



Bitcoin and the Public Markets

BTC Underperforms on Risk-Off Follow-Through; We Flag Estimate Risk for Public Miners on Hashrate

Macro markets remain in risk off mode and Bitcoin is no exception. The correlation of BTC to the Nasdaq Composite is still hovering at 54%. As we noted last week, the Russian invasion of Ukraine led to a large sell off in risk assets, while commodities have rallied. The largest gainer in our tracked basket is Wheat (both Ukraine and Russia are large wheat exporters), although oil has also rallied on the potential for sanctions on Russian oil ([slide 3](#)). Bitcoin, Ethereum and Euro Stoxx 50 round out the worst performing assets WoW.

Markets expect volatility to continue – realized volatility remains at 71% today, the same as a week ago, but 30-day at the money implied volatility only jumped to over 69% vs. 56.8% last week ([slide 4](#)). Realized volatility is currently 1.4% points above implied volatility.

We updated Hashrate and bitcoin holdings for the 18 publicly listed miners tracked in this weekly. As a group, they now operate 34 EH/s, and are expected to achieve 125 EH/s of hashing capacity by year end / early 2023. If they can achieve this growth, it would represent ~ 70% of the Hashrate growth between the now and our YE estimate of 327EH/s. This suggests that either the semiconductor and power infrastructure supply chain constraints could ease, leading to upside to our network Hashrate estimates, or that the public miners could face some delays and shortfalls on their projections. In a future report, we plan to assess the potential impact of such delays / shortfalls or an upside surprise on network Hashrate on consensus estimates in the space.

The 18 publicly listed mining stocks trade at an average adjusted Enterprise Value per YE 2022 PH/s of planned capacity of \$90k, adjusted down on updated balance sheet crypto holdings. Adjusted EV = Market Cap + Debt – Cash – Market Value of Crypto Holdings.

Notably, miners like Hive that have relatively modest expansion plans, or Riot that have low power and operating costs, trade at a premium to the group. We also examined financials based on Bloomberg analyst consensus, finding that the companies that do have estimates trade at 3.0x 2022E EBITDA and 6.5x 2022E Contribution (Gross Profit + Depreciation). Consensus estimates ([slide 16](#)) call for \$3.2B in EBITDA (11/18 miners) on ~\$4.9B in revenue (estimates on 13/18 miners). Considering our 327EH/s year end network Hashrate estimate, we suspect that consensus EBITDA estimates may need downward revisions unless Bitcoin price accelerates to new highs.

Our [institutional fund flow section](#) covers 19 funds with \$23B of AUM. GBTC, an ETP, is 75%+ of the group, and has seen no inflows recently. The others are mostly crypto-exposed equity ETFs with a broader innovation focus – ProShares BITO Bitcoin futures fund excepted.

Over the past week, funds have seen a \$21mm in net redemptions ([slide 21](#)). BITO saw a \$41mm redemption on 2/24 alone, in line with the broader risk off markets

following the Russian invasion, but saw \$14.4mm in net inflows last week. Year-to-date, overall outflows across the selected funds we track were \$282mm ([slide 23](#)).

The futures curve is flat through May, with little liquidity beyond ([Slide 27](#)). According to the 3/1 Commitment of Traders report, Non-commercial Net Length expanded to 517 lots ([slide 29](#)) despite an overall fall in open interest led by both spreading and Leveraged players ([slide 28](#)).

Key Takeaways

- *Bitcoin is acting as a high beta risk asset, selling off with equities while commodities continue to rally*
- *Markets expect volatility to continue – implied volatility has now risen to meet elevated realized volatility*
- *Updated BTC holdings and operational Hashrate metrics for the 18 tracked public miners show that on our preferred adjusted EV / PH/s metric, the miners trade at \$90k per PHs*
- *Public miners' guidance constitutes ~70% of the Hashrate growth to our 327EH/s YE 2022 target – implying either downside risk to their guidance or upside to our network target.*
- *Over the past week, funds have seen \$21mm in outflows, taking YTD outflows to \$282mm year-to-date, led largely by ARKW (outflows of \$3.1B over 12 months / \$360mm YTD)*
- *CME futures positioning is 517 lots net long for non-commercial players even as open interest has dropped 2.7% WoW*

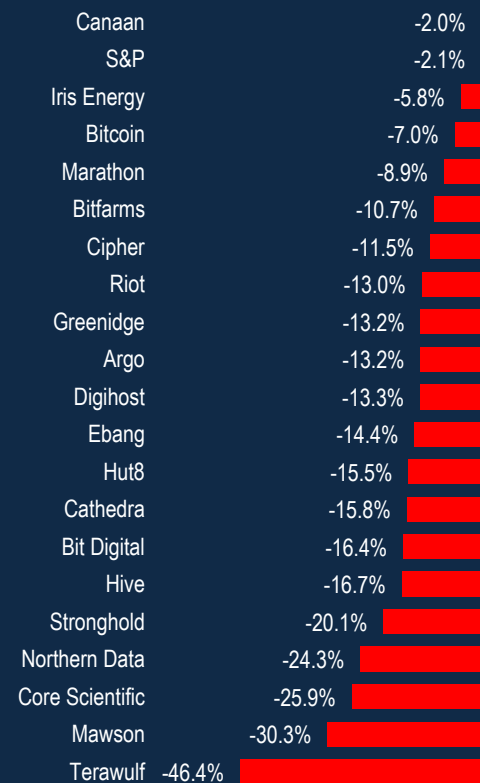
Research

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BTC Price \$38,772
(3/7 at 12pm ET)

Obs Hashrate 197 EH/s

7 Day Performance



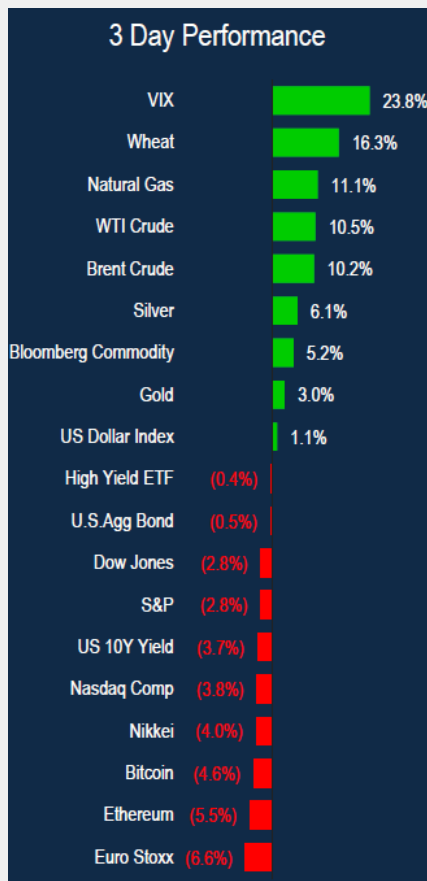


Bitcoin and Broader Markets

Macro Markets: Continuing Follow Through

- The contours of the initial response to Russia’s invasion of Ukraine are seeing continuing follow through
- Both the direction and the order of performance is largely unchanged, although most initial moves have been magnified
- The VIX is the exception, up 11.5% WoW

3D Performance as of 2/23



7D Performance as of 3/7

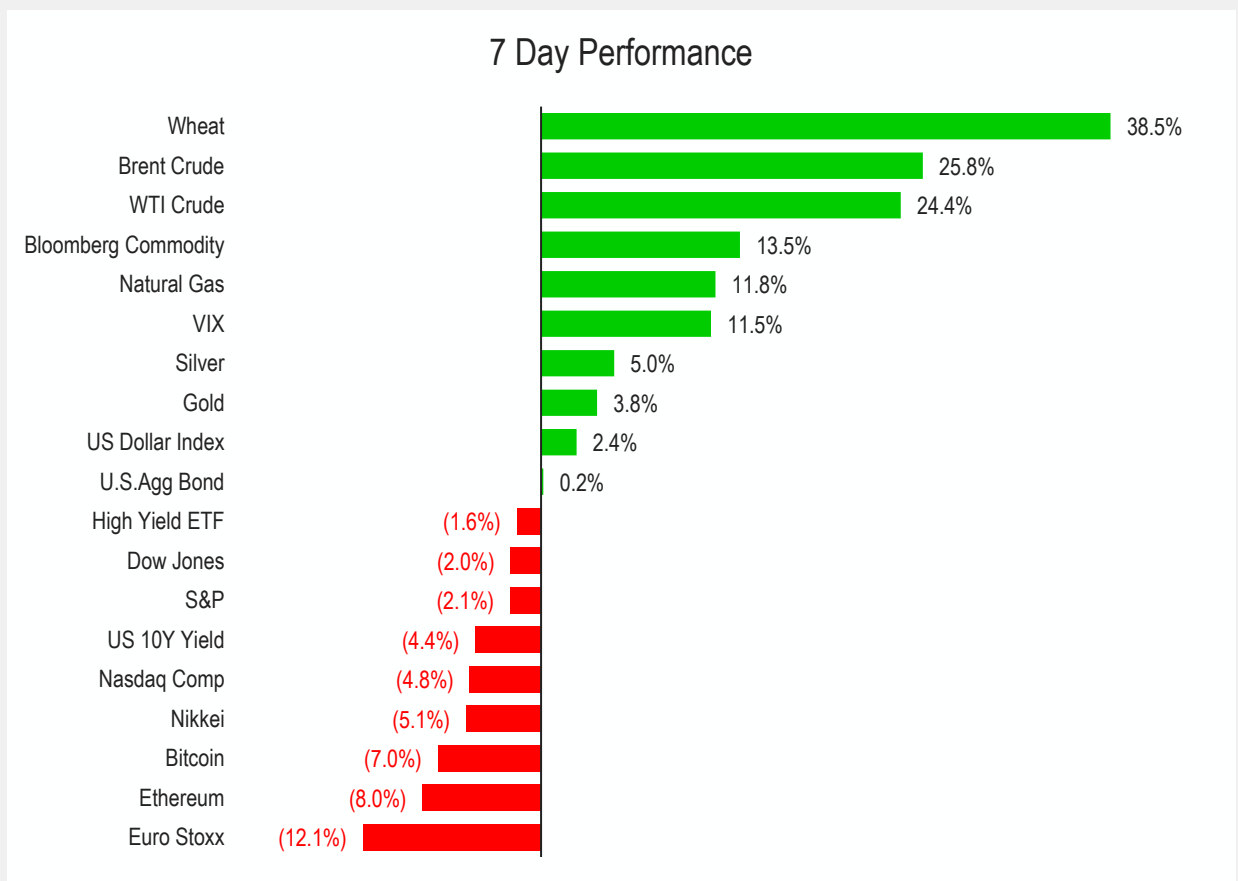


Figure: Macro Indicators: Returns over 7 days, and 3 day returns as of 2/23

Source: BitOoda, Bloomberg

Implied BTC Volatility Jumps Just 1.4% Below Realized

- Realized Bitcoin volatility (30-day annualized) consistently comes in under 100% moneyness implied vol for the generic 1st CME contract
- However, this recently flipped to realized exceeding implied volatility
- Overall, both volatilities came down WoW
- Currently, 100% moneyness implied volatility is 69.6% (vs. 56.75% week ago), compared with 71% (71.1% week ago) for realized volatility
- Realized volatility is 1.4% points above implied volatility, vs. 14.4% above last week

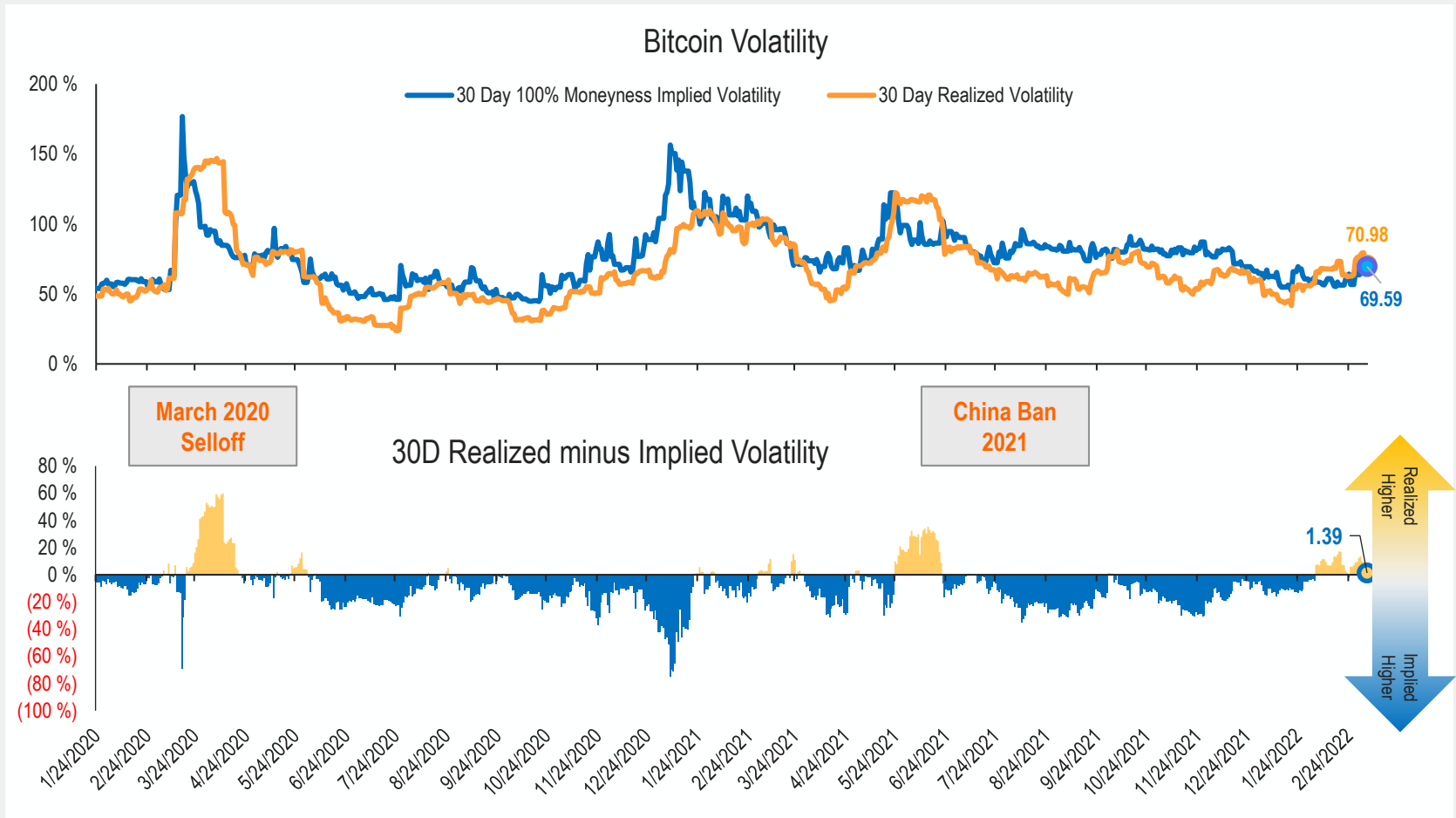


Figure: Trailing 2-year Bitcoin annualized volatility based on 30-day trailing daily returns of XBTUSD Curncy and 100% Moneyness Implied Volatility for BTC1 Curncy

Source: Bloomberg, BitOoda



When the Nasdaq Sneezes Bitcoin Catches a Cold

- As shown below, when the Nasdaq performance is in the bottom quartile of its range (since BTC's peak), Bitcoin's return is usually also in the bottom quartile
- This relationship holds in the second quartile of Nasdaq performance as well
- However, the relationship is much weaker when the Nasdaq is doing well
- Later in this report, we also show performance by decile since 1/1/2020

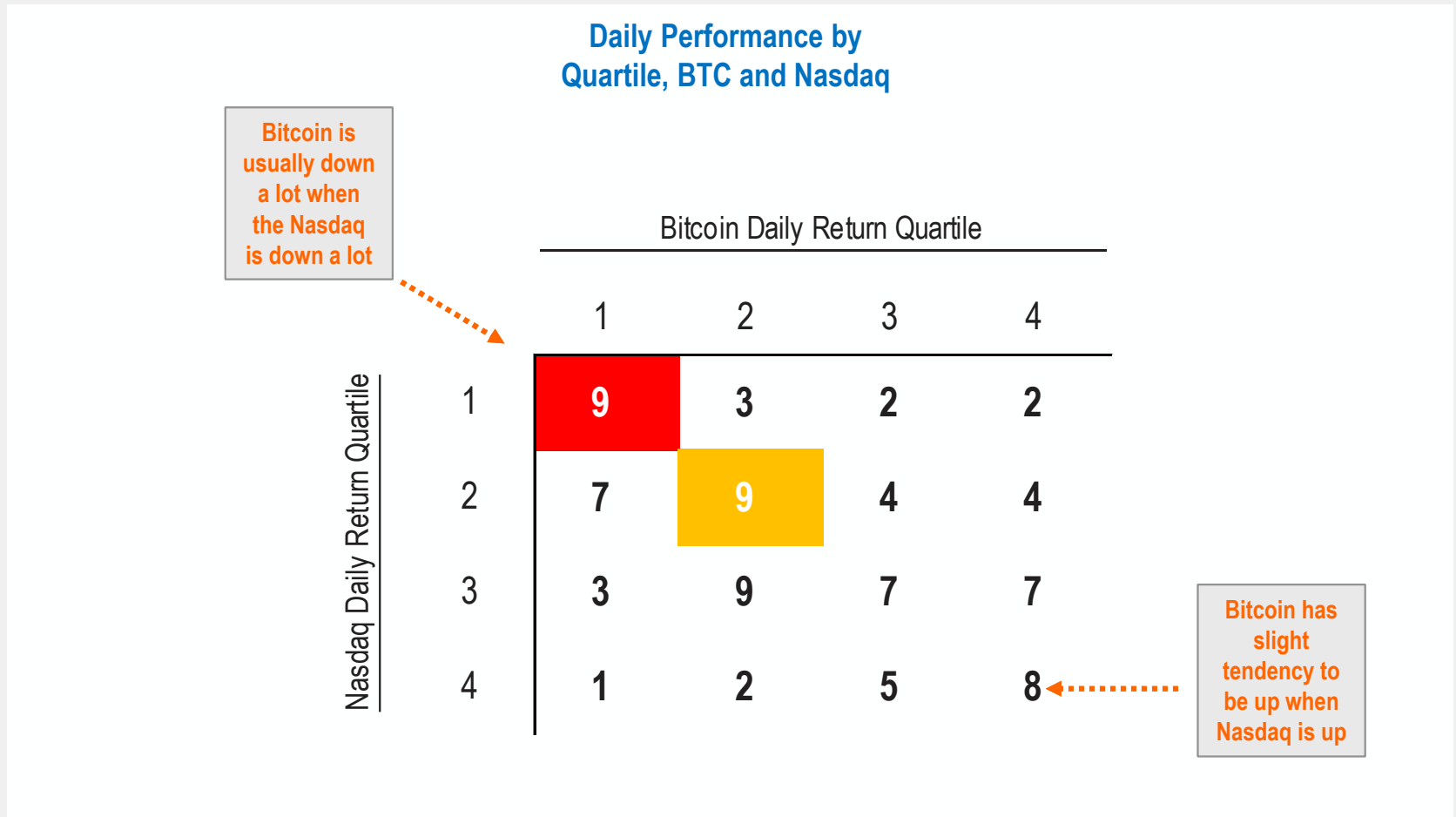


Figure: Sample count of daily returns by quartile, Bitcoin and Nasdaq Note Since 11/10/21

Source: BitOoda, Bloomberg

57% BTC / Nasdaq Correlation Stronger when Nasdaq Weak

- The scatter plot below shows the daily performance of Bitcoin against the Nasdaq, grouped by quartile of Nasdaq returns, since BTC's peak on 11/10/21
- We see that Bitcoin returns cluster on the negative side when the Nasdaq is weakest
- Further, the worst daily returns coincide with some of the worst Nasdaq returns

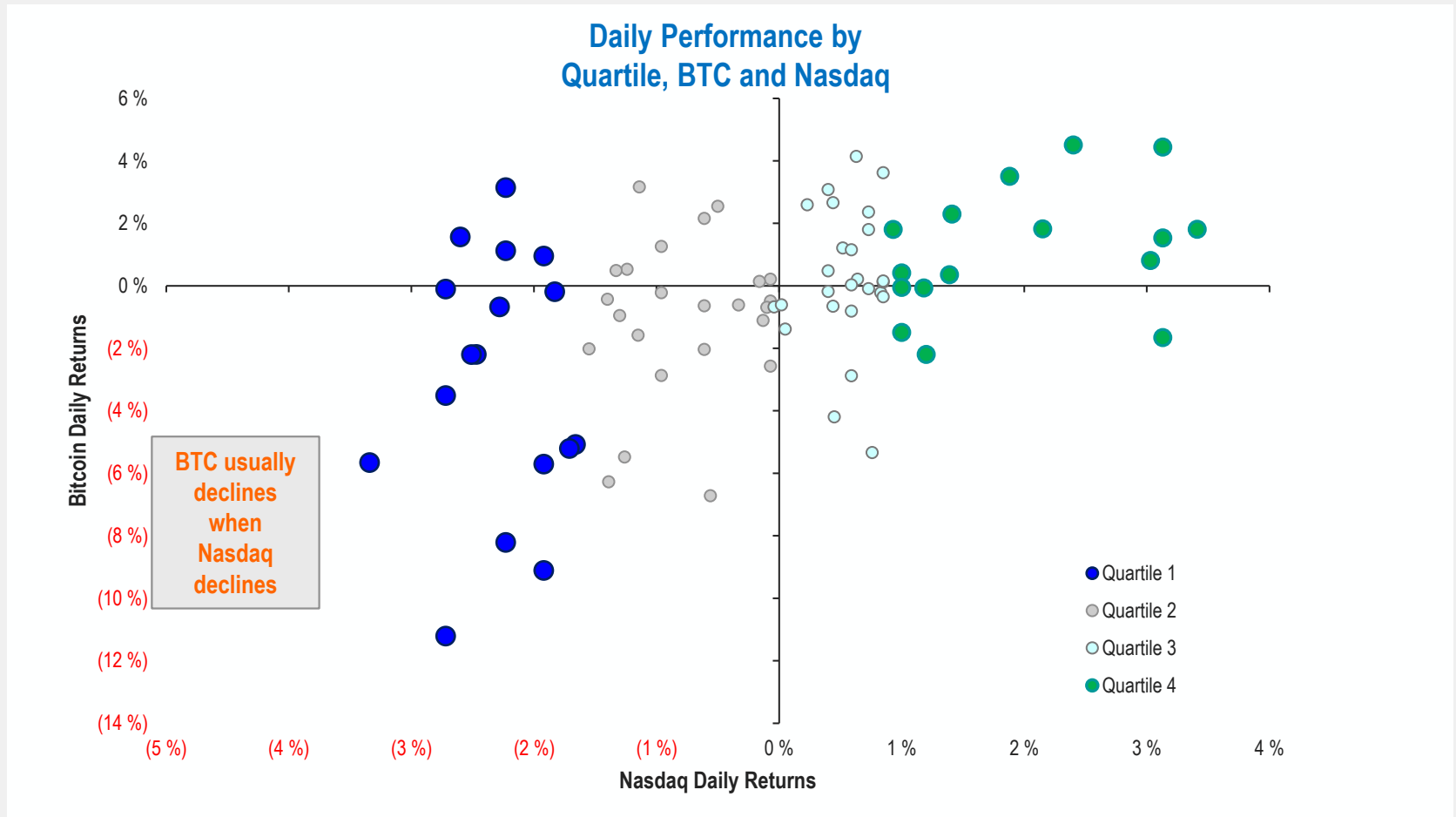


Figure: Bitcoin miner drawdowns
Note Lowest quartile is weakest 25% of daily returns

Source: BitOoda, Bloomberg

Worst Decile of BTC Returns Most Likely When Nasdaq Weakest

- BTC is likely to perform poorly when the Nasdaq is underperforming, based on performance data since Jan 2020
- With the larger sample size, we looked at deciles of daily returns for both Bitcoin and the Nasdaq
- The single largest sample frequency is when both Bitcoin and the Nasdaq have returns in the bottom decile – 20 instances
- This relationship holds in the top decile of Nasdaq performance as well

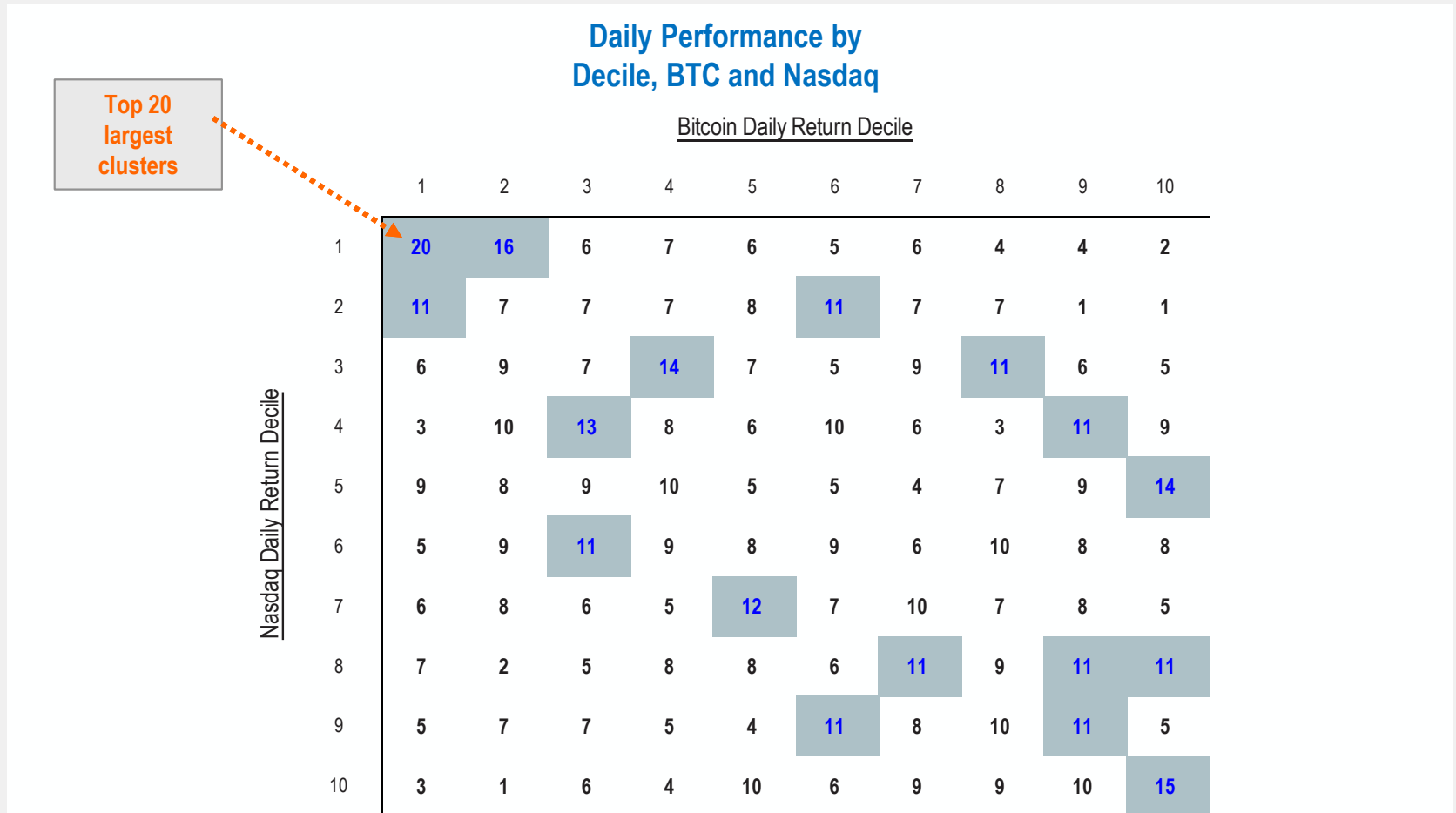


Figure: Sample count of daily returns by quartile, Bitcoin and Nasdaq Note Since 1/1/20

Source: BitOoda, Bloomberg



Long Term BTC / Nasdaq Correlation

- The scatter plot below shows the daily performance of Bitcoin against the Nasdaq, grouped by the top / bottom decile of Nasdaq returns, since 1/1/2020
- We see that Bitcoin returns cluster on the negative side when the Nasdaq is weakest
- Equally, there is a visible relationship when the Nasdaq is strongly positive
- Further, the worst daily returns coincide with some of the worst Nasdaq returns
- The overall correlation is close to zero ($R^2 = 0.08$), making Bitcoin an “uncorrelated asset”, but the relationship is stronger at the extremes – so it is correlated when investors need it to be uncorrelated

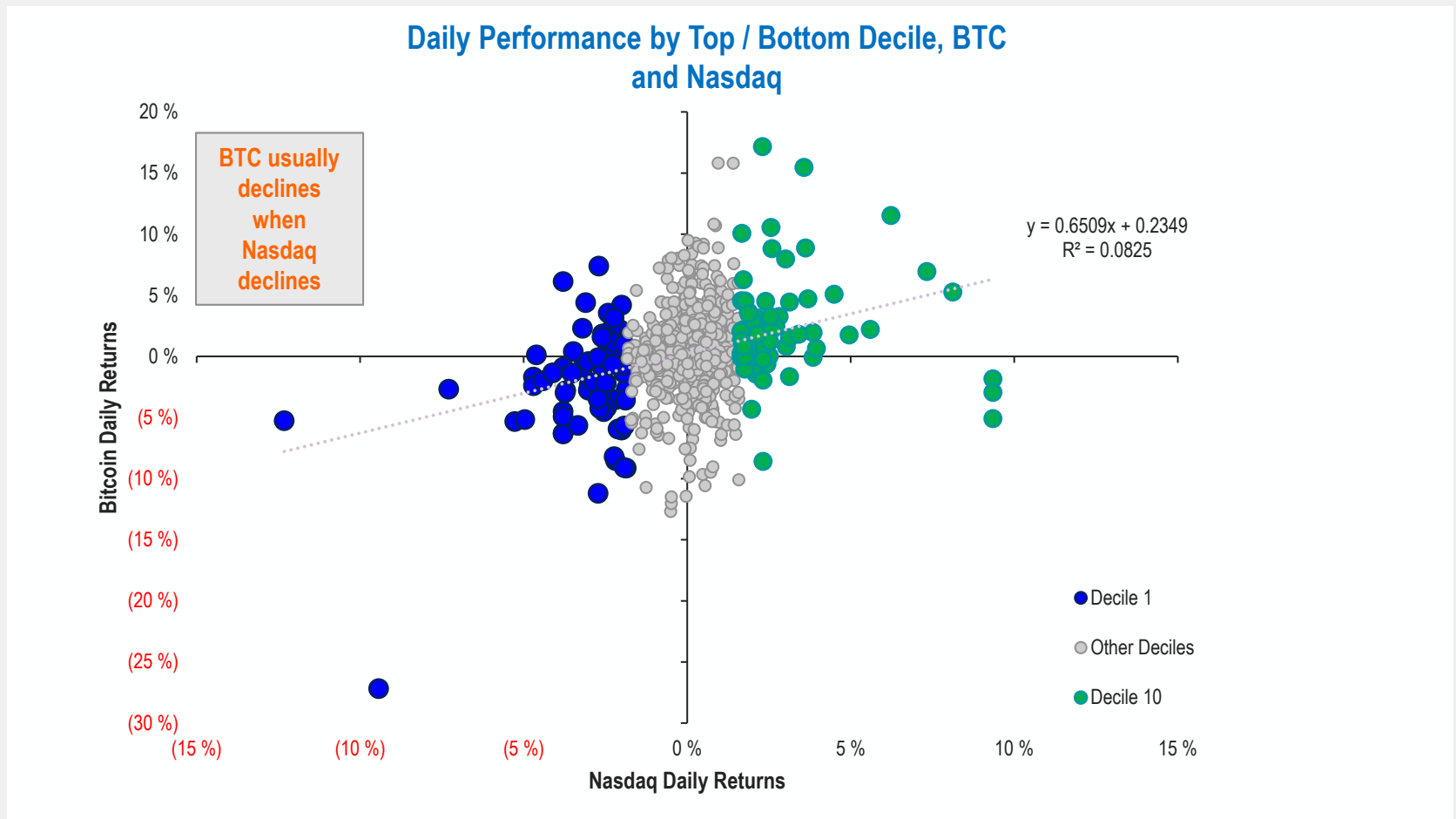


Figure: Bitcoin miner drawdowns
 Note Lowest decile is weakest 10% of daily returns, since 1/1/2020

Source: BitOoda, Bloomberg

Bitcoin Drawdowns Much Deeper and Longer than Equity

- Bitcoin is in its fourth major drawdown since 2014
- Over the same period, equities have exhibited frequent small drawdowns, but have exceeded 10% into correction territory only a handful of times
- There have been only two short-lived bear markets in equities since 2014, including early in the pandemic
- Bitcoin is only intermittently within 10-20% of all time highs

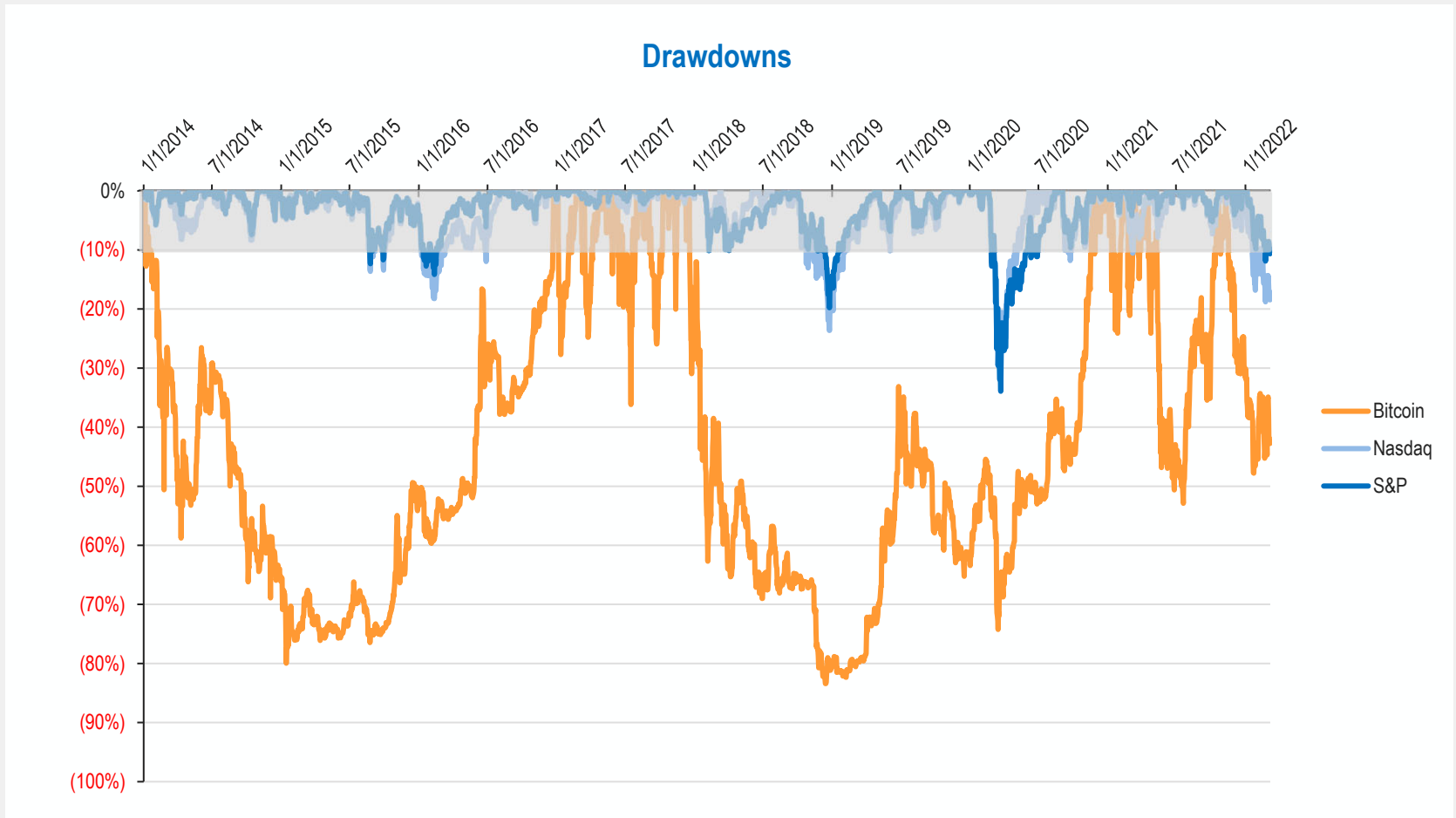


Figure: Drawdowns comparisons: Bitcoin vs the S&P and Nasdaq Composite Since 1/1/2014

Source: BitOoda, Bloomberg





Public Miners

Bitcoin Miners Performance Map

- Relatively few public Bitcoin miners have outperformed Bitcoin YTD
- Core Scientific is up the most today, at 5.6% on preliminary full year 2021 and February 2022 updates

| Year to Date | Quarter to Date | Month to Date | 30 Day | 7 Day | 1 Day |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-----------------------|
| | | | | | Core Scientific, 5.6% |
| | | | Canaan, 14.5% | | Terawulf, 4.4% |
| | | | Stronghold, 13.5% | | Canaan, 3.3% |
| | | | Iris Energy, 7.2% | | Cipher, 1.5% |
| Ebang, 3.9% | Ebang, 3.9% | | | | Marathon, 1.2% |
| Canaan, 0.3% | Canaan, 0.3% | Canaan, (2.0%) | Marathon, (1.8%) | Canaan, (2.0%) | Riot, 0.5% |
| S&P, (10.1%) | S&P, (10.1%) | S&P, (10.1%) | Cipher, (2.5%) | S&P, (2.1%) | Greenidge, (0.3%) |
| Iris Energy, (12.8%) | Iris Energy, (12.8%) | Iris Energy, (5.8%) | S&P, (4.8%) | Iris Energy, (5.8%) | Bitcoin, (0.7%) |
| Bitcoin, (16.4%) | Bitcoin, (16.4%) | Bitcoin, (7.0%) | Bitcoin, (7.0%) | Bitcoin, (7.0%) | Argo, (1.0%) |
| Stronghold, (21.6%) | Stronghold, (21.6%) | Marathon, (8.9%) | Riot, (9.5%) | Marathon, (8.9%) | Bit Digital, (1.1%) |
| Marathon, (29.7%) | Marathon, (29.7%) | Bitfarms, (10.7%) | Bitfarms, (11.7%) | Bitfarms, (10.7%) | S&P, (1.1%) |
| Cathedra, (30.0%) | Cathedra, (30.0%) | Cipher, (11.5%) | Ebang, (14.4%) | Cipher, (11.5%) | Bitfarms, (2.2%) |
| Riot, (32.9%) | Riot, (32.9%) | Riot, (13.0%) | Hive, (15.0%) | Riot, (13.0%) | Iris Energy, (2.3%) |
| Bitfarms, (33.4%) | Bitfarms, (33.4%) | Greenidge, (13.2%) | Cathedra, (20.0%) | Greenidge, (13.2%) | Ebang, (2.7%) |
| Digihost, (33.9%) | Digihost, (33.9%) | Argo, (13.2%) | Hut8, (20.4%) | Argo, (13.2%) | Hut8, (2.9%) |
| Hut8, (34.2%) | Hut8, (34.2%) | Digihost, (13.3%) | Bit Digital, (20.5%) | Digihost, (13.3%) | Stronghold, (3.0%) |
| Argo, (34.8%) | Argo, (34.8%) | Ebang, (14.4%) | Argo, (23.8%) | Ebang, (14.4%) | Cathedra, (4.2%) |
| Hive, (35.6%) | Hive, (35.6%) | Hut8, (15.5%) | Core Scientific, (27.8%) | Hut8, (15.5%) | Digihost, (4.4%) |
| Core Scientific, (37.7%) | Core Scientific, (37.7%) | Cathedra, (15.8%) | Digihost, (28.5%) | Cathedra, (15.8%) | Hive, (4.5%) |
| Cipher, (41.7%) | Cipher, (41.7%) | Bit Digital, (16.4%) | Northern Data, (29.3%) | Bit Digital, (16.4%) | Northern Data, (7.6%) |
| Bit Digital, (46.0%) | Bit Digital, (46.0%) | Hive, (16.7%) | Greenidge, (31.0%) | Hive, (16.7%) | Mawson, (12.0%) |
| Greenidge, (48.2%) | Greenidge, (48.2%) | Stronghold, (20.1%) | Mawson, (43.7%) | Stronghold, (20.1%) | |
| Northern Data, (48.7%) | Northern Data, (48.7%) | Northern Data, (24.3%) | Terawulf, (50.3%) | Northern Data, (24.3%) | |
| Mawson, (55.7%) | Mawson, (55.7%) | Core Scientific, (25.9%) | | Core Scientific, (25.9%) | |
| Terawulf, (58.4%) | Terawulf, (58.4%) | Mawson, (30.3%) | | Mawson, (30.3%) | |
| | | Terawulf, (46.4%) | | Terawulf, (46.4%) | |





Trading Comparables

Miners Trade at an Adj EV of \$90k per PH/s of 2022YE Hashrate

- Updated Hashrate and Bitcoin holdings for each of the miners reveals both a lower adjusted EV (on higher holdings) and a higher Hashrate. Adjusted EV is Market Cap + Debt – Cash – USD value of crypto holdings
- The public companies have 34 EH/s operational, above our prior compilation of 24EH/s
- This includes a placeholder for Terawulf, that just announced commencement of mining operations but did not disclose hashrate
- We exclude future capex commitments: for many miners, part of the balance sheet will be used to pay for delivery of future Hashrate, boosting fair EV. However, a lack of data for most companies makes this adjustment imprecise in practice
- On our preferred valuation metric, the group trades at an average of \$650k per current operating PH/s and \$90k per YE 2022 expected PH/s

Trading Comparables

| Name | Ticker | Name | Price | 52-week Range | | Market Cap | Cash | Debt | Bitcoin on BS | Bitcoin on BS (USD) | Adj EV | Hashrate | | | EV/ PH/s | | |
|----------------------|------------|------------------------------|-------------|---------------|-------------|-------------------|------------------|----------------|------------------|---------------------|-------------------|-------------------|-------------------|--------------------|---------------|---------------|--|
| | | | | Low | High | | | | | | | Current | 2022 Deliveries | YE 2022 | Current | 2022YE | |
| Bitcoin | XBTUSD | Currency Xbt-Usd Cross Rate | \$38,749.22 | \$28,824.32 | \$68,991.85 | \$735,335 | | | | | | | | | | | |
| S&P | SPX Index | S&P 500 Index | 4283.11 | 3730.2 | 4818.6 | \$38,106,193 | | | | | | | | | | | |
| Nasdaq | COMP Index | Nasdaq Composite | 13089.02 | 12397.1 | 16212.2 | \$22,629,903 | | | | | | | | | | | |
| Public Miners | | | | | | | | | | | | | | | | | |
| Argo | ARBK | Argo Blockchain Plc | \$7.93 | \$7.51 | \$21.00 | \$371.2 | \$0.0 | \$0.0 | 2748 BTC | \$106.5 | \$264.7 | 1605 PH/s | 2000 PH/s | 3700 PH/s | \$0.16 | \$0.07 | |
| BitDigital | BTBT | Bit Digital Inc | \$3.28 | \$3.16 | \$20.74 | \$228.4 | \$26.5 | \$0.0 | 627 BTC | \$24.3 | \$177.6 | 1603 PH/s | 1000 PH/s | 2603 PH/s | \$0.11 | \$0.07 | |
| Bitfarms | BITF | Bitfarms Ltd/Canada | \$3.37 | \$2.75 | \$9.36 | \$667.3 | \$43.3 | \$21.1 | 4883 BTC | \$189.2 | \$455.9 | 2300 PH/s | 5900 PH/s | 8200 PH/s | \$0.20 | \$0.06 | |
| Cathedrala | CBIT CN | Cathedrala Bitcoin Inc | \$0.36 | \$0.29 | \$0.92 | \$31.7 | \$5.7 | \$0.6 | 129 BTC | \$5.0 | \$21.6 | 187 PH/s | 566 PH/s | 725 PH/s | \$0.12 | \$0.03 | |
| Cipher | CIFR | Cipher Mining Inc | \$2.70 | \$2.33 | \$15.39 | \$675.5 | \$282.3 | \$0.0 | 0 BTC | \$0.0 | \$393.2 | 0 PH/s | 8000 PH/s | 8000 PH/s | \$0.05 | \$0.05 | |
| Cleanspark | CLSK | Cleanspark Inc | \$9.54 | \$5.47 | \$31.75 | \$395.6 | \$6.0 | \$2.2 | 633 BTC | \$24.5 | \$367.3 | 2200 PH/s | 2170 PH/s | 4370 PH/s | \$0.17 | \$0.08 | |
| Core Scientific | CORZ | Core Scientific Inc | \$6.82 | \$5.82 | \$14.98 | \$2,163.8 | \$1.6 | \$0.0 | 7355 BTC | \$285.0 | \$1,877.2 | 8200 PH/s | 12360 PH/s | 20560 PH/s | \$0.23 | \$0.09 | |
| Digihost | DGHI | Digihost Technology Inc | \$3.06 | \$2.44 | \$9.45 | \$76.4 | \$17.3 | \$2.5 | 766 BTC | \$29.7 | \$31.9 | 415 PH/s | 3185 PH/s | 3600 PH/s | \$0.08 | \$0.01 | |
| Greenidge | GREE | Greenidge Generation Holding | \$8.31 | \$7.81 | \$60.00 | \$337.9 | \$51.6 | \$26.3 | 0 BTC | \$0.0 | \$312.6 | 1400 PH/s | 3300 PH/s | 4700 PH/s | \$0.22 | \$0.07 | |
| Hive | HIVE | Hive Blockchain Technologies | \$1.71 | \$1.50 | \$5.60 | \$701.1 | \$114.3 | \$15.7 | 3375 BTC | \$130.8 | \$471.7 | 1870 PH/s | 1000 PH/s | 2870 PH/s | \$0.25 | \$0.16 | |
| Hut8 | HUT | Hut 8 Mining Corp | \$5.15 | \$3.15 | \$16.57 | \$873.5 | \$223.2 | \$10.3 | 5826 BTC | \$225.8 | \$434.9 | 2360 PH/s | 2140 PH/s | 4500 PH/s | \$0.18 | \$0.10 | |
| Iris Energy | IREN | Iris Energy Ltd | \$14.10 | \$8.55 | \$28.25 | \$775.7 | \$118.6 | \$0.0 | 0 BTC | \$0.0 | \$657.2 | 800 PH/s | 5671 PH/s | 6471 PH/s | \$0.82 | \$0.10 | |
| Marathon | MARA | Marathon Digital Holdings In | \$23.06 | \$18.32 | \$83.45 | \$2,366.7 | \$268.5 | \$728.4 | 8133 BTC | \$315.1 | \$2,511.4 | 3500 PH/s | 19000 PH/s | 22500 PH/s | \$0.72 | \$0.11 | |
| Mawson | MIGI | Mawson Infrastructure Group | \$2.94 | \$2.00 | \$17.25 | \$202.9 | \$32.4 | \$3.8 | 0 BTC | \$0.0 | \$174.3 | 1100 PH/s | 3050 PH/s | 4150 PH/s | \$0.16 | \$0.04 | |
| Northern Data | NB2 GY | Northern Data Ag | \$41.15 | \$40.20 | \$134.00 | \$956.3 | \$0.0 | \$0.0 | 0 BTC | \$0.0 | \$956.3 | 2000 PH/s | 2600 PH/s | 4600 PH/s | \$0.48 | \$0.21 | |
| Riot | RIOT | Riot Blockchain Inc | \$15.00 | \$12.90 | \$67.85 | \$1,748.8 | \$71.5 | \$8.4 | 5347 BTC | \$207.2 | \$1,478.4 | 3400 PH/s | 9400 PH/s | 12800 PH/s | \$0.43 | \$0.12 | |
| Stronghold | SDIG | Stronghold Digital Mining-A | \$10.08 | \$7.26 | \$35.80 | \$486.1 | \$41.4 | \$54.5 | 56 BTC | \$2.2 | \$497.0 | 1300 PH/s | 7600 PH/s | 8900 PH/s | \$0.38 | \$0.06 | |
| Terawulf | WULF | Terawulf Inc | \$6.30 | \$5.94 | \$43.98 | \$629.9 | \$1.5 | \$0.0 | 0 BTC | \$0.0 | \$628.3 | 100 PH/s | 2100 PH/s | 2200 PH/s | \$6.28 | \$0.29 | |
| Total | | | | | | \$13,688.7 | \$1,305.7 | \$873.9 | 39877 BTC | \$1,545.2 | \$11,711.7 | 34340 PH/s | 91042 PH/s | 125449 PH/s | \$0.34 | \$0.09 | |
| Average | | | | | | \$760.5 | \$72.5 | \$48.6 | 2215 BTC | \$85.8 | \$650.7 | 1908 PH/s | 5058 PH/s | 6969 PH/s | \$0.65 | \$0.09 | |
| Median | | | | | | \$648.6 | \$36.9 | \$2.3 | 630 BTC | \$24.4 | \$445.4 | 1604 PH/s | 3118 PH/s | 4550 PH/s | \$0.22 | \$0.08 | |

Figure: Comparable analysis: Adjusted Enterprise Value per PH/s of YE 2022 Capacity

Source: BitOoda, Bloomberg

Adj EV / 2022YE PH/s Average of \$90k

- The chart shows the adjusted EV per PH/s of expected 2022 YE Hashrate valuation
- The group trades at an average of \$90k per future PH/s

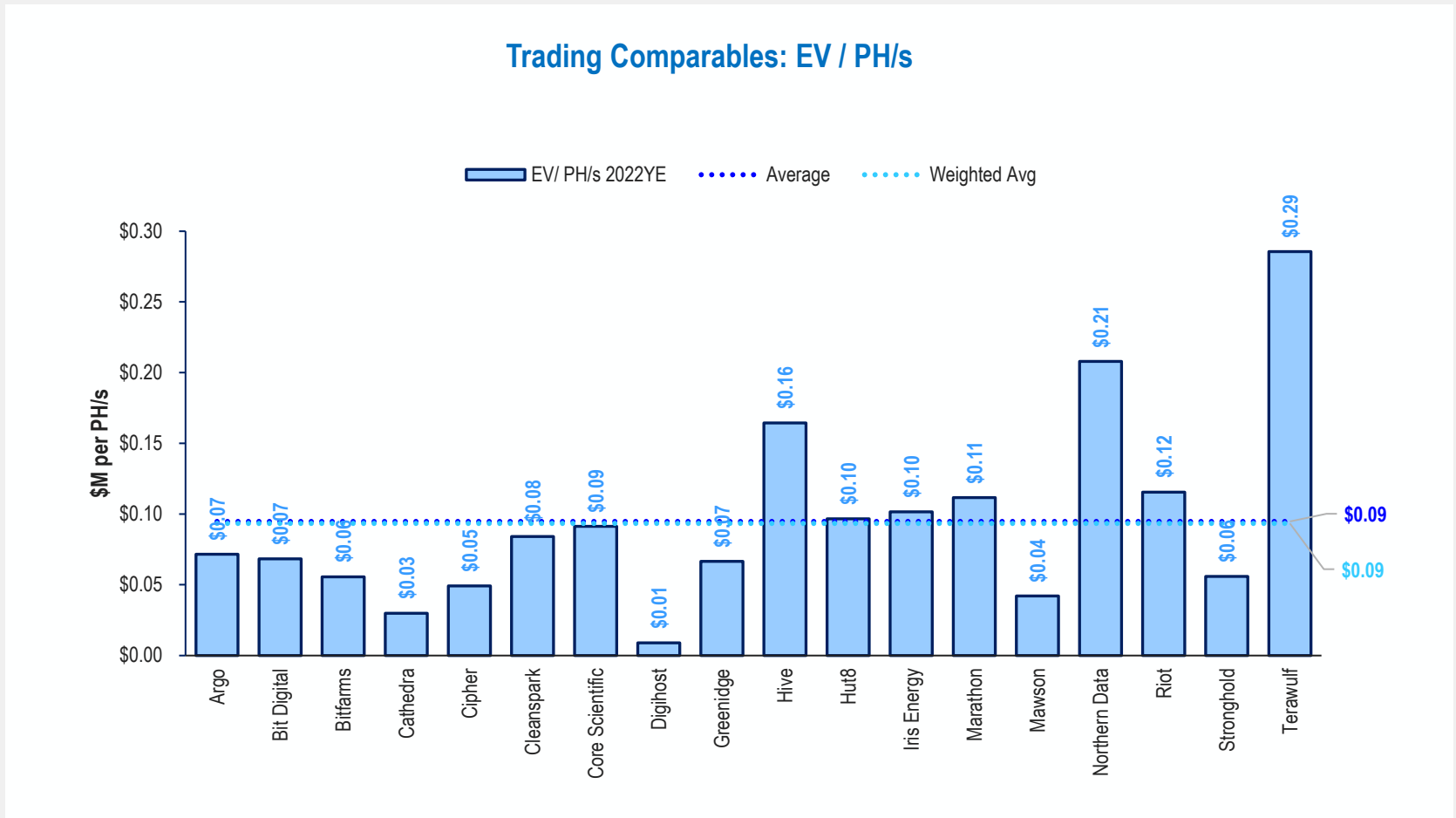


Figure: Comparable analysis: Adjusted Enterprise Value per PH/s of YE 2022 Capacity

Source: BitOoda, Bloomberg





Valuations are Higher The More YE 2022 Hashrate Comes Online

- Markets give a premium to operational capacity
- The more year end 2022 capacity is already online, the higher the valuation
- This supports the notion that the market recognizes the drop off in Bitcoin production over time
- However, we are seeing this relationship degrade in the past few weeks, suggesting that market differentiation across other dimensions of operations and the distinct business models is increasing
- **Thus, the less growth is in the future, the higher the multiple; this is quite unlike most traditional equities**

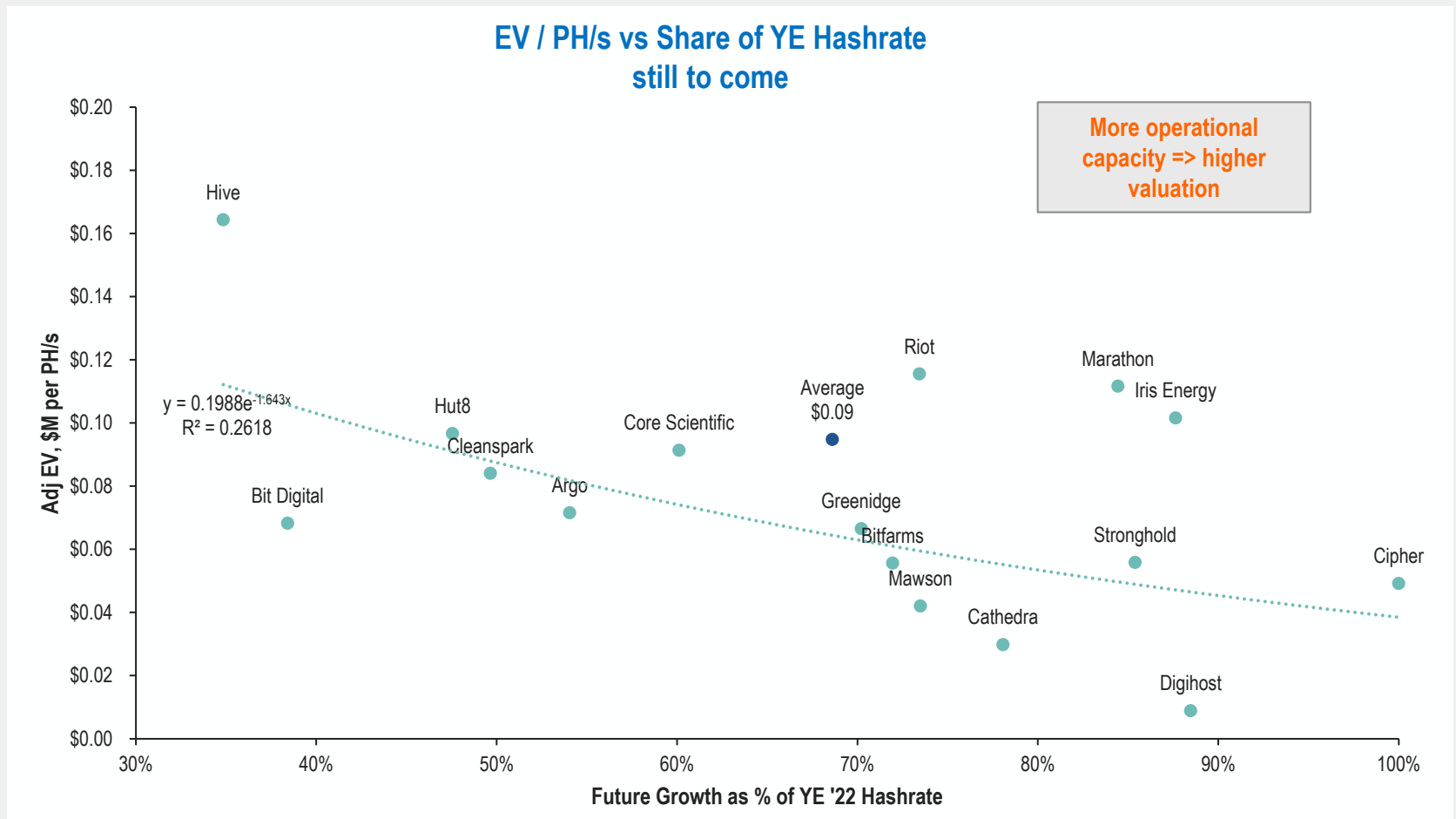


Figure: Public miner adjusted EV per PH/s vs. percentage of YE 22 Hashrate already operational

Source: BitOoda, Bloomberg

Note: Terawulf and Northern Data excluded as outliers



Valuation Differentials Aided by Power / Hosting Costs

- Entities with the lowest direct operating cost, such as Greenidge and Riot, exhibit a premium to the group
- However, for most other companies, the relationship is weaker
- Hive, which has the highest valuation in the group, has a higher estimated all-in direct operating cost (based on BitOoda’s estimates)
- Hive also has the largest share of YE 2022 Hashrate already operational, which may explain the higher valuation

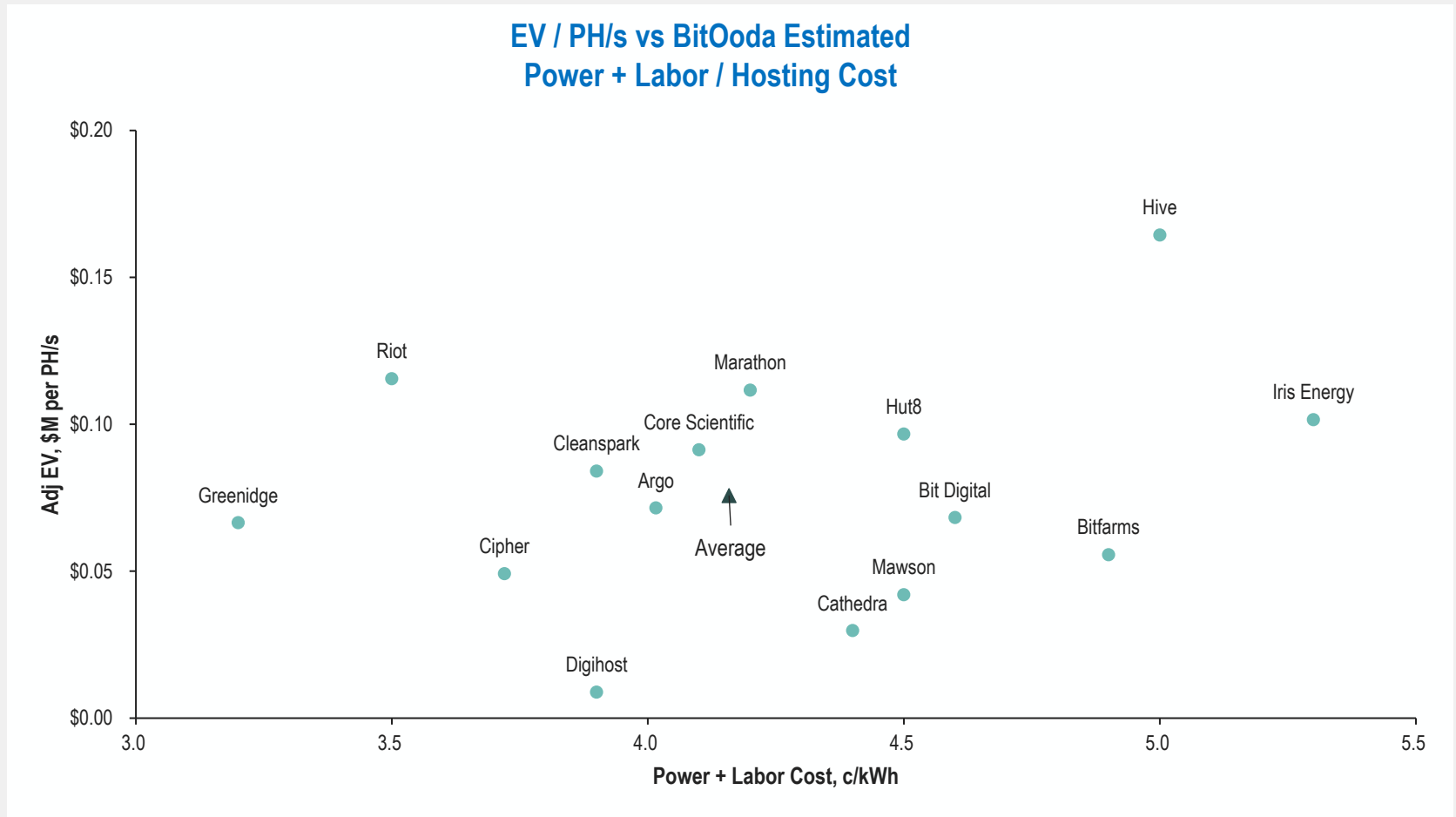


Figure: Adjusted EV per PH/s vs all in power + labor or hosting cost, cents per kWh
 Note: 1. BitOoda estimates based on publicly available information; may not fully reflect actual all-in cost. 2. Excludes Terawulf and Northern Data

Source: BitOoda, Bloomberg

Select Financials

Few Analyst Estimates For Industry Aggregate Metrics

- The median trailing gross margin was 62%, with a 43% EBITDA margin
- As a group, the miners are expected to generate \$3.2B in 2022 EBITDA on \$4.9B in revenue, based on Bloomberg consensus
- The group trades at an average 6.5x 2022E contribution (defined as cash cost of sales, adding back D&A to gross profit) and 3.0x Adj EV to 2022E EBITDA

Select Miner Financials

| Name | Ticker | LTM Margins | | Revenue | | Gross Margin | | | EBITDA | | | D&A | EBIT | | | Contribution CY22E | Multiple of Contribution | Adj EV / 2022E EBITDA | |
|-----------------|---------|--------------|--------------|---------------|----------------|----------------|--------------|--------------|--------------|---------------|---------------|----------------|---------------|---------------|---------------|-----------------------|-----------------------------|--------------------------|-------------|
| | | Gross | EBITDA | LTM | CY21E | CY22E | LTM | CY21E | CY22E | LTM | CY21E | CY22E | CY22E | LTM | CY21E | | | | CY22E |
| Argo | ARBK | | | | 97.23 | 148.15 | 80.80 | 80.80 | | 74.28 | 123.29 | 29.50 | | 56.62 | 93.79 | 108.06 | 2.4x | 2.1x | |
| Bit Digital | BTBT | | | | 109.00 | 112.00 | 73.30 | 73.30 | | | | | | 35.40 | 37.00 | | — | — | |
| Bitfarms | BITF | | | 121.22 | 172.00 | 244.00 | 69.80 | 69.80 | | | | | | 86.60 | 112.00 | | — | — | |
| Cathedrala | CBIT CN | 31.04 | 260.07 | 3.08 | | | | | 31.04 | | | | 4.64 | | | | — | — | |
| Cipher | CIFR | | | 0.00 | | | | | | | | | | | | | — | 1.5x | |
| Cleanspark | CLSK | 75.76 | (0.87) | 88.42 | 45.55 | 182.50 | 75.76 | 73.20 | 73.20 | 1.16 | (4.90) | 88.50 | 36.05 | (17.97) | (17.75) | 52.45 | 69.39 | 5.3x | 4.2x |
| Core Scientific | CORZ | | | | 472.67 | 1018.50 | 57.60 | 57.60 | | | | 198.33 | 559.50 | 104.50 | 158.33 | 455.00 | 376.76 | 5.0x | 3.4x |
| Digihost | DGHI | | | | | | | | | | | | | | | | | — | — |
| Greenidge | GREE | | | | 125.00 | 231.00 | | | | | | 49.70 | 124.00 | 42.70 | (43.00) | 81.30 | | — | 2.5x |
| Hive | HIVE | 67.29 | 120.30 | 240.03 | 193.69 | 160.49 | 67.29 | 69.60 | 69.60 | 260.21 | | | 214.38 | 123.33 | 63.09 | | | — | — |
| Hut8 | HUT | 42.37 | 47.17 | 129.39 | 140.70 | 322.18 | 42.37 | 49.27 | 49.27 | 47.13 | 81.97 | 216.95 | 48.08 | 29.40 | 41.28 | 168.87 | 117.40 | 3.7x | 2.0x |
| Iris Energy | IREN | | | | 72.23 | 328.67 | | 80.50 | 80.50 | | 42.18 | 236.17 | 44.17 | | 155.33 | 192.00 | 102.31 | 6.4x | 2.8x |
| Marathon | MARA | 77.61 | (331.22) | 150.46 | 151.00 | 601.40 | 77.61 | 79.25 | 79.25 | (93.86) | 120.00 | 462.75 | 95.25 | (85.08) | 25.05 | 367.50 | 214.92 | 11.7x | 5.4x |
| Mawson | MIGI | | | | | | | | | | | | | | | | | — | — |
| Northern Data | NB2 GY | | | | 231.05 | 807.52 | | 66.30 | 66.30 | | 117.81 | 602.78 | 218.47 | | 36.60 | 384.32 | 371.65 | 2.6x | 1.6x |
| Riot | RIOT | 62.15 | 43.49 | 127.64 | 211.13 | 440.75 | 62.15 | 65.40 | 65.40 | 20.11 | 109.15 | 269.33 | 123.66 | (2.84) | 59.06 | 145.67 | 261.74 | 5.6x | 5.5x |
| Stronghold | SDIG | | | | 33.68 | 296.60 | | 4.00 | 4.00 | | 9.49 | 210.20 | 30.40 | | (2.89) | 179.80 | 31.75 | 15.7x | 2.4x |
| Terawulf | WULF | 33.76 | (4.61) | 16.30 | | | 33.76 | | | (0.76) | | | | (1.51) | | | | — | — |
| Total | | | | 876.54 | 2054.92 | 4893.76 | | | | 238.64 | 793.01 | 3164.47 | 772.77 | 87.76 | 713.95 | 2332.79 | | | |
| Average | | 55.71 | 19.19 | 97.39 | 158.07 | 376.44 | 55.71 | 64.08 | 64.08 | 34.09 | 72.09 | 287.68 | 77.28 | 9.75 | 54.92 | 179.45 | 183.77 | 6.5x | 3.0x |
| Median | | 62.15 | 43.49 | 121.22 | 140.70 | 296.60 | 62.15 | 69.70 | 69.70 | 4.64 | 74.28 | 236.17 | 46.12 | (2.84) | 41.28 | 145.67 | 117.40 | 5.3x | 2.5x |

Figure: Select financial metrics – Bloomberg consensus revenue and EBITDA estimates
 Note: Contribution is BitOoda estimate of gross profit less depreciation

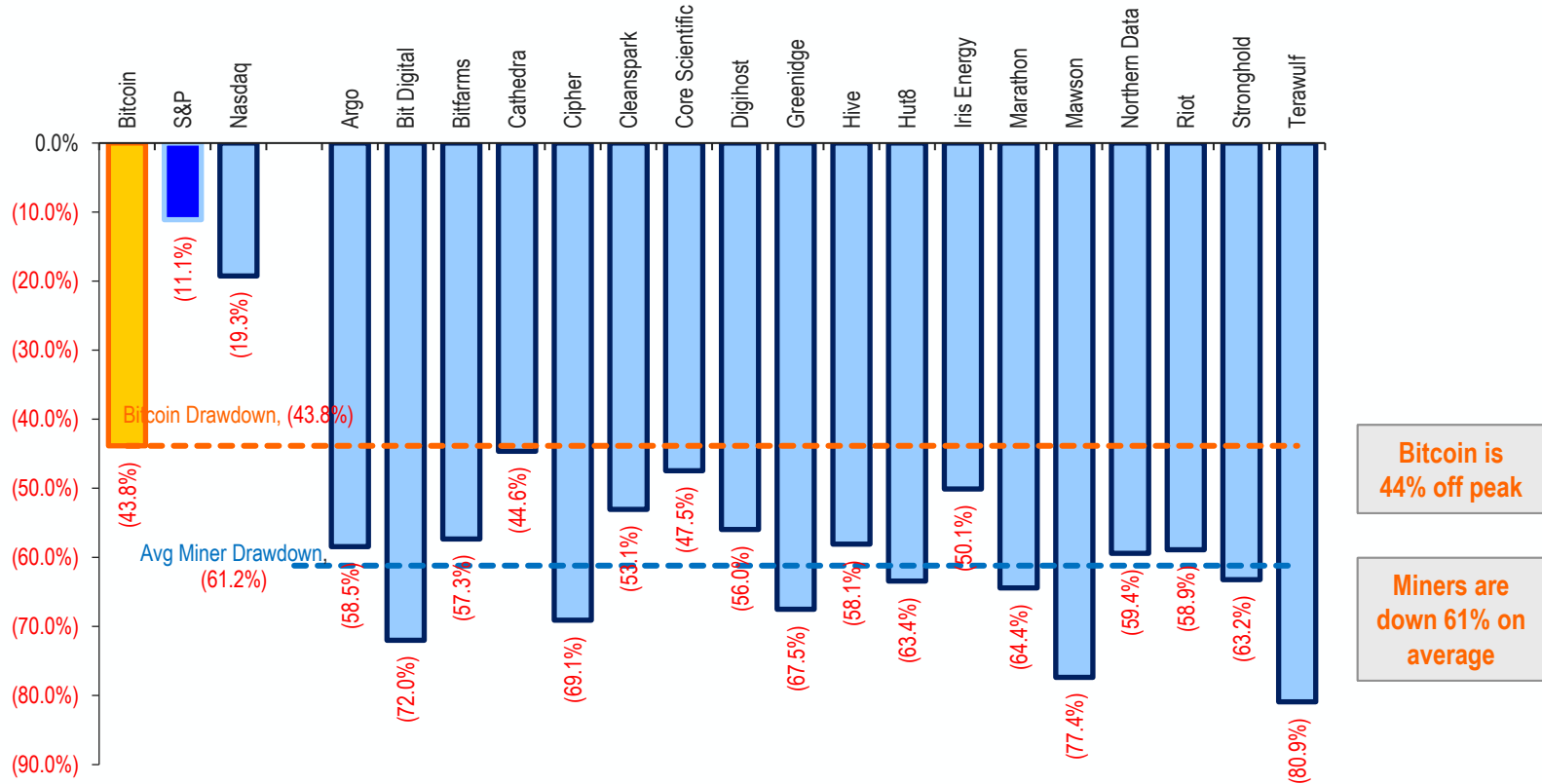
Source: BitOoda, Bloomberg

Drawdowns From BTC Peak

Miners Underperforming Bitcoin

- Bitcoin is off 44% from its peak on November 10, 2021
- Over the same period, the S&P 500 is down 11% and the Nasdaq 19%
- Most miners have underperformed Bitcoin since November 2021 by an average additional 17%

Drawdowns Since 11/10/21 BTC Peak



Bitcoin is 44% off peak

Miners are down 61% on average

Figure: Bitcoin miner drawdowns
 Notes: 1. Iris Energy's drawdown measured from 11/17/21

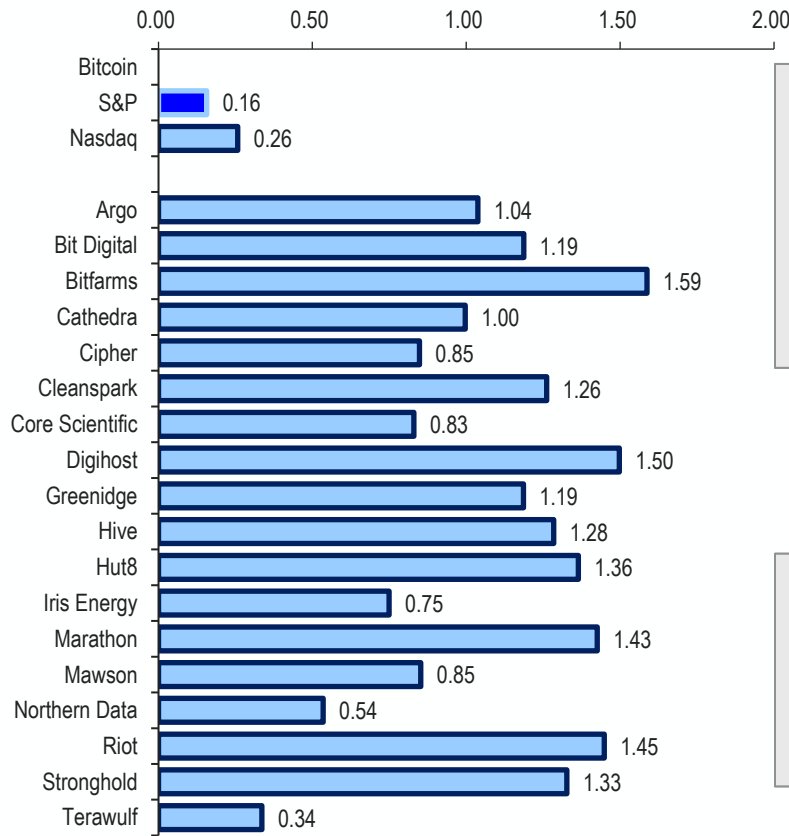
Source: BitOoda, Bloomberg

Beta & Correlation

Not All Miners Are Equal

- We expect most miners to exhibit a Beta > 1 relative to Bitcoin
- Bitcoin is off 44% from its November 2021 peak, Hashrate is up, and transaction fees are flattish, so miners should experience both falling revenue and margin compression
- Interestingly, although most miners have underperformed Bitcoin, both the beta to Bitcoin and correlation to Bitcoin show much more dispersion
- The correlation of Bitcoin to the S&P and Nasdaq is quite high, at 47% & 54%, respectively
- **The correlation to equities is picking up again as macro fears affect equity markets**

Beta to BTC Since BTC Peak



Bitcoin has a 47% correlation to the S&P and 54% to the Nasdaq since its peak

Some miners show both a low Beta and a low correlation to Bitcoin

Correl to BTC since BTC Peak

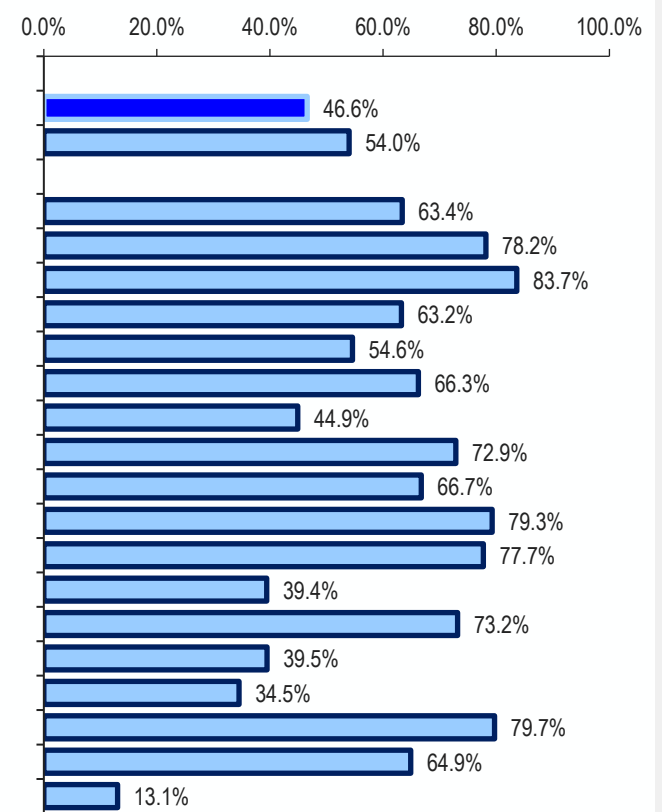


Figure: Bitcoin miner drawdowns
 Note 1. Iris Energy's drawdown measured from 11/17/21

Source: BitOoda, Bloomberg



Institutional Fund Flows



Select Fund Analysis

GBTC is Largest; Most are Small

- GBTC, an ETP, has the largest Assets Under Management (AUM) in our select group below, representing \$18B of the \$23B AUM for the group
- Some of the other large-ish funds with crypto exposure include ARKW, BITO, BLOK and BITW
- Of these, GBTC appears not to have raised any capital in recent times
- Please let us know of any funds you would like to see included in the data

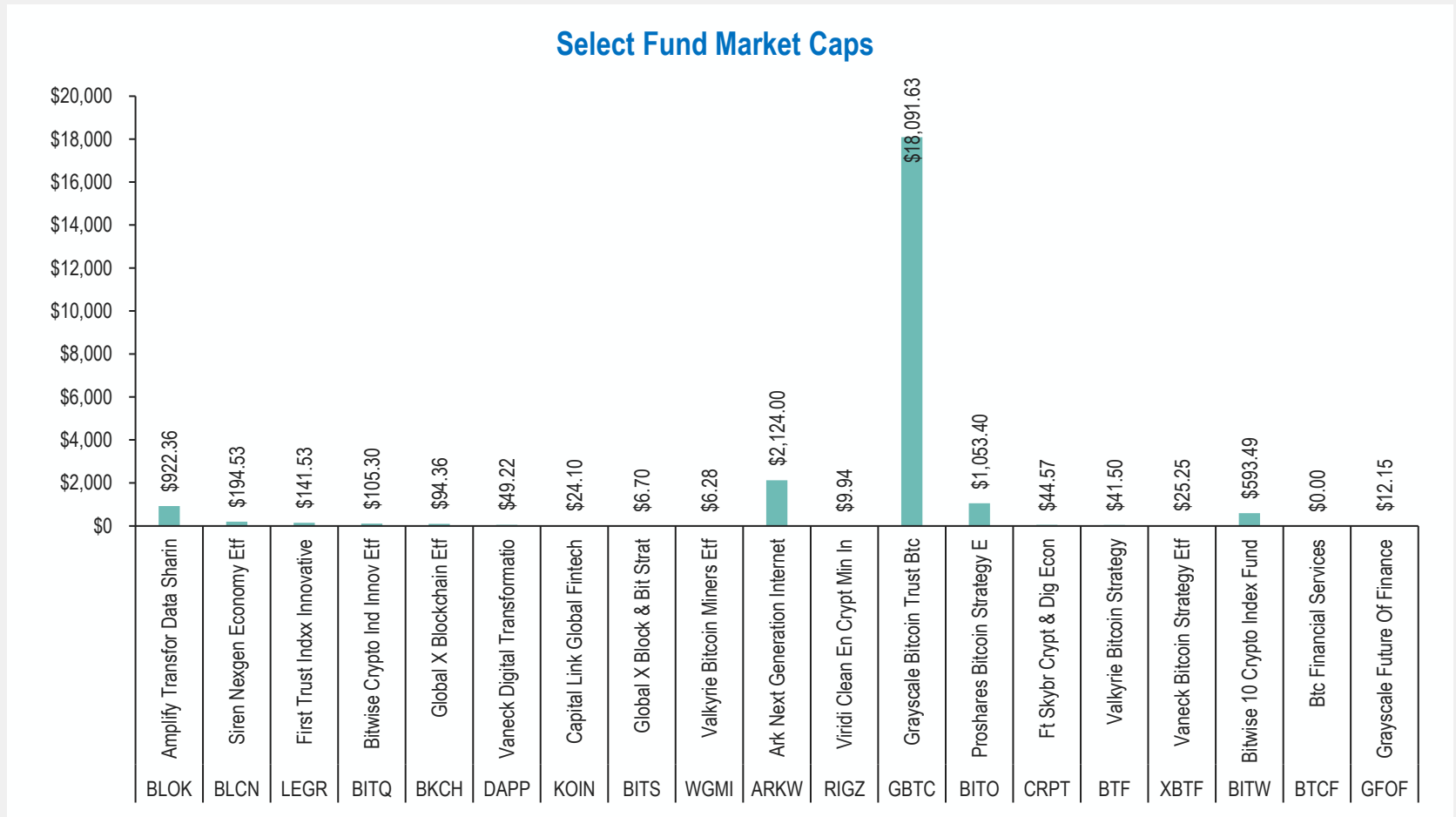


Figure: Select fund markets caps
As of 2/28/2022

Source: BitOoda, Bloomberg

Trailing 12M Cumulative Flows \$300mm Net Inflows

- The select fund group saw consistent outflows for much of the last year, offset by inflows into BITO upon launch in October.
- Overall, our selected funds show inflows of \$303mm over the trailing 12 months
- A week ago, the number stood at \$57mm of outflows, but the change is not new inflows as much as dropping large outflows in the year-ago week

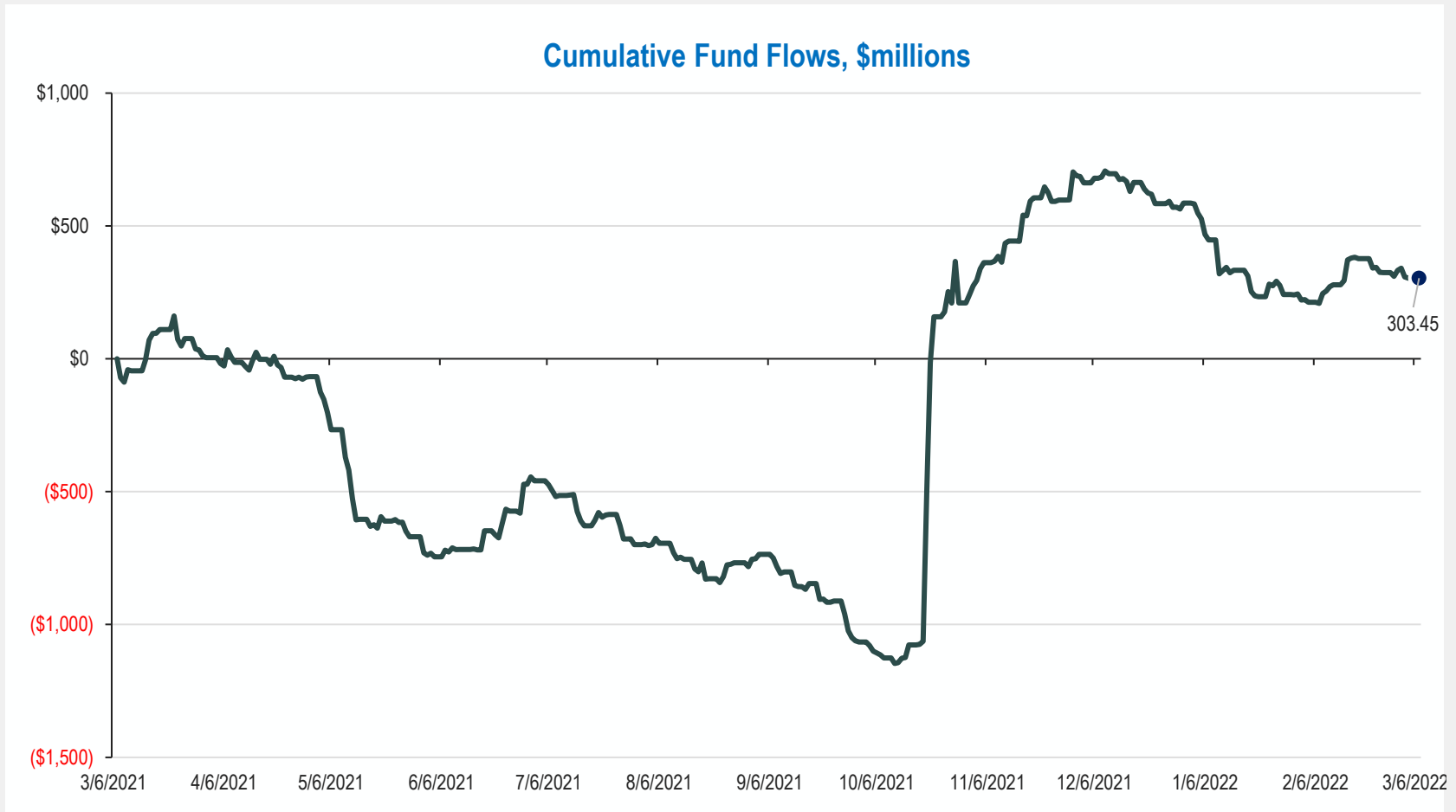


Figure: Cumulative fund flows for select crypto / crypto exposed funds
Trailing one year

Source: BitOoda, Bloomberg





Select Flows

BITO, BLOK Inflows; ARKW Outflows

- Over the past year, ARKW – which is not just exposed to crypto but to Web 3 / tech innovation more broadly – has seen \$2.6 billion of outflows
- Over the same period, BITO has seen \$1.7B of inflows, with BLOK receiving \$467mm and other selected funds receiving \$738mm of inflows

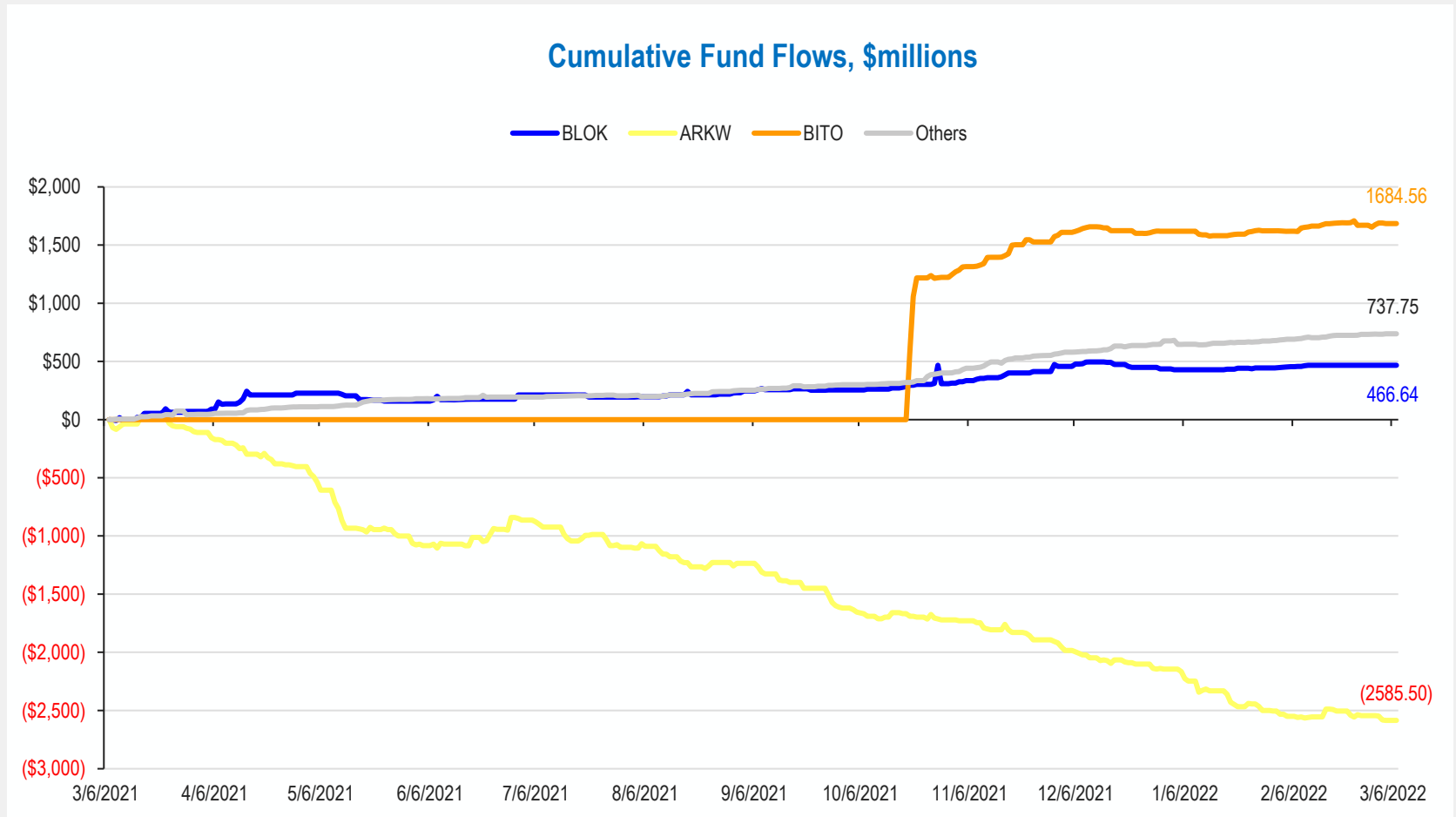


Figure: Cumulative fund flows for select crypto / crypto exposed funds
Trailing one year

Source: BitOoda, Bloomberg

YTD Daily Fund Flows

\$21mm Outflows in Past Week Alone; \$282mm Outflows YTD

- Since the beginning of the year, the fund group saw \$282mm in redemptions
- The group saw \$21mm of outflows last week

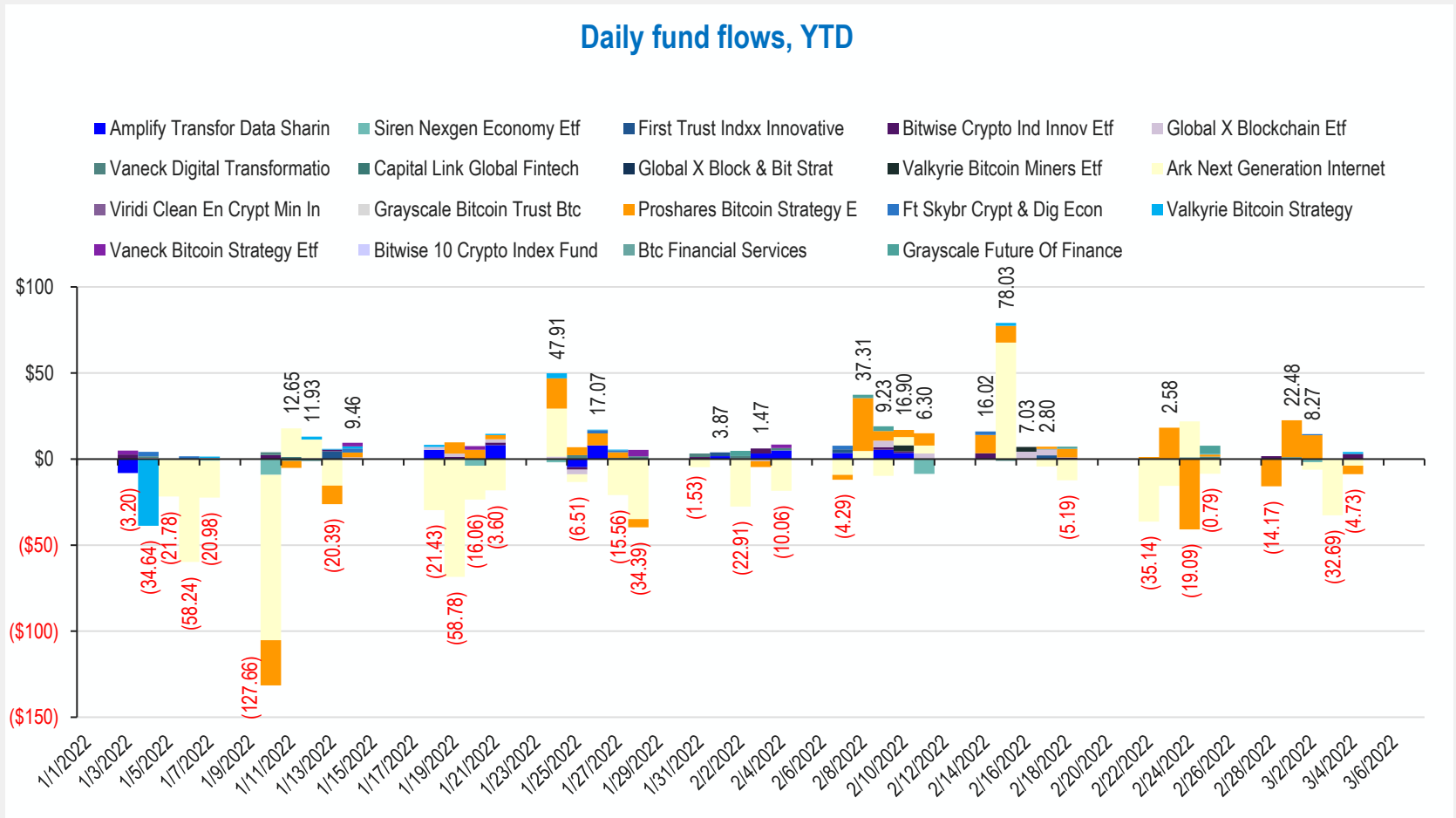


Figure: Daily fund flows Since 1/1/2022

Source: BitOoda, Bloomberg



ProShares Futures ETF BITO

Modest, Expected Underperformance

- The ProShares ETF BITO currently has a market cap of \$1053 million
- The ETF has underperformed Bitcoin by 1.75%, declining by 41% since launch vs. a 39.25% decline in the price of BTC in the same timeframe
- This is expected given the cost of rolling the futures contracts each month

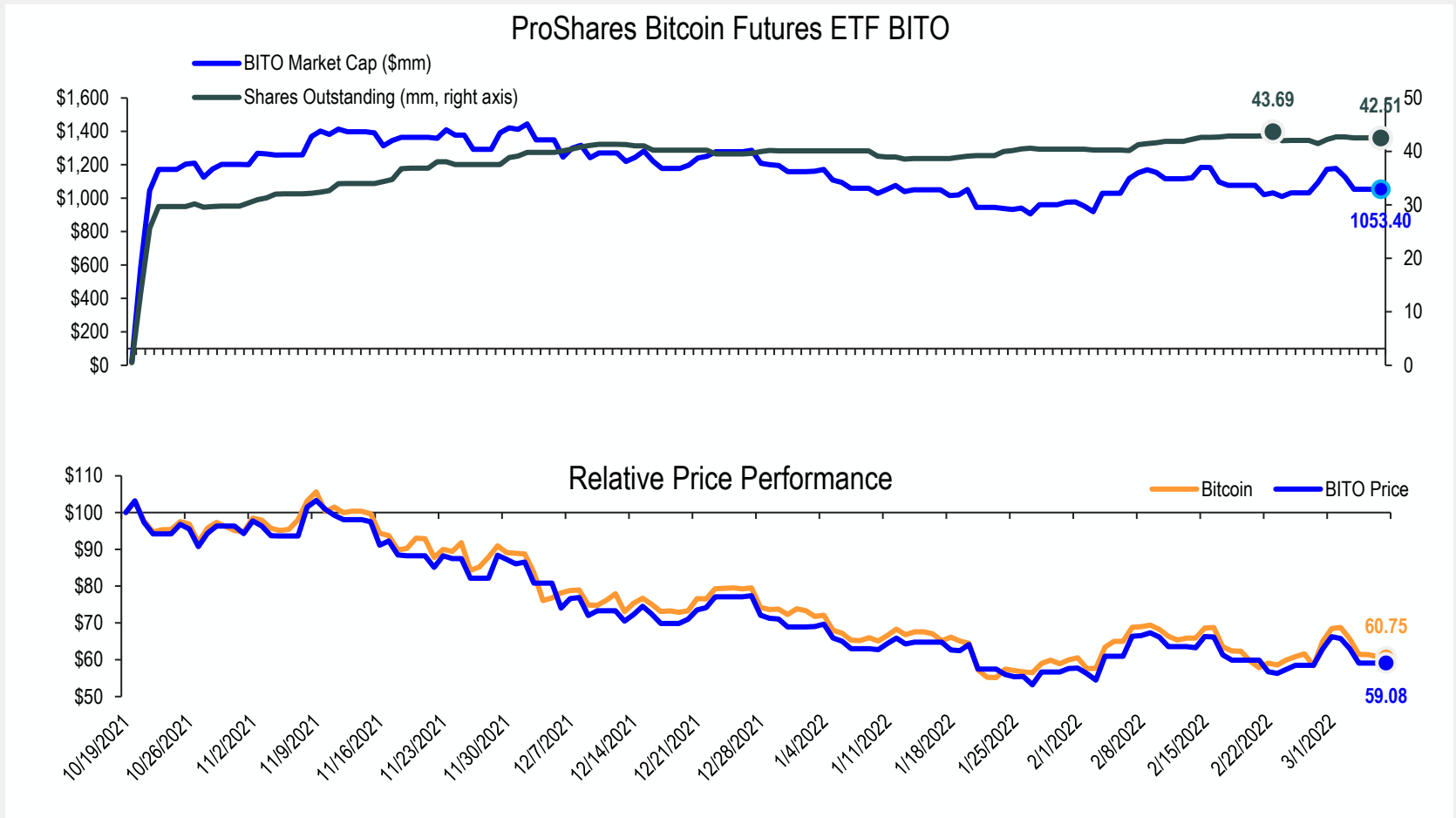


Figure: ProShares Bitcoin Strategy Futures ETF market cap and price performance compared to Bitcoin

Source: BitOoda, Bloomberg



ProShares Futures ETF BITO

\$14.4mm Net Inflows in Past Week

- The ProShares ETF BITO saw ~\$41mm of redemptions on 2/24
- This is consistent with the risk off trade we saw with the Russian invasion of Ukraine
- However, in the past week the fund saw net inflows of \$14.4mm

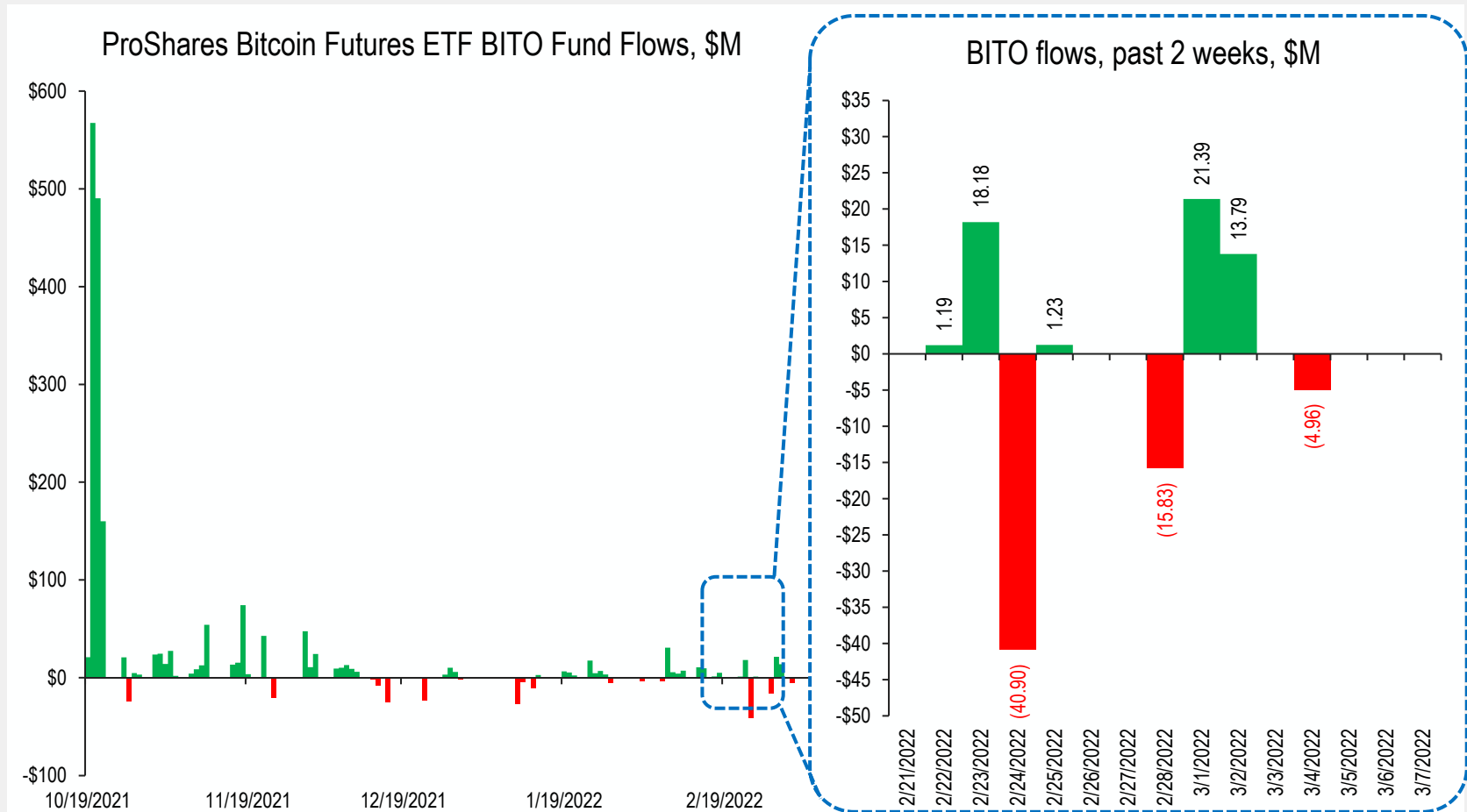


Figure: ProShares Bitcoin Strategy Futures ETF market cap and price performance compared to Bitcoin

Source: BitOoda, Bloomberg



CME Futures

Futures Curve Flat through July

Open Interest Down 2.7% WoW

- The futures curve is flat through July
- Contango beyond, but without meaningful open interest or change in open interest
- Overall CME open interest fell 2.7% vs. last week and 6.1% vs. two weeks ago to 9652 lots
- The February roll is complete, but April Open Interest is much lower than March was two weeks ago



Figure: Bitcoin futures metrics

Source: BitOoda, CME, Bloomberg

CME Commitment of Traders 3/1 Open Interest Dipped on Lower Spreading, Leveraged Positions

- The CME Bitcoin Commitment of Traders report shows that open interest dipped over the week to 3/1/22
- Data shows 9980 lots on 3/1 compared with 11,007 lots on 2/22
- Spreading positions almost halved to 480 from 846
- Leveraged players reduced longs by 300 lots, and short positions by almost 1000 lots
- Commercial players increased their shorts by over 250 lots

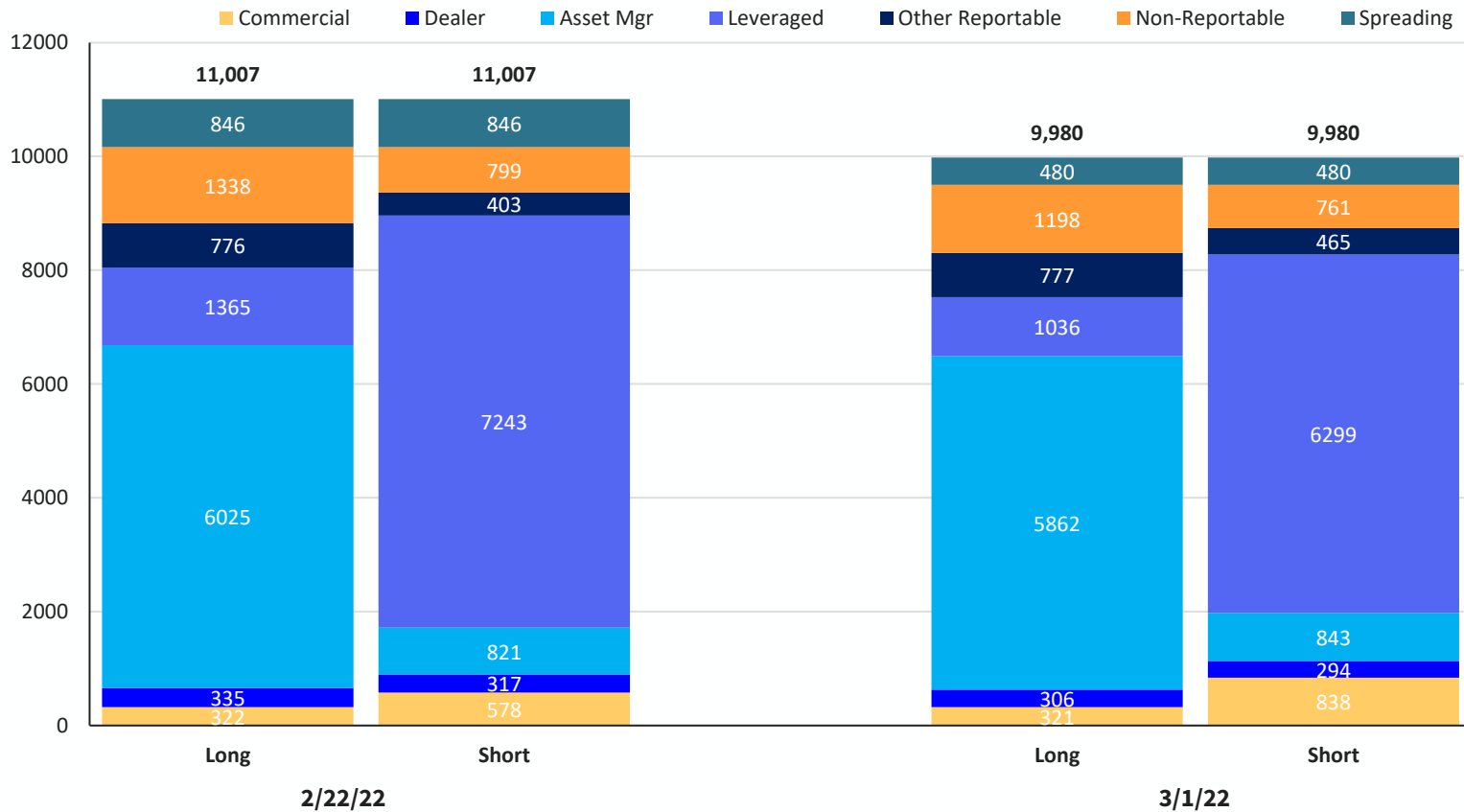


Figure: CME Bitcoin Commitment of Traders, 2/22/2022 and 3/1/2022

Source: BitOoda, Bloomberg, CME



Non-Commercial Net Length Is Now 517 Lots

- Commercial Bitcoin players are not very active in the options space, participating mainly in the futures arena
- Commercial positioning has been largely long futures, but recently switched to short
- As a result, the net position for non-commercial market participants has been largely short and is now long for the first time since September
- The net length for non-commercial participants rose to 517 lots

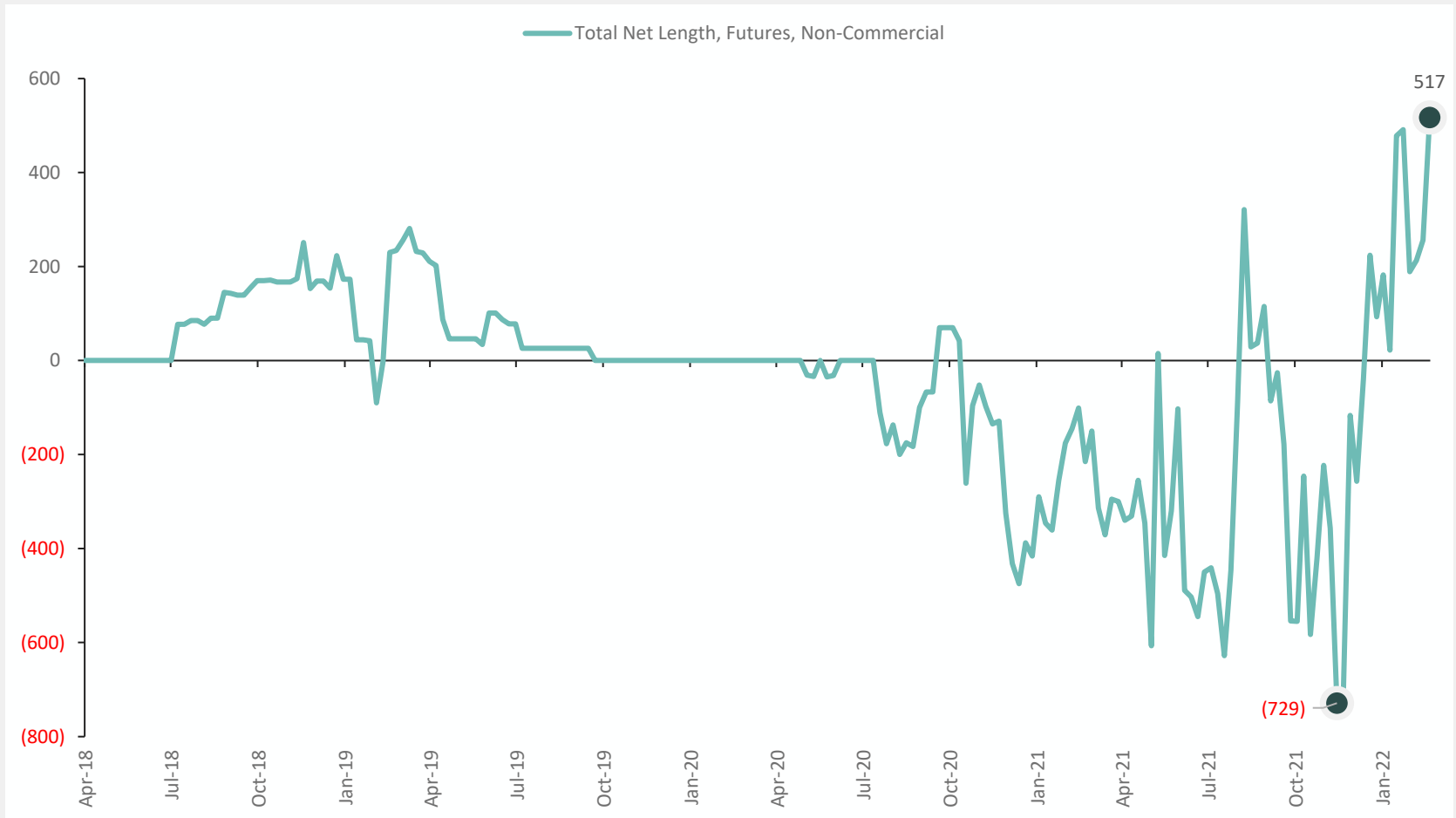


Figure: CME Bitcoin Future Non-Commercial Net Length, from Jan 1 2021

Source: Bloomberg



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