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QUIET WEEKENDS IN A MARKET THAT NEVER CLOSES: BITCOIN, ETHER AND THE U.S. SPOT ETFS

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Abstract: This study tests whether the launch of U.S. spot exchange-traded funds (ETFs) for Bitcoin in January 2024 and for Ether in July 2024, which can be traded only when U.S. stock exchanges are open, changed the difference between weekend and weekday behaviour of these two cryptocurrencies. I used daily Yahoo Finance data from January 2018 to September 2026 (3,195 days for each coin) and a difference-in-differences regression of absolute daily returns with Newey-West standard errors, which was chosen as the main test before any result was calculated, together with several robustness checks. Weekends were much calmer than weekdays in every period: Bitcoin's average absolute daily return was 1.54% on weekends and 2.48% on weekdays, and weekends had about 22% of trading volume instead of the 28.6% that two days out of seven would get, while average returns did not differ. The main test found no change in the weekend gap after either launch (Bitcoin: +0.09 percentage points, 95% confidence interval -0.18 to 0.35), and most of the move toward quieter weekends happened in 2022 and 2023, before the ETFs existed. An unplanned finding is that after the launches, weekdays on which U.S. exchanges were closed for a holiday became about as calm as weekends, which needs to be checked again with more data.

Keywords: Bitcoin, Ether, weekend effect, spot ETF, volatility, trading volume, difference-in-differences

1. Introduction

Shares of companies such as Apple are traded on U.S. stock exchanges only from Monday to Friday, while Bitcoin can be bought and sold at any hour of any day. Because cryptocurrency exchanges never close, there is no obvious reason for crypto prices to behave differently on a Saturday than on a Tuesday. In practice, earlier studies have found that Bitcoin is calmer and less traded on weekends [1, 2, 3]. A common explanation is that a large part of trading follows the working hours of people and institutions, and many of them do not work on weekends [4].

In January 2024 something changed that could make this pattern stronger. On 10 January 2024 the U.S. Securities and Exchange Commission approved the listing and trading of spot bitcoin exchange-traded products [5], and the first funds started trading the next day [6]. These funds hold real bitcoin, but their shares are traded on stock exchanges, which are closed on weekends and U.S. public holidays. In July 2024 spot Ether funds started trading in the same way [7]. If a growing part of the money in Bitcoin and Ether now moves through funds that trade only on weekdays, weekends could become even quieter compared with weekdays than they were before.

The weekend effect is one of the oldest findings in finance. Studies of U.S. stocks from around 1980 looked at how returns behave over the weekend, when the market is closed [8]. Gibbons and Hess found that the average return on Mondays was unusually low, sometimes even

negative, and none of the explanations they tested could fully account for it [9]. For stocks, the weekend effect is about what happens while the market is closed and how prices react when it opens again.

For cryptocurrencies the question is different, because the market does not close. Early studies of Bitcoin found mixed results for returns. Caporale and Plastun found no day-of-the-week effect in most cryptocurrencies, with the exception of Bitcoin, for which Monday returns were higher than on other days, although a trading simulation did not show that this could be used to make reliable profits [10]. Aharon and Qadan, using data from 2010 to 2017, found a day-of-the-week effect in both Bitcoin's returns and its volatility [11]. Later studies point more toward volatility than toward returns. Kinateder and Papavassiliou found no classical day-of-the-week effect in Bitcoin returns between 2013 and 2019, but significantly lower risk over the weekend and higher volatility at the start of the week [1]. Baur et al. used more than 15 million observations from seven exchanges and found that patterns in returns did not persist over time, while trading activity was consistently lower in local evening hours and on weekends [2].

Two studies connect this directly to stock markets. Wang et al. looked at hourly Bitcoin data on the Bitstamp exchange and found that trading volume and volatility were higher during the hours when European and U.S. stock exchanges are open, and higher on weekdays than on weekends [4]. The study closest to this one is by Xu, who used daily Bitcoin data from September 2014 to 21 January 2024 and found no difference between weekends and weekdays in average returns, but lower volatility and lower trading activity on weekends [3]. Xu's sample ends ten days after the spot Bitcoin ETFs started trading, so it cannot say whether the ETFs changed anything. On the ETFs themselves, Lee and Lee found that after the approval in January 2024 the correlation between Bitcoin and stocks, which had been falling, started to rise, and that risk spread more strongly in both directions between Bitcoin and equity markets [12]. If the ETFs made Bitcoin more connected to the stock market, it is reasonable to expect that the stock market's weekly calendar would also matter more for Bitcoin. To my knowledge, no study has tested this for weekends using both the Bitcoin and the Ether ETF launches, which happened six months apart and give two separate tests of the same idea.

I have studied digital payments and household borrowing in Kazakhstan before [13]. That work was about how people pay and borrow; this paper looks at a different side of digital money, the market for the cryptocurrencies themselves. As in the earlier work, I check whether a pattern that looks obvious at first holds when it is tested properly. The paper asks three questions:

– Do Bitcoin and Ether behave differently on weekends than on weekdays, in returns, in how much the price moves, and in trading volume?

– Did the difference between weekends and weekdays change after spot Bitcoin ETFs started trading in January 2024, and after spot Ether ETFs started trading in July 2024?

– If the weekend pattern changed, when did it change?

2. Materials and methods

Data. Daily prices and trading volume for Bitcoin (BTC-USD) and Ether (ETH-USD) were downloaded from Yahoo Finance on 5 October 2026 [14, 15]. Each daily record covers one calendar day in Coordinated Universal Time (UTC), from 00:00 to 24:00. The sample runs from 1 January 2018 to 30 September 2026, which gives 3,195 days for each coin with no missing days. To check that the results do not depend on one data provider, daily reference prices were also downloaded from Coin Metrics [16]. Daily returns calculated from the two sources were almost identical (correlation 0.994 for both coins).

Variables. The daily return is the change in the natural logarithm of the closing price, multiplied by 100, so a value of 2 means the price rose by about 2% that day. Two measures of how much the price moved were used. The first is the absolute daily return, which ignores the direction of the move. The second is the Parkinson range, which uses the day's highest and lowest prices and is a more precise estimate of volatility than one based on closing prices only [17]. Saturday and Sunday in UTC were counted as weekend days. For trading volume, raw numbers were not

compared, because the volume reported for cryptocurrencies is added up across many exchanges, and these exchanges can be quite separate markets with different prices [18]. Instead I used the share of each week's volume that was traded on Saturday and Sunday. If trading were spread evenly across the week, this share would be 2/7, or 28.6%.

Event dates. The "after" period for Bitcoin starts on 11 January 2024 and for Ether on 23 July 2024, the first days on which the spot funds were traded, according to the daily price history of the largest funds [6, 7]. Before these dates there were 2,201 days for Bitcoin and 2,395 for Ether; after them, 994 and 800.

Main test. Before calculating any results, I wrote down which test the paper would be built on. It was a difference-in-differences regression of the absolute daily return on a weekend indicator, an after-ETF indicator and their product:

$$|r| = a + b \cdot Weekend + c \cdot After + d \cdot (Weekend \times After) \quad (1)$$

Here b is the usual weekend gap, c is the general change in volatility after the ETF, and d shows whether the weekend gap itself changed. A negative d would mean that weekends became relatively calmer after the ETF. Because crypto volatility comes in waves, where calm days follow calm days and wild days follow wild days, ordinary standard errors would be too small. I therefore used Newey-West standard errors with seven lags, which allow for this kind of dependence [19]. The main test was the coefficient d for Bitcoin; the same test for Ether was planned as a second, independent check.

Other tests. Average returns on weekends and weekdays were compared with Welch's t-test, the Mann-Whitney test and a regression with Newey-West errors. For the ratio between average weekend and weekday absolute returns, 95% intervals were calculated with a block bootstrap that resamples blocks of seven consecutive days, using 5,000 repetitions. The main test was also repeated with Coin Metrics prices, without March 2020 (the month of the COVID-19 crash), with a "before" period of the same length as the "after" period, with only one year on each side of the launch, and with the logarithm of the Parkinson range, which measures changes in proportion rather than in percentage points. Finally, I defined a second kind of "closed" day: a weekday on which the S&P 500 index has no trading record because U.S. exchanges were closed for a holiday [20]. There were 85 such days in the sample.

3. Results and discussion

3.1 Weekends are calmer, but not more profitable

Table 1 summarises the main differences. For both coins and in both periods, the price moved much less on weekends than on weekdays. Over the whole sample, Bitcoin's average absolute daily return was 1.54% on weekends and 2.48% on weekdays, so a typical weekend day moved only 62% as much as a typical weekday (95% interval 58% to 68%). For Ether the ratio was 71% (95% interval 66% to 77%). The weekend gap was statistically significant in every test and every period ($p < 0.001$). Saturday was the calmest day for both coins: Bitcoin's average absolute return was 1.30% on Saturdays, 1.79% on Sundays and 2.70% on Mondays, the most volatile day of the week (Figure 1).

Table 1 – Weekend and weekday behaviour of Bitcoin and Ether before and after the U.S. spot ETF launches

Coin and period	Mean return, weekend (%)	Mean return, weekday (%)	Absolute return, weekend (%)	Absolute return, weekday (%)	Weekend ÷ weekday	Weekend share of volume (%)
Bitcoin, before ETF	0.06	0.05	1.73	2.69	0.64	24.0
Bitcoin, after ETF	0.04	0.07	1.12	2.00	0.56	19.2
Ether, before ETF	0.28	-0.02	2.48	3.39	0.73	24.0
Ether, after ETF	-0.02	-0.04	1.82	2.79	0.65	20.3

Note: Bitcoin before: 1 Jan 2018 to 10 Jan 2024, after: 11 Jan 2024 to 30 Sep 2026; Ether before: 1 Jan 2018 to 22 Jul 2024, after: 23 Jul 2024 to 30 Sep 2026. Returns are daily log returns in UTC days. Source: Yahoo Finance; author's calculations.

Trading followed the same pattern. Over the whole sample, Saturdays and Sundays together had 21.9% of Bitcoin's trading volume and 22.6% of Ether's, well below the 28.6% they would have if trading were spread evenly.

Average returns, on the other hand, were not different. Bitcoin's mean daily return was 0.06% on weekends and 0.06% on weekdays (p = 0.99), and a joint test of all seven days of the week found no day-of-the-week effect in returns (p = 0.21). Ether's weekend returns were somewhat higher before its ETF, 0.28% against -0.02%, but this difference was not significant (Newey-West p = 0.07 before the ETF, p = 0.10 over the whole sample), and after the ETF it disappeared. This agrees with Kinateder and Papavassiliou [1] and with Xu [3], who also found lower weekend volatility but no difference in average returns.

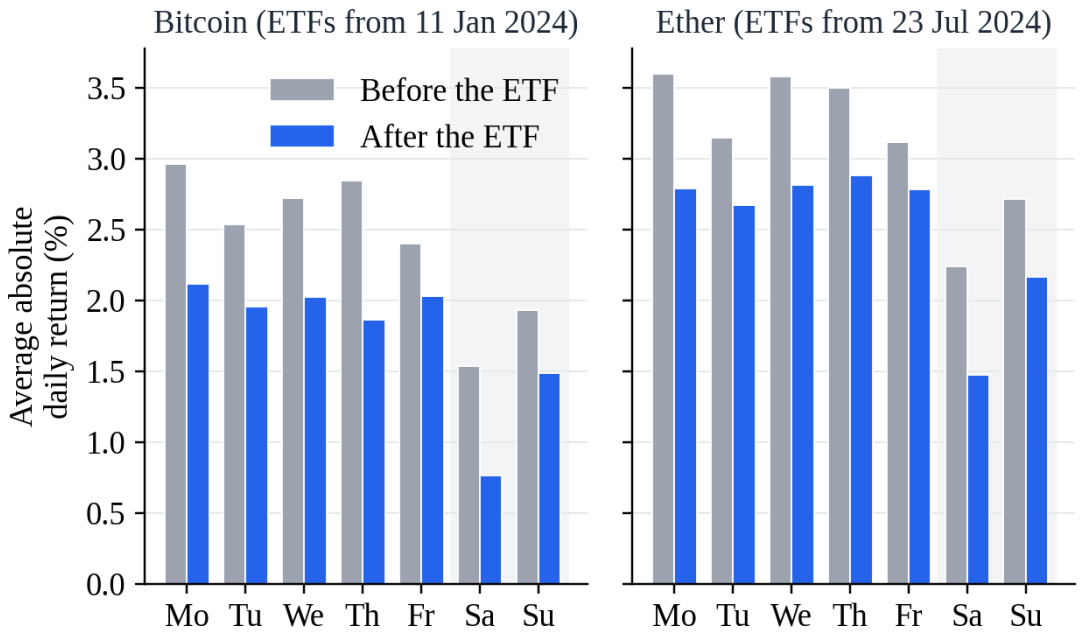


Figure 1 - Average absolute daily return by day of the week, before and after the spot ETF launches (the shaded area marks the weekend; source: Yahoo Finance, author's calculations)

3.2 Did the ETFs change the weekend gap?

At first sight, Table 1 seems to say yes. After the Bitcoin ETFs started trading, the weekend-to-weekday ratio fell from 0.64 to 0.56, and the weekend share of volume fell from 24.0% to 19.2%. Ether shows a similar picture. But Table 1 also shows that volatility fell on all days after the launches, and the main test was designed to separate these two things.

The main test did not find a change. For Bitcoin, the coefficient d was +0.09 percentage points (95% interval -0.18 to 0.35, p = 0.52), and for Ether it was -0.06 (95% interval -0.46 to 0.35, p = 0.78). So after the ETFs both weekends and weekdays became calmer by roughly the same number of percentage points, and the gap between them stayed about the same size. The bootstrap interval for the change in the Bitcoin ratio, from 0.64 to 0.56, also included zero (-0.18 to 0.02). The result did not depend on the data source, on the COVID-19 crash, or on how "closed" days were defined (Table 2). With a before period of the same length as the after period, the Bitcoin coefficient was even positive (+0.28, p = 0.07), which would mean that weekends became slightly less calm compared with weekdays.

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Table 2 – Did the weekend gap change after the ETF launches? Difference-in-differences estimates

Version of the test	Bitcoin: d (95% interval)	p	Ether: d (95% interval)	p
Main test (Yahoo Finance prices)	+0.09 (-0.18 to 0.35)	0.52	-0.06 (-0.46 to 0.35)	0.78
Coin Metrics prices	+0.09 (-0.17 to 0.35)	0.50	-0.03 (-0.44 to 0.38)	0.87
Without March 2020	+0.08 (-0.18 to 0.34)	0.55	-0.07 (-0.48 to 0.33)	0.72
Closed day = any day U.S. exchanges were closed	0.00 (-0.26 to 0.27)	> 0.99	-0.17 (-0.56 to 0.22)	0.39
Before period of equal length	+0.28 (-0.02 to 0.57)	0.07	-0.07 (-0.51 to 0.37)	0.76
One year before and one year after	-0.15 (-0.56 to 0.27)	0.49	+0.02 (-0.57 to 0.61)	0.95
Log of Parkinson range, whole sample	-0.25 (-0.34 to -0.16)	< 0.001	-0.15 (-0.24 to -0.07)	< 0.001
Log of Parkinson range, from 2022 only	-0.01 (-0.11 to 0.10)	0.88	+0.02 (-0.08 to 0.13)	0.64

Note: d is the coefficient on Weekend × After in formula (1). In the first six rows it is measured in percentage points of absolute daily return; in the last two, in log points of the Parkinson range. A negative d means weekends became relatively calmer after the launch. Newey-West standard errors with 7 lags. Source: Yahoo Finance, Coin Metrics; author's calculations.

One version of the test did show a change. When volatility is measured with the logarithm of the Parkinson range, which looks at changes in proportion rather than in percentage points, weekends became relatively calmer after the launch: for Bitcoin, the weekend range shrank by about 22% more than the weekday range (d = -0.25, p < 0.001). This is the same thing Table 1 shows with the falling ratio. The question is whether this happened because of the ETFs or simply around the same time.

3.3 When did weekends become quieter?

To answer this, I looked at when the change happened. Figure 2 shows the weekend share of trading volume over time. For both coins it was about 25% to 27% a year in 2018 to 2021, then dropped during 2022 and 2023 to around 20%, and has stayed between about 18% and 21% since. The drop was already over when the ETFs arrived. In a regression with a time trend, the weekend share of Bitcoin volume was falling by about 1.3 percentage points per year before January 2024. At the launch itself there was a small extra drop (-1.8 points, p = 0.05), but after it the decline stopped and the share stayed roughly flat (the change in the trend was +1.6 points per year, p < 0.001). For Ether there was no break at its ETF launch at all (p = 0.15 for the level and p = 0.92 for the trend).

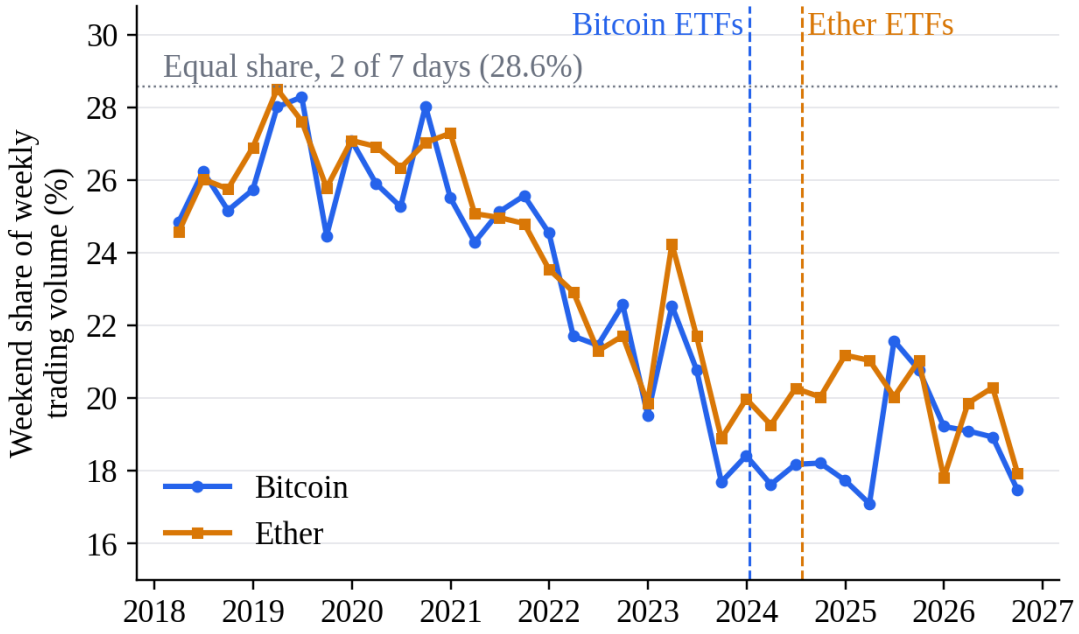


Figure 2 - Share of each week's trading volume that was traded on Saturday and Sunday, quarterly averages (dashed lines mark the first trading days of the spot ETFs; source: Yahoo Finance, author's calculations)

Volatility tells the same story. I repeated the proportional test inside the period before the ETFs only, splitting it at 1 January 2022. This "placebo" test, where no ETF was involved, produced an even larger change than the real one: weekends became relatively calmer after the start of 2022 ($d = -0.37$ for Bitcoin and -0.29 for Ether, both $p < 0.001$). When the ETF test was run only on data from 2022 onward, the effect disappeared (Table 2, last row). The year-by-year numbers show the same thing. The weekend-to-weekday ratio for Bitcoin was 0.81 in 2019, 0.60 in 2021, 0.57 in 2022 and 0.47 in 2023, the lowest of any year, before any ETF existed. In the twelve months up to 25 November 2023 it was 0.45. It dipped a little lower for a short time, to 0.39 in the twelve months up to 11 March 2024, but those twelve months were mostly before the launch. In every twelve-month window that lies fully after the launch, the ratio stayed at 0.49 or above, and in 2025 it was back at 0.63.

So the weekends did become quieter compared with weekdays, but this happened mostly in 2022 and 2023. That was also a period when both coins lost about two-thirds of their value: Bitcoin fell from about $46,300 at the end of 2021 to about $16,500 at the end of 2022, and Ether from about $3,700 to about $1,200. The data cannot show why the weekend share fell at that time, but the timing does not support the idea that the ETFs caused it.

3.4 U.S. holidays: a pattern that was not planned

While checking the different definitions of a "closed" day, I noticed something that had not been planned, so it is reported separately and with caution. Before the launches, weekdays when U.S. exchanges were closed for a holiday looked almost like ordinary weekdays. For Bitcoin the average absolute return on these days was 2.45%, against 2.70% on other weekdays (Mann-Whitney $p = 0.66$). After the launch, holidays looked like weekends: 1.14% on the 28 holidays, against 2.03% on ordinary weekdays and 1.12% on weekends (Figure 3). Ether showed the same pattern: 3.10% against 3.40% before its ETF ($p = 0.41$), and 1.56% on 22 holidays against 2.84% on ordinary weekdays after.

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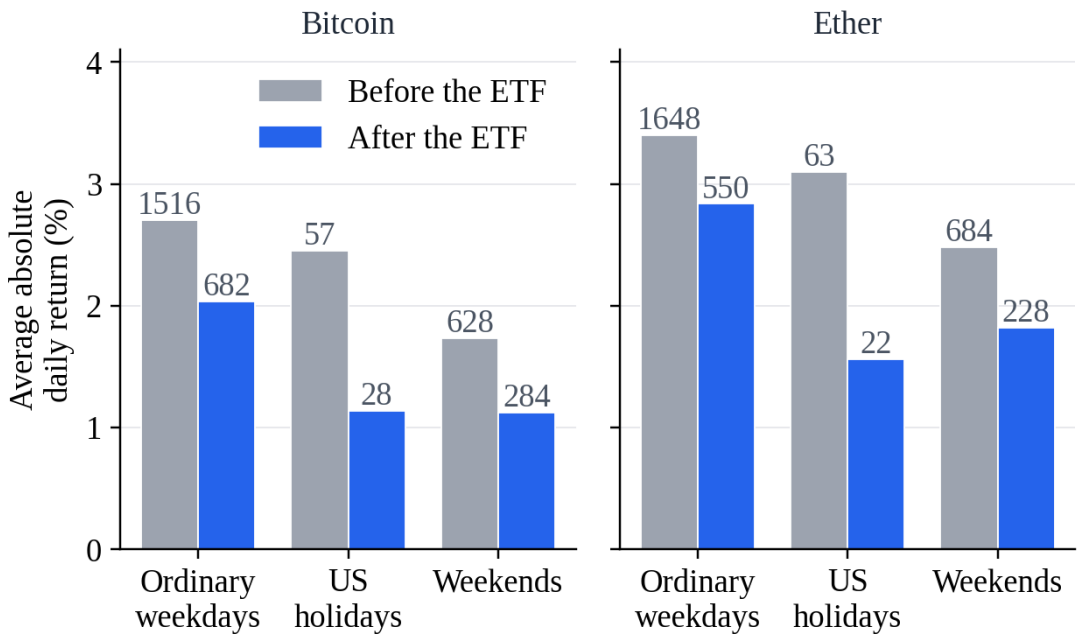


Figure 3 - Average absolute daily return on ordinary weekdays, weekdays when U.S. exchanges were closed for a holiday, and weekends, before and after the spot ETF launches (numbers above the bars are the number of days; source: Yahoo Finance, author's calculations)

The number of holidays after the launches is small, so this was tested in two ways. In a difference-in-differences regression on weekdays only, the holiday gap grew after the launch by 0.65 percentage points for Bitcoin ($p = 0.09$) and by 0.98 for Ether ($p = 0.046$); in proportional terms the change was significant for both coins ($p = 0.006$ and $p = 0.019$). In a permutation test, 28 random weekdays were drawn from Bitcoin's after period 20,000 times. A random set of days was as calm as the real holidays only 0.2% of the time (0.5% for Ether, with 22 days). Because this test was not planned and the holidays include days like Christmas and New Year, when many people around the world are not working, the result needs to be checked again in a few years with more holidays.

3.5 Discussion

I started this project expecting that the spot ETFs would make crypto weekends even quieter, because the funds can be traded only on weekdays. Before seeing any results, I wrote down my forecast (translated from Russian): "On weekends Bitcoin moves less than on weekdays. The quiet comes on Saturday. After the ETF the gap grew, weekends became even quieter compared with weekdays." The first two parts turned out to be right. The third part is also what the simple before-and-after numbers in Table 1 show, but the main test does not support it. The weekend gap was large before the ETFs and stayed about the same size after them. Most of the shift toward quieter weekends happened in 2022 and 2023, and a comparison that only looked at "before 2024" and "after 2024" would have given the ETFs credit for a change that had already happened. In my earlier work, a strong-looking pattern in regional statistics depended on a change in regional borders [13]. Here, a strong-looking change after the ETFs depended on where the "before" period begins. Both times, the simplest comparison gave a different answer from a more careful one.

The finding that weekends are calm but not more profitable fits what earlier studies found for Bitcoin [1, 3], and these data show that it still holds after 2024 and also holds for Ether. It also fits the idea that crypto trading follows the working week of the people and institutions that trade it [2, 4]. If prices move less on weekends simply because fewer people are trading, there is no reason for weekend returns to be higher or lower, and that is what I found.

The holiday result was not planned, and I treat it with care. If it holds up with more data, it would mean that the ETFs changed how crypto behaves on U.S. holidays, even though they did not

change the weekend gap. Weekends were already quiet before 2024 for reasons that had nothing to do with the U.S. stock market. A U.S. holiday on a Monday, however, is a normal working day in most of the world. Before the ETFs, crypto seemed to treat it like a normal day; after them, it seems to treat it more like a weekend. This would fit with the finding that Bitcoin has become more closely connected to stock markets since the ETF approval [12]. In that case, U.S. market holidays would matter more for crypto now than they did before 2024.

3.6 Limitations

The study has several limitations. First, it uses daily data with days in UTC. U.S. exchanges close on Friday at 20:00 or 21:00 UTC and open on Monday at 13:30 or 14:30 UTC, so the "weekend" here does not match the real closed period exactly, and hourly data would give a sharper test. Second, the volume reported for cryptocurrencies is added up across many exchanges that work as partly separate markets [18], so its completeness could not be checked. This is why only weekend shares, and not raw volumes, were used. Third, other things also happened in 2024, and an event study with two dates cannot separate the effect of the ETFs from everything else that changed at the same time. Fourth, the holiday result was not planned, is based on only 28 and 22 days, and includes days that are holidays in many countries, so it should be treated as a lead for future work rather than a finding. Finally, only the two largest cryptocurrencies were studied, and smaller coins may behave differently.

4. Conclusion

Between 2018 and 2026, Bitcoin and Ether moved much less on weekends than on weekdays, and weekends had a smaller share of trading, but average returns on weekends were not significantly different from weekday returns. The launch of U.S. spot ETFs for Bitcoin in January 2024 and for Ether in July 2024 did not change the size of the weekend gap in the main test. The move toward quieter weekends happened mostly in 2022 and 2023, before the ETFs. The one change found after the launches, that U.S. stock market holidays became about as calm as weekends, was not planned and needs more data to confirm. The main conclusion is that the weekend pattern in crypto existed before the ETFs, and that in this kind of study the choice of the "before" period can change the answer.

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Author contributions and use of AI

The author chose this research question from three topics proposed by his mentors in an admissions mentoring programme and wrote down his forecast before seeing any results. The data download, the statistical analysis, the figures and the drafting of the text were done by the author with the help of his research mentor. Every number in the paper comes from that code run on the public data described in Section 2 and was checked against the saved results; no data, number or reference was taken from an AI tool without being checked against its source.

Data availability

All data are public. Daily prices and volumes come from Yahoo Finance and Coin Metrics. The daily dataset and the analysis scripts are available from the author on request.

Conflicts of interest

The author declares no conflicts of interest.

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