

Who Trades Bitcoin Futures and Why?

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ABSTRACT

Using regulatory data with identifiers, we analyze the traders active in the Bitcoin futures (BTC) contracts traded on the Chicago Mercantile Exchange (CME). We find two primary trader types, those who hold almost exclusively BTC (concentrated traders) and those who hold BTC to diversify a broader futures portfolio (diversified traders). The prevalence of these two types changes over time. We also study how BTC markets are connected to other futures markets through common holdings of BTC traders. Finally, we analyze the micro BTC contract and find that the trader composition is different than that of the full-size contract.

JEL classification: G12, G19

Keywords: Bitcoin; Bitcoin Futures; Concentrated Traders; Diversified Traders; Micro Bitcoin Futures

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I. Introduction

Cryptoassets have been one of the most discussed investment topics of the last few years. Starting with Bitcoin in 2009, the volatility in this investment vehicle has intrigued both finance professionals and retail traders.¹ However, still little is known about who actually invests in the most famous cryptocurrency, Bitcoin. Part of the reason for that is because most of Bitcoin trading happens on unregulated exchanges and there is no disclosure of counterparty identities.

In an effort to address this vacuum in the literature, our paper makes use of a regulatory data set, which has information on the identities of investors, to understand who trades Bitcoin futures (BTC) and why. We specifically focus on the regulated Bitcoin futures market traded on the CME, as well as the micro Bitcoin futures contract introduced recently by the CME.²

We present four main analyses in this study. First, we investigate trading motives of traders in the CME Bitcoin futures markets. This is especially pertinent considering the price movements in Bitcoin making headlines recently, and the increased interest in Bitcoin exposure among hedge funds and money managers. We argue that there are two main types of traders in the BTC markets, those who almost exclusively invest in Bitcoin futures (*concentrated* traders) and those who hold Bitcoin futures to diversify their large futures portfolio (*diversified* traders). Second, we show that the composition of the BTC market, in terms of the percentage of diversified and concentrated investors, has changed over time. Specifically, we observe that this shift takes place around mid-2020. Third, we analyze the futures market portfolios of the BTC traders to understand

¹“Blockchain trends: Crypto and cryptocurrency lead Twitter mentions in Q1 2021” Retrieved on August 31st, 2021 from <https://www.verdict.co.uk/blockchain-trends-crypto-currency/>

²As of October 2021, the CME is the second largest Bitcoin futures exchange by dollar value of open interest <https://www.coindesk.com/markets/2021/10/08/2020s-bull-redux-cme-improves-its-ranking-in-biggest-bitcoin-futures-exchanges-list/>

which other markets they are also investing in. We argue that common traders with exposure to different futures markets can be viewed as a way to “connect” BTC to other futures markets and we rely on a measure from the finance literature to gauge how connected BTC is to other futures markets.³ Finally, we offer a short analysis of the newly-introduced micro BTC contract and show that its trader composition is different than the BTC contract.

Previous papers have analyzed other aspects of the Bitcoin futures market. Many of these focus on whether price discovery occurs in the CME BTC futures market or elsewhere.⁴ [Baur and Dimpfl \(2019\)](#) find that the majority of price discovery occurs in Bitcoin spot markets. Despite using similar data and methods, [Karkkainen \(2018\)](#) find the opposite, that BTC leads price discovery. [Alexander and Heck \(2020\)](#) find that price discovery occurs primarily on unregulated (not CME) futures markets. Other papers use an event study approach to investigate how futures markets affect spot markets. [Jalan et al. \(2019\)](#) and [Augustin et al. \(2020\)](#) argue that improved efficiency and price discovery from the introduction of Bitcoin futures, aided by the ease of shorting Bitcoin futures, led to the 2018 crash in the Bitcoin spot market. Alternatively, [Corbet et al. \(2018\)](#) show that introduction of Bitcoin futures has increased spot volatility of Bitcoin and claim that Bitcoin futures are not an effective hedging tool. The closest paper to ours is [Makarov and Schoar \(2021\)](#), which studies the ownership concentration of cash Bitcoin. They find that the individual holdings are highly concentrated, with the top 1,000 investors owning about 3 million Bitcoin and the top 10,000 investors owning around 5 million Bitcoins (which is about a third of Bitcoin in circulation at the end of 2020). However, to the best of our knowledge, this is the first paper to present a detailed

³We rely primarily on the [Anton and Polk \(2014\)](#) measure, which looks at the degree of common ownership across different markets.

⁴The findings from these papers are not always the same. Conflicting results can be due to differences in sample periods, methodologies, and trading venues.

analysis of who trades Bitcoin futures.

In the sections that follow, we first start with a general overview of the CME Bitcoin contracts as well as provide a comparison of them to contracts on other Bitcoin exchanges active around the world. Then we briefly introduce the data we use and provide some descriptive statistic of the CME Bitcoin contracts. We explore the portfolio characteristics of BTC traders, analyze how that changed since the inception of the CME BTC contract, and discuss the recent interest in CME BTC contract from a specific group of investors. Using our unique data, we explore which other futures contracts are held by BTC futures investors, and finally we provide a brief analysis of the micro BTC contract.

II. Background on Bitcoin Derivatives Markets

The Bitcoin derivatives markets consist of regulated markets such as the futures and option contracts listed for trading by the Chicago Mercantile Exchange (CME) and unregulated markets such as the perpetual contracts and other derivatives listed by a variety of cryptocurrency exchanges worldwide.

The CME⁵ listed for trading a Bitcoin futures contract regulated by the Commodity Futures Trading Commission (CFTC) in December 2017. The contract is settled in cash rather than delivery of actual Bitcoin with a contract size of five Bitcoin. The cash settlement price is the CME CF Bitcoin Reference Rate (BRR) which is calculated based on pricing data from five Bitcoin exchanges and trading platforms, including Bitstamp, Coinbase, Gemini, itBit, and Kraken.⁶ Subsequently, the CME listed Bitcoin options

⁵The Chicago Mercantile Exchange (CME) is one of four futures exchanges operated by the CME Group.

⁶Cboe Global Markets also listed a regulated futures contract in December 2017 with a contract size of one Bitcoin and a cash settlement price based on a daily auction at the Gemini exchange. The Cboe contract was delisted in 2019. Following the Cboe delisting, Gemini began contributing pricing data to

in January 2020 and micro Bitcoin futures in May 2021. Micro Bitcoin futures have a contract size of 0.1 Bitcoin but are otherwise identical to the original CME Bitcoin futures. The CME's futures contracts are cleared through CME Clearing, a CFTC-registered derivatives clearing organization (DCO). The DCO sets margins (performance bonds) for Bitcoin futures under CFTC oversight. In light of the high volatility of Bitcoin, the CME DCO typically sets margins for Bitcoin futures at around 35% of the notional amount of the contract, thus providing for a leverage ratio of slightly less than 3 to 1. The margin levels for Bitcoin futures are much higher than the 10% or less that is typical for other regulated futures contracts.

Market participants in all futures contracts are required to report end-of-day positions that equal or exceed the reportable level specified in CFTC regulation 15.03.⁷ Reporting traders submit CFTC form 40 to the Commission on a daily basis and may be required to submit other forms as well. Information in form 40 as set out in CFTC regulation 18.04 includes, among other things, the identity of the trader, whether the trader is a commercial trader (that is, the trader is in a business that would indicate a commercial need to use the futures contract for hedging or risk management), and whether the trader is active in, or expects to be active in, other futures contracts.⁸ The reportable level for both Bitcoin futures and micro Bitcoin futures is 25 contracts, representing a notional amount of 125 Bitcoin for the original Bitcoin futures contract and 2.5 Bitcoin for the micro Bitcoin futures contract. Although the micro contract may be more convenient to trade, the exchange clearing and trading fees of the regular contract are only about twice as high as the fees for the micro. This makes the regular contract much cheaper to trade.⁹

the CME's BRR.

⁷See, *e.g.*, <https://www.ecfr.gov/current/title-17/chapter-I/part-15#15.03>

⁸See, *e.g.*, <https://www.ecfr.gov/current/title-17/chapter-I/part-18/section-18.04>

⁹<https://www.cmegroup.com/company/clearing-fees.html>

In addition to the regulated contracts listed by the CME, there exist numerous unregulated Bitcoin derivatives that are listed on various cryptocurrency exchanges, including Binance, BitMEX, Kraken, and others. The most common unregulated Bitcoin derivative is the perpetual swap (also called a perpetual future or perpetual contract)¹⁰ which, unlike ordinary futures contracts, has no specified expiration date. Perpetual Bitcoin swaps differ from CME Bitcoin futures in several other ways, including the settlement mechanism, the denomination, the amount of leverage, regulation, and availability to U.S. persons.

Perpetual contracts have no specified expiration date and positions can be held indefinitely. While ordinary futures contracts ensure convergence to the price of the underlying asset via either physical delivery or cash settlement at expiration (CME Bitcoin futures use cash settlement as discussed above), perpetual contracts instead have a funding mechanism (referred to as the funding rate) whereby long position holders and short position holders exchange payments as the Bitcoin price fluctuates to ensure that the futures price reflects the cash Bitcoin price.¹¹ Such payments are typically made at set intervals, often multiple times per day. Funding rates are expressed as percentages (e.g., 0.01 percent) and are typically negative when Bitcoin prices rise and positive when Bitcoin prices fall. When funding rates are negative, the short position holders make payments to the long position holders and when funding rates are positive, the long position holders make payments to the short position holders. Funding rates can also differ across exchanges, depending on ease of arbitrage between cash and futures prices.

While CME futures provide for a fixed number of Bitcoin (5 Bitcoin or 0.1 Bitcoin for the micro futures) with a variable notional amount denominated in dollars, perpetual

¹⁰As discussed further below, the CFTC has indicated that it considers perpetual contracts to legally be swaps rather than futures contracts.

¹¹See, e.g., <https://www.binance.com/en/blog/421499824684900382/A-Beginners-Guide-To-Funding-Rates>

contracts are typically for a fixed number of dollars (commonly \$1.00) with a variable amount of Bitcoin. Thus, for CME contracts, a participant uses dollars to obtain exposure to Bitcoin, while a perpetual contract participant uses Bitcoin to obtain exposure to dollars.

The exchanges listing perpetual contracts generally offer far more leverage than CME futures contracts, sometimes as much as 200 to 1, meaning a user need only post margin of 1/2 of 1% of the notional value of a position. With this much leverage, a relatively modest adverse price move may result in an exchange forcing a position holder to liquidate at a loss. In contrast, the CME typically charges a margin of about 35% of the notional value of a contract providing approximately 3 to 1 leverage. In light of recent forced liquidations associated with the late spring 2021 price decline in bitcoin, some unregulated Bitcoin derivatives exchanges have recently reduced the amount of leverage available, but leverage of 20-1 or more is still common.¹²

There are various reasons why a trader might choose to trade on futures on the CME over other exchanges. The CME is a regulated exchange, that is, it is a designated contract market (DCM) registered with the CFTC to offer futures, options, and swaps to retail and institutional market participants. In general, U.S. persons are legally permitted to trade futures only on DCMs.¹³ A multilateral trading facility that offers only swaps can register with the CFTC as a swap execution facility (SEF).¹⁴ Retail

¹²See, *e.g.*, “Leaders in Cryptocurrency Industry Move to Curb the Highest-Risk Trades,” New York Times, July 25, 2021 available at <https://www.nytimes.com/2021/07/25/us/politics/cryptocurrency-ftx-high-risk-trade.html>

¹³Regulated non-U.S. futures exchanges can offer their products in the U.S. if they register with the CFTC as a foreign board of trade (FBOT) under part 48 of the CFTC’s regulations. One FBOT, Eurex, launched a futures contract on Bitcoin Exchange Traded Notes (ETNs) in September 2021. The underlying ETNs are traded on Deutsche Börse. See <https://www.eurex.com/ex-en/find/news/Eurex-announces-launch-of-Bitcoin-ETN-futures-2753220>

¹⁴The CFTC can grant exemption from SEF registration to a non-U.S. regulated trading facility that offers swaps. For a list of exempt SEFs, see <https://www.cftc.gov/International/ForeignMarketsandProducts/ExemptSEFs>

participants are not permitted to trade swaps on SEFs,¹⁵ but can trade swaps on DCMs.

The cryptocurrency exchanges offering perpetual contracts are not regulated, that is, they are not registered with CFTC as a DCM or SEF and they are not registered as an exchange or trading facility in any jurisdiction. It is illegal for U.S. persons to trade Bitcoin derivatives on these exchanges and the exchanges generally do endeavor to prevent U.S. persons from participating. U.S. persons sometimes use virtual private networks or other means to evade these prohibitions. Moreover, it is illegal to operate a multilateral trading facility (exchange) in the U.S. that offers derivatives without registering as a DCM or SEF and complying with regulations applicable to DCMs or SEFs.¹⁶ However, it is legal for U.S. persons to trade spot Bitcoin on unregulated exchanges.

III. Data

Our data set is comprised of end-of-day position of large traders with positions in the CME Bitcoin futures contract. We mainly focus on the time period from December 2017, which is the inception of the BTC contract, to September 2021. However we also make use of a longer time series going back to the early 2000s to investigate when certain traders start trading futures in general. It is important to note that our sample ends before the Bitcoin futures based exchange traded funds (ETFs) started being traded,

¹⁵Only eligible contract participants (ECPs) as defined in section 1a(18) of the Commodity Exchange Act (CEA) can trade swaps on a SEF or off-exchange. ECPs generally are financial institutions but the definition is too complicated to fully explain here. See <https://www.law.cornell.edu/uscode/text/7/1a>

¹⁶In a recent enforcement action against cryptocurrency exchange BitMEX, the entities comprising BitMEX settled charges that they, among other things, operated an illegal unregistered derivatives exchange in the U.S. and illegally permitted U.S. persons to trade perpetual contracts on the exchange. The CFTC also held that a perpetual contract is a swap as defined in section 1a(47) of the CEA rather than a futures contract. Whether a perpetual contract is a swap or a futures contract, it is illegal for U.S. persons that are not ECPs to trade perpetual contracts except on a registered DCM. See, U.S. Southern District of New York, Commodity Futures Trading Commission, Plaintiff v. [various persons doing business as BitMEX], Defendants, August 10, 2021, available at <https://www.cftc.gov/media/6261/enfhdrglobaltradingconsentorder081021/download>

which was on October 19th, 2021. As a result, our analysis does not capture the impact of such ETFs on the Bitcoin futures market.

The data set we use is unique in the sense that it has identifiers for each market participant. These identifiers allow us to analyze participants' end-of-day positions in the BTC as well as other futures contracts. Using the identifiers, we also track traders' positions throughout time and also understand how many large traders are active in the contract on any given day. Finally, our data set allows us to have information on the direction of trader positions, which we use to analyze which traders are long and which ones are short the BTC contract.

IV. Market Characteristics

In this section we explore the general market characteristics of the CME BTC contract. Figures 1 and 2 show the open interest in terms of contracts, and the dollar notional of the BTC contract respectively. Prices and open interest in the CME BTC contract were fairly stable from inception through mid-2020. Open interest in the market was around 4,000 contracts and price moved between \$10,000 and \$20,000. Since May of 2020, we observe a significant increase in the open interest of the BTC contract, accompanied by a sharp increase in its notional value. While the increase in the notional value of the contract is partially driven by the increase in the Bitcoin price, as shown in Figure 3, the jump in the price corresponds to the beginning of 2021. This suggests that the increasing open interest in the BTC contract is not solely driven by an increasing Bitcoin price and we explore this phenomenon further in the following sections.

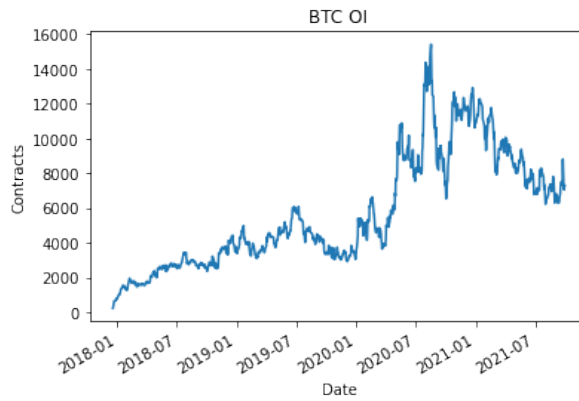


Figure 1: Daily Open Interest in the CME BTC contract Dec 2017 - September 2021

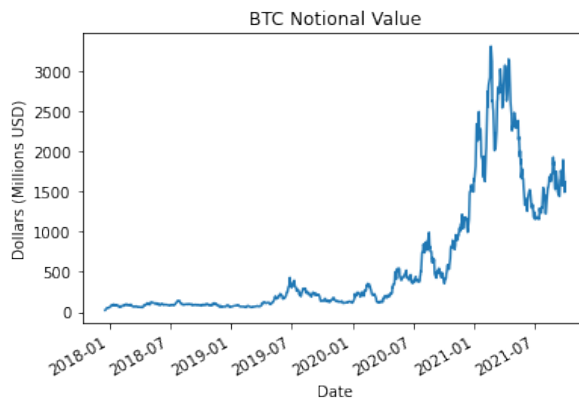


Figure 2: CME BTC Contract Notional Value Dec 2017 - September 2021

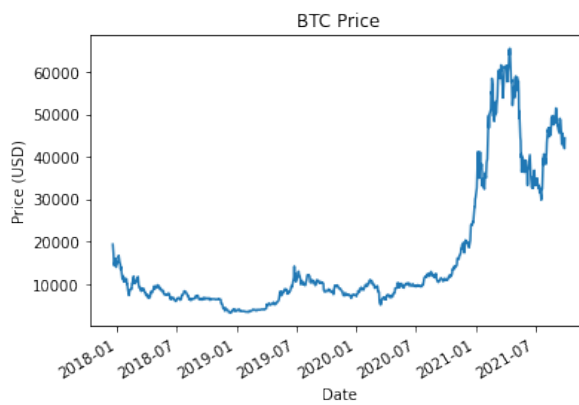


Figure 3: Daily Settlement Price in the CME BTC contract Dec 2017 - September 2021

V. Futures Portfolio Characteristics of BTC Traders

Next, we analyze the futures portfolios of BTC traders. We find most BTC traders either hold almost exclusively BTC futures or have a large futures portfolio where the BTC futures contract is only a small part. Figure 4 shows the average portfolio of BTC traders during the period they are in our sample. The spikes at both ends of this histogram indicate that most traders hold either a very high or a very low percentage of BTC in their futures portfolios. We classify the traders into three groups based on their average positions over the Dec 2017 to Aug 2021 period: *concentrated* traders holding over 80% of their portfolio in BTC futures; *diversified* traders holding less than 20% of their portfolio in BTC futures; and *hybrid* traders on average holding between 20% and 80% of their portfolio in BTC futures.

This bimodal portfolio distribution is interesting for a number of reasons. First, it is possible that the types of traders who prefer to hold only the BTC contract are quite different than those for whom the BTC futures makes up only a small percentage of their portfolio. The latter group, which seems to be more prevalent in the market in 2021, are potentially large traders with diversified portfolios (which we explore in more depth in the next section). However, the former group are likely to be small traders, who probably want to have exposure to Bitcoin futures on a regulated exchange. Second, the distribution of portfolio holdings in futures contracts for gold (Figure 5), an asset frequently compared to Bitcoin, is not as drastically bimodal. Comparing the distribution of these two markets, untabulated results suggest that on average 48% of BTC traders are in the extreme tails (defined as the 1st and 99th percentile), whereas that statistic is only 31% for gold.

Next, we present an analysis of each of these trader groups separately.

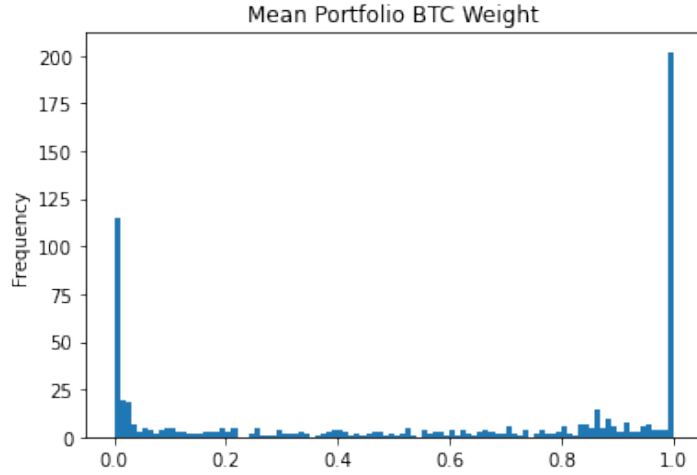


Figure 4: Distribution of the mean level of BTC in trader portfolios

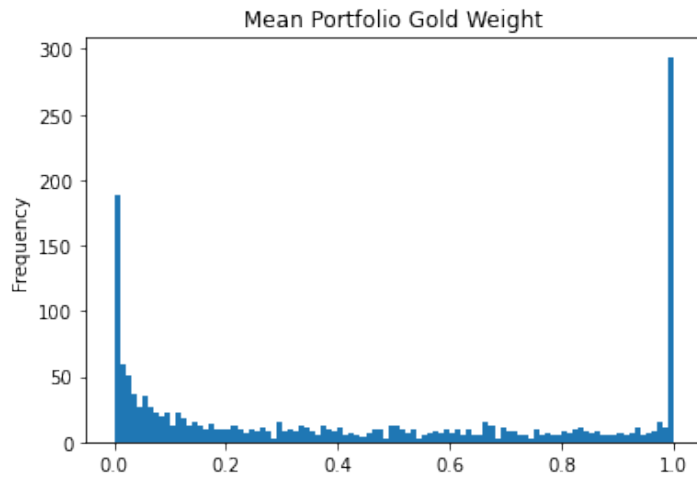


Figure 5: Distribution of the mean level of Gold in trader portfolios

A. Concentrated Traders

There are 303 concentrated traders (with an average BTC portfolio weight of greater than 80%) that reported BTC positions over the lifespan of the contract. However, these traders are not always active in the market throughout our data sample. We focus on a random date in the period before the late 2020 price increase (June 23, 2020) as well as a more recent date (June 22, 2021) and provide descriptive statistics on this group.

Table Ia reports summary statistics on the portfolios for the 61 concentrated traders with positions on June 23, 2020. These traders have a mean portfolio size of \$7.391m USD and a mean BTC position size of \$7.332m USD. Within this group of traders, the mean BTC portfolio weight is 99.2%. The distribution of concentrated trader portfolios is highly skewed towards a few large portfolios with a skew of 5.749 and kurtosis of 34.614.¹⁷ This indicates the presence of a few traders with very large positions. In the more recent period on June 22, 2021 shown in Table Ia, the distribution of concentrated traders becomes less skewed and has shifted towards larger portfolios. There are 36 large traders on this date with a mean portfolio size of \$19.544m USD and BTC weight of 88.58%. The skew for these portfolios is 2.816 and the kurtosis is 8.151.

B. Diversified Traders

There have been 187 total diversified traders (with an average BTC weight of less than 20%) with reported positions in CME Bitcoin. Looking at Table Ib, on June 23, 2020, there were 29 reportable diversified traders with CME BTC positions with a mean notional futures portfolio value of \$4.674 billion USD and a Bitcoin position of \$9.309m. The distribution has a skew of 2.266 and kurtosis of 4.550.

By June 22, 2021, the number of diversified traders had increased to 62. The average portfolio size (\$16.75 billion USD) and net BTC held (\$18.155m USD) increased, as well as the skew (3.088) and kurtosis (9.781).

When compared to concentrated traders, diversified traders have significantly larger notional futures portfolios. The mean diversified trader has a total portfolio over 600x bigger than the mean concentrated trader, while the mean Bitcoin position is only 1.3x bigger. As such, the size discrepancy between these two types of traders arises from

¹⁷Skewness is a measure of the asymmetry of the distribution; kurtosis is a measure of how heavy the tails of a distribution are.

the differences in the rest of their portfolio rather than the size of their notional BTC positions. This holds in both June 2020 and June 2021.

C. Hybrid Traders

There have been 136 separate hybrid traders who reported BTC positions. From the contract's inception to mid-2019, there were roughly 10 concurrent hybrid traders in the market. Since then, the presence of hybrid traders has increased.

As per Table [Ic](#), there were 22 hybrid traders in the market on June 23, 2020. The mean hybrid trader had an overall portfolio with \$924.822m in notional value and \$8.809m in BTC positions. Like the concentrated and diversified trader groups, the distribution is skewed towards a few large traders with a skew of 3.170 and kurtosis of 9.146.

Later in the sample, on June 22, 2021, the number of hybrid traders increases to 32. The mean portfolio size (\$1.295b) increases as well, while the net BTC position (\$7.566m) decreases slightly. Skew (3.973) and kurtosis (15.563) for hybrid portfolios both increase.

Table I: BTC Trader Portfolios
 Values below are notional values, millions of USD

(a) Panel A: Concentrated Traders

	Positions on June 23, 2020		Positions on June 22, 2021	
	Net Portfolio	Net BTC	Net Portfolio	Net BTC
Number of Traders	43		36	
Mean (millions)	7.391	7.332	19.544	17.312
Std. (millions)	22.894	22.908	36.869	31.226
Skew	5.749	5.746	2.816	2.626
Kurtosis	34.614	34.586	8.151	6.874

(b) Panel B: Diversified Traders

	Positions on June 23, 2020		Positions on June 22, 2021	
	Net Portfolio	Net BTC	Net Portfolio	Net BTC
Number of Traders	29		62	
Mean (millions)	4673.590	9.309	16753.139	18.155
Std. (millions)	8339.848	16.306	35649.980	30.374
Skew	2.266	2.463	3.088	3.163
Kurtosis	4.550	6.144	9.781	12.249

(c) Panel C: Hybrid Traders

	Positions on June 23, 2020		Positions on June 22, 2021	
	Net Portfolio	Net BTC	Net Portfolio	Net BTC
Number of Traders	22		32	
Mean (millions)	924.822	8.809	1295.062	7.566
Std. (millions)	2906.157	18.829	4729.448	11.670
Skew	3.170	2.973	3.973	2.134
Kurtosis	9.146	8.441	15.563	4.062

VI. Interest in the BTC Futures Contract

A. Trader Counts

In the previous section, we focused on the differences in BTC exposure across the three groups of traders. In this section, we analyze how the presence of concentrated, diversified, and hybrid traders in the BTC futures market change over time. Figure 6 shows the number of concurrent traders with nonzero positions for six week intervals throughout the history of the CME BTC contract. From the inception of the contract through 2019, we see a steady increase in the number of concurrent reportable traders overall, numbers plateauing around 25-35 concurrent reportable concentrated traders until early 2020, and a comparable number (20-30) of concurrent diversified traders around the same time. After mid-2020, the market started to shift quickly. This timing corresponds with the Covid-19 lockdowns, and the associated interest of retail traders in online trading,¹⁸ as well as the interest of big banks in the cryptoasset space. Concurrent trader counts increased from 80 total traders to 140 traders by November 2020. Most of this increase was due to an influx of diversified traders. The relative proportions of the two trader groups changed again in 2021. Concentrated traders dropped from 60 traders down to 35. Meanwhile, diversified traders maintained their elevated numbers at 60-70 traders even after BTC prices fell during Spring 2021. There is also a slight increase in the number of hybrid traders during this period.

Another aspect of these three trader types we analyze is whether they are new to futures trading or have they been trading futures for a while. To create this statistic, we use the unique identifiers of BTC futures traders and look them up to see if they hold any futures contracts going back to 2002. Figure 7 displays the cumulative number

¹⁸“Money Stuff: Dogecoin Is Up Because It’s Funny” Retrieved on September 10th, 2021 from <https://www.bloomberg.com/news/newsletters/2021-05-06/money-stuff-dogecoin-is-up-because-it-s-funny>

of BTC traders from each group since 2002, regardless of which futures contract they hold. This illustrates the timing of when the different types of traders first entered the futures markets.

First of all, the number of traders in each group increase monotonically since 2002. However, this observation is to be expected since it is more likely for a trader who was trading in the futures markets in 2015 to also be in the futures markets in 2020 than a trader who was trading in 2002. What is more interesting is the sharp increase in the concentrated group in 2017, which is not observed in any of the other two groups. To be more precise, there are 303 unique concentrated traders who reported BTC positions. Of these 303, only 50 were present in the futures markets prior to the introduction of CME BTC futures. In comparison, there are 200 unique diversified traders in our sample, however 180 out of the 200 diversified traders were active in futures markets before CME BTC began trading. So, most of the diversified traders were already trading futures contracts, they simply decided to include the BTC futures contract to their portfolio when it was offered by the CME. Compared to the other two groups, hybrid traders account for relatively few traders present in the market, but they have grown steadily from around 10 concurrent traders in mid 2019 up to around 30 traders in 2021. There have been a total of 130 unique hybrid traders and a third of these traders had reportable futures positions before the CME BTC contract began trading.

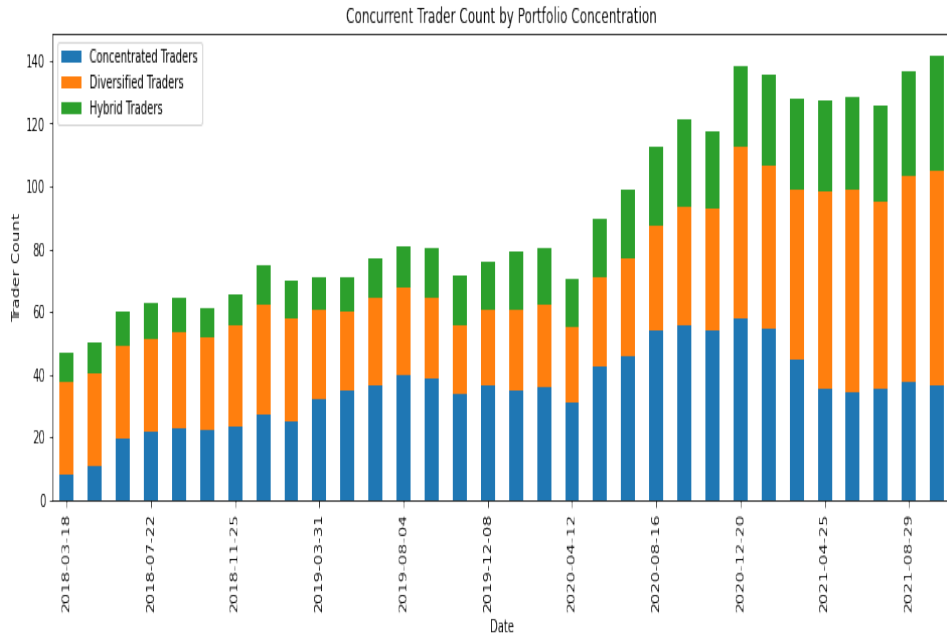


Figure 6: Number of Concurrent Traders by Position Size Group

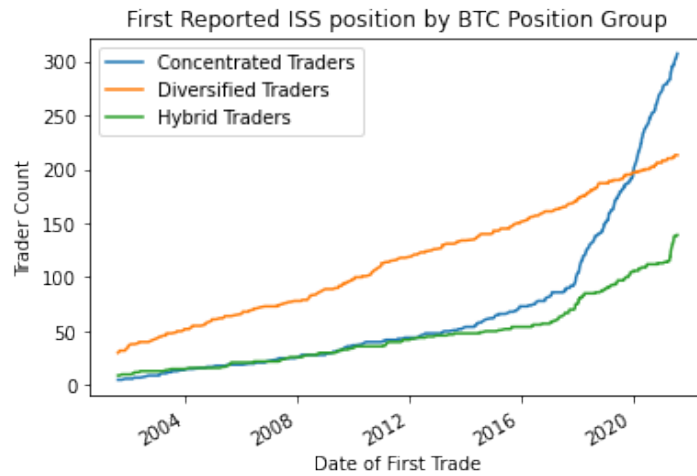


Figure 7: First Reported Positions in ISS by Position Size Group

B. Size of Positions by Group

Futures contracts always have a long and a short side, one side thinking the futures price may increase in the future and the other side expecting it to decrease. This is especially

the case with Bitcoin futures, where there are extremely few commercial traders. This makes it interesting to analyze which traders are on the long side and which traders are on the short side of the contract, in general. Figure 8 shows the fraction of long and short open interest held by each trader group, including non-reportable traders, for six week intervals since the inception of the contract. Note that both the long and short positions each sum to 1.

Concentrated traders held roughly 50% of long open interest in late 2018 before stabilizing at around 25% open interest for the remaining sample period. Short open interest grew for this group through mid-2020 to a peak of 40% before falling to 20% in early 2021. Concentrated traders held a large share of both long and short open interest at varying points in time, with the aggregate fraction held by this group is at its lowest points in 2021 and early 2018, shortly after the contract began trading.

Diversified traders have held 30-40% of long open interest over the lifetime of the CME BTC contract. Short open interest for this group has varied from 40% of OI in late 2018 to 20% in late 2019 to late 2020. Since spring 2020, diversified traders have grown their positions to 60% of short open interest. This timing corresponds to the increased number of diversified traders in the market shown in Figure 6. Long positions for this group have been mostly unchanged over the same period.

Hybrid traders as a whole have been net short for the entire sample period for the CME BTC contract. Hybrid traders have held around 10% of long open interest, but until late 2020 accounted for approximately 50% of short open interest in CME Bitcoin futures in spite of their low trader count. Since 2021, these large short positions have decreased to around 10% of short open interest.

Maybe more interestingly, Figure 8 also illustrates the percent of open interest held by non-reportables. Over 90% of the short open interest in BTC is made up of large

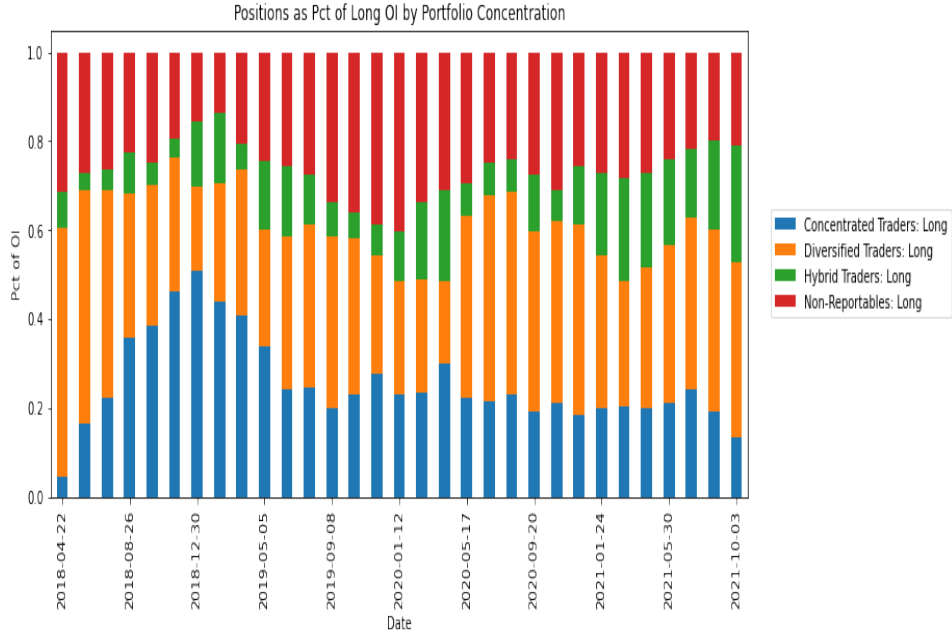
reportable traders and this is fairly stable over the contract's life.¹⁹ On the other hand, only 75% of long positions meet the reporting threshold requirements, which is a lower percentage than what we observe in most other markets. The share of market-wide long exposure that is held by non-reportable traders peaked in early 2020 with roughly 45% of open interest, which indicates that the end-of-day positions of almost half of the investors with long exposure were below the reportable level of 25 BTC contracts²⁰.

¹⁹This is comparable to the size of non-reportables in other markets in general. See [Robe and Roberts \(2019\)](#) for more details.

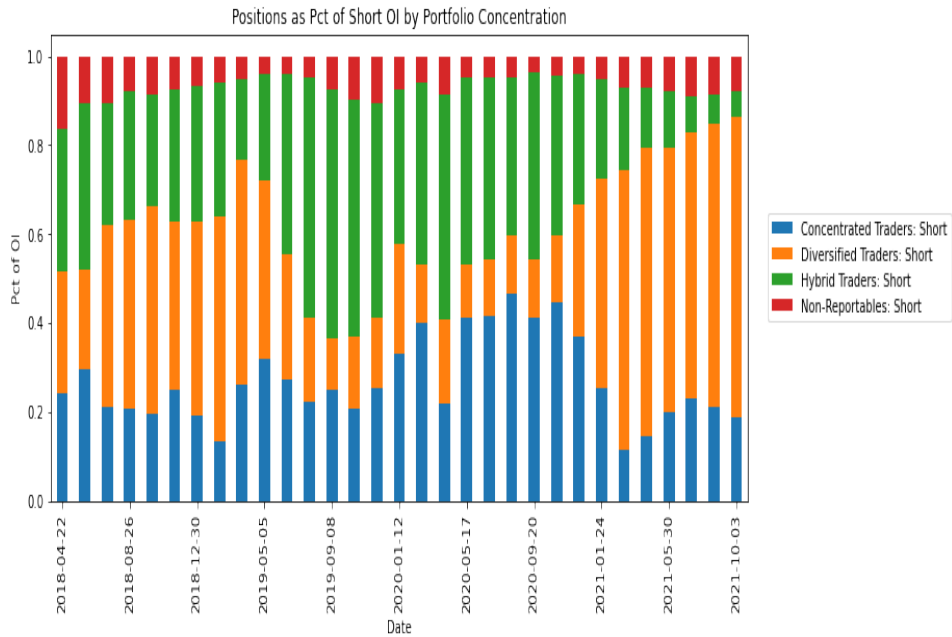
²⁰It is possible that some market participants might be reporting their positions to the CFTC even if their positions are below the reportable level.

Figure 8: Aggregate Net Positions / OI by BTC Position Group

Panel A: Long Open Interest



Panel B: Short Open Interest



VII. Which markets are connected to BTC futures?

Having shown that diversified traders hold a sizable and growing portion of the open interest, especially on the short side, next we analyze how the BTC contract is connected to other regulated futures markets. We define a connection measure inspired by the measure introduced in [Anton and Polk \(2014\)](#), which involves identifying a group of common traders with contracts in two markets and creating a normalized measure of their aggregate positions across both of these markets. For example, the measure of connectedness between BTC and Gold contracts can be represented as (adjusted for futures contracts):

$$\frac{\sum_i^I p_{t,btc} * |c_{t,i,btc}| + p_{t,gold} * |c_{t,i,gold}|}{p_{t,btc} * OI_{t,btc} + p_{t,gold} * OI_{t,gold}}$$

Where i is a trader with positions in both Gold and BTC contracts, p_t is the dollar (settlement) price of a given contract on day t , c_i is the number of contracts held by investor i in a given contract, and OI_t is the total open interest of a given contract on day t . In simpler forms, this measure calculates the size of the positions held by traders in both BTC and Gold contracts, divided by the joint market cap of BTC and Gold. For each trader, we calculate the net long minus short position to remove any effect of spreads and then take the absolute value. We are indifferent to whether traders are long or short in a particular market, we are just counting the number of contracts held by traders in both markets. While we use the Gold contract for illustration purposes, we actually construct this measure for all futures markets in our sample.

In [Table II](#) we report the most common futures contracts held by BTC traders, as well as how many traders hold that contract. Commonly held positions include precious metals, energy, and equity indices. When available, these traders also frequently hold

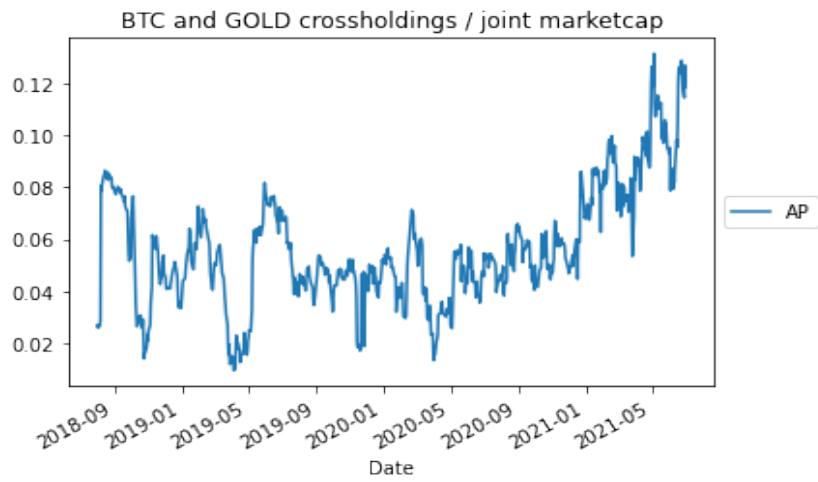
Table II: Frequently Held Positions by BTC Traders

year	Market	
2018	BITCOIN	152
	BITCOIN-USD	79
	GOLD	54
	CRUDE OIL, LIGHT SWEET	39
	E-MINI S&P 500 STOCK INDEX	37
	SILVER	37
2019	BITCOIN	216
	GOLD	49
	E-MINI S&P 500 STOCK INDEX	41
	CRUDE OIL, LIGHT SWEET	40
	SILVER	38
	NATURAL GAS	37
2020	BITCOIN	330
	GOLD	90
	CRUDE OIL, LIGHT SWEET	68
	SILVER	68
	E-MINI S&P 500 STOCK INDEX	66
	NATURAL GAS	61
2021	BITCOIN	372
	ETHER CASH SETTLED	104
	GOLD	103
	NASDAQ-100 STOCK INDEX (MINI)	100
	COPPER-GRADE #1	92
	MICRO BITCOIN	91

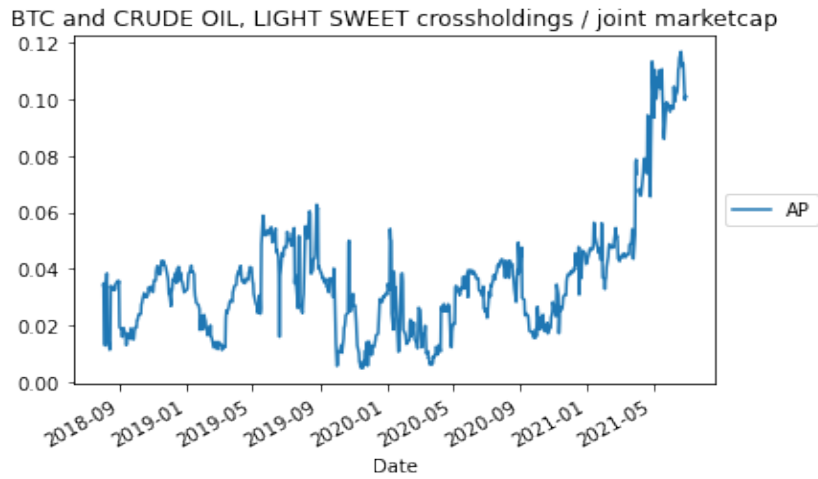
other crypto futures. Most of these common holdings are due to the diversified BTC traders, since by construction, concentrated traders tend to hold very few contracts other than BTC.

Figure 9 reports the Anton Polk measure over time for contracts commonly held by BTC traders. For three of the most common markets, gold, crude oil, and the S&P E-Mini, the level of cross holdings is consistent from around inception until spring of 2020. The level of cross holdings then increases from spring 2020 onward in tandem with the increase in diversified traders.

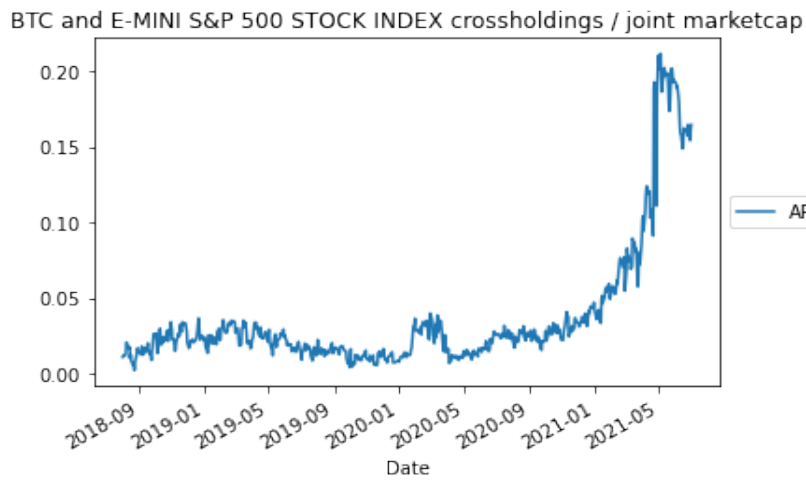
Figure 9: Anton Polk (AP) Connections between BTC and other Markets



(a) Connection between BTC and Gold



(b) Connection between BTC and Crude Oil



(c) Connection between BTC and E-Mini S&P 500

VIII. Micro BTC

The micro BTC contract, which has a contract size of 0.1 Bitcoin and a reporting threshold of 2.5 Bitcoin, began trading on May 3, 2021. Despite being introduced during a period of high price volatility (the price of the underlying Bitcoin fell 25% during the first two weeks of the contract’s introduction), its open interest quickly grew to a peak of 35,000 contracts in late May 2021 before falling to 15,000 contracts at the end of June 2021 (Figure 10). Open interest subsequently continued to fluctuate through the end of September. Although the contract’s open interest has been volatile, Figure 11 shows that concurrent reportable trader counts stabilized after the first two weeks of trading. The number of reportable traders has remained stable between 140 and 150 traders until the end of our sample, which is September 2021.

Figure 11 depicts the composition of traders within the micro contract. We use the same concentrated, diversified, and hybrid definitions described above for the large CME BTC contract and apply it to the portfolios of traders in the micro contract. After the first 2 weeks of the contract’s introduction, the majority of reportable traders in the contract are concentrated traders, with 80 to 100 of them being active in the market recently. It is worth noting that many micro BTC traders did not have sizeable presence in futures markets before May 2021. During the two months of the sample period, 230 different traders have reported micro BTC positions. However, as Figure 12 suggests, only 50 of those were reportable traders prior to the launch of the micro BTC contract. There is also a noticeable uptick in the number of hybrid reportable traders around when the micro contract started trading as well, suggesting most concentrated traders and some hybrid traders came into futures trading to trade micro BTC. In comparison, more than half of the traders in the diversified trader group were already trading futures prior to the launch of the micro BTC contract.

Shifting focus from number of traders to the percentage of open interest held, we see a different picture. Figure 13 shows the fraction of open interest held by each trader group.²¹ While the number of concurrent concentrated traders is typically 2 to 3 times the number of diversified traders, concentrated traders hold a relatively small share of open interest. Over 60% of the long open interest and over 90% of the short open interest is held by diversified traders and only roughly 20% of the long open interest is held by concentrated and hybrid traders. It is also worth noting that around 20% of the long open interest is held by non-reportable traders. A back-of-the-envelope calculation would suggest that, based on the recent price of Bitcoin and the low reporting threshold, non-reportable traders in this market typically hold positions worth less than \$100,000.

The recent introduction of the micro BTC contract raises the question of whether existing BTC traders started trading the micro BTC contract, or even switched over to the micro contract entirely. We do not observe a sharp drop in the concurrent reportable trader count activity in the main CME BTC market in May 2021, so the micro BTC contract does not appear to have taken reportable traders away from the original BTC futures contract. Maybe more interesting is that introduction of the micro BTC contract appears to have brought in new, smaller participants to the BTC contract. There is a small, but visible decrease in the percent of OI held by long non-reportables in Fig 8 at the time the micro BTC contract was introduced. This may have been caused by small traders below the reporting threshold in the main contract moving over to the micro contract and becoming reportable under the lower reporting threshold in the micro contract (2.5 Bitcoin vs 125 Bitcoin).

²¹We combine the concentrated and hybrid groups to avoid data privacy issues.

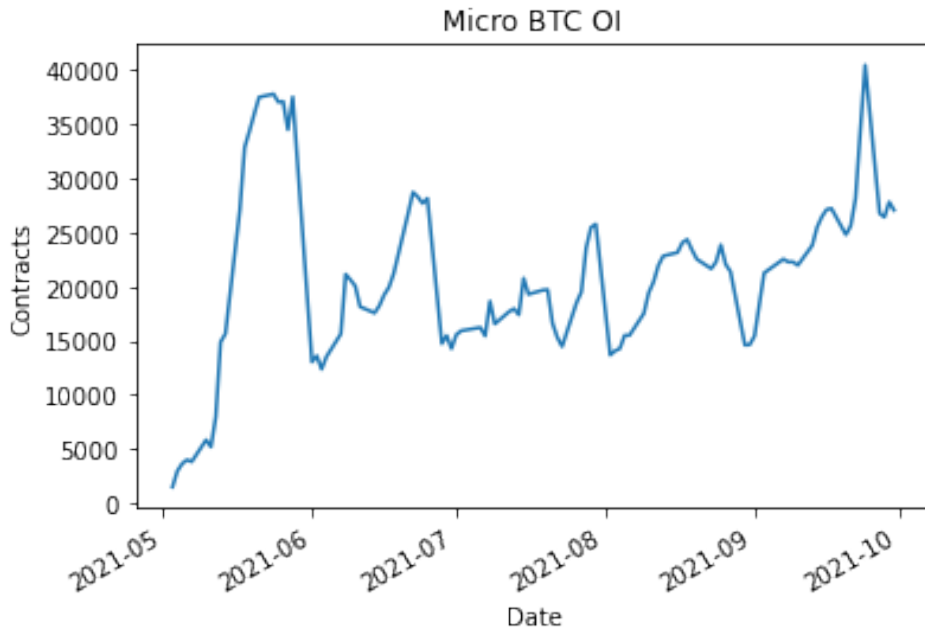


Figure 10: Open Interest in CME Micro BTC Contract

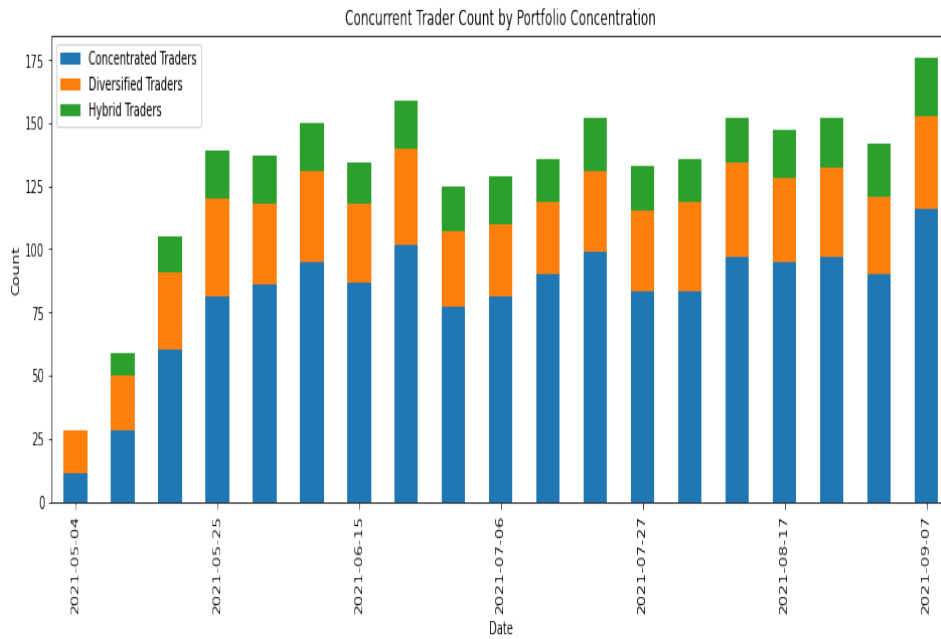


Figure 11: Number of Concurrent Traders by Position Size Group

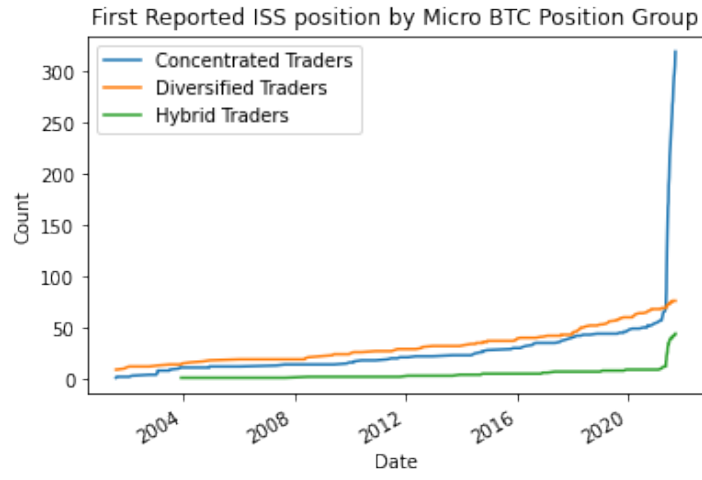
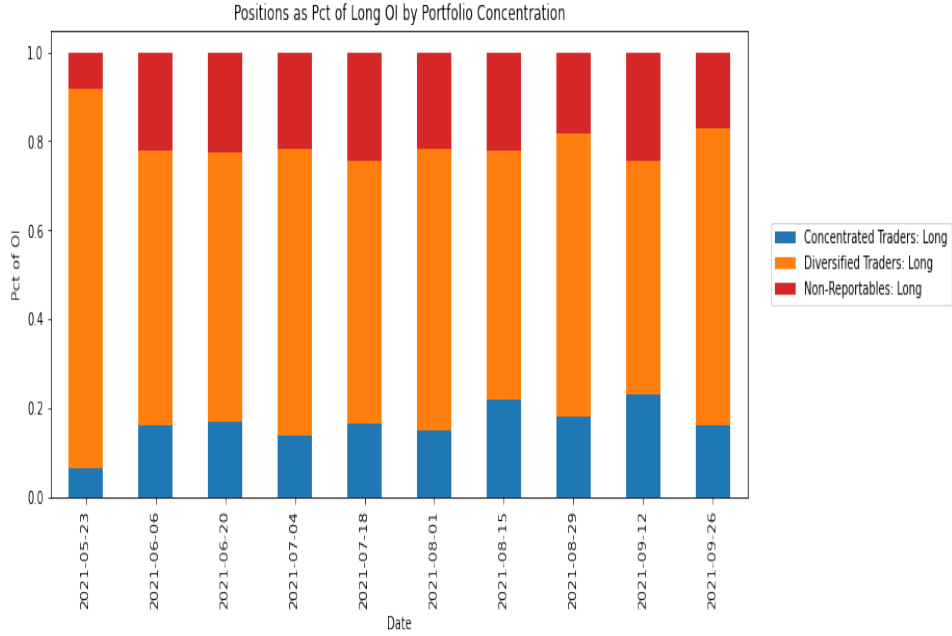


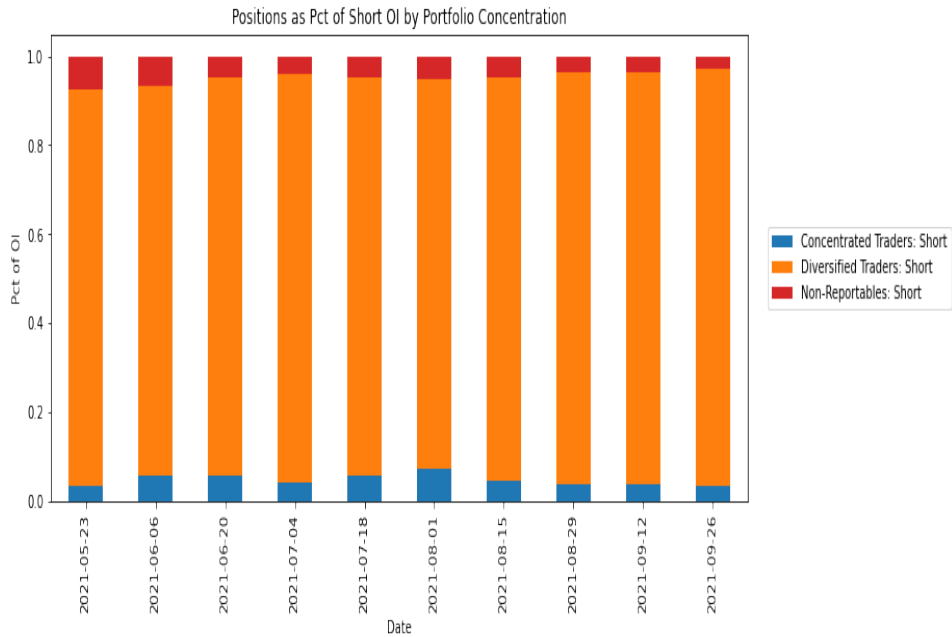
Figure 12: First Reported Positions in ISS by Position Size Group

Figure 13: Aggregate Net Positions / OI by Micro BTC Position Group

Panel A: Long Open Interest



Panel B: Short Open Interest



IX. Concluding Remarks

In this paper we analyze the CME's BTC futures contract and shed light on who trades BTC futures. We find that the market is largely comprised of two types: concentrated traders that hold almost their entire portfolio in BTC futures and diversified traders that hold on a very small fraction. We observe an increase in the presence of diversified traders in spring of 2020, accompanied by an increase in the share of short interest held by these traders. Striving to understand how the BTC futures contract is connected to other futures contracts, we find that BTC traders hold concurrent positions in energy, precious metal and equity index futures. We also show that traders were also holding other cryptocurrency futures when they are available.

We also analyze the newly introduced micro BTC futures contract. We find that while there are many concentrated entrants to this market, the majority of open interest is held by diversified traders. While we do not find any indication that the micro BTC contract caused reportable traders to switch over from the BTC contract, it is possible that smaller non-reportable traders in the BTC contract moved to the micro BTC contract and became reportable as a result.

It is important to note that our sample ends before the Bitcoin futures based ETFs started being traded. Future research might study whether the characteristics of the BTC futures market changes as a result of the introduction of these ETFs. Specifically, understanding how the trader composition in the market changes would be interesting to the market participants, regulators as well as the academic community.

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