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CRYPTOCURRENCY MARKET DYNAMICS AROUND BITCOIN FUTURES EXPIRATION EVENTS

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ABSTRACT
In the rapidly evolving landscape of cryptocurrency markets, understanding the underlying dynamics that drive price movements and investor sentiment can be a matter of survival. However, there are myriad facets of trading reality, and the only thing that we can do is to slowly understand them one after another, one step at a time. This article picks one corner of the cryptocurrency market and sheds a little light on it. We have already written a few times about the importance of the introduction of Bitcoin futures and their impact on the Bitcoin price. Therefore, in this article, we will specifically examine Bitcoin's behavior around the critical events when Bitcoin futures expire.

Keywords: Cryptocurrencies, market timing own-research

INTRODUCTION
Firstly, let us briefly introduce future contracts or short-ened futures.

- As mentioned several times in older articles, futures contract sare financial derivatives that oblige the buyer to purchase a determined underlying asset (or the seller to sell that asset) at a predetermined future price and date. They are used mainly for portfolio hedging and speculation purposes.
- Each has a special characterization (such as Trading Hours, minimum Price Fluctuation, and Settlement) by the exchange on which it is traded; in our example, we are interested in Bitcoin Futures Contract Specs—from CME Group.

Primarily used in commodity/currency/rates and equity markets, they have also found use in cryptocurrency markets, utilizing theoretical aspects of perpetual (*BTC-PERP*) futures (Shiller, 1993). the beginning were) traded on unregulated exchanges (often It is important to note that *PERPs* are (or at least at with leverage up to 100x) but recently were added to respected ones such as *Coinbase* (which is traded on NASDAQ as ticker *COIN*) too.

Perpetual futures have no expiration dates, but traditional futures do. Therefore, we are interested in the impact of the introduction of traditional highly liquid futures on the CME Exchange and their expiration calendar on the underlying Bitcoin price.

Related (Research and) Literature We were partially inspired by (Blasco, Corredor and Satrústegui, 2023) and encouraged to continue in their steps and choose our own direction for lacking research. In short summary, this paper studies the effect of monthly expiration on the intraday movements of the Bitcoin market. Their results show that around the time of maturity, there are significant changes in the trading volume, volatility, and returns of bitcoin, an asset traded in many exchanges simultaneously:

- The prevailing effect on trading volume is that it increases before the expiration, at least in the case of cash-settled contracts, and decreases later.
- Volume increases tend to increase volatility and vice versa. However, the effect on volatility is shorter in time than that detected on volume.
- The overlapping of possible effects from other unregulated futures with the exact maturity dates as those of some of the formally regulated futures under analysis, as well as the expiration of other sophisticated products, such as options or futures with daily maturity, may also influence the results obtained in the spot markets.
- Introducing bitcoin futures contracts in regulated markets leads to an expected increase in institutional investors' trading.

Their research sheds some light on cryptocurrencies, and casts doubts on market efficiency, and how bitcoin pricing can be stable. They empirically confirm a clear anomaly in the spot market when the futures expiration date arrives, a Page 1 of 4 phenomenon which is clearly manifested in the hours around the expiration.

Our plan is to follow in the footsteps of (Blasco et al., 2023) and study the impact of the futures expiration on the daily timeframe, spot Bitcoin prices, and BTC ETF prices.

DATA AND COLLECTION

We relied on one source, Yahoo Finance, from where we downloaded historical data for two assets:

- Bitcoin USD (BTC-USD) Price History & Historical Data – BTC spot
- ProShares Bitcoin Strategy ETF (BITO) Stock Historical Prices & Data – BTC ETF

YF got its data on the spot *BTC* from Coin Market Cap, which is often a trusted and reliable price source for derivative exchanges to calculate mark prices. They do so by accumulating and aggregating prices and volumes from the most respectable exchanges, and we consider this the closest to the "real" price of Bitcoin (you can get to sell/buy at any point in time).
The data sample starts with the first BTC futures expiration day on Friday, 12/29/2017 and runs until 28/2/2024. Bitcoin spot is traded 24/7 and each trading day in our data ends at 0.00 UTC time.

APPROACHES & METHODOLOGIES

A bit of history window, in nice chronology and important points, is necessary:

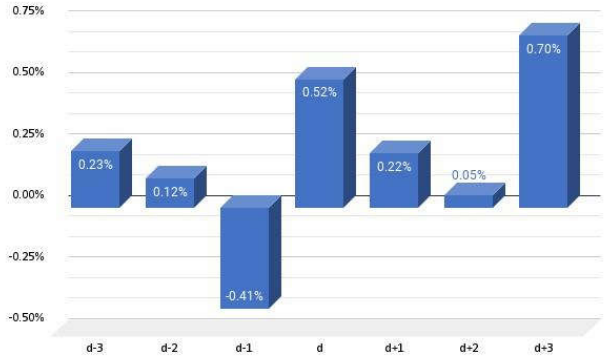
- Cboe Bitcoin futures, the first U.S. regulated futuresof their kind, launched on December 10, 2017.[1]
- Then (8 days later), *CME* announced that its new bitcoin futures contract would be available for trading on Dec. 18. The *CME* announcement came as the *Commodity Futures Trading Commission* said it would allow the world's largest futures exchange and its competitor, the bit coin contracts; *CNBC* *Cbo Futures Exchange*[2] reported on this in a couple, to launch of articles.
- Speaking of future options, unlike regular market hours, Bitcoin contract positions expire on *CME* at 16:00[3] London time on the last Friday of **every month**.
- As the ProShares investment prospect*BITO*, the first of its kind, was incepted on 10/18/21.[4] points out, *BITO* invests in Bitcoin futures and does not invest in spot Bitcoin. There is no guarantee the fund will closely track Bitcoin returns. But it does sufficiently so, and for a long time, up until January 2024, it was the only trustworthy way for institutional investors that wanted *BTC* exposure in *ETF* form.
- Then came the first spot, U.S. ETFs (European and Canadian were before, but they were thinly traded and hence had a negligent influence on the price of spot Bitcoin), which is fast-forward and another story.

However, back on topic!
Since we have an absolutely minuscule (weeks) sample of spot *ETF*s, events, and surroundings, their consequent influences on future prices during expiration have yet to be shown. We will leave any guesses open. What will definitely be interesting is to see if *trad-fin* "classical" events will *emanate* on spot *ETF*s and, therefore, influence spot and futures prices; we are talking about holiday effects, the turn of the months, etc. All of that is yet to be seen.

MAIN RESULTS AND COMMENTARY

Let's start with a simple sub-task: plot spot *BTC* behavior in t days before (*t-3* to *t-1*), at (day *d*), and after the expiration event (*d+1* to *d+3*), and try to draw some conclusions. Our hypothesis is that the introduction of the BTC futures trading may have an impact on the BTC spot returns around the BTC futures expiration days (research by Blasco et al. (2023) has already shown that there are intraday patterns around the expiration).

This bar chart nicely shows the arithmetical (linear) average of returns on Friday, on day *d* (introduced before), and days around.

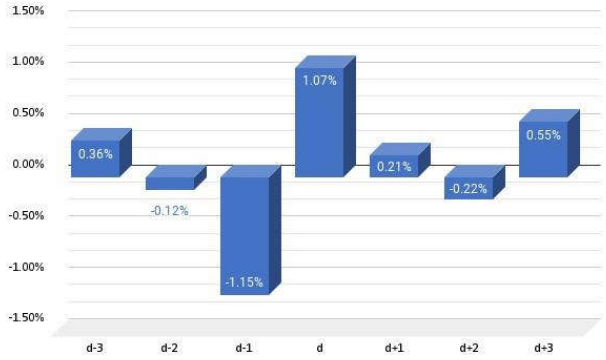


We can see that BTC gains significantly during expiration day but have negative returns on the preceding day. Note that returns during the subsequent weekend (d+1 and d+2) are comparable to those three and two days before expiration and are not a matter of interest. Looks really like first Monday after the expiration is the best day return-wise from them all.

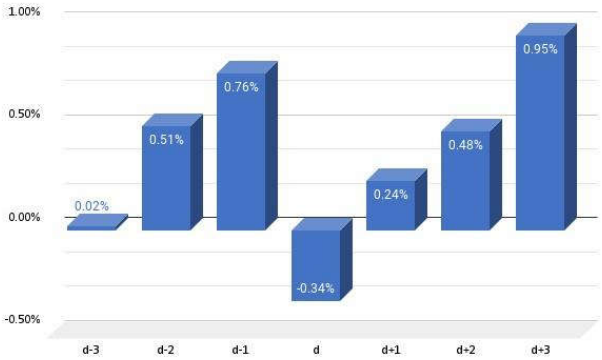
This one is from a full sample, but it is to be said that we will have our focus on two sub-samples:

- before *BITO* launch;
- and after the *BITO* launch.

This is our question -> Is there any influence of ETF traded BITO on returns around expiration? Our hypothesis is that with the introduction of the BITO ETF, there was a significant influx of money into BTC futures, which could shift the pattern in the returns around the BTC futures expiration.



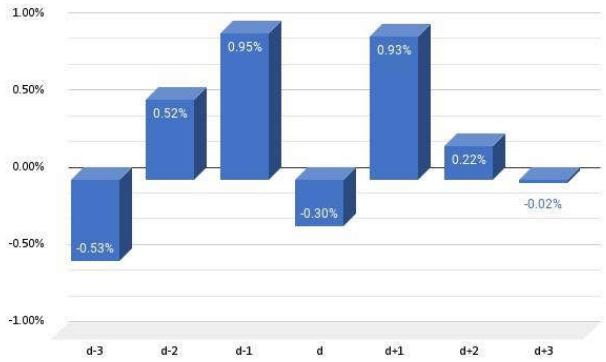
: Until BITO creation (last expiration was on Friday 9/24/2021)



:Spot from BITO creation onwards (first expiration with
BITO in the trading environment of NYSE ARCA exchange was on 10/29/2021)

An astute reader would see that *"price action"* (returns around in the vicinity of expiration day) kind of flipped around the dates before and after the *BITO* launch. The daily pattern in the BTC returns in the period before the BITO introduction (2017-2021) is similar to the whole period (2017-2024). On the other hand, the pattern in the daily returns after the BITO ETF introduction (2021-2024) is reversed, especially on days preceding the expiration and on the expiration day itself.

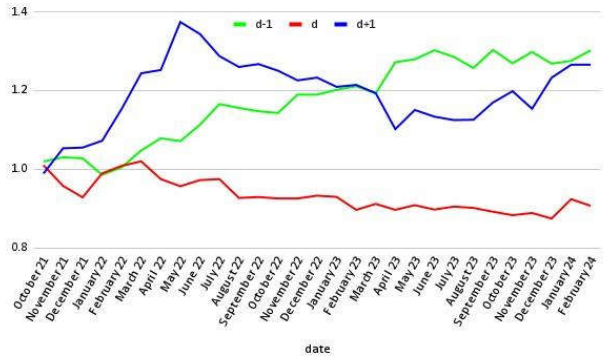
Finally, let's just quickly look at the returns of *BITO ETF* (obviously, we track it from its first expiration on futures, whichwas10/29/2021,as mentione dear lier):*[topofthenext page]* One very important warning – the chart above shows the performance around the expiration days in the NYSE Exchange trading calendar, as BITO is not traded 24/7 as BTC spot, but only during working days. Therefore, d+1



performance includes the performance from Friday's NYSE close (4pm ET) until next Monday's close (4pm ET). Therefore, it also includes Saturday and Sunday returns.

On expiration, Friday, *BITO*, same as BTC spot, underperforms relatively to days preceding expiration (*d-2* and *d-1*) but really shines on Monday (*d+1*) (same as spot or perpetual futures on unregulated exchanges). Of course, the natural question arises—how would the performance curve look if we built trading strategies based on days around futures expiration using the BITO ETF?

And here comes *equity curves* (y-axis to depict appreciation/depreciation of $ 1 invested in strategy, or /100 return in % in time):



With the traditional performance table:

rel. to exp. day	*d-1*	*d*	*d+1*
CAR p.a.	11.13%	-3.81%	9.88%
Volatility p.a.	8.92%	9.47%	14.36%
Max DD	-6.21%	-14.27%	-19.78%
Sharpe Ratio	1.25	-0.40	0.69
CAR / max DD	1.79	-0.27	0.50

So, if you plan to trade around the BTC futures expiration, you should consider the days around the expiration (Thursday and the weekend afterward + Monday) and avoid the expiration day itself. This pattern is similar to the Option Expiration Week strategy in stock indexes.

CONCLUSION & ENDING

Unfortunately, we only have a relatively short sample (four plus three years *circa*) for our analysis, but data suggests that BTC futures expiration impacts BTC spot prices andBITOETF.Butourresearchdoesn'tendhere.Surely,the introduction of the BTC spot ETFs can and probably would impact the price action. We definitely plan to revisit this research after more data are available and analyze the impact of the BTC spot ETFs. Should the price action become even more apparent or disappear completely? Time will tell.

Trading Strategy (*TBD*)
Combination of *d-1* + *d+2*
Quick Info
CRediT authorship contribution statement RadovanVojtko:Conceptualizationofthisstudy,Method-
ology. **Cyril Dujava:** Software.

REFERENCES

[1] Blasco, N., Corredor, P., Satrústegui, N., 2023. Is there an expiration effect in the bitcoin market? International Review of Economics Finance 85,647–663. URL: https://www.sciencedirect.com/science/article/pii/S1059056023000515, doi:https://doi.org/10.1016/j.iref.2023.02.013.

[2] Shiller, R.J., 1993. Measuring Asset Values for Cash Settlement in Derivative Markets: Hedonic Repeated Measures Indices and Perpetual Futures. Journal of Finance 48, 911–931. URL: https://ideas.repec.org/a/bla/jfinan/v48y1993i3p911-31.html.

	CAR p.a.	Volatility p.a.	Sharpe Ratio	Max DD	CAR / max DD
(Model Portfolio)	22.51%	13.87%	1.62	-10.80%	2.09

Portfolio Summary

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