 2022. Mano is a competitive idle role-playing game (RPG) deploying the concept of GameFi in the innovative combination of NFTs (non-fungible token) and DeFi (decentralized finance) based on blockchain technology, with a “Play-to-earn” model that the players can earn while they play in MEGA’s metaverse universe “alSpace”. The Company believes it is the first NYSE AMEX listed company with GameFi business operations…”

Appendix C. Vague Disclosures

**CompoSecure, Inc. (CMPO)** May 09, 2022

“…Key Highlights – Q1 2022 Adjusted EBITDA1 of $33M, 14% higher than Q1 ‘21 due to increased customer acquisitions by our clients and a focus on operational excellence and process improvement Strong momentum from Fintechs and traditional banks in the payment card business along with initial Arculus B2B momentum from multiple cryptocurrency platforms selecting Arculus as their digital authentication partner Significant enhancements for Arculus wallet enabling NFT viewing, sending, and receiving, connection to DeFi…”

**Examples for *“Vague”* Disclosures**.

**AGM GROUP HOLDINGS, INC. (AGMH)** June 30, 2021

“…In blockchain and fintech application areas, we launched a financial training network web service back to June 2019. It targets the beginner and intermediate users and help them to improve their basic trading skills and be more familiar with knowledge of modern trading software and financial markets. Fintech product team remain actively research and seek opportunities to introduce blockchain-based NFT and Defi technologies into existing products, aiming to provide more values to clients and bring more knowledge of blockchain and crypto assets to clients…”

**Appendix C** – **Sales of NFTs vx. a Long-Term Approach (platform or marketplace) Disclosures**

**GameStop Corp. (GME)** Dec 08, 2021

“... We are pursuing, and expect to continue to pursue, business and strategic initiatives, some of which may expose us to new or enhanced risks. For example, we are exploring opportunities in blockchain, NFT, and Web 3.0 technology…”

**Examples for *NFT sale***. (248, 824)

**Allied Esports Entertainment, Inc.** **(AESE)** August 15, 2022

“…The Company’s NFT revenue was generated from the sale of non-fungible tokens (NFTs). The Company’s NFTs exist on the Ethereum Blockchain under the Company’s EPICBEAST brand, a digital art collection of 1,958 unique beasts inspired by past and present e-sport games. The Company uses the NFT exchange, OpenSea, to facilitate its sales of NFTs. The Company, through OpenSea, has custody and control of the NFT prior to the delivery to the customer and records revenue at a point in time when the NFT is delivered to the customer and the customer pays. The Company has no obligations for returns, refunds or warranty after the NFT sale…”

**AMC ENTERTAINMENT HOLDINGS, INC. (AMC)** March 1, 2022

“…. During the fourth quarter of 2021, we partnered with Sony Pictures to become the first theatrical exhibition company to offer AMC Stubs members a limited number of exclusive Spider-Man: No Way Home non-fungible tokens (“NFTs”) based on a ticket purchase and redemption of a Spider-Man ticket on the opening night of the film. Some 86,000 exclusive and limited edition NFTs offer guests a tradeable collectible commemorating the most successful film of 2021. This NFT is tradeable and in the future will offer discounts or other benefits to the then-current holders to generate future attendance. We will continue to implement innovative NFT offers to further engage and build loyalty with our guests. ”

**Examples for NFT Platform**

**Mogo Inc. (MOGO)** March 23, 2022

“…. On January 11, 2022, Mogo announced a strategic investment in NFT Trader. Mogo’s initial investment is through a convertible note which, if converted, will represent a 25% interest in NFT Trader. Mogo also has an option to acquire an additional interest in NFT Trader through a secondary purchase from the founders of NFT Trader of 25% within six months of the initial investment. …”

**Medigus Ltd. (MDGS)** October 13, 2021

“Medigus Enters NFT Space with a First Investment in Blockchain Company Safee

Medigus to invest $400,000 in Safee, an NFT-based ownership social network aiming to bring its unique technology to mass market creators and audiences…”

**Appendix D - Warning Disclosures**

**Dunxin Financial Holdings Ltd (DXF)** May 02, 2022

“... For example, NFTs raise various intellectual property law considerations, including adequacy and scope of assignment, licensing, transfer, copyright, and other right of use issues. The creator of an NFT will often have all rights to the content of the NFT and can determine what rights to assign to a buyer, such as the right to display, modify, or copy the content. To the extent we are directly or indirectly involved in a dispute between creators and buyers on our NFT platform, it could materially and adversely affect the success of our NFT platform and harm our business and reputation. NFTs, and our NFT platform, may also be an attractive target for cybersecurity attacks. For example, a perpetrator could seek to obtain the private key associated with a digital wallet holding an NFT to access and sell the NFT without valid authorization, and the owner of the NFT may have limited recourse due to the nature of blockchain transactions and of cybercrimes generally. NFT marketplaces, including our NFT platform, may also be vulnerable to attacks where an unauthorized party acquires the necessary credentials to access user accounts. The safeguards we may implement in the future to protect against cybersecurity threats may be insufficient. If our NFT platform were to experience any cyberattacks, it could negatively impact our reputation and market acceptance of our platform. We, or our service providers, may deposit, transfer, and custody customer’s NFT in multiple jurisdictions…”

**Kuke Music Holding Ltd (KUKE)** May 02, 2022

“... The technology underlying blockchain technology is affected by a number of industry-wide challenges and risks relating to consumer acceptance of blockchain technology, including but not limited to government and quasi-government regulation of NFTs and their use, or restrictions on or regulation of access to and operation of blockchain networks or similar systems, the maintenance and development of the open-source software protocol of blockchain networks, changes in consumer demographics and public tastes and preferences, the extent to which current interest in NFTs represents a speculative “bubble.” The slowing or stopping of the development or acceptance of blockchain networks and blockchain assets, may deter or delay the acceptance and adoption of NFTs and adversely impact the value of NFTs.”

1. Blockchain technology, which is both decentralized and immutable, has the potential to revolutionize industries by providing secure and transparent transactions and data management. [↑](#footnote-ref-1)
2. Discord is a private chat platform for communities. [↑](#footnote-ref-2)
3. Reddit is a public forum for discussion and content sharing, [↑](#footnote-ref-3)
4. Etherium is the second largest digital currency by market cap apart from Bitcoin. [↑](#footnote-ref-5)
5. The term “address” typically refers to a unique party associated with a digital wallet or account on a blockchain network. [↑](#footnote-ref-6)