Cryptocurrency Market Dynamics Following the Approval of Bitcoin ETFs

Kadir Gökhan Babaoğlu, PhD
Head of Research, Volmex
March 25, 2024

In this study, we conduct a comprehensive analysis to investigate how ETF fund flows are related to various aspects of Bitcoin trading activity and volatility. Utilizing a dataset spanning from the inception of Bitcoin ETFs, we examine the relationships between fund flows and key market variables, including trading volume, implied volatility, price ranges, and intraday price movements. Our findings reveal significant connections between ETF fund flows, trading volume, and volatility metrics. Moreover, we observe distinct patterns in the relationship between fund flows and market dynamics when BTC price movements are negative compared to positive. These results provide valuable insights into the impact of ETF fund flows on Bitcoin market dynamics, offering implications for investors, regulators, and market participants.

1. Introduction

The approval of spot Bitcoin exchange-traded funds (ETFs) by the U.S. Securities and Exchange Commission (SEC) on January 10, 2024, marked a pivotal moment for the cryptocurrency market. Over the past two months since their approval, these ETFs[1] have seen significant net flows totaling $11.3 billion across various funds, with inflows amounting to $25 billion and outflows from the Grayscale Bitcoin Trust (GBTC) reaching $13.7 billion during the same period. This influx of funds underscores the growing interest among traditional investors in gaining regulated exposure to Bitcoin without directly owning the cryptocurrency. Thus, it is important to understand how cryptocurrency markets have been behaving since the approval of these ETFs.

We have examined the spot BTC and derivatives markets during the first two months following the introduction of these ETFs. The next section describes the data sources. Section 3 analyzes the data comprehensively, while Section 4 focuses on the first month, and Section 5 delves into the second month of ETF activity. Finally, Section 6 presents the conclusions drawn from the analysis.

[1] See Appendix A for the full list of approved ETFs

2. Data

For our analysis, we utilized a combination of data sources to examine Bitcoin ETF fund flows and related market variables:

a. **Bitcoin ETF Fund Flows**: Historical data on Bitcoin ETF fund flows was manually collected from two primary sources: ETF.com and ETFdb.com. Additionally, the most recent fund flows were obtained from Farside Investors' website,[2] providing a comprehensive dataset covering a range of time periods.

b. **Spot BTC Price and Volume Levels**: Data on spot Bitcoin price[3] and trading volume was sourced from CoinMarketCap, a widely-recognized platform for cryptocurrency market data.

c. **Implied Volatility Data (BVIV Levels)**: Implied volatility data, represented by Bitcoin Volmex Implied Volatility (BVIV) levels, were retrieved from Volmex Finance.[4] BVIV levels provide model-free 30-day forward-looking volatilities implied by BTC options, offering valuable insights into market expectations and future price movements.

By leveraging these data sources, we were able to conduct a comprehensive analysis of the relationships between Bitcoin ETF fund flows and various market variables, shedding light on the dynamics of the Bitcoin market and the impact of ETF activity on market behavior.

3. Comprehensive Analysis of Data

In this section, we assess the connections between Bitcoin ETF fund flows and a diverse array of BTC variables derived from both spot and derivatives markets. By examining these connections comprehensively, we aim to clarify the nuanced interactions and dynamics within the BTC ecosystem, shedding light on how fund flows impact various facets of BTC trading activity and market behavior across different market segments.

---

[2] https://farside.co.uk/
[3] Open, high, low and close levels
[4] BVIV is available on different channels, these are,
- Volmex Charts: https://charts.volmex.finance/
- CoinMarketCap: https://coinmarketcap.com/charts/#bitcoin-options-volatility
- TradingView: https://www.tradingview.com/chart/?symbol=VOLMEX%3ABVIV
- Laevitas: https://app.laevitas.ch/misc/volmex

Time Window

After the approval of spot Bitcoin ETFs on January 10, 2024, significant flows began to emerge, predominantly commencing on January 15, 2024. Therefore, our analysis begins from this date and extends until the end of March 22, 2024, encompassing a total of 49 trading days. This section aims to explore the relations between fund flows and trading activities observed in both spot and derivative markets during this specified time frame.

Variables

We employ several variables derived from spot BTC price and BVIV levels to capture different aspects of market behavior:

1. **Log-Volume**: Given the availability of spot trading for BTC, we utilize trading volume as an indicator of market activity. To handle the large amounts typically involved in trading volume, we apply a logarithmic transformation which normalizes the data and facilitates more meaningful analysis, particularly in cases where there are significant fluctuations or outliers in trading volume levels..
2. **Returns**: Three types of returns calculated. These are
    a. **CC (Close-to-close)**. These returns represent the percentage change from the previous close level to the most recent one. They take into account after-trading hours.
    b. **CO (Open-to-close)**. Representing returns observed only within trading hours, CO returns denote the percentage change from the open level to the close.
    c. **AA (Average-to-average)**. To account for after-trading hours and trading day activities, we establish the daily average level as the mean of open and close levels. AA returns then depict the percentage change from the previous average level to the most recent one, incorporating both close and open levels from current and previous observation sets.
3. **Range**: This variable gauges the extent of daily swings in both BTC and BVIV. It is calculated as the percentage ratio of the difference between the daily high and low to the average level.
4. **Range-based Volatility (RBV)**: Specifically for BTC, RBV calculates the average of 1-hour Garman-Klass (GK) volatility estimates during trading hours. Offering insight into BTC market dynamics, RBV serves as a valuable proxy for assessing **realized volatility**.
5. **Upward spike**: Capturing maximal upward divergence from the daily average level, this metric (called “maxUp” in the figures) measures the percentage ratio of the difference between the daily high and average levels to the average level..
6. **Downward spike**: Conversely, the downward spike variable (“maxDown”) quantifies the maximal downward divergence from the daily average level as the percentage ratio of the difference between the daily average and low to the average level.

ETF Fund Flows vs Spot BTC Market

As part of our preliminary investigation, we explore the relationship between spot BTC trading and ETF fund flows. Our analysis indicates that, as depicted in Figures 1a and 1b, while net fund flows show no significant relation, the IBIT fund flows exhibit explanatory power over the variation in BTC trading volume.

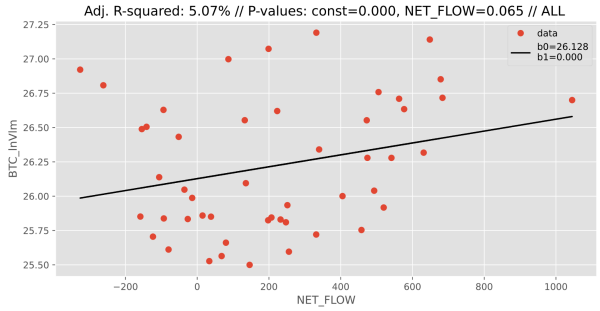

Figure 1a

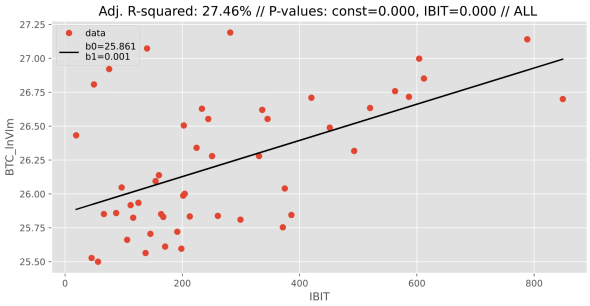

Figure 1b

This finding suggests a noteworthy association between IBIT fund flows and Bitcoin spot trading volume across the trading day, implying a potentially influential relationship between ETF fund flows and spot BTC trading dynamics.

Moving forward, we analyze Bitcoin realized volatility, as proxied by BTC RBV. Our results reveal that while net fund flows display no significant association (Figure 2a), the IBIT fund flows demonstrate a statistically significant relationship with BTC RBV (Figure 2b).

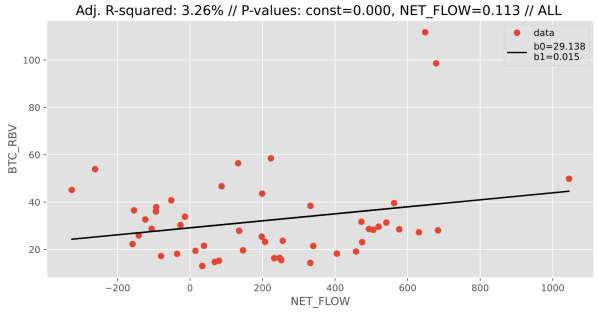

Figure 2a

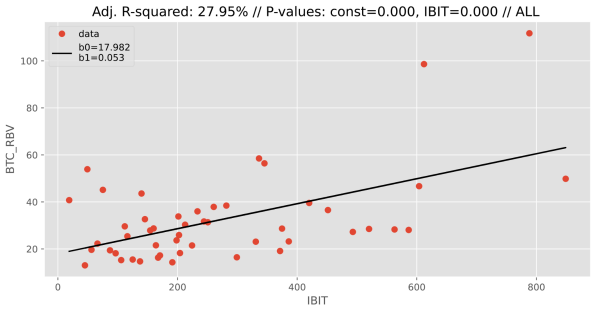

Figure 2b

This suggests that the IBIT fund flows may have an influence on Bitcoin's realized volatility, emphasizing the significance of examining individual ETF fund flows, especially IBIT, when evaluating BTC volatility patterns.

Furthermore, aside from BTC RBV, we observe robust connections between the IBIT fund flows and BTC downward spikes,[5] as well as the BTC range, as shown in Figures 3a and 3b. Specifically, we find that larger inflows into IBIT are associated with larger downward spikes in BTC price and broader price fluctuations in the form of price ranges during trading days.

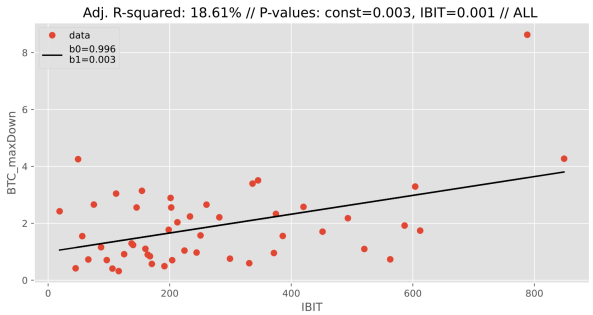

Figure 3a

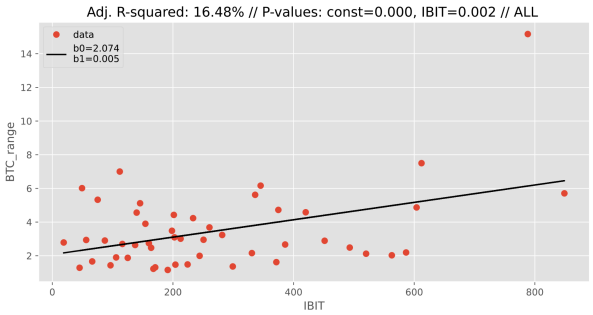

Figure 3b

This could be seen as that the IBIT fund flows may have significant implications for the volatility and price movements of BTC, particularly in terms of downward movements and price ranges.

Based on these results, an intriguing observation emerges: GBTC outflows overall do not exhibit a significant relationship with either BTC range or downward movements, while IBIT fund flows demonstrate a strong relationship with these variables. This may imply that IBIT may possess the ability to effectively time the market.

ETF Fund Flows vs BTC Derivatives

While the spot price of BTC provides insight into the current state of the cryptocurrency markets, derivatives offer a unique perspective on BTC dynamics by capturing specific aspects of future expectations. In our analysis, we leverage the Bitcoin Volmex Implied Volatility Index (BVIV), which derives model-free 30-day forward-looking volatilities from BTC options. By examining BVIV, we gain valuable insights into market expectations, allowing for a more comprehensive understanding of BTC dynamics beyond spot prices alone.

We have previously documented strong connections between IBIT fund flows and intraday BTC price fluctuations, as captured by BTC realized volatility, range, and downward spikes. To gain a deeper understanding of how fund flows are related to market uncertainties, we examine BVIV, the implied volatilities.

Among all funds, only IBIT fund flows exhibit a strong relationship with BVIV, as illustrated in the Figures 4a and 4b below: the larger the IBIT inflows, the broader the BVIV ranges, and the larger the upward intraday spikes in BVIV.

[5] **`maxDown`** variable used in both the regressions and shown in the figures measures the magnitude of downward spikes.

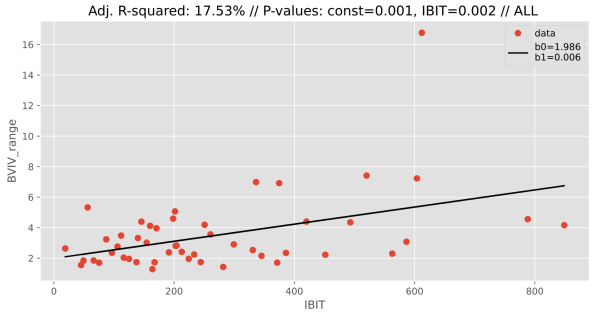

Figure 4a

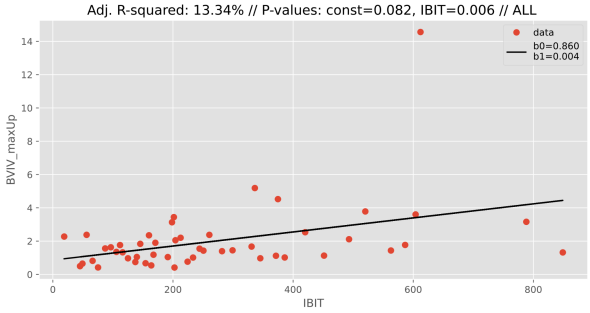

Figure 4b

The results indicate a strong connection between IBIT fund flows and BVIV, suggesting that IBIT fund inflows may play a crucial role in shaping BTC derivatives market dynamics and amplifying volatility.

ETF Fund Flows During BTC Price Declines

So far, we have examined fund flows unconditionally. To better understand their impact, we investigate the relationships specifically on trading days characterized by negative open-to-close (CO) BTC returns in this section.[6] This analysis aims to shed light on the market dynamics that occur when the BTC price falls during trading hours.

Starting with the trading volumes, our results reveal a highly robust relation between IBIT flows and BTC trading volume when CO returns are negative, as can be seen in Figure 5a, which disappears when CO returns are positive as Figure 5b shows.

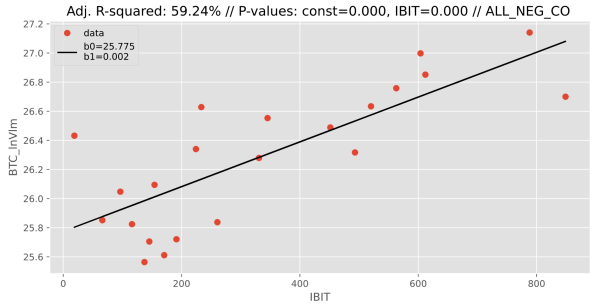

Figure 5a

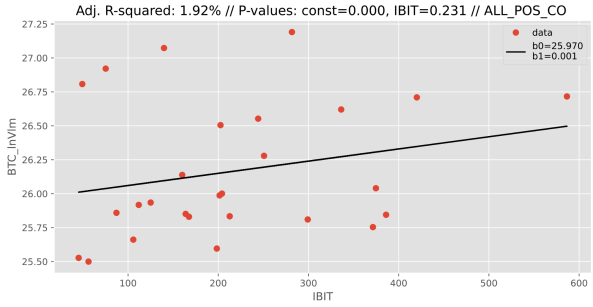

Figure 5b

We also observe a strong relation between BTC RBV and the IBIT flows: Higher IBIT flows coincide with higher Bitcoin GK volatilities (i.e., RBV) when BTC CO returns are negative. Similar to the case with trading volumes, this relationship disappears when CO returns are positive, as shown in the Figures 6a and 6b below.

[6] Out of the 49 trading days, we have identified 22 days with negative CO returns.

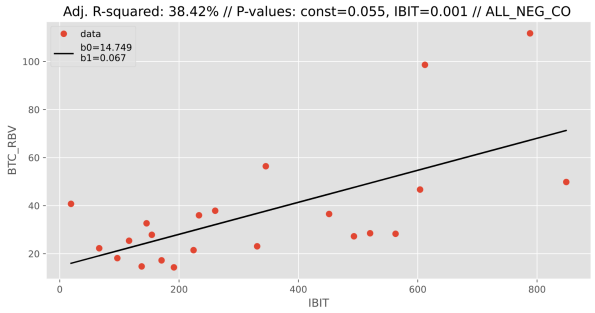

Figure 6a

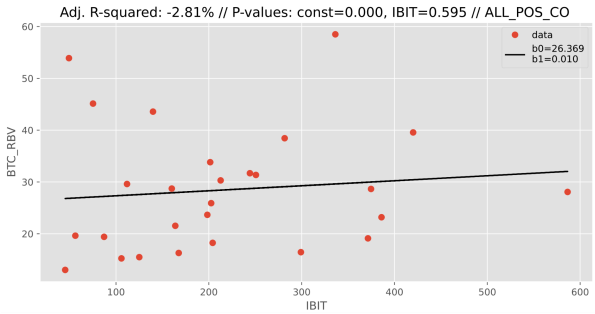

Figure 6b

Another approach to examining uncertainties in price and volatility levels is to analyze the relationship between fund flows and the daily ranges of BTC and BVIV. Similar to the patterns observed in trading volume and RBV, only IBIT displays a significant relationship, as illustrated in the Figures 7a and 7b.

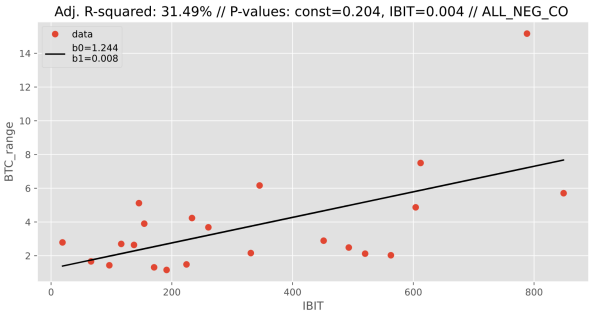

Figure 7a

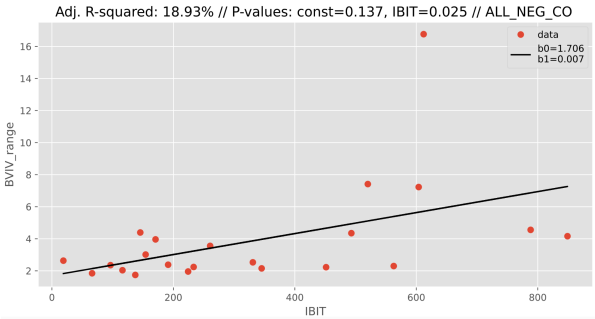

Figure 7b

In addition, these relationships disappear when CO returns are positive as shown in Figures 8a and 8b, which implies that the IBIT fund flows persisted during increased market uncertainties with negative price actions in BTC.

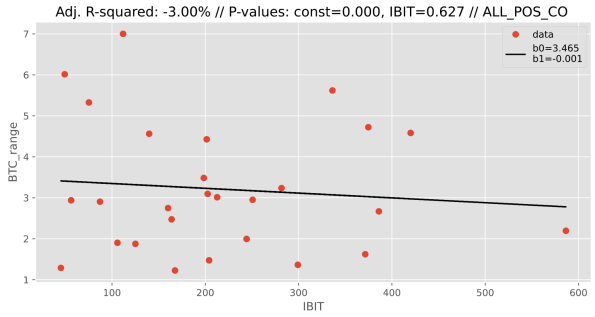

Figure 8a

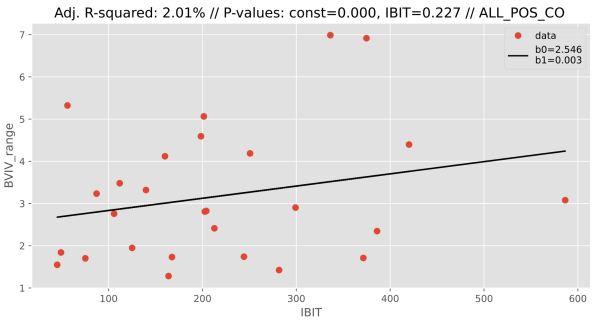

Figure 8b

4. Analysis of First Month

This section aims to examine the relationships between fund flows and trading activities, focusing on the initial subperiod consisting of the first 22 trading days, which corresponds to the subperiod that spans from January 15 to February 13, 2024.

Similar to previous analyses, only IBIT fund flows demonstrate a strong relation with overall BTC trading volume (Figure 9a). Additionally, we observe a relationship between GBTC outflows and BTC average-to-average (AA) returns (Figure 9b). Specifically, decreased GBTC outflows correspond to higher BTC returns, supporting the claims that GBTC outflows precede market declines.

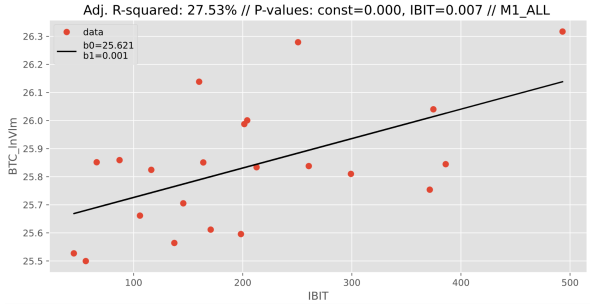

Figure 9a

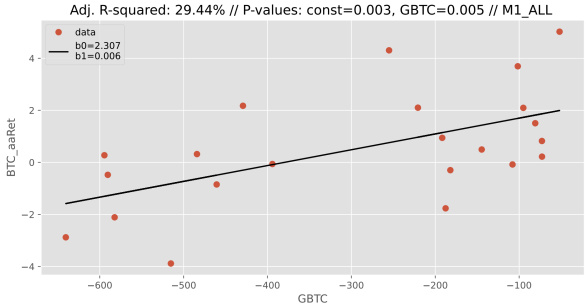

Figure 9b

Since the GBTC outflows and market declines proxied by BTC AA returns are related, we take a deeper look at the data conditional upon negative AA returns. Although we have only 9 data points, we can spot some significant relationships of GBTC outflows in the derivatives markets.

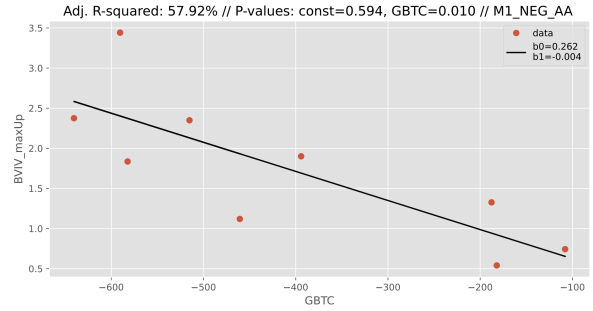

Figure 10a

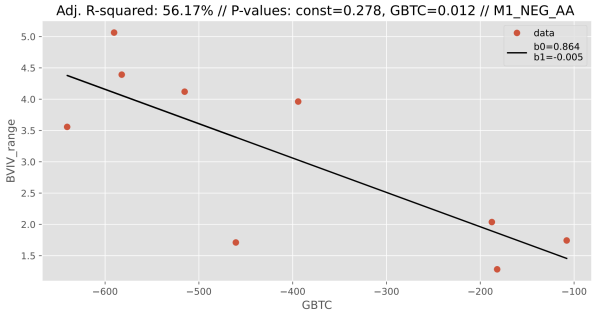

Figure 10b

In the figures above, we observe that decreased GBTC outflows coincide with narrower BVIV ranges (Figures 10b) and reduced upward spikes (Figures 10a) in BVIV. This suggests a potential relationship between GBTC outflows and Bitcoin implied volatility (BVIV). When GBTC outflows decrease, indicating a reduction in outflowing funds from the Grayscale Bitcoin Trust, BVIV ranges tend to narrow, and upward spikes in BVIV decrease. This pattern may imply that changes in GBTC outflows influence market sentiment, potentially leading to shifts in BVIV levels. It highlights the interconnectedness between fund flows, market sentiment, and implied volatility in the Bitcoin market.

We also examine the data when AA returns are positive. BTC trading volume exhibits the strongest relation with non-GBTC flows[7] as shown in Figure 11a. In the derivatives market, we observe that higher net flows[8] strongly align with more positive changes in BVIV levels, as shown in Figure 11b.

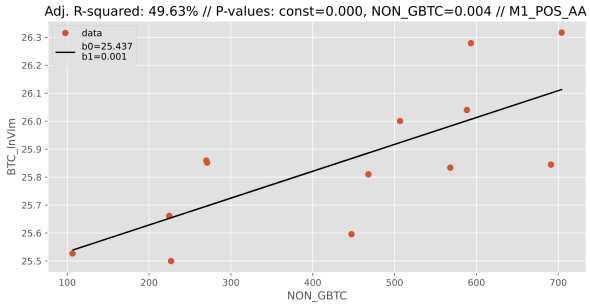

Figure 11a

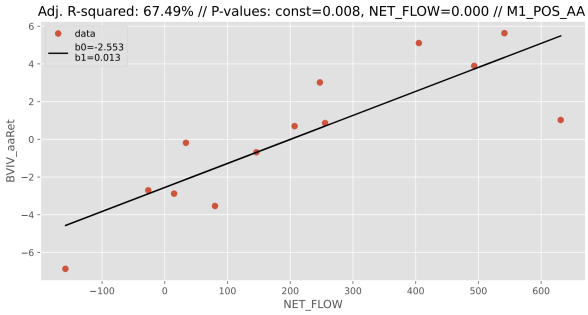

Figure 11b

This suggests that net flows on days with positive returns may elevate uncertainty regarding Bitcoin's future behavior, as evidenced by heightened levels of implied volatility, captured by BVIV.

5. Analysis of the remaining days

In the previous section, we examined the initial 22 trading days. This section aims to delve into the relationships between fund flows and trading activities, focusing on the latter subperiod comprising the remaining 27 trading days, specifically from February 14 to the end of March 22, 2024.

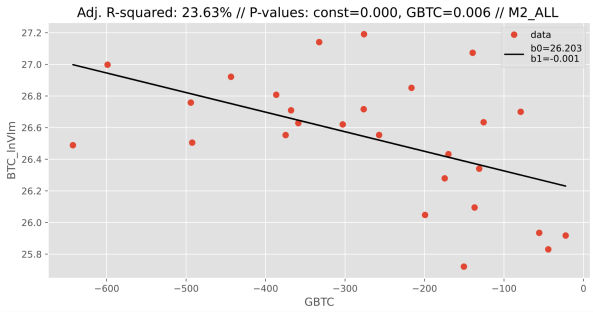

Figure 12a

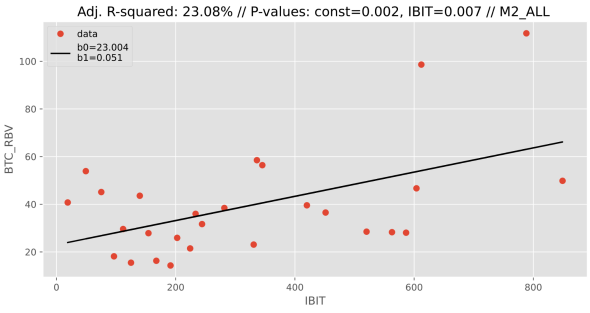

Figure 12b

In this subperiod, we see a robust relationship between GBTC fund outflows and BTC trading volume which is stronger than that of IBIT. This is a result of GBTC outflows especially between March 18 and March 22, 2024 and that IBIT fund flows were relatively less than previous weeks. However, IBIT fund flows are strongly linked to RBV levels in this period as can be seen in Figure 12b.

[7] Non-GBTC fund flows are simply the sum of all other fund flows.
[8] Net flows are the sum of all fund flows

Supporting the relationship between IBIT fund flows and BTC RBV, IBIT fund flows are also associated with BVIV range as shown in Figure 13a. FBTC flows have significant relations after the first month. Figure 13b shows FBTC flows coincide with BTC close-to-close (CC) returns.

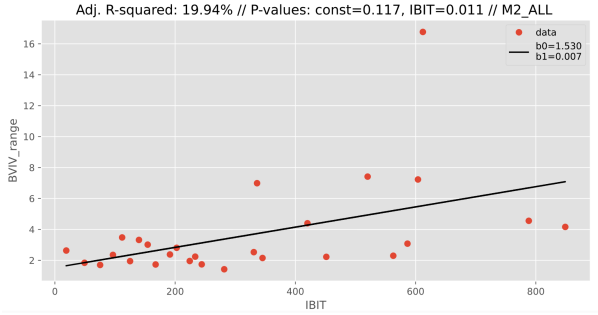

Figure 13a

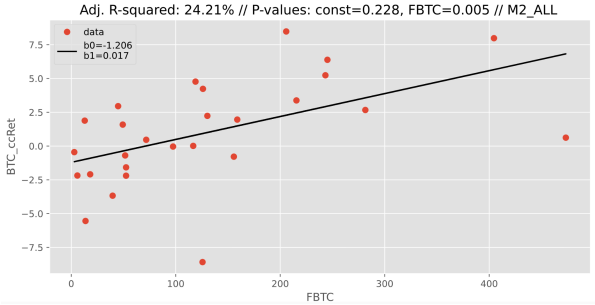

Figure 13b

To gain a deeper understanding of the aforementioned relationships, we examine the days with negative BTC CC returns. With only 11 observations available, ensuring the robustness of these relationships is challenging. However, it is conceivable that larger inflows (excluding GBTC, i.e., Non-GBTC fund flows) correspond to more significant intraday moves in BVIV (as depicted in Figure 14a). Additionally, IBIT fund flows appear to coincide with downward spikes in price, as shown in Figure 14b, supporting the market timing of IBIT.

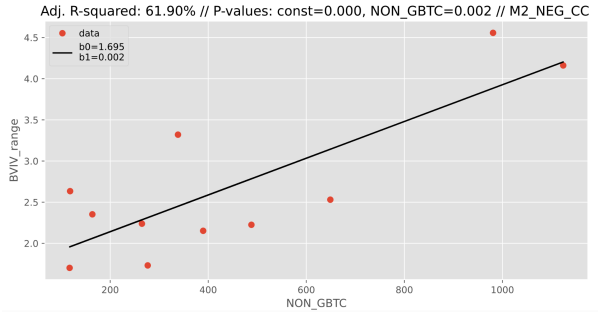

Figure 14a

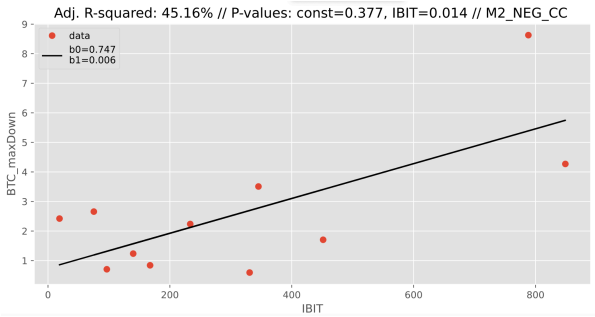

Figure 14b

Finally, we investigate the remaining part of the data, focusing on positive BTC CC returns. We observe a relationship between IBIT fund flows and BVIV range, as well as upward spikes in BVIV, as seen in Figures 15a and 15b.

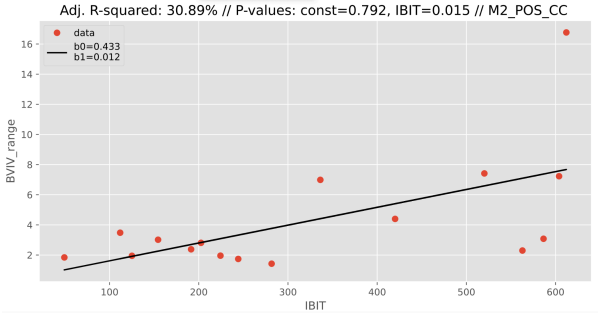

Figure 15a

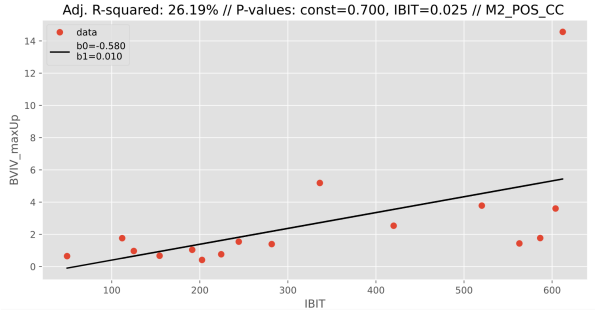

Figure 15b

6. Conclusion

In conclusion, our comprehensive analysis underscores the significance of examining ETF fund flows in conjunction with BTC price movements and BVIV levels to gain deeper insights into the dynamics of the cryptocurrency market.

Of particular interest is the possibility of market timing of IBIT stemming from IBIT fund flows coinciding with downward spikes in BTC, implying tactical positioning by BlackRock's IBIT in response to market conditions. Given that ETFs are not actively engaged in trading, this phenomenon may be attributed to the actions of market makers collaborating with IBIT.

Through our investigation, we have identified several compelling relationships between fund flows, BTC trading activity, and implied volatility. Notably, the observed relations between IBIT fund flows and various market indicators suggest a complex interplay between ETF fund flows, investor sentiment, and market volatility.

These findings underscore the potential for future research to better understand the mechanisms driving investor behavior in the cryptocurrency market. Furthermore, additional investigation is warranted to shed light onto how the fund flows influence market dynamics as we gather and analyze more data. These efforts will contribute to a more comprehensive understanding of the complex interactions between investor sentiment, fund flows, and market outcomes in the evolving cryptocurrency trading landscape.

Appendix A

The 11 spot Bitcoin ETFs that received approval from the SEC are:

- ARK 21 Shares Bitcoin ETF (NYSE:ARKB)
- Bitwise Bitcoin ETF (NYSE:BITB)
- Blackrock's iShares Bitcoin Trust (NASDAQ:IBIT)
- Franklin Bitcoin ETF (NYSE:EZBC)
- Fidelity Wise Origin Bitcoin Trust (NYSE:FBTC)
- Grayscale Bitcoin Trust (NYSE:GBTC)
- Hashdex Bitcoin ETF (NYSEARCA:DEFI)
- Invesco Galaxy Bitcoin ETF (NYSE:BTCO)
- VanEck Bitcoin Trust (NYSE:HODL)
- Valkyrie Bitcoin Fund (NASDAQ:BRRR)
- WisdomTree Bitcoin Fund (NYSE:BTCW)