

BITCOIN FUTURES: MARKET EVOLUTION



CINDICATOR

Cindicator Analytics Team prepared the report “Bitcoin Futures: Market Evolution,” a new analysis of the emerging market for Bitcoin (BTC) futures.

For this analysis, [Cindicator](#) researchers first looked at volumes on futures and volumes on crypto exchanges in Bitcoin terms to have an idea about the liquidity and the development of the market. The second part of the report is dedicated to BTC price and volatility movements around futures expiry dates to find evidence of repetitive market behaviour during these periods.

Contents

| | |
|---|-----------|
| General overview | 4 |
| Futures data analysis | 5 |
| Graphical analysis | 7 |
| Regression Analysis | 18 |
| Correlation analysis | 20 |
| Conclusions and further analysis | 25 |
| About Cindicator | 27 |
| Contacts | 27 |

General overview

The first Bitcoin futures were introduced by the CBOE on 10 December last year and, seven days later, the CME launched its own. The CBOE Bitcoin Futures Contract uses the XBT ticker and is equal to one Bitcoin with a single price auction at 20:00 UTC on the settlement date on the Gemini exchange as the final settlement value. The CME Bitcoin Futures Contract uses the BTC ticker and is equal to five Bitcoins, using the CME Bitcoin Reference Rate as the daily reference rate. This is an index that references pricing data from cryptocurrency exchanges, currently made up of Bitstamp, GDAX, itBit and Kraken, taken at 19:45 UTC on its final settlement date.

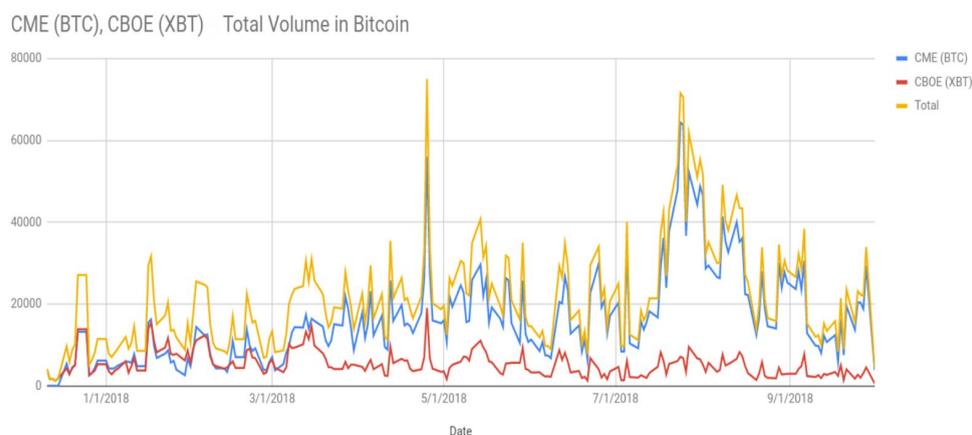
The decision to allow futures on Bitcoin worried some crypto investors who believed that these products would bring about the eventual death of the first cryptocurrency, whereas others in the community thought it would bring lower volatility and thus be a step towards complete and widespread adoption. After the launches both futures gained popularity and experienced an increase in volume traded, while Bitcoin's volatility lowered and its price suffered a sharp decline of two thirds of the value at the beginning of the year.

In our analysis, we have compared volumes on futures and volumes on crypto exchanges in Bitcoin terms in order to get an idea about the presence of institutional investors in the futures market. We then analyse their past positions on futures and compare them to price movements before futures expiry dates. The second part is dedicated to price and volatility movements around futures expiry dates, as we try to find evidence of recurrent market behaviour during these periods. Is it true that the Bitcoin price drops before futures expiries and recovers after contract fixing?

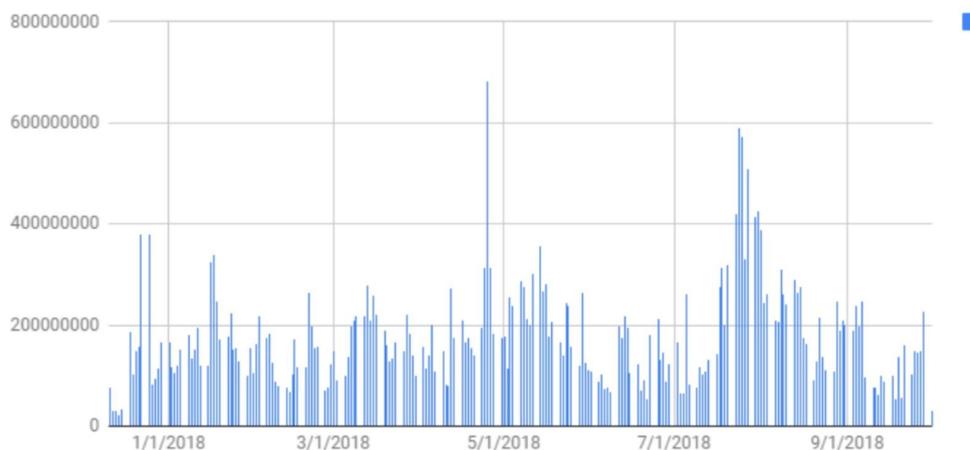
The first thing to consider is how an investor can be classified as institutional. The investor category is composed of retail investors and institutional investors such as banks, insurance companies, hedge funds, investment advisers, endowments, and mutual funds among others. An unregulated market such as the Bitcoin market makes it nearly impossible to clearly separate these two categories. Usually, futures contracts are more suitable for institutional investors given the high contract value and the liquidity a standardised contract provides. However, looking at volumes data, it is obvious futures are still not common instruments for taking on exposure on the Bitcoin market. A probable explanation is that pioneer institutional investors have preferred to trade directly on crypto exchanges, bearing the risk of holding Bitcoin (or the counterparty risk of leaving them on crypto exchanges), rather than paying high spreads for a lack of liquidity or risking being barred from closing their positions by the halting trading mechanisms of CME and CBOE (given the volatility experienced in the first few months of the year this could have been a viable concern).

Futures data analysis

Looking at the cumulative volumes of CME and CBOE futures we see that total daily volumes ranged from 10,000 to 75,000 BTC, with average daily total volumes of USD 17 million and a maximum of USD 680 million.



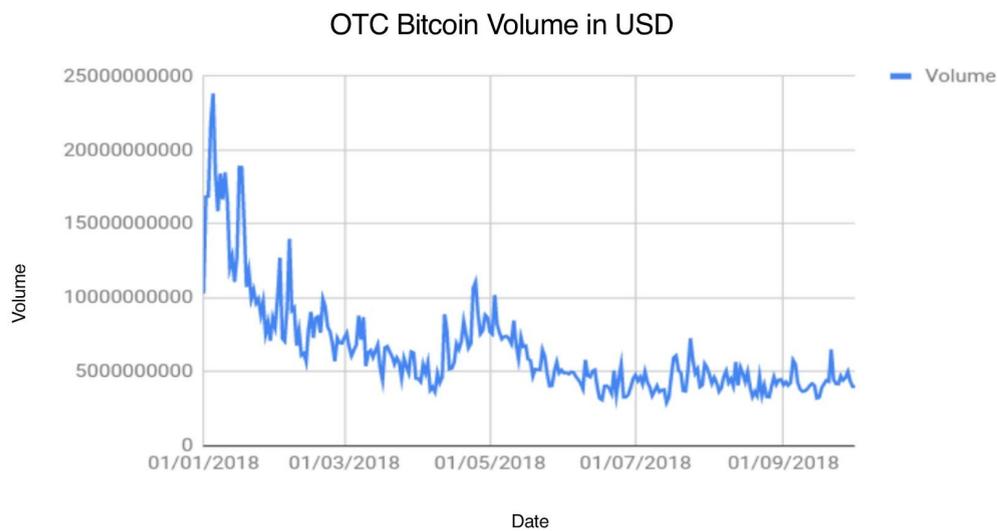
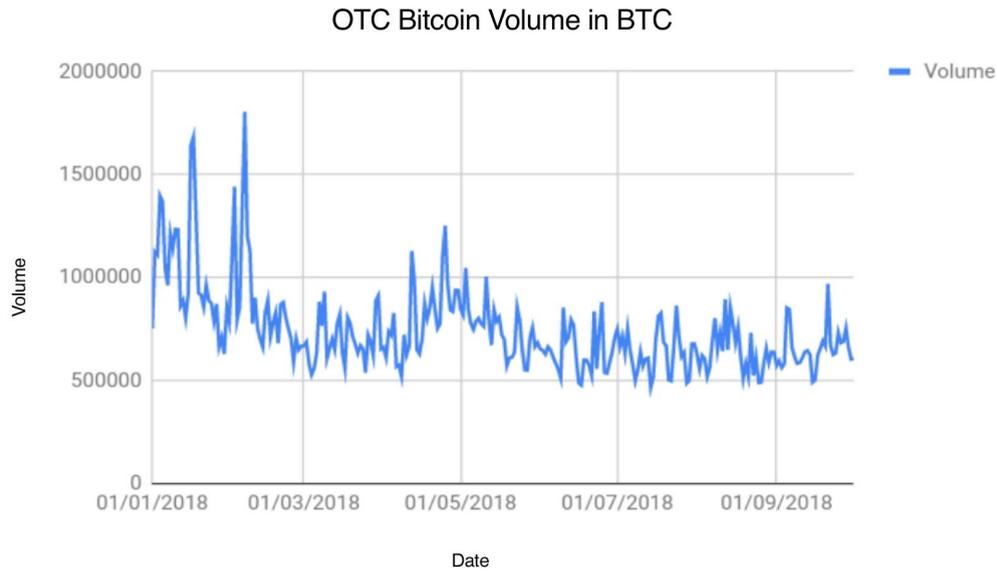
Total Futures Volumes in USD



Traded futures volumes are considerably lower than total Bitcoins exchanged through the over-the-counter (OTC¹) market, even though we can see a positive variation that highlights the increase of institutional positions in the crypto market. Considering the drop in recent OTC volumes with respect to the start-of-year level, it is clear that futures are becoming more relevant as a trading instrument given their utility in betting against possible price

¹ OTC in this report refers to crypto exchange prices. We use this term only to differentiate it from futures prices given that futures are standardised sized contracts that are quoted in regulated exchanges

appreciation. This opposite trend can be explained by the entry of new institutional investors right after Bitcoin's price volatility decreased. Lower price volatility is a necessary condition for institutions to consider Bitcoin as an asset in the portfolio construction process.



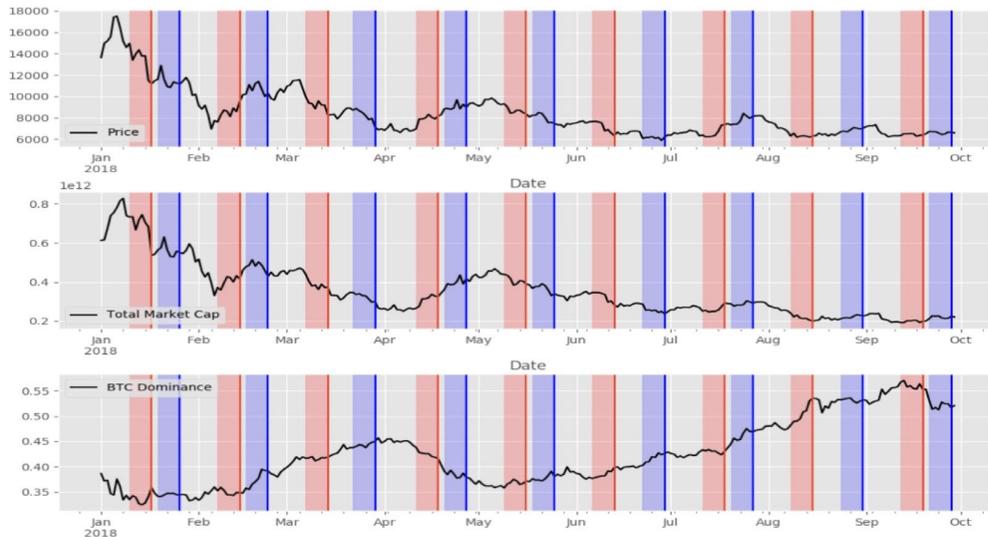
However, considering the current market, Bitcoins are traded mostly on crypto exchanges and futures prices have a minor impact on price development. Even though studying futures prices to predict Bitcoin spot prices seems insufficient, analysing how Bitcoin's price moves around futures expiry dates can make sense. This is partly because of arbitrageurs trying to gain from differences between futures and spot prices that can be produced by lower liquidity and/or differing demand–supply dynamics of futures and spot investors in the short term.

Graphical analysis

Futures expiries:

| CBOE | | | | CME | | |
|--------|--------|------------|--|--------|--------|------------|
| Ticker | Month | Last trade | | Ticker | Month | Last trade |
| XBTF8 | Jan 18 | 17/01/2018 | | BTCF8 | Jan 18 | 26/01/2018 |
| XBTG8 | Feb 18 | 14/02/2018 | | BTCG8 | Feb 18 | 23/02/2018 |
| XBTH8 | Mar 18 | 14/03/2018 | | BTCH8 | Mar 18 | 29/03/2018 |
| XBTJ8 | Apr 18 | 18/04/2018 | | BTCJ8 | Apr 18 | 27/04/2018 |
| XBTK8 | May 18 | 16/05/2018 | | BTCK8 | May 18 | 25/05/2018 |
| XBTM8 | Jun 18 | 13/06/2018 | | BTCM8 | Jun 18 | 29/06/2018 |
| XBTN8 | Jul 18 | 18/07/2018 | | BTCN8 | Jul 18 | 27/07/2018 |
| XBTQ8 | Aug 18 | 15/08/2018 | | BTCQ8 | Aug 18 | 31/08/2018 |
| XBTU8 | Sep 18 | 19/09/2018 | | BTCU8 | Sep 18 | 28/09/2018 |
| XBTV8 | Oct 18 | 17/10/2018 | | BTCV8 | Oct 18 | 26/10/2018 |
| XBTX8 | Nov 18 | 14/11/2018 | | BTCX8 | Nov 18 | 30/11/2018 |
| XBTZ8 | Dec 18 | 19/12/2018 | | BTCZ8 | Dec 18 | 28/12/2018 |
| XBTF9 | Jan 19 | 16/01/2019 | | BTCH9 | Mar 19 | 29/03/2019 |

The **red areas** represent the seven-day period before the expiries of CBOE futures and the **blue ones** represent the seven-day period before CME expiries.

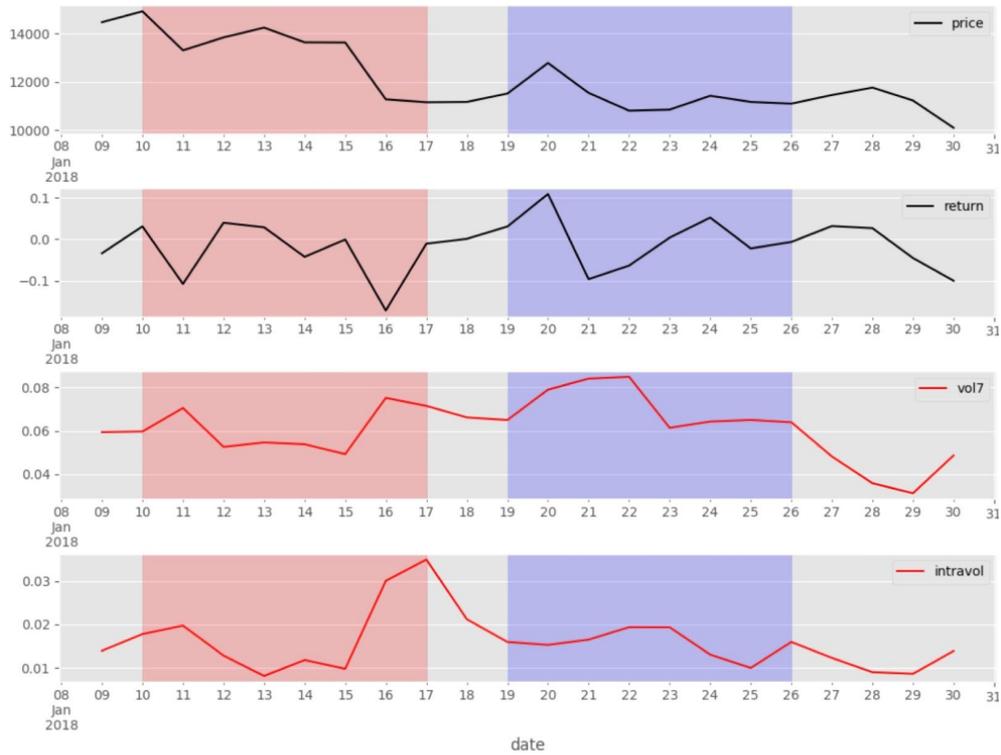


From a merely graphical point of view, we can see why there is a common belief about the Bitcoin price tending to drop shortly before each futures expiry and recover after the contract fixing. This particular pattern occurred frequently during the first expiries but became less visible after April 2018 and, therefore, we should analyse price patterns in a more detailed manner.

We observed monthly prices and the evolution of returns from the first expiry until the last one in September. In addition, we calculated a seven-day rolling volatility series and the daily intraday volatility of hourly returns in order to look for any abnormal spikes around futures expiries.

JANUARY 2018 – Expiries of F8 contracts

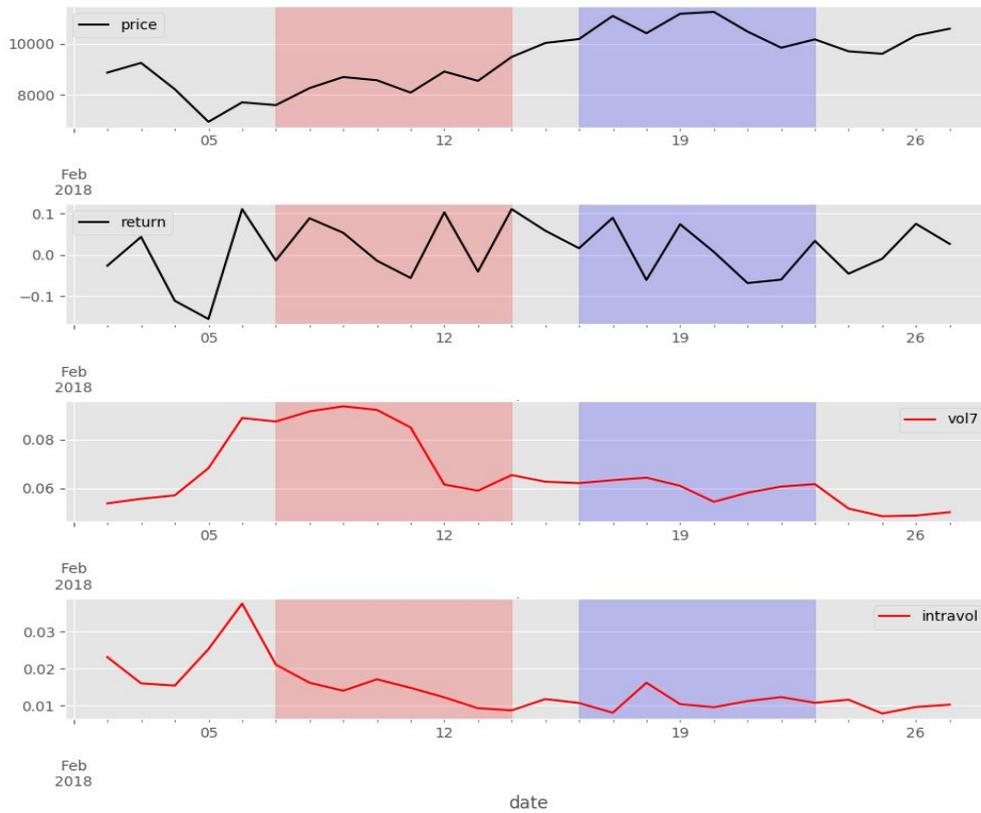




The price pattern in the week before the first expiry of CBOE and CME futures is similar. Bitcoin's price dropped before each fix and increased afterwards. Probably because it was the first expiry, the CBOE futures experienced a spike in intraday hourly return volatilities on expiry day. This characteristic could have been caused by the uncertainty of market participants around this event, which is also visible in the dump and pump price behaviour of Bitcoin between 16 and 17 January. The lower volatility during the first expiry of CME futures shows the different approach the market had. In fact, the dump and pump movement, in this case, took eight days from 21 to 29 of January, indicating a smoother reaction.

FEBRUARY 2018 — Expiries of G8 contracts

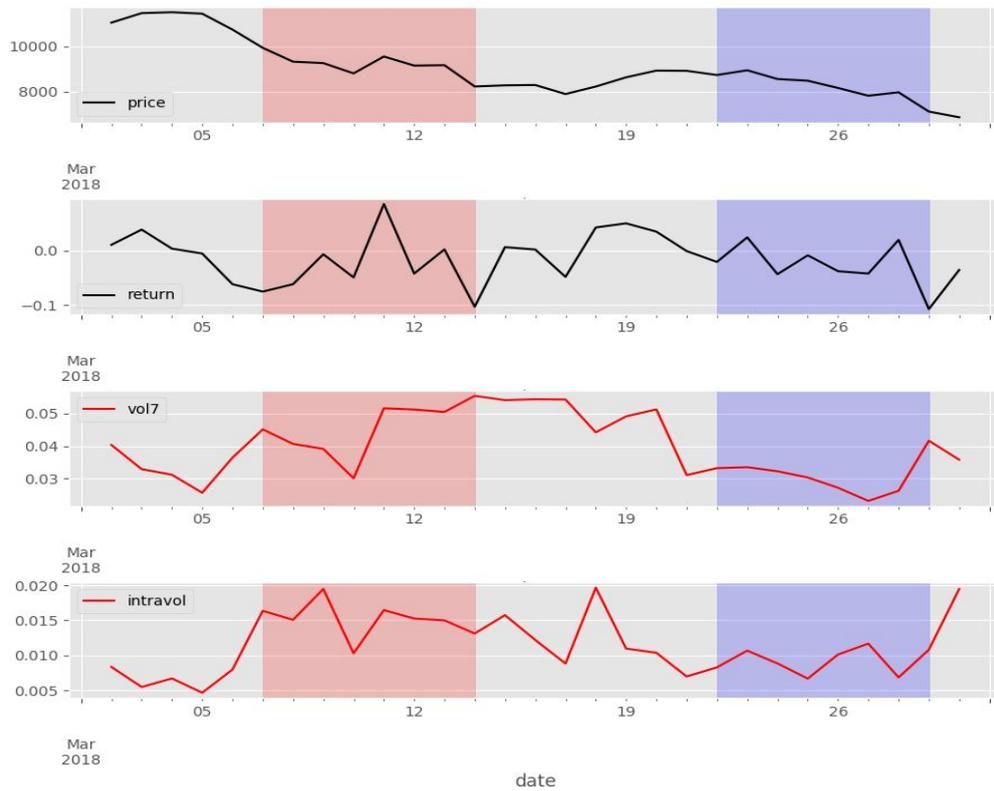




The second expiries for both futures followed the crypto market crash. This huge drop in Bitcoin's price had absolutely impacted February returns and volatilities movements, and decreased the importance of futures expiry events. However, the impending second expiry of CME futures could have been the reason why the 100% rally, which started after Bitcoin's price touched the USD 6,000 level, came to an end. This might have confirmed the market expectation of negative returns during the futures expiry day.

MARCH 2018 — Expiries of H8 contracts

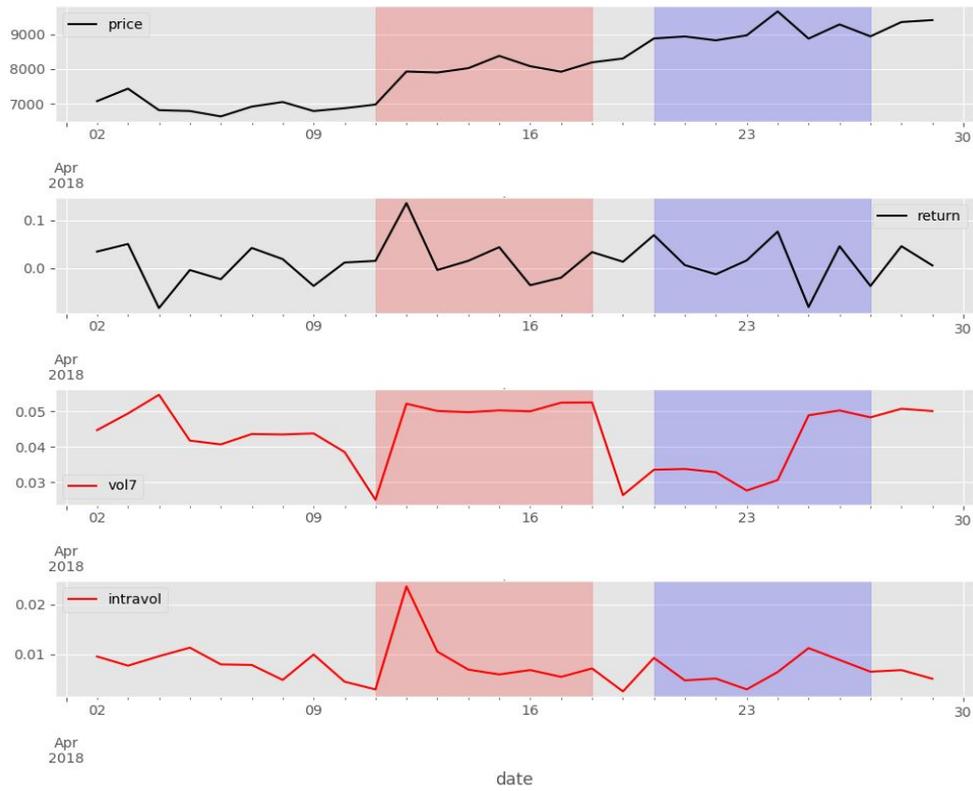




The March expiries were characterised by a bearish Bitcoin market. As already seen during the first part of February, it seems that futures expiries were losing importance and market players seemed more focused on the Bitcoin price itself rather than arbitrage opportunities or futures price movement dynamics. This characteristic was confirmed in the fact that, despite the drop in price before the expiries, there was no recovery phase during the days after the rolling futures.

APRIL 2018 – Expiries of J8 contracts

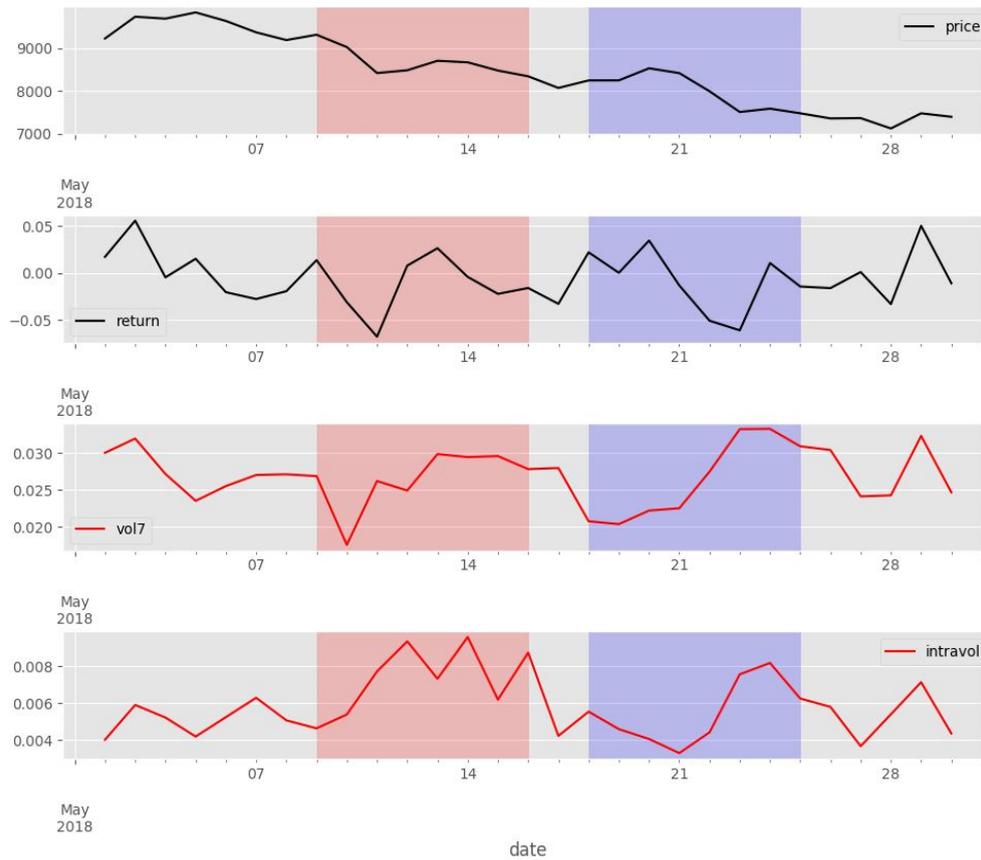




The same focus on Bitcoin’s price continued in April. Given the relevance of the technical level tested by prices, market participants were more concerned about support and resistance barriers rather than pre-futures fixing movements. However, we can see sell-offs and an increase in volatility right before the expiries, providing more evidence of dump and pump behaviours around these events.

MAY 2018 – Expiries of K8 contracts

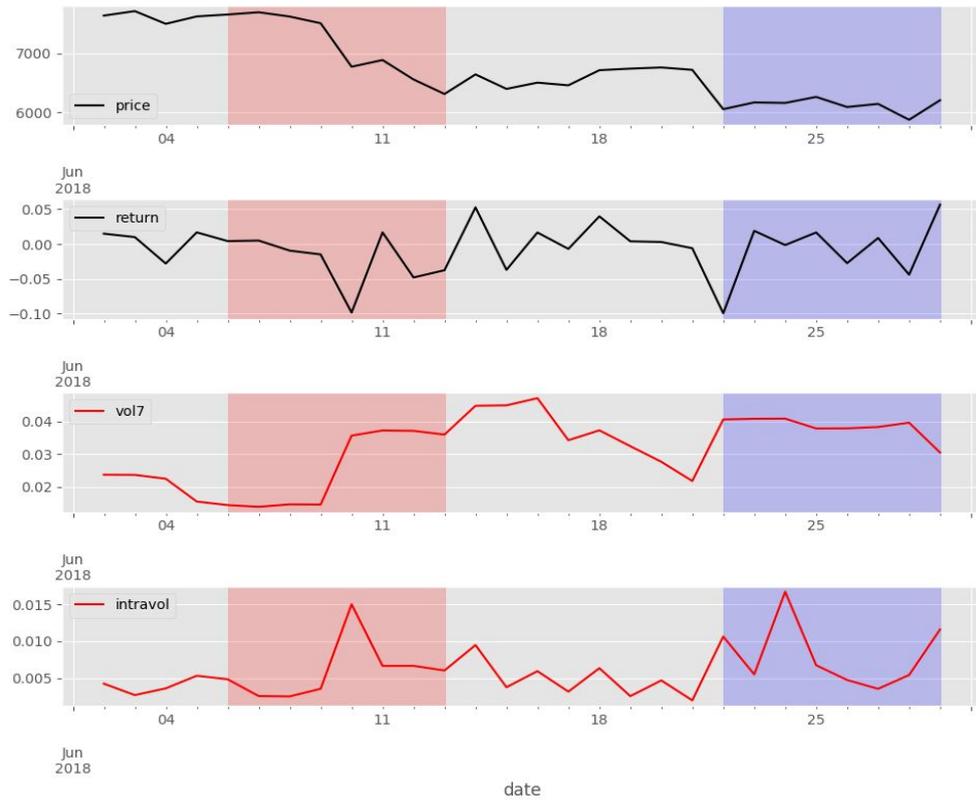




At the beginning of May, the failure to break the psychological USD 10,000 resistance level lead to the creation of a bearish trend that caused Bitcoin prices to drop almost linearly from USD 10,000 to 7,000. As was also discovered in recent months, the bearish trend worried traders and investors and decreased the focus on futures expiries. Regardless, despite the small impact of futures on the trend, it is interesting to note that volatilities picked up before expiries — a price discovery activity signal.

JUNE 2018 — Expiries of M8 contracts

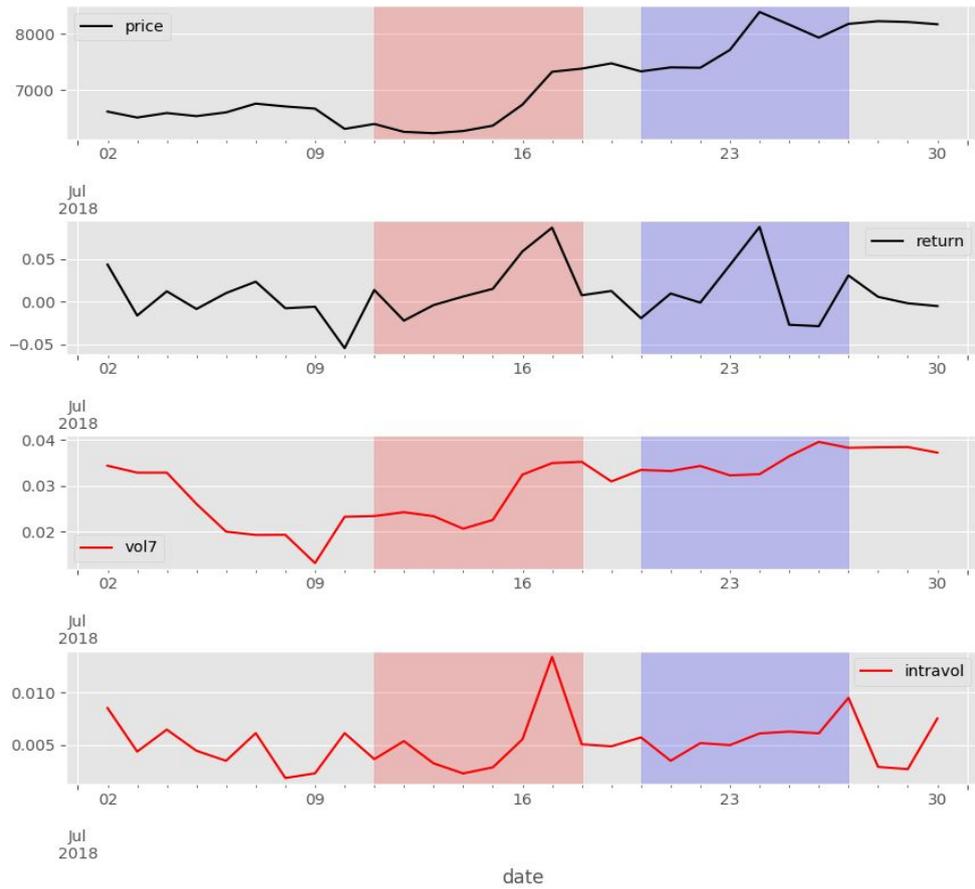




Before the 13 June CBOE futures expiry, Bitcoin's price dropped markedly. This could have been caused by the approaching expiries but was surely exacerbated by the crossing down of the USD 7,000 support. This broken support level subsequently became a resistance level and prevented a recovery. Movements around the USD 6,000 level and increasing volatilities during the last week of the month seem to have been determined more by technical factors than by positioning for futures expiries.

JULY 2018 - Expiries of N8 contracts

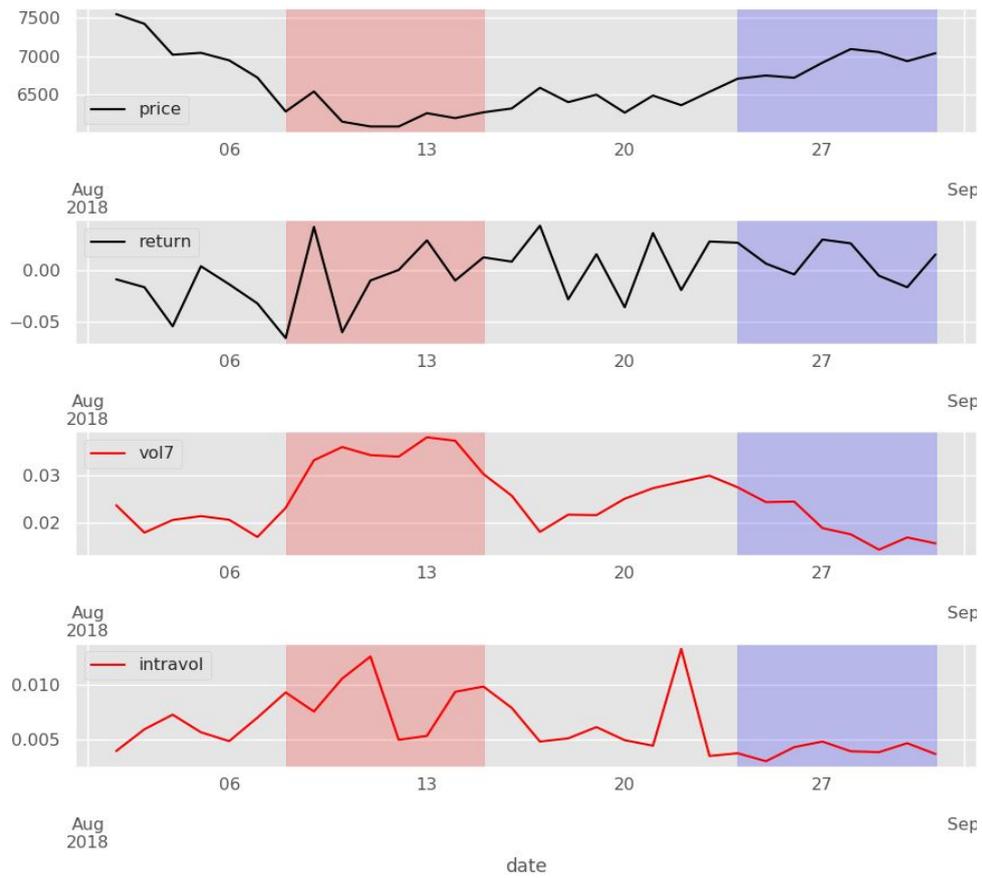




As in June, technical factors, and especially, the breach of the USD 6,500 level led to a bullish trend that saw the price testing the USD 8,500 level. Volatilities increased near expiries but, in contrast with usual behaviour, were determined by positive returns.

AUGUST 2018 – Expiries of Q8 contracts

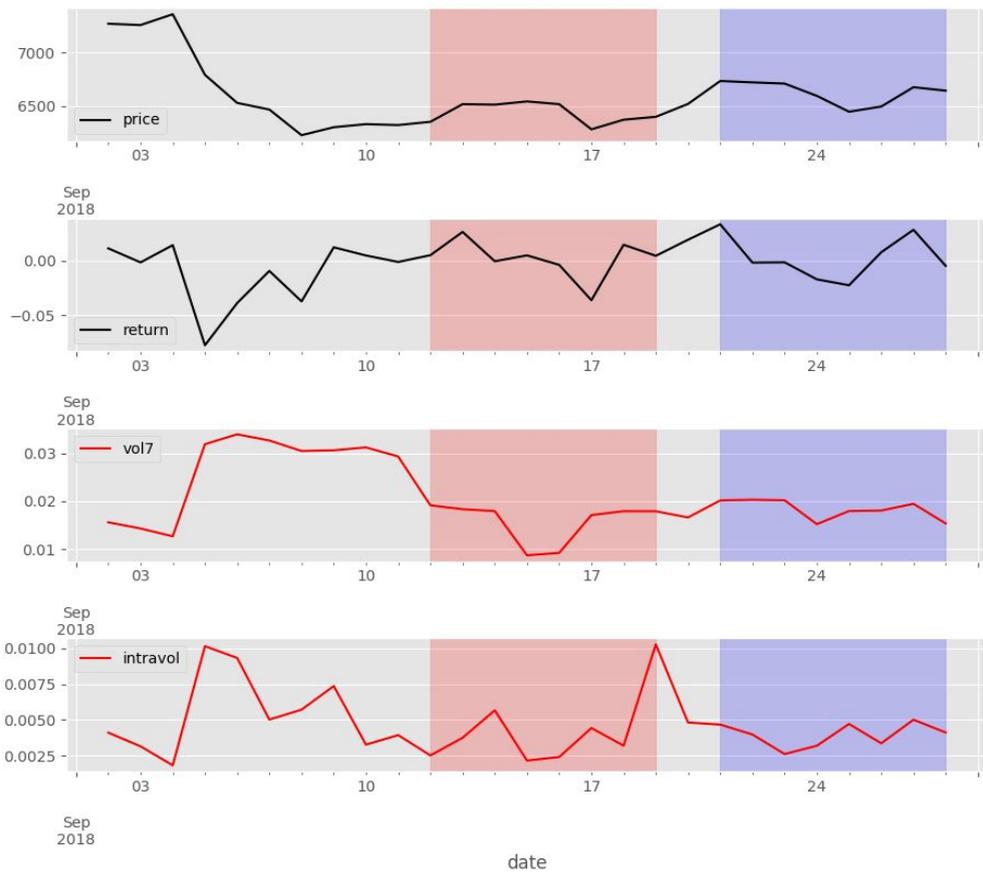




The month of August was characterised by a reduction of return volatilities. The Bitcoin price did not successfully defend the USD 7,000 per unit point and stabilised in the USD 6,000–7,000 range. During August, it seemed that market participants had regained interest by selling out or reducing contract positions before expiry dates and buying them back during these events.

SEPTEMBER 2018 — Expiries of U8 contracts





The sharp decrease in volatilities continued in September. After the umpteenth unlucky attempt of trading stably above USD 7,000, Bitcoin's price ranged between USD 6,200 and 6,800. In this environment, futures expiries had practically no impact on token prices and did not provide any clear trading signal.

Regression Analysis

To confirm our visual findings that no clear pattern exists, we analysed whether a relationship exists between Bitcoin returns and futures expiry dates. We employed a regression with hourly Bitcoin returns as the dependent variable and hourly returns of an index consisting of high market capitalisation coins and a dummy variable for the expiry of futures as the independent variables for both a seven- and one-day period before and after futures expiry dates. Our regression output does not allow us to reject the null hypothesis that the coefficients for the dummy variables are equal to zero. This result confirms our previous findings and means that we can't confirm a role in influencing Bitcoin hourly returns in the seven-day and one-day periods before and after each expiry. These relationships might change over time as so far only nine futures expiry dates for CBOE and CME were considered.

Seven day before expiry

n=6592

| | Coefficient | Std error | t |
|-----------------------|--------------------|------------------|----------|
| Intercept | -0.00006012 | 0.0000769 | -0.782 |
| Dummy variable | 0.00003562 | 0.000 | 0.335 |
| Index returns | 0.7068 | 0.004 | 127.087 |

Seven days after expiry

n=6592

| | Coefficient | Std error | t |
|-----------------------|--------------------|------------------|----------|
| Intercept | -0.00002101 | 0.0000549 | -0.382 |
| Dummy variable | -0.0003 | 0.000 | -1.423 |
| Index returns | 0.7068 | 0.004 | 172.118 |

One day before expiry

n=6592

| | Coefficient | Std error | t |
|-----------------------|--------------------|------------------|----------|
| Intercept | -0.0001 | -0.0000708 | -1.56 |
| Dummy variable | 0.0002 | 0.000 | 1.472 |
| Index returns | 0.7067 | 0.004 | 172.097 |

One day after expiry

n=6592

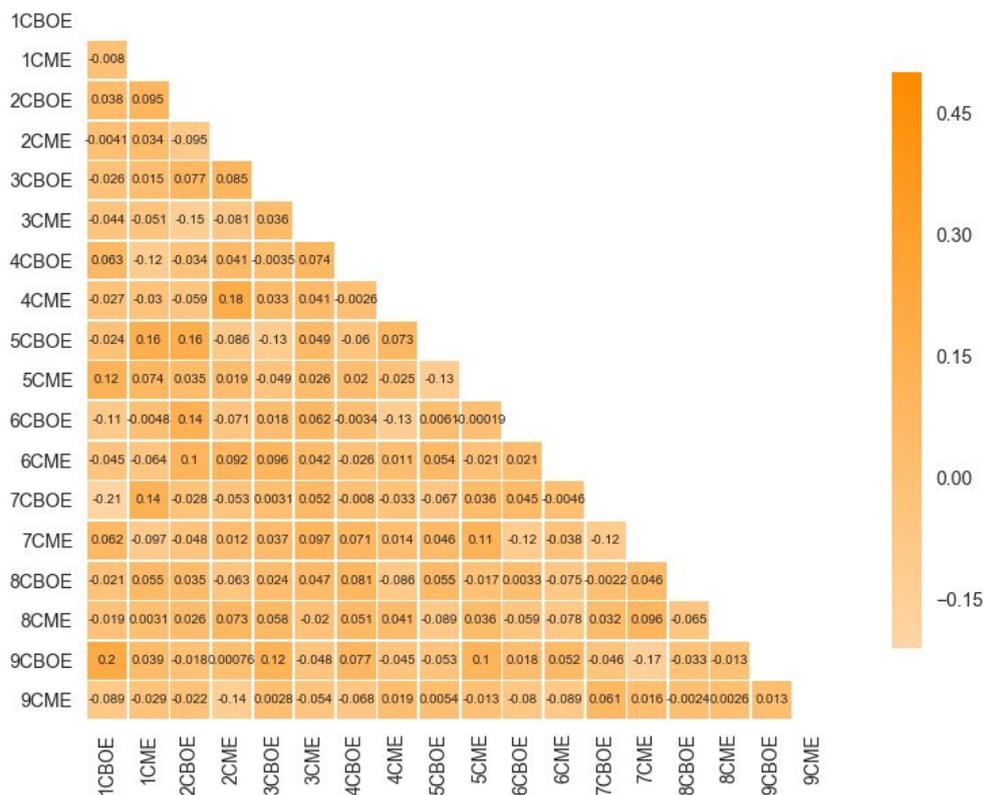
| | Coefficient | Std error | t |
|-----------------------|--------------------|------------------|----------|
| Intercept | -0.00003277 | 0.0000549 | -0.597 |
| Dummy variable | -0.0001 | 0.000 | -0.610 |
| Index returns | 0.7068 | 0.004 | 127.07 |

Correlation analysis

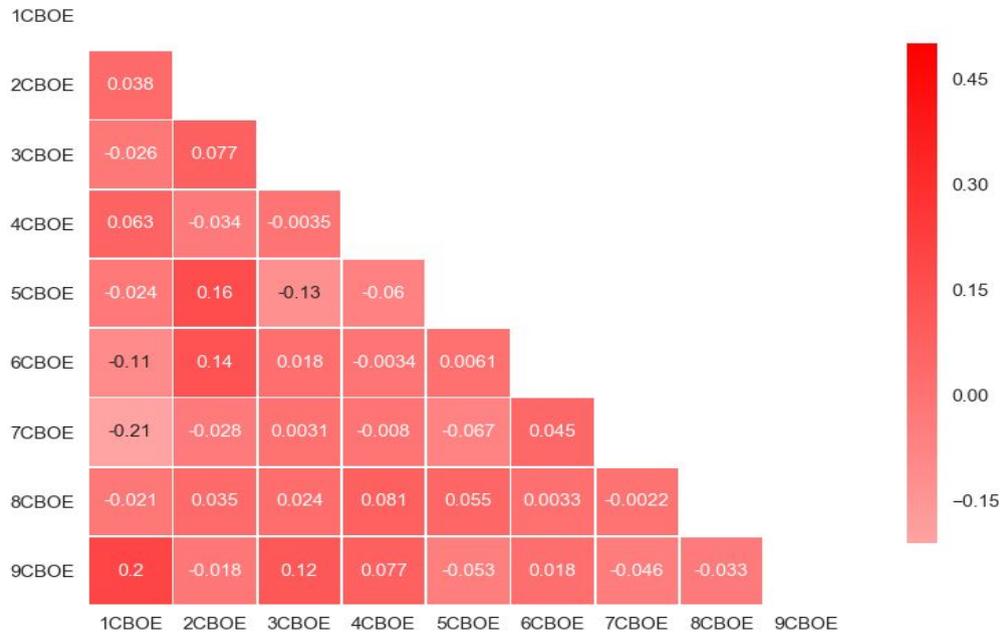
After describing the different behaviours of Bitcoin's price during futures expiry events, we calculated pairwise return correlations between contracts in order to confirm the absence of clear and recurring patterns of the Bitcoin price before and after contract rolling dates.

The correlations are calculated on the basis of hourly returns for seven days before (first three matrices) and seven days after (last matrix) the events (including expiry day) under consideration and are computed both between different contracts of the same futures and between different contracts of different futures.

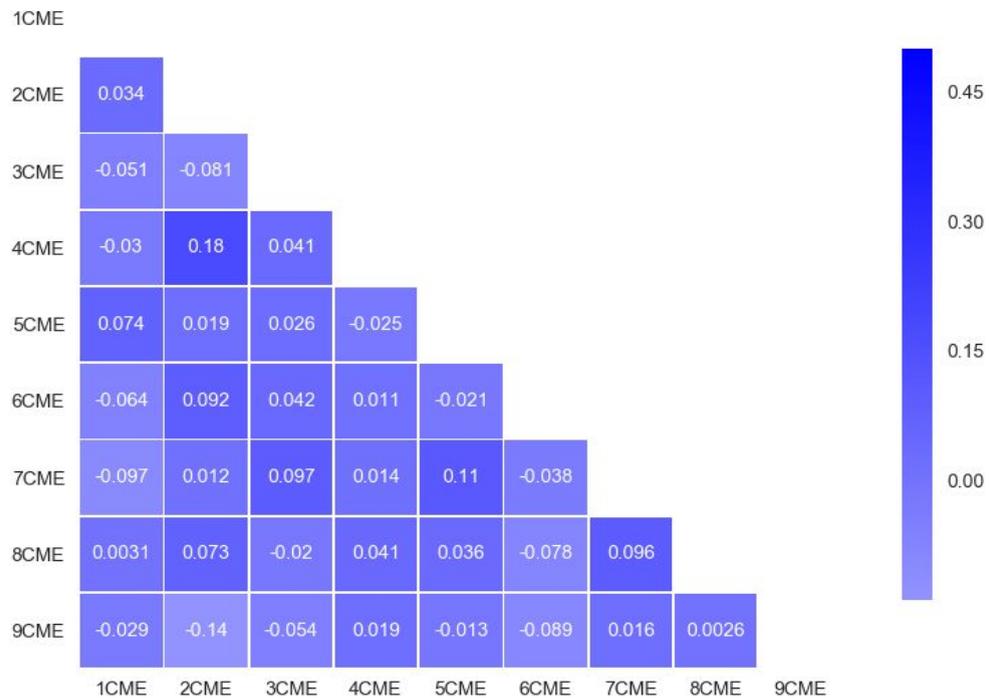
Total correlation matrix (CBOE and CME futures) - 7 days before



CBOE correlation matrix – 7 days before



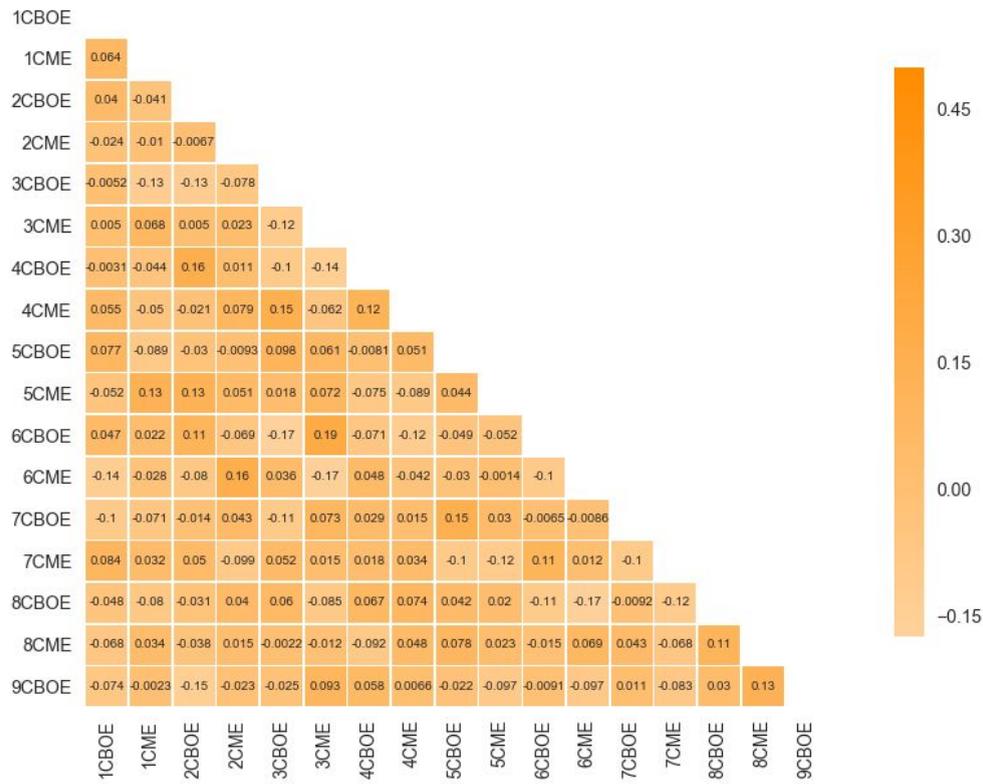
CME correlation matrix – 7 days before



As expected, correlations in the seven-day period before expiries are very low, confirming the absence of a linear relationship among returns. The non-recurrence of price patterns drew us

to the same conclusions and tells us that is necessary to consider the higher complexity of market reactions to these particular events.

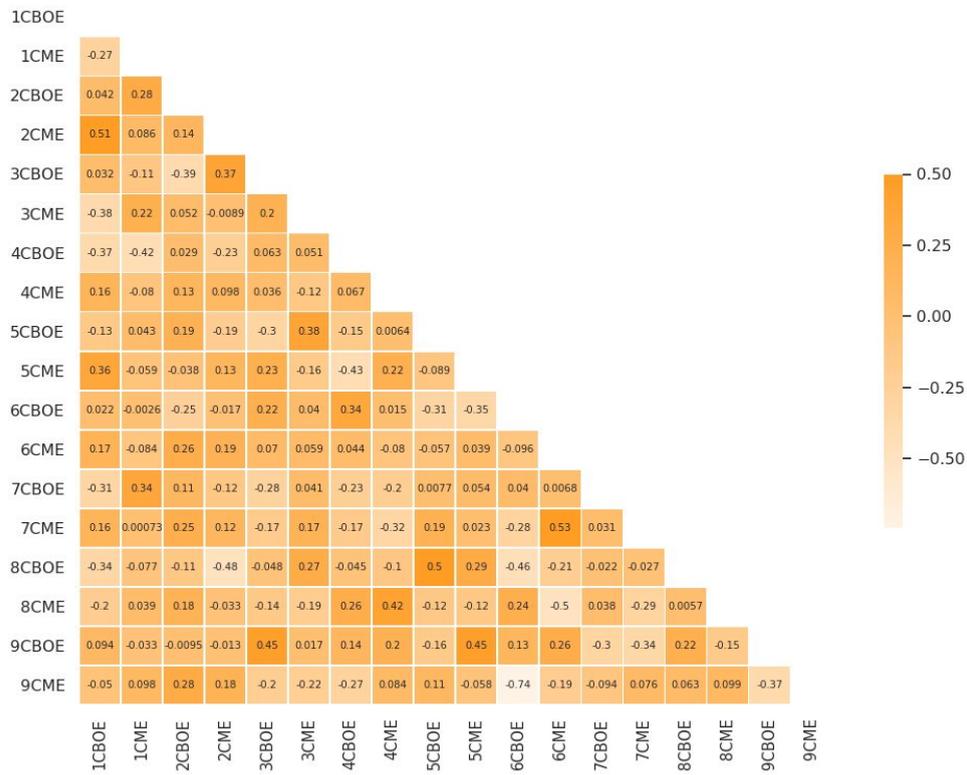
Total correlation matrix (CBOE and CME futures) – 7 days after



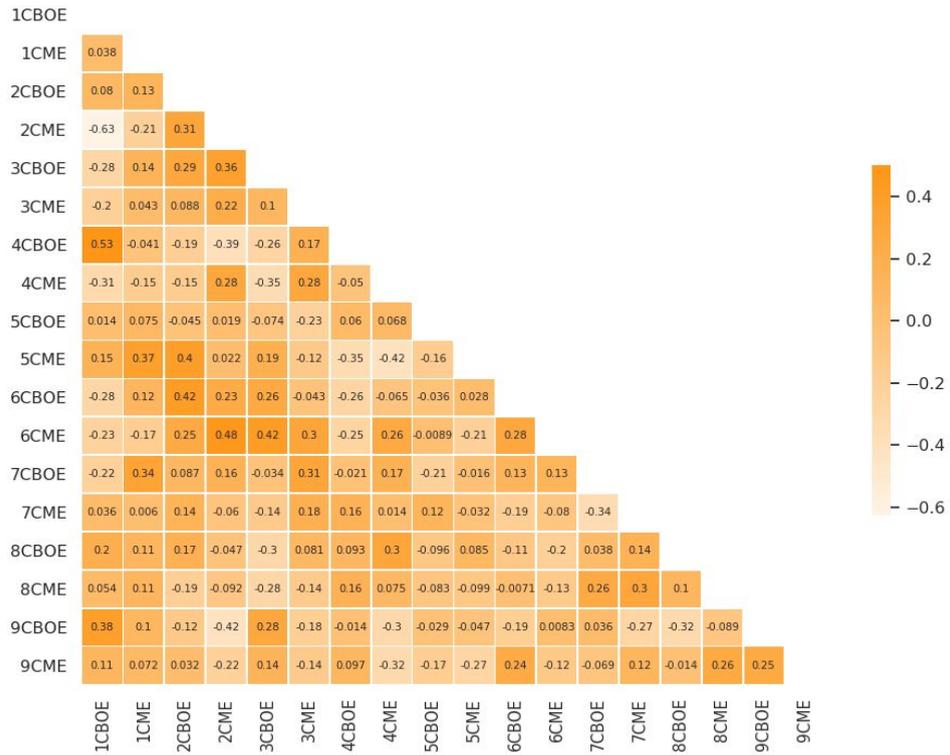
Exactly the same results are found when computing the hourly return correlation matrix for the seven-day period following the expiry dates.

In order to focus on the even shorter term, we also calculated correlation matrices for the day before and on the day of expiries where price movements are most concentrated.

Total correlation matrix (CBOE and CME futures) – 1 day before



Total correlation matrix (CBOE and CME futures) – During expiry day

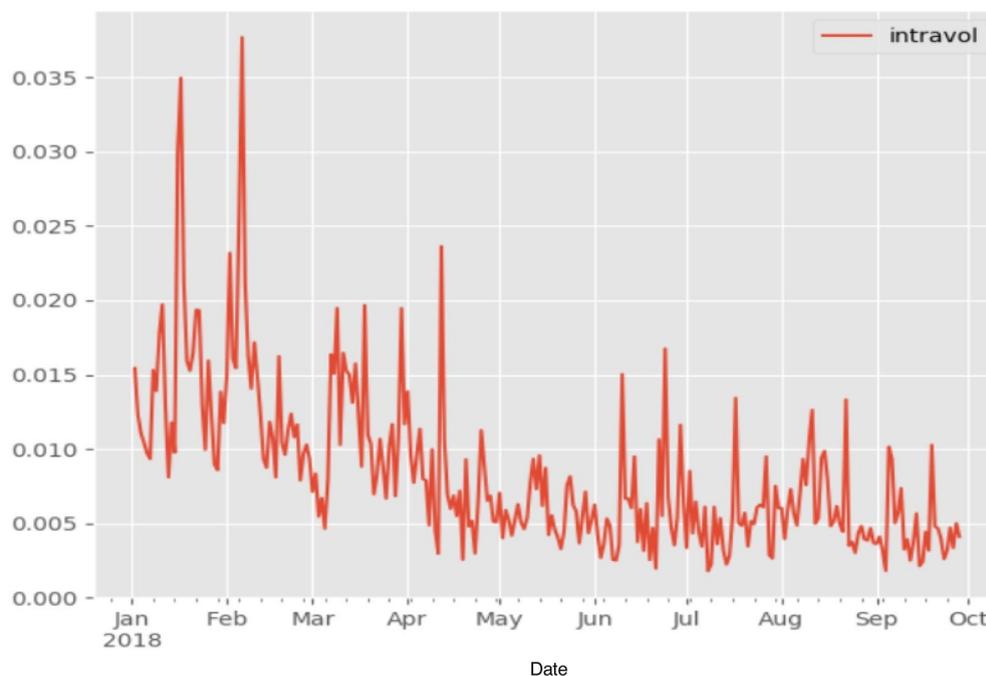


Clearly, a stronger linear relationship is present during this one-day period with respect to the seven-day period. Even though it is a good signal for analysts looking for common movements, the signs of these linear relationships do not coincide and make it impossible to outline a simple trading idea. Given that there wasn't a common pattern either before or after each of the rolling dates, we need a deeper and more complex analysis in order to build a trading strategy around expiry dates.

Conclusions and further analysis

Looking at the past movements of Bitcoin's price during rolling dates of futures contracts, it seems there is no golden trading rule to be extrapolated. We think the presence of bearish trends and impactful technical levels during price actions can influence Bitcoin prices in a much stronger way with respect to positioning around futures expiries. In calmer markets or during bullish trends, it is more sensible to consider expiry dates when building a trading strategy. The common idea that Bitcoin's price is always dumped before expiries and pumped right after them has no solid basis, though it seems valid for consideration during specific market phases when looking for levels to close or open positions. Conversely, fast market phases with prices trading around critical resistance or support levels or following bearish trends pay less attention to futures expiries and therefore, making trading strategies based on them is ineffective.

Nevertheless, the increasing popularity of futures in recent months also creates a basis for an increase in the importance of rolling futures. This analysis should be reconsidered when futures and OTC volumes start to converge, something not so unlikely given the possible entry of institutional investors into the crypto market fostered by the bearish trend experienced this year with Bitcoin intraday hourly return volatilities.



The illiquidity of futures, their trading halt mechanisms, the trading closing hours and the other inefficiencies that financial markets bring are something that it is worthwhile to investigate. For example, studying how the BBR fixing of CME futures is calculated and the

arbitrage opportunities it creates could be something that adds value and could help us to assess the right strategy to follow during rolling futures dates. Evidence of a narrowing of the spread between the average Bitcoin price on Bitstamp, GDAX, itBit and Kraken, and the CME futures price could show us whether there is arbitrageur activity and, accordingly, provide us with trading signals.

About Cindicator

Cindicator is a fintech company that has been developing its Hybrid Intelligence platform since 2015. This platform is used by 117,000+ highly motivated decentralized analysts. Their forecasts on crypto and traditional markets are collected and enhanced with a wide set of machine-learning models and neural networks. As a result of this symbiosis of humans and AI, Cindicator creates valuable trading indicators, predictive analytics and sentiments that improve investment decision-making amid high uncertainty for traders and investors. In September 2017, Cindicator's token sale attracted \$500 million in applications from which the team selected 4,507 contributors, raising \$15 million and creating the most supportive and active community possible. To learn more about the Cindicator Products, please visit: cindicator.com

Contacts

Simon Keusen, Head of Analytics: keusen@cindicator.com

Vlad Kazakov, Product Owner: kazakov@cindicator.com