

December 18, 2023

Kaiko Research

Weekly Chartbook

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1. Price Dynamics

Bitcoin

Sunday Close
\$41,352

All Time High
\$68,630

Ether

\$2,195

\$4,848

7D Returns

Percentage price change since previous Sunday's close



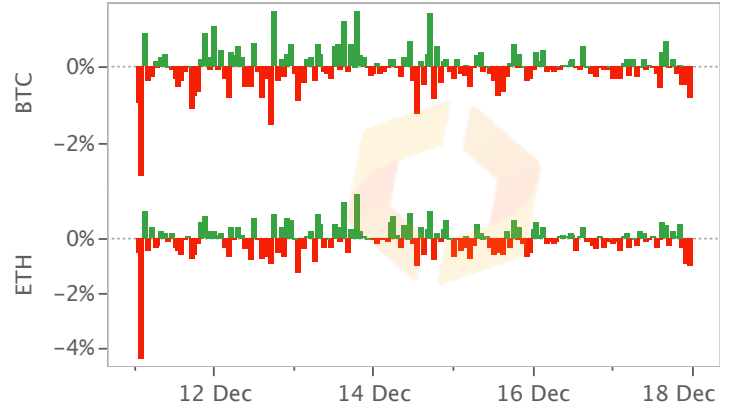
Data Source: Kaiko asset prices

ETH to BTC Ratio



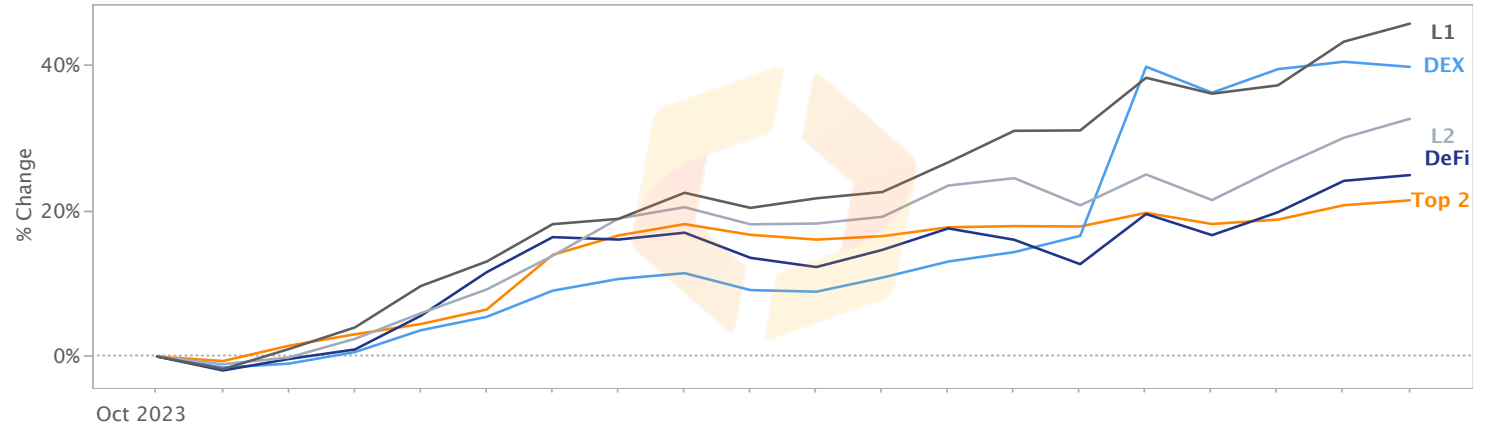
Data Source: Kaiko asset prices

Hourly Returns



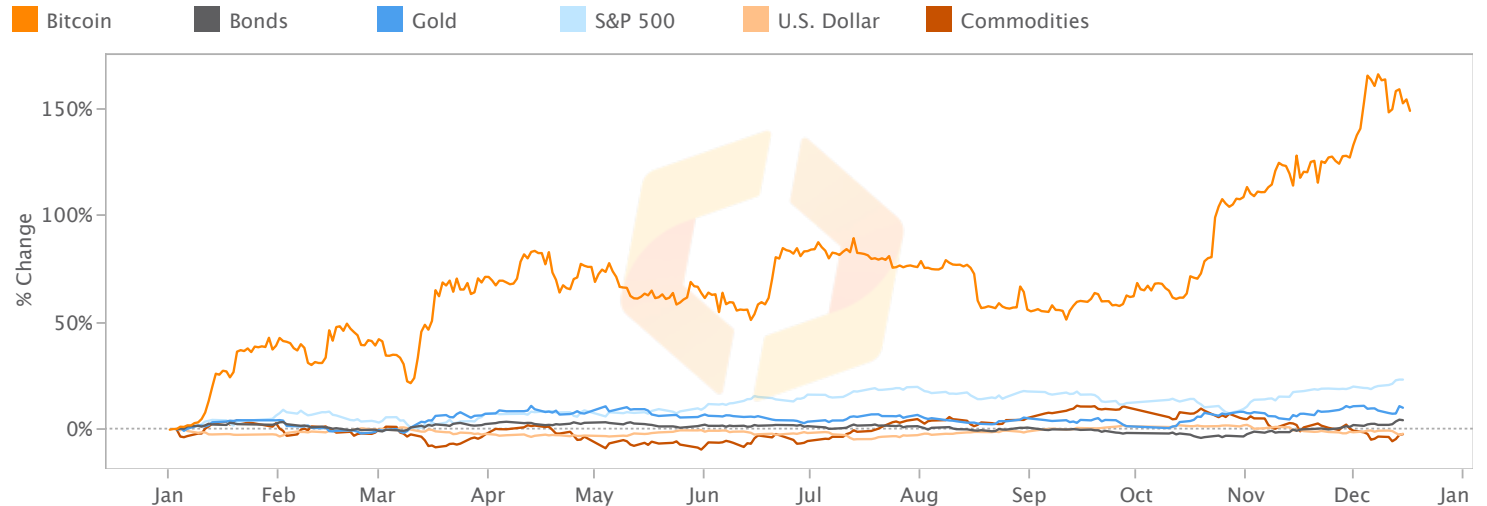
Data Source: Kaiko asset prices

90D Crypto Sector Returns



Data Source: Kaiko valuation data

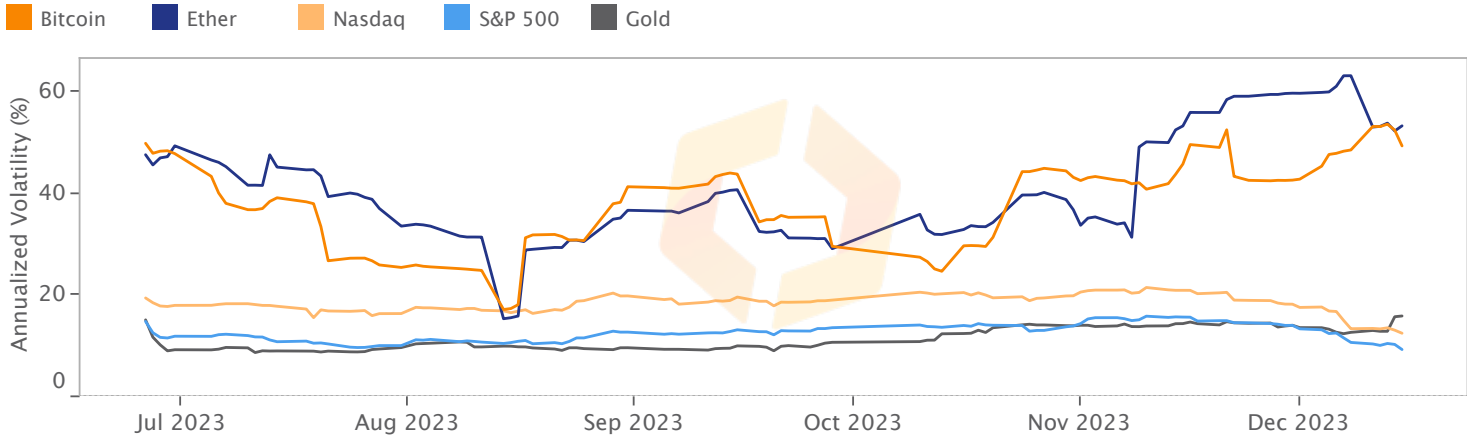
YTD Traditional Asset Returns



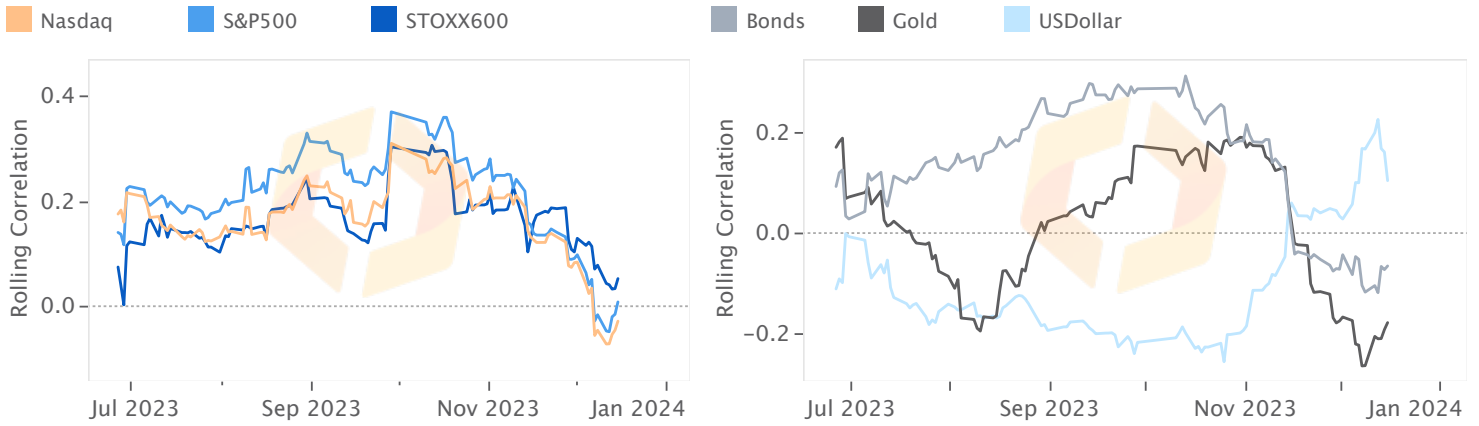
Data Source: Kaiko, Yahoo Finance.

2. Volatility and Correlations

30D Rolling Historical Volatility



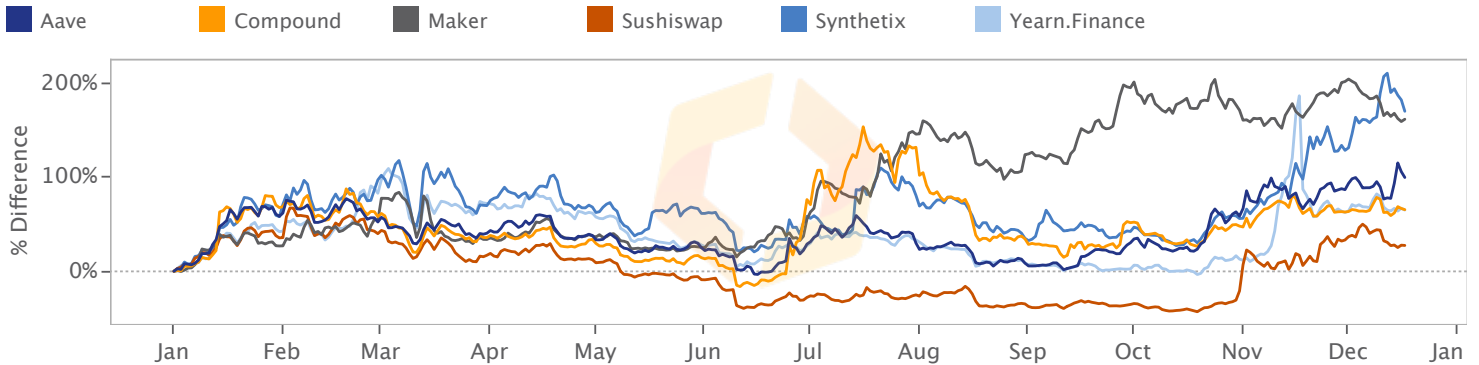
60D Rolling Correlation With BTC Daily Returns



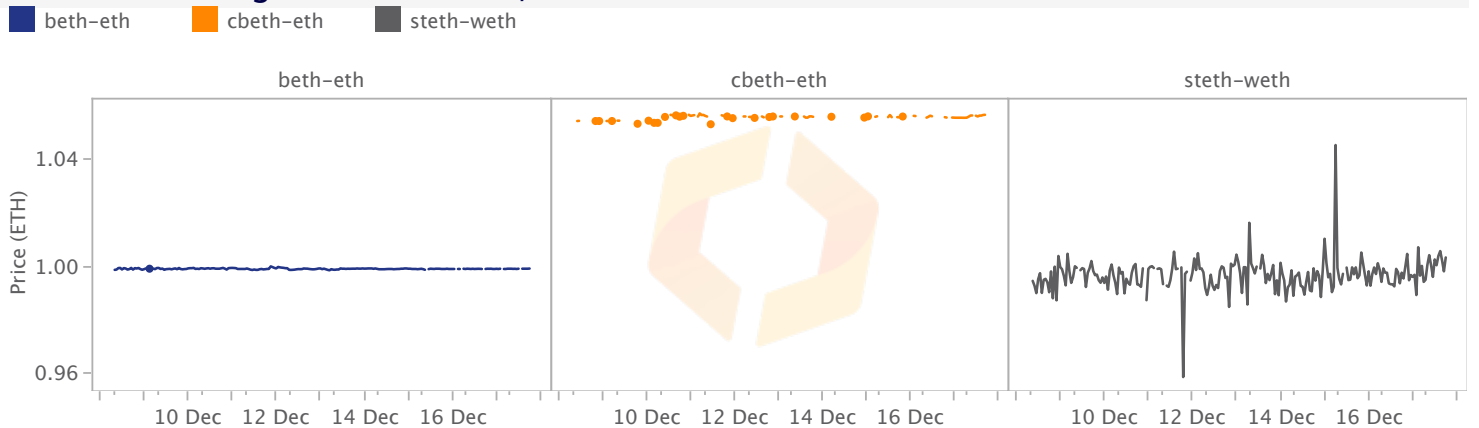
Data Source: Kaiko asset prices, Yahoo Finance

3. DeFi

DeFi Token YTD Returns



Ethereum Staking Token Discount/Premium



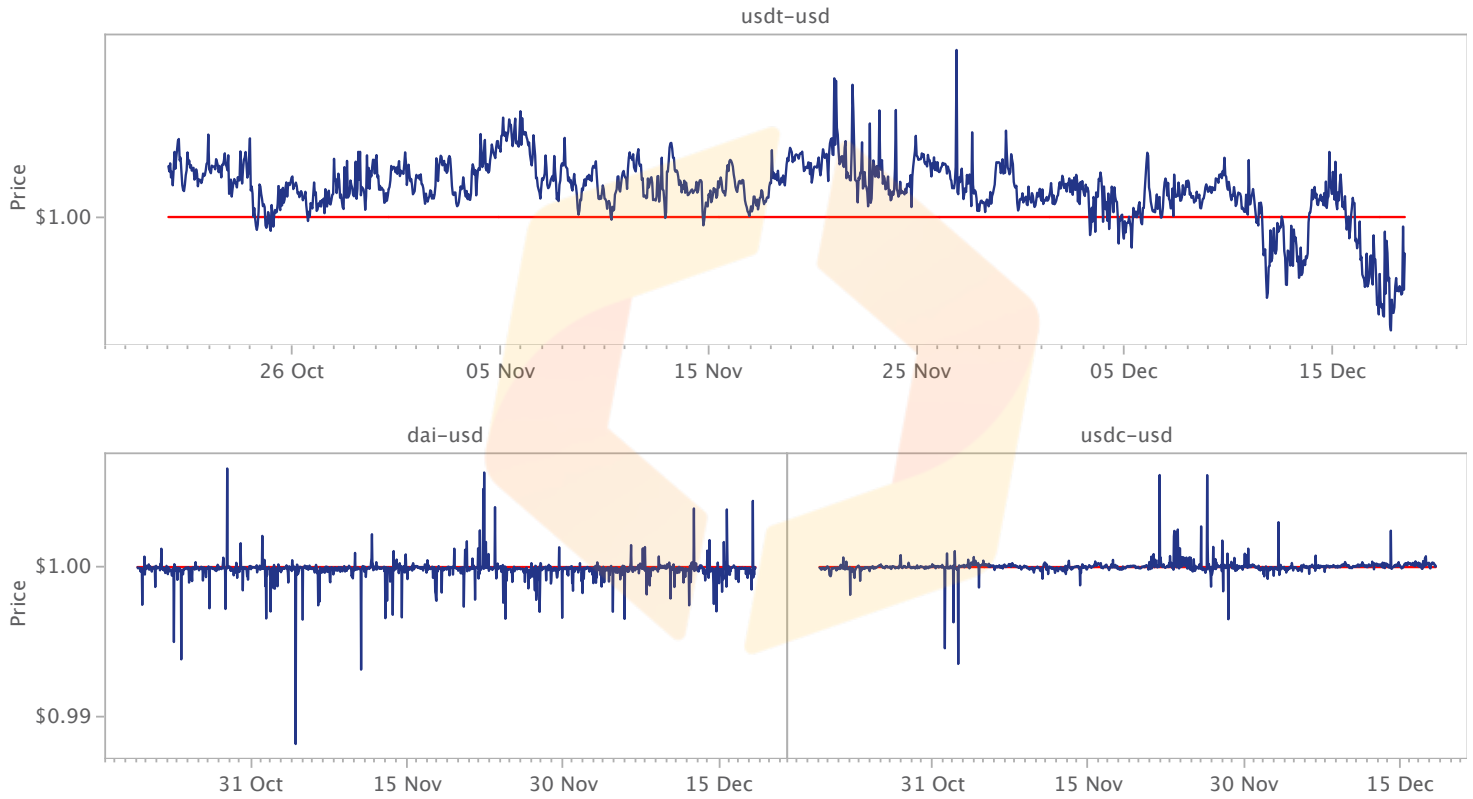
Data Source: Kaiko asset prices, Yahoo Finance.

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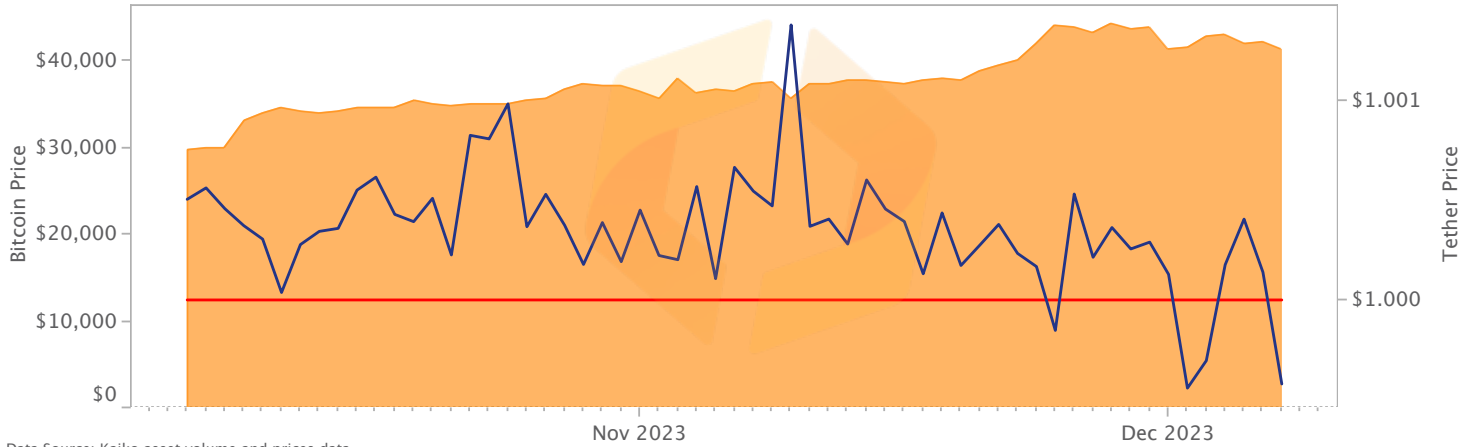
4. Stablecoins

Dollar-Pegged Stablecoin USD Exchange Rate



Data Source: Kaiko asset prices

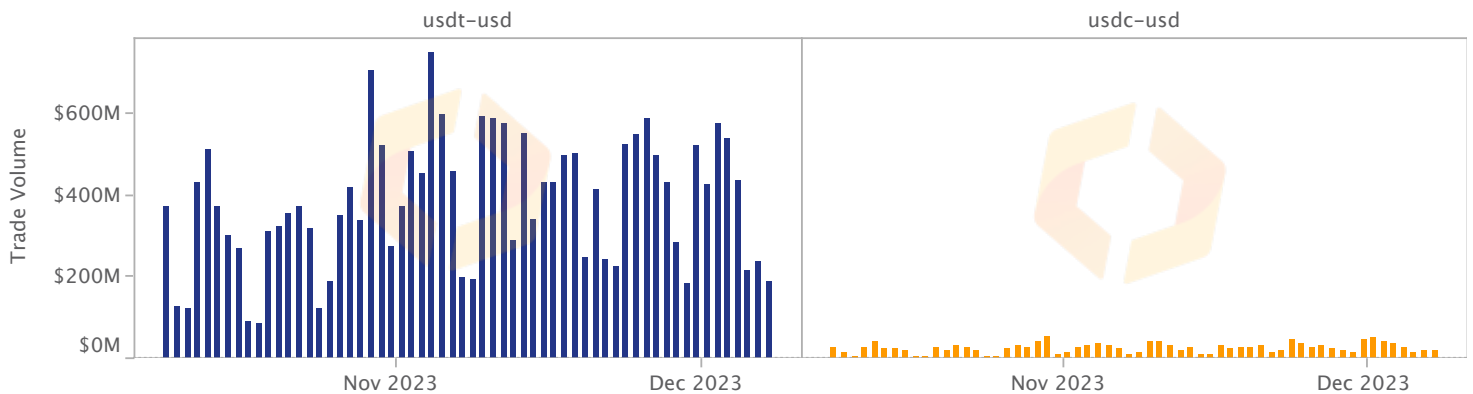
Tether vs. Bitcoin Price



Data Source: Kaiko asset volume and prices data

Daily Trading Volume

Volume aggregated across all USDC-USD and USDT-USD trading pairs

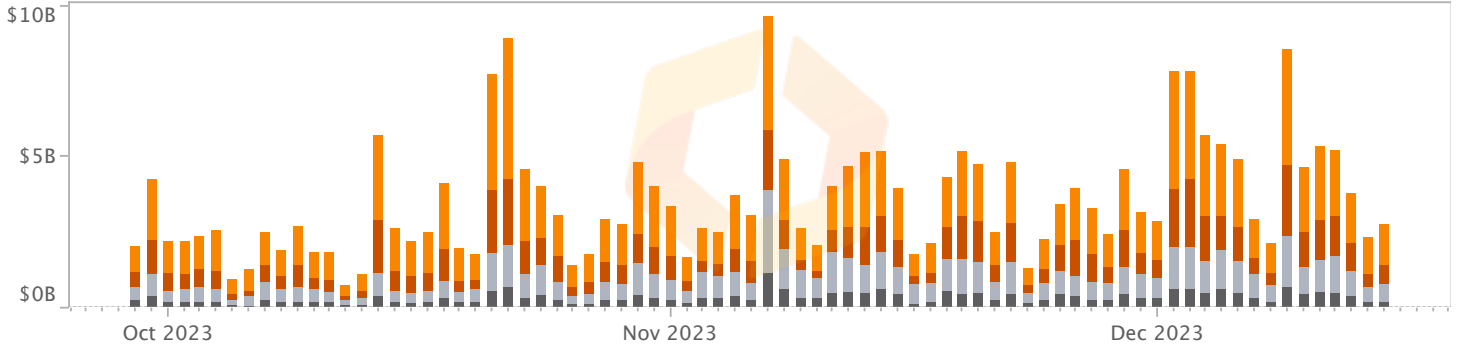


Data Source: Kaiko asset volume and prices data

5. Aggregated Volume

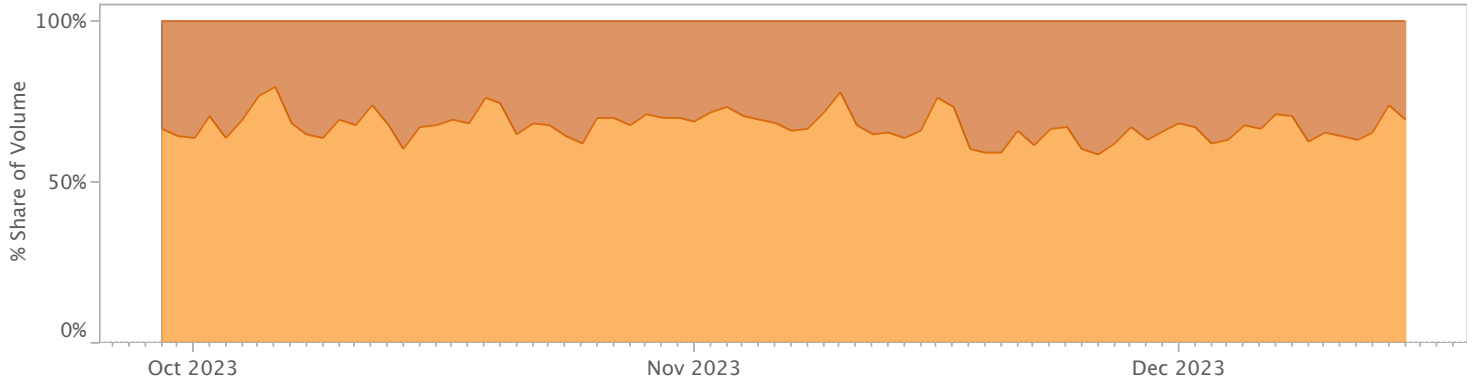
■ BTC-USDT
 ■ BTC-USD
 ■ ETH-USDT
 ■ ETH-USD

Aggregated Daily Trade Volume



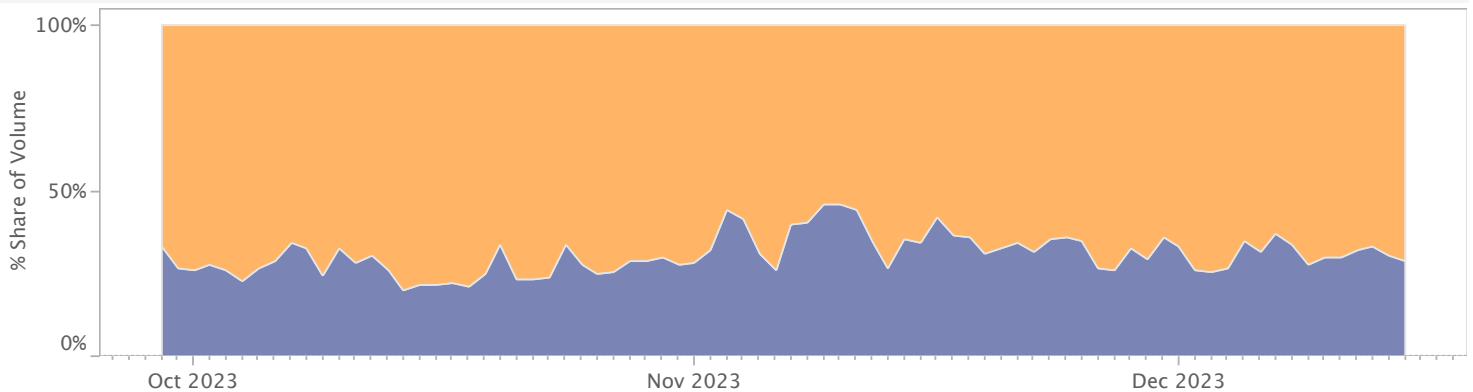
Percentage Share of Volume: USD vs. USDT

■ BTC-USD
 ■ BTC-USDT



Percentage Share of Volume: BTC vs. ETH

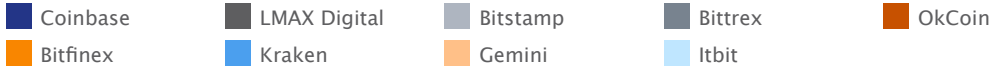
■ BTC-USDT(T)
 ■ ETH-USDT(T)



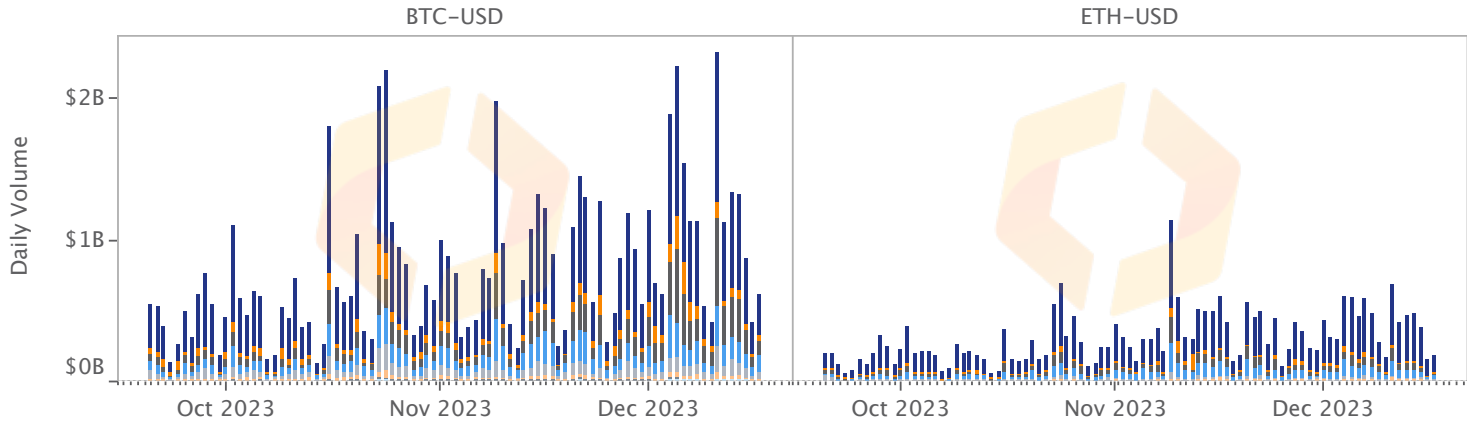
Weekly Percentage Difference in Trade Volume

Exchange	BTC-USD		ETH-USD		BTC-USDT		ETH-USDT	
Binance					▲	45.35%	▲	12.60%
Binance US	○		○		▼	-15.97%	▼	-39.10%
Bitfinex	▲	18.47%	▲	9.31%	▲	94.67%	▼	-6.72%
Bitstamp	▲	42.54%	▼	-20.73%				
Bittrex	○		○		○		○	
Coinbase	▲	69.66%	▲	26.16%				
Gemini	▲	88.52%	▼	-2.96%	·	-58.37%	▲	10.02%
Huobi					▲	89.67%	▲	34.38%
Itbit	▼	-3.51%	▼	-23.41%				
Kraken	▲	108.73%	▲	10.10%	▲	99.85%	▲	7.07%
KuCoin					▲	53.66%	▲	57.80%
OkCoin	▲	54.21%	○					
Poloniex					▲	15.92%	▲	6.17%

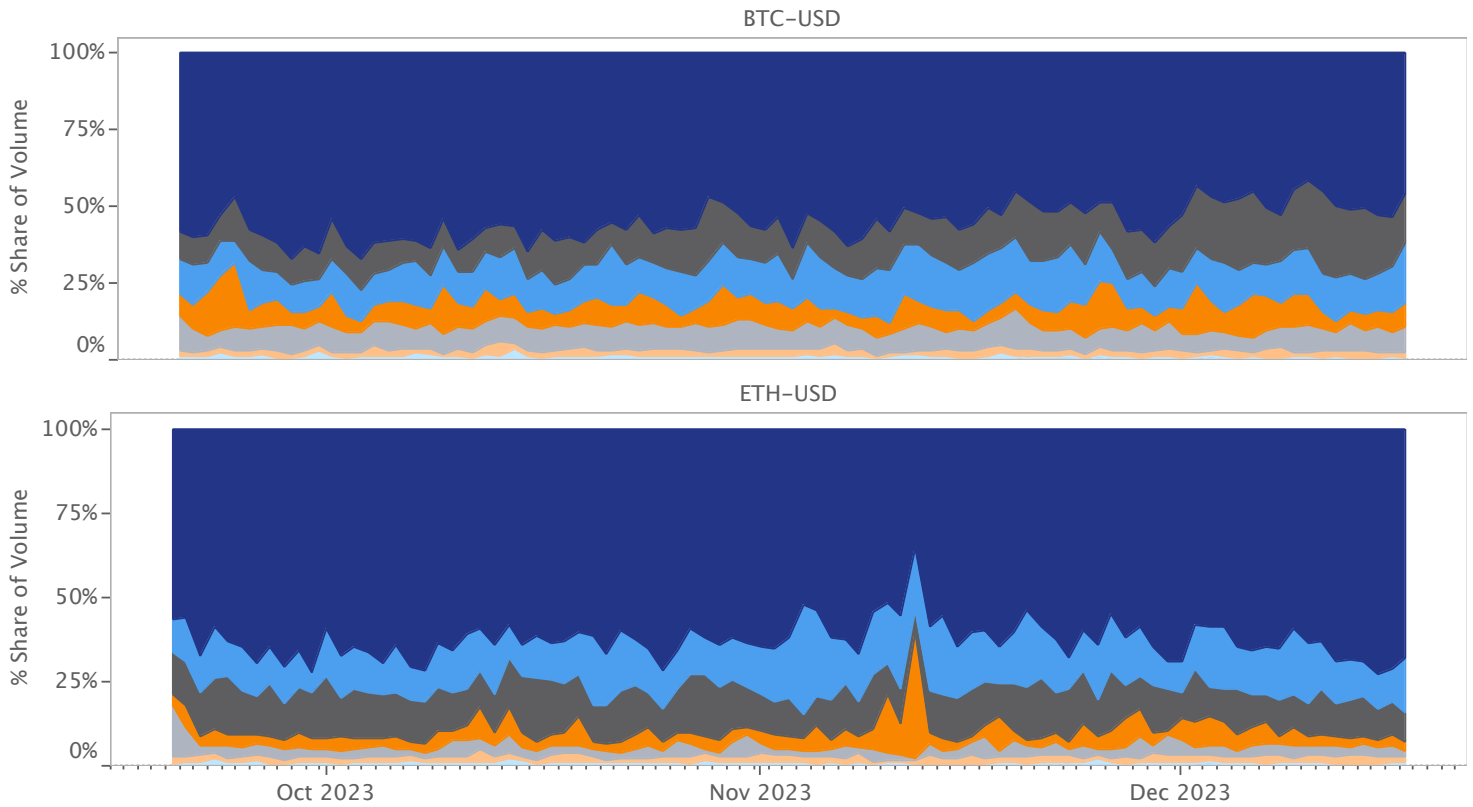
6. Exchange Volume – Fiat Pairs



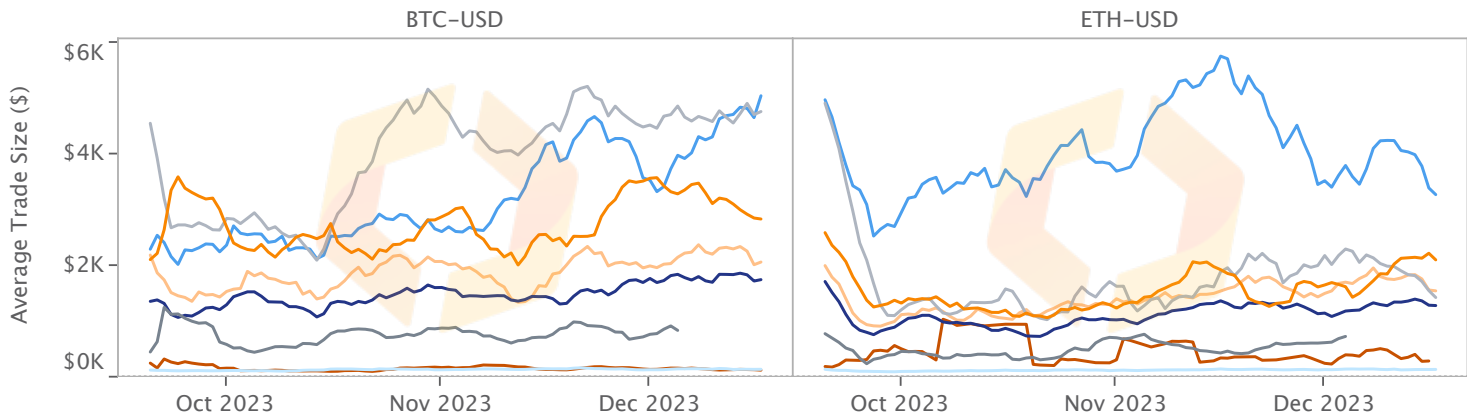
Daily Trade Volume – 90 Days



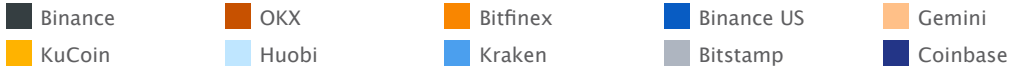
Percentage Share of Volume



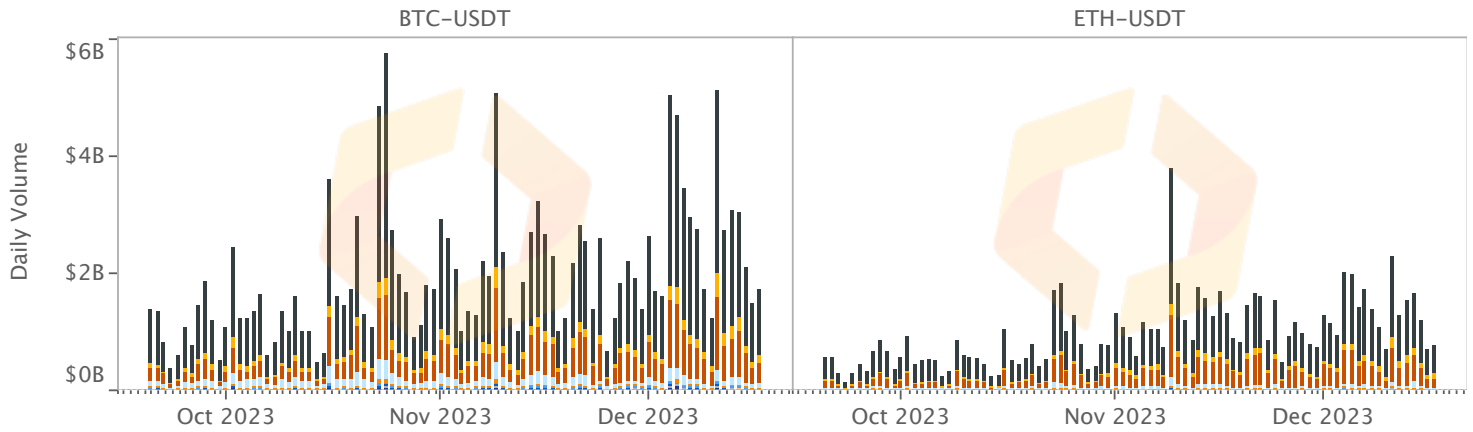
Average Trade Size 7D Moving Average



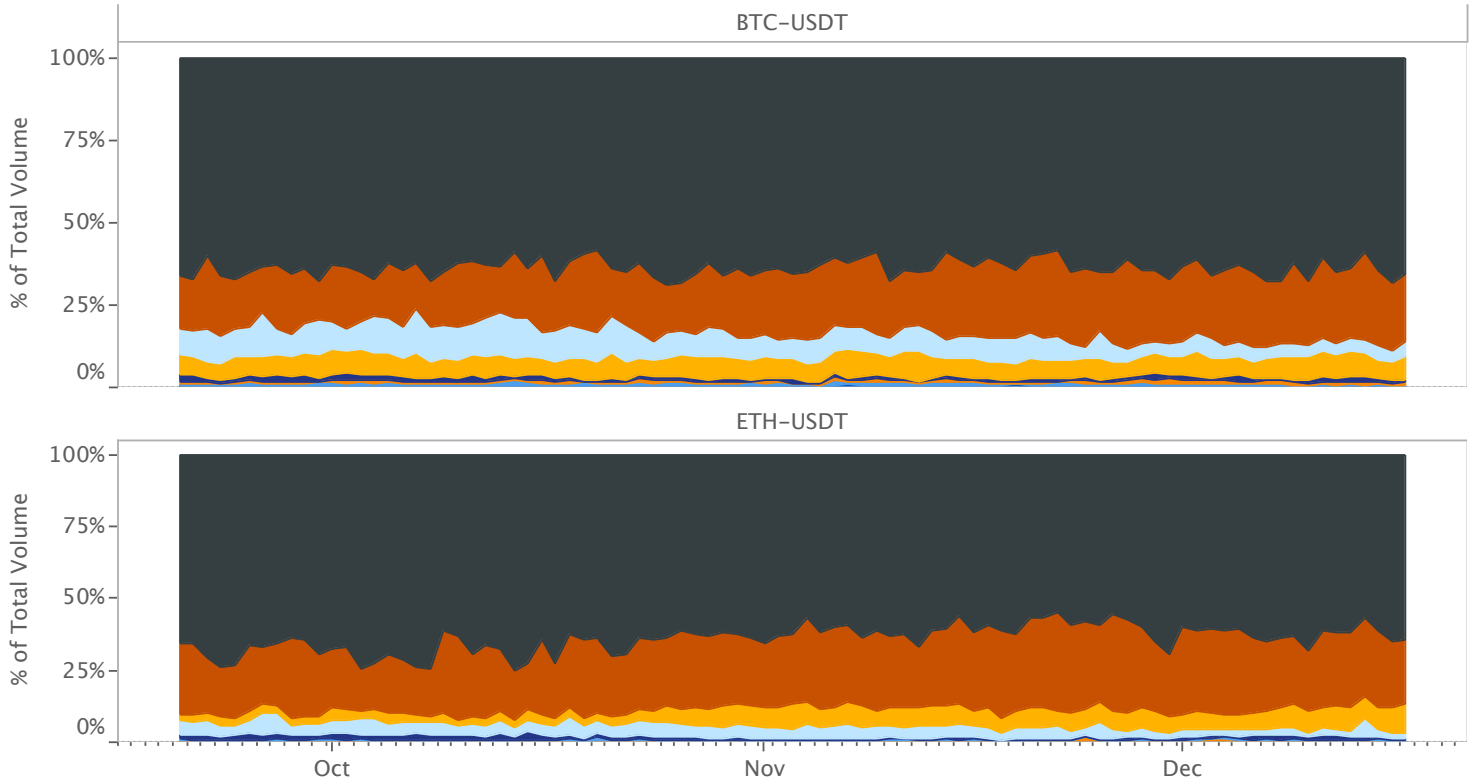
7. Exchange Volume – Tether Pairs



Daily Trade Volume – 90 Days

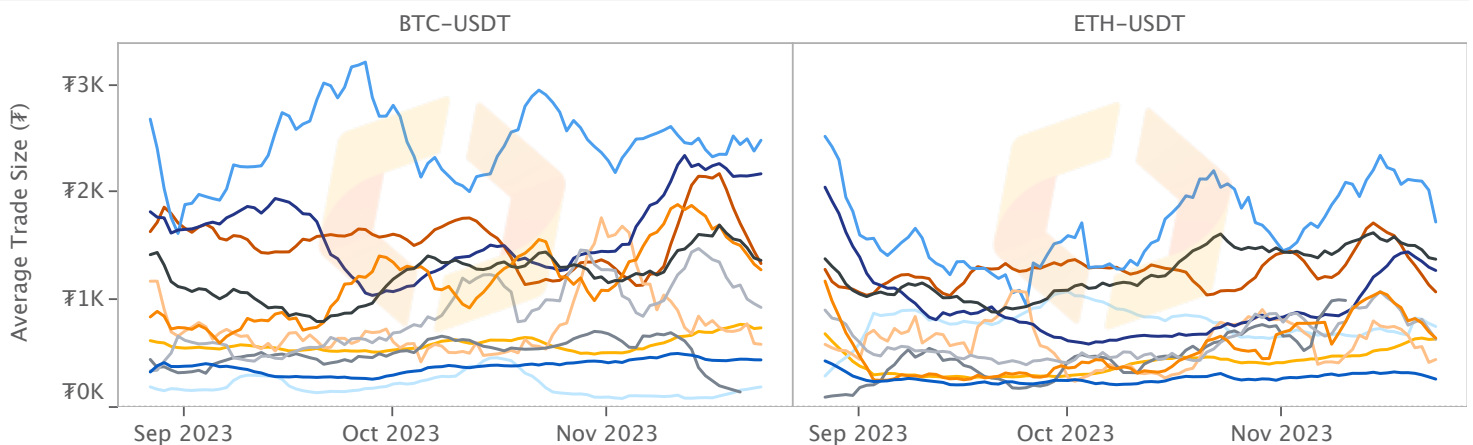


Percentage Share of Volume



Average Trade Size

7D Moving Average



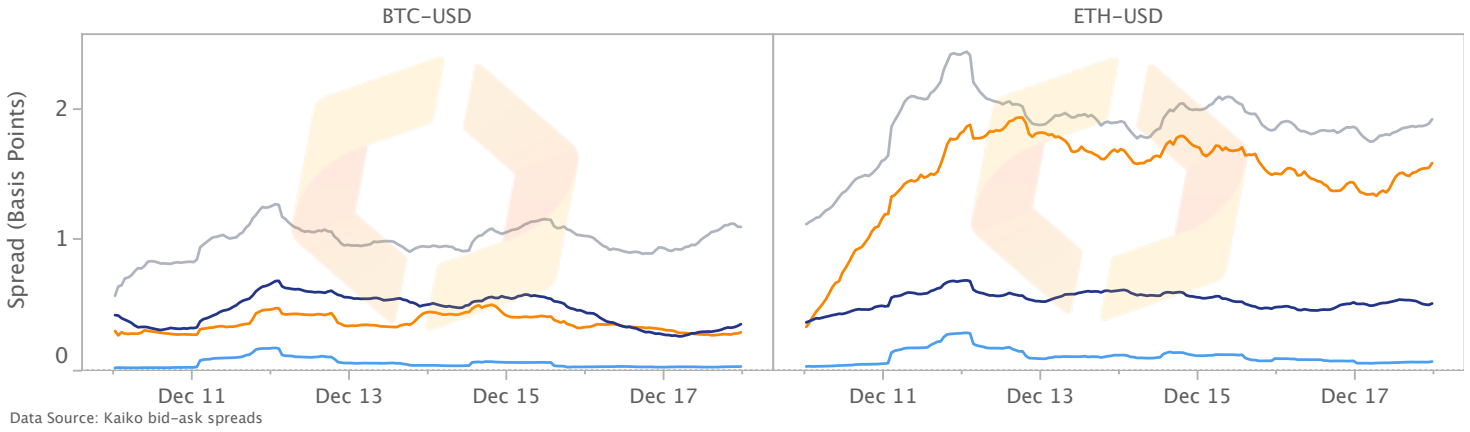
Data Source: Daily aggregated trade volume and count

8. Order Book Liquidity – Fiat Pairs

■ Coinbase ■ Bitfinex ■ Kraken ■ Bitstamp

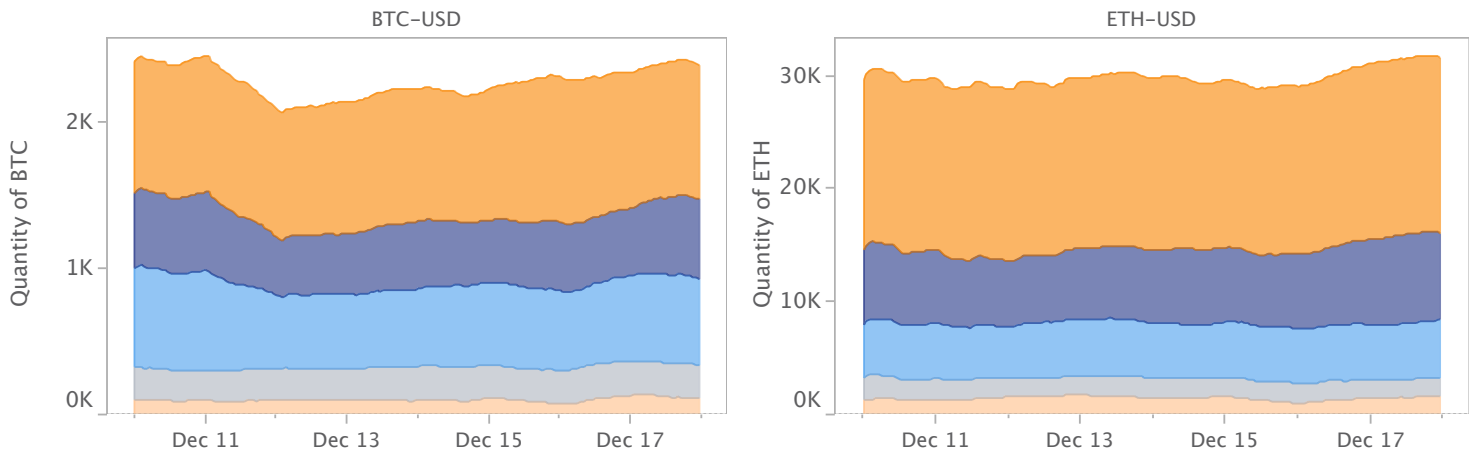
Bid-Ask Spread

The difference between the best ask and the best bid on an asset's order book.



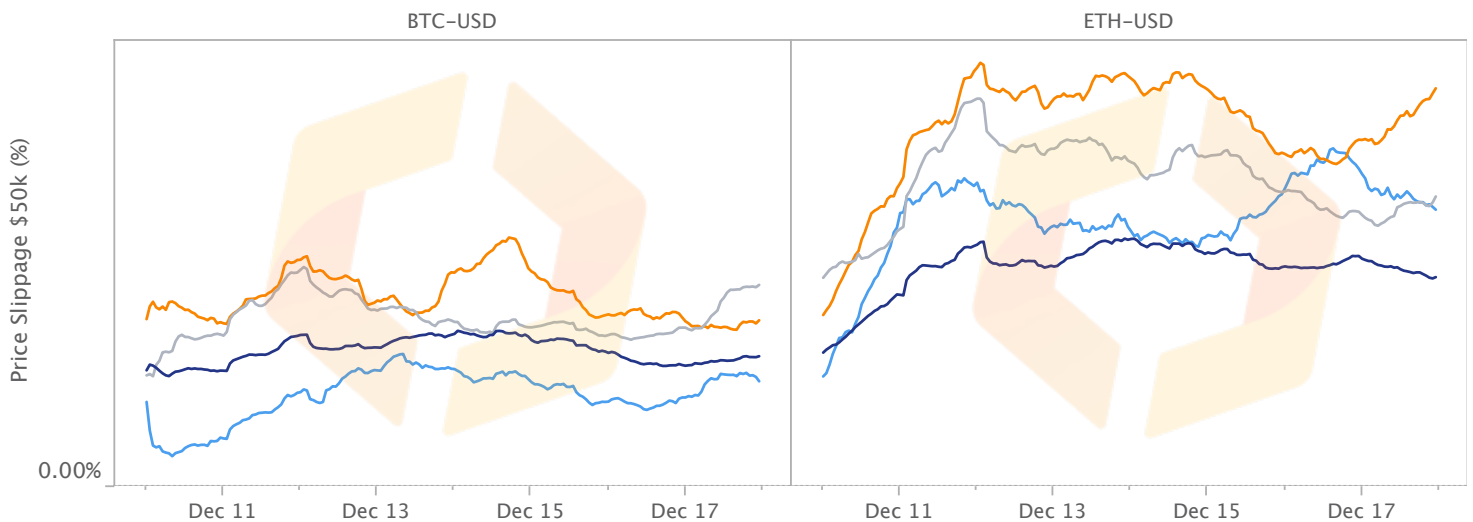
2% Market Depth

The sum of all bids and asks placed within 2% of the midprice on a trading pair's order book.



Price Slippage

The difference between the expected price of a \$50k sell order and the price at which the simulated trade is executed.

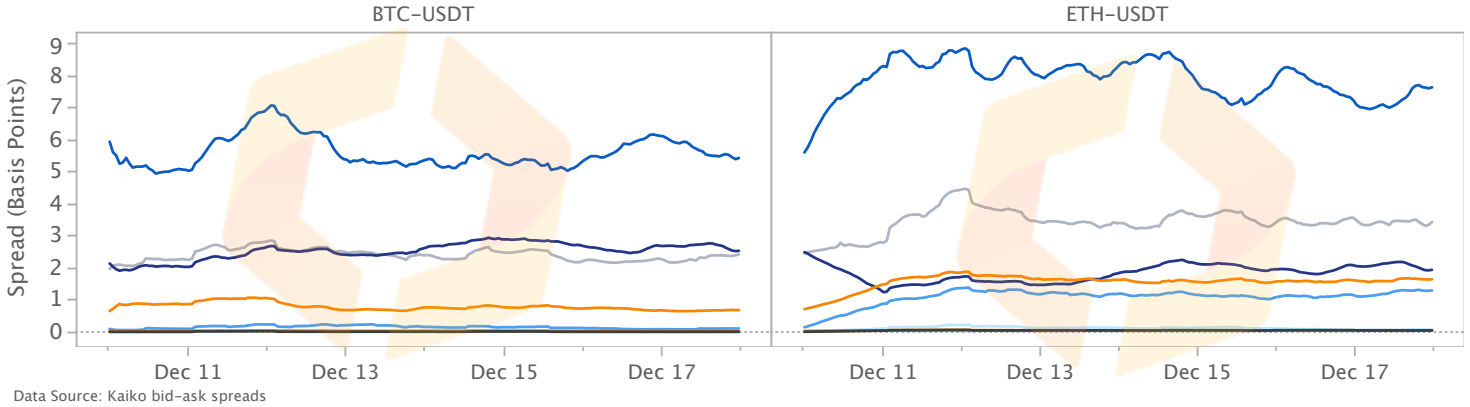


9. Order Book Liquidity – Tether Pairs

■ Binance
 ■ Bitfinex
 ■ OKX
 ■ Huobi
 ■ Kraken
 ■ Kucoin
 ■ Binance US
 ■ Coinbase
 ■ Bitstamp

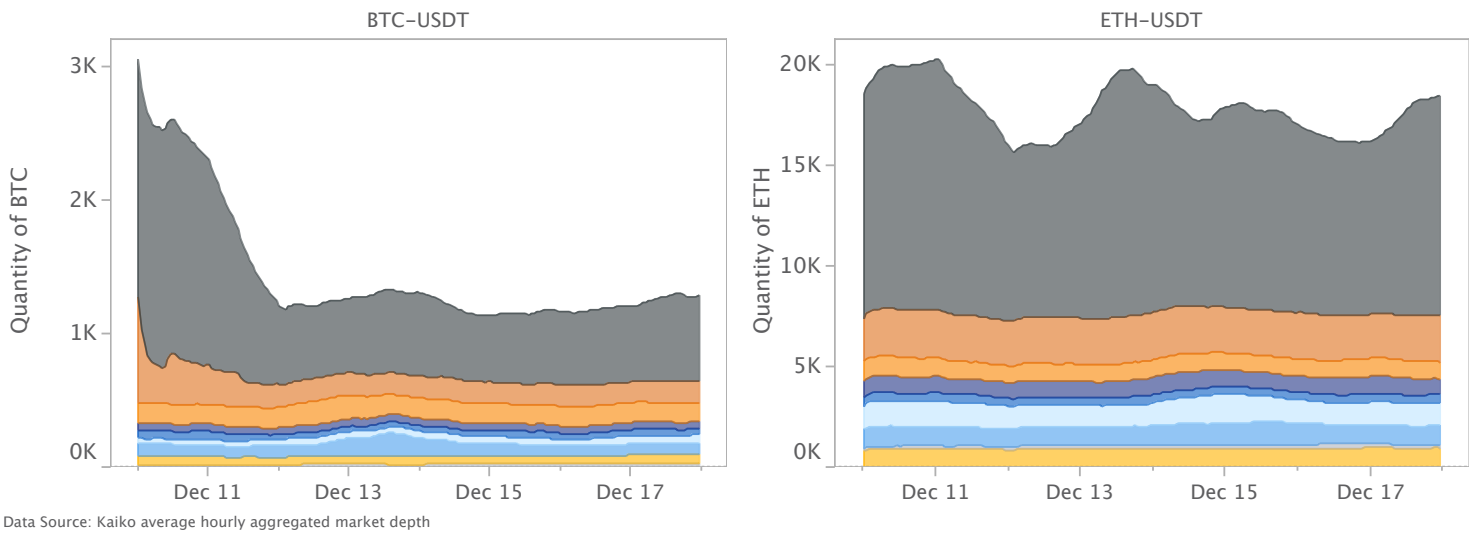
Bid-Ask Spread

The difference between the best ask and the best bid on an asset's order book.



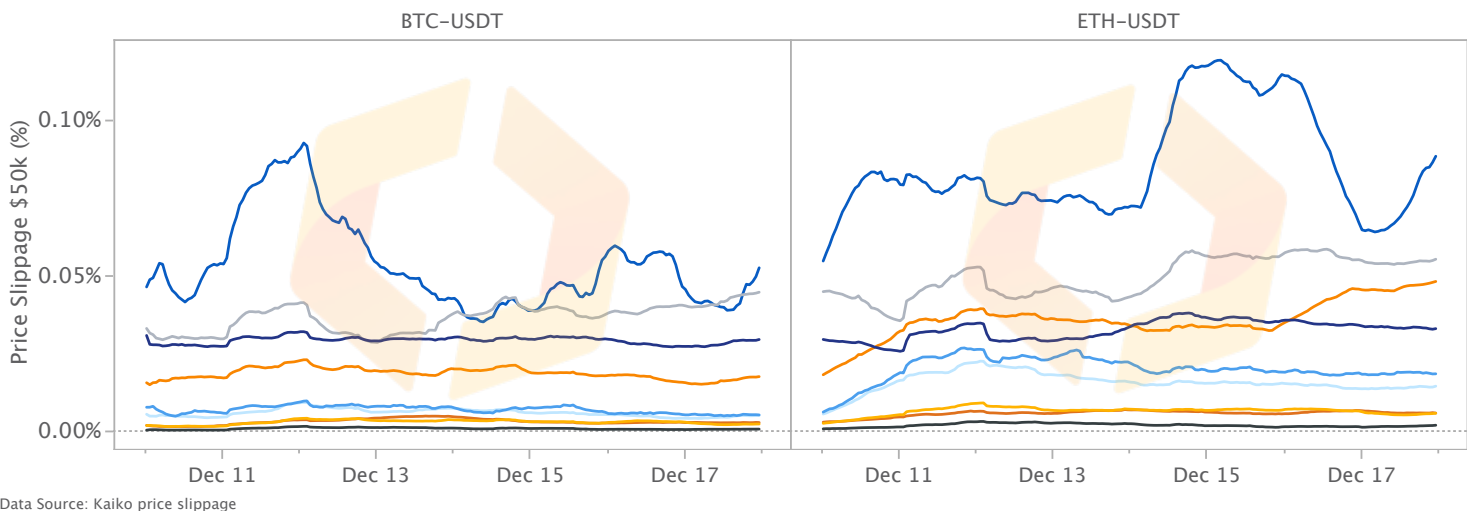
2% Market Depth

The sum of all bids and asks placed within 2% of the midprice on a trading pair's order book.



Price Slippage

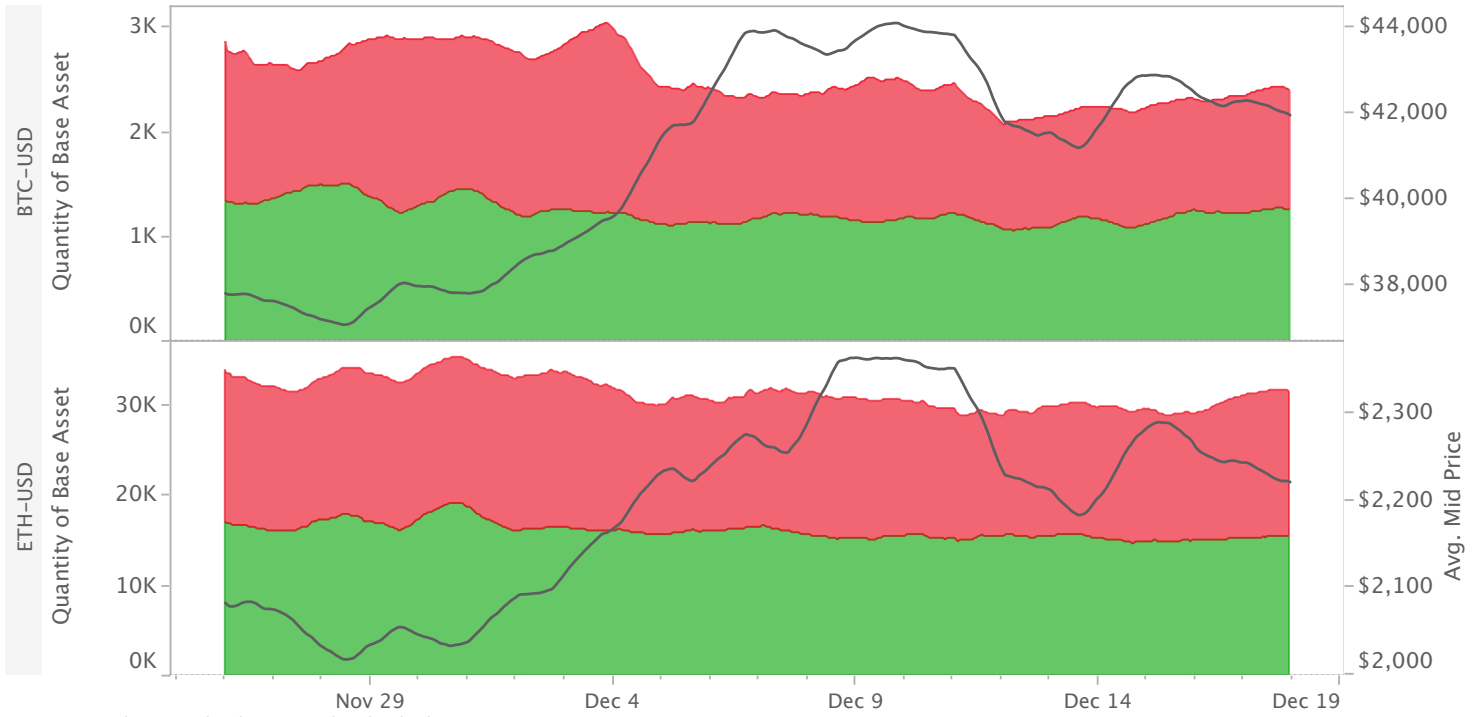
The difference between the expected price of a \$50k sell order and the price at which the trade is executed.



10. Aggregated Order Books

Bid Depth and Ask Depth – USD Markets

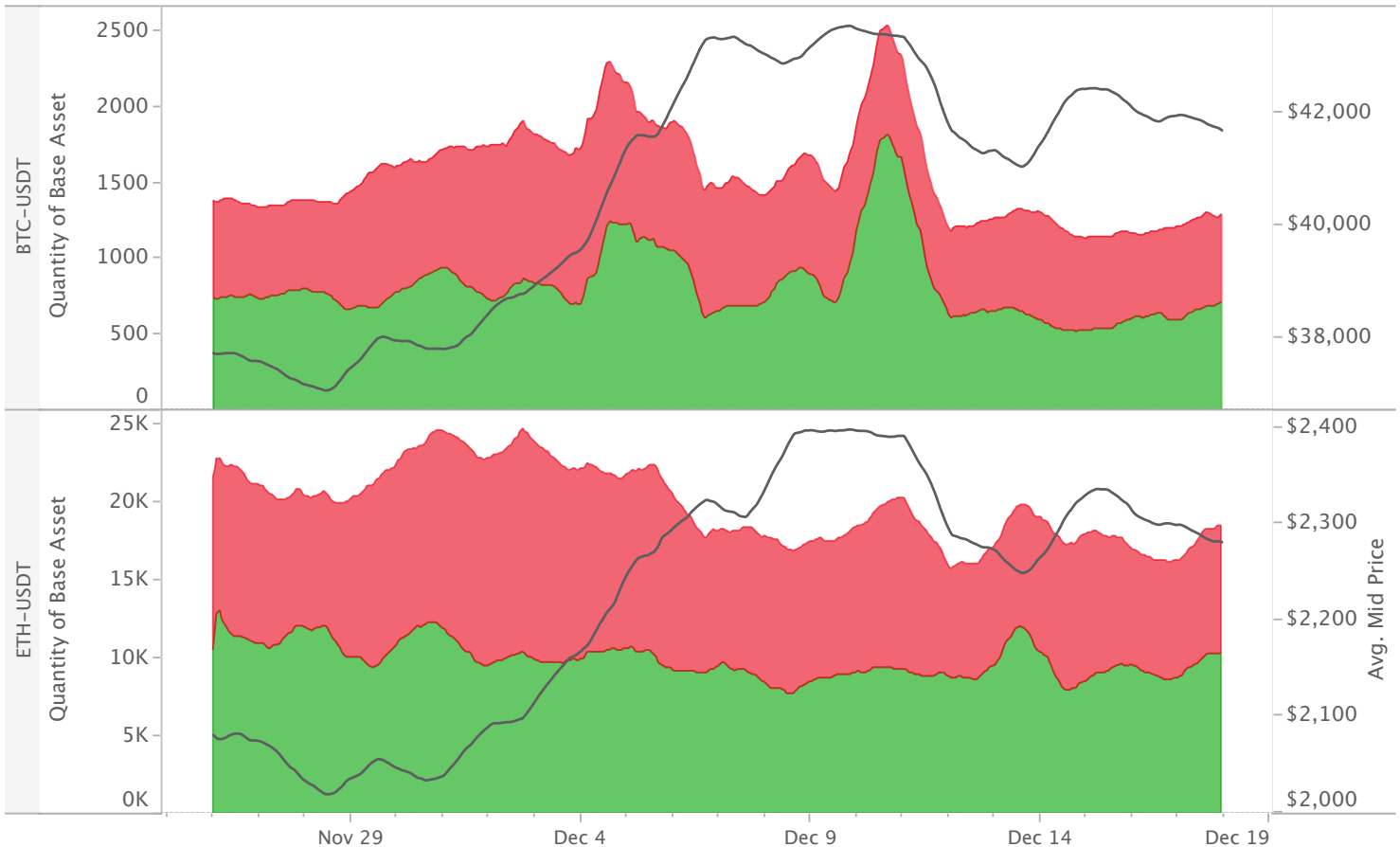
The quantity of bids and asks within 2% of the midprice on BTC-USD order books aggregated across Coinbase, Bitstamp, Kraken, Bitfinex, Itbit, Binance US, and Gemini.



Data Source: Kaiko average hourly aggregated market depth

Bid Depth and Ask Depth – USDT Markets

The quantity of all bids and asks within 2% of the midprice aggregated across Binance, Binance.US, Coinbase, Bitstamp, Bitfinex, Kraken, Bittrex, Huobi, OKX and KuCoin.



Data Source: Kaiko average hourly aggregated market depth

This Factsheet was created by Anastasia Melachrinos, Clara Medalie, Jean Mouvilliat, with help from the Kaiko team.

Detailed Methodology

Contact us at research@kaiko.com or visit www.kaiko.com if you are interested in our enterprise data services.

1. Price Dynamics

Data sources: Kaiko hourly reference rates and valuation data

Returns

Computed as the percentage difference in price since the previous Sunday's close.

Bitcoin/Ethereum Price

The USD price aggregated across the following exchanges: Bitfinex, Kraken, Bitstamp, Coinbase, BitFlyer, Gemini, itBit, Bittrex. The price is derived from our direct exchange rate calculation, which is the volume-weighted average price (VWAP) of all exchange-pair VWAPs at hourly time intervals.

Hourly Returns

The hourly percentage difference in price.

Bitcoin - Fiat Premium

The premium for purchasing Bitcoin with fiat (KRW, EUR, GBP, JPY) versus USD derived from the following example formula:

$$Premium_{KRW} = \frac{BTC/KRW * KRW/USD}{BTC/USD} - 1$$

Valuation Data

We build five equally weighted multi-asset portfolios for the top assets by market cap for each crypto sector using Kaiko's custom valuation tool.

Layer 1: ada, avax, ftm, sol, atom; Layer 2 : op, skl, dydx, lrc, matic ; Top 2: btc,eth; DeFi: mkr, ldo, aave, comp, cvx ; DEX : uni,sushi,bal,crv. Usd pairs. Subject to change depending on market conditions.

More information about our valuation tool can be found here:

<https://www.kaiko.com/pages/custom-valuation>

2. Volatility and Correlations

Data sources: Kaiko hourly reference rates, FRED St. Louis, Quandl

30D Historical Volatility

The volatility of each asset is calculated by taking the annualized 30 day rolling standard deviation of daily log returns. Data for Nasdaq and S&P 500 comes from FRED St. Louis and Gold from Quandl.

30D Rolling Correlation with Bitcoin Daily Returns

Calculated using the daily log returns over the past 30 days, for selected crypto-pairs and traditional indexes including Nasdaq, S&P 500 and gold. Data for Nasdaq and S&P 500 comes from FRED St. Louis and Gold from Quandl. The correlation coefficient takes a value of 1 when two assets are perfectly correlated, 0 when there is no linear interdependence, and -1 when perfectly anticorrelated.

3. DeFi Data

Data sources: Kaiko daily USD cross exchange rates

DeFi Token Weekly Returns

The percentage price difference since the previous Sunday's daily USD volume-weighted average price. Aggregated USD price data is calculated using Kaiko's USD exchange rate methodology which finds the path of highest liquidity between each DeFi asset and the closest USD trading pair. Not every DeFi asset trades against USD, which requires us to use cross rates to determine a USD price.

DeFi Token YTD Returns

The percentage price difference since January 1st, 2021.

4. Stablecoins

Data sources: Kaiko hourly direct USD exchange rate and aggregated volume

Dollar-Pegged Stablecoin USD Exchange Rate

The hourly USD exchange rate for all stablecoin-USD pairs in Kaiko's data collection (view every instrument used in this calculation [here](#)). This is calculated by taking the hourly VWAP for each stablecoin-USD pair (ex. USDT-USD on Bitfinex), and then taking the VWAP for USDT-USD pairs across all exchanges.

Tether vs. Bitcoin Price

The hourly Tether and Bitcoin price averaged across all exchanges that offer a USDT-USD and BTC-USD trading pair.

USDT-USD Trading Volume

Aggregated daily volume across all exchanges that offer a USDT-USD trading pair (full list of instruments used in this calculation [here](#)).

5. Aggregated Volume

Data sources: Daily aggregated volume per trading pair and per instrument

Aggregated Trade Volume

Daily aggregated volume across a selection of exchanges for the listed trading pair. Full list of instruments included in the calculation can be viewed [here](#).

Percentage Share of Volume: BTC-USD vs. BTC-USDT

Daily aggregated volume for BTC-USD and BTC-USDT trading pairs (full list of instruments included in this calculation [here](#)). Assuming that most institutional traders prefer transacting with USD, when there is a spike in BTC-USD volume this suggests USD inflows or a sell-off.

Percentage Share of Volume: BTC-USD vs. ETH-USD

Daily aggregated volume for BTC-USD and ETH-USD trading pairs (full list of instruments used in this calculation [here](#)). Assuming Ethereum is a proxy for altcoin markets, when volume for ETH-USD spikes this suggests that traders are rotating funds out of Bitcoin and into Ethereum and altcoin markets.

Weekly Percentage Difference in Trade Volume

Percentage difference between most recent week of volume and previous week of volume for each listed instrument.

6/7. Exchange Volume - Fiat/Tether Pairs

Data sources: Daily aggregated trade volume and count per instrument

Trade Volume

Daily aggregated volume per trading pair per exchange.

Percentage Share of Volume

Percentage volume of trades for each trading pair per exchange.

Average Trade Size

The total volume of trades (volume of base asset * price) / trade count. For Tether pairs, the average trade size is denominated in USDT. A higher average trade size suggests that more institutional traders are using the exchange.

8/9. Order Book Liquidity - Fiat/Tether Pairs

Data sources: Average hourly bid-ask spread, market depth, price slippage

Bid-Ask Spread

The wider the bid-ask spread, the less liquid the traded instrument. We calculate spread from Kaiko's raw order book snapshots which are taken twice per minute. We take the difference between the best ask and the best bid for each snapshot, and then take the average for all values for spread over the course of 1 hour. To normalize the spread, we divide by the mid price and then multiple by 10,000 to get the spread in *basis points*. One basis point is equal to 1/100th of 1%, or 0.01%, or 0.0001, and is used to denote the percentage change in a financial instrument. A 24-hour moving average is applied.

2% Market Depth

Market depth is an indicator of liquidity: the higher the market depth, the deeper the order books, and the less likely a large market order will move the price of an asset. Market depth is derived from Kaiko's raw order book snapshots which are taken twice per minute. Each of our order book snapshots includes all bids and asks within 10% of the midprice. For this chart, we cut each snapshot down to all bids and asks within 2% of the midprice, which better reflects changes in market dynamics. We then take the average of

2% market depth over the course of 1 hour. Finally, we take the sum of both 2% Bid Depth and 2% Ask Depth for each instrument. A 24-hour moving average is applied.

Price Slippage

We calculate slippage using raw order book snapshots taken twice per minute. Slippage is calculated by running a \$50k sell order through the bid side of an order book. The steps below run through an example calculation for placing a \$50k sell market order which would give a value for Bid Slippage. The same steps can be followed for buy orders and orders of different values:

Step 1: Run through sorted Bids by price level until \$50k sell order is filled, starting from the Best Bid.

Step 2: Compute the Average Sell Price using all Bids needed to fill the \$50k order. For example, in an imaginary order book where there are Bids at \$10,000 for 3 Bitcoin and Bids at \$10,100 for 4 Bitcoin, the Average Sell Price would be $(\$30,000 + \$40,400)/7 = \sim \$10,057$.

Step 3: Calculate the percentage of variation between the Best Bid and Average Sell Price using the formula: $|\text{Average Sell Price} - \text{Best Bid}| / \text{Best Bid}$.

A 24-hour moving average is applied.

10. Aggregated Order Books

Data sources: Average hourly aggregated market depth

Bid Depth and Ask Depth

Instead of adding Bid Depth and Ask Depth, we separate depth per side of the order book, and aggregate across multiple exchanges that offer a BTC-USD and ETH-USD trading pair. This is calculated by taking the quantity of all bids and asks within 2% of the midprice on USD order books aggregated across Coinbase, Bitstamp, Kraken, Bitfinex, Binance US, Itbit, Bittrex, and Gemini. The data is an hourly average with a 24 hour moving average applied. The average mid price is also charted with a 24 hour moving average.

Ratio of Bid Depth to Ask Depth

The quantity of aggregated bids divided by the sum of total market depth (sum of both bids and asks). When the ratio is above .5, this means that the quantity of bids is higher than the quantity of asks.

DATA SOURCES

All crypto data is provided by Kaiko.

Data for Nasdaq and S&P 500 is sourced from FRED St Louis API.

Data for gold is sourced from Quandl.

ABOUT KAIKO

Founded in 2014, Kaiko is a market data provider in the digital finance industry providing institutional investors and market participants with enterprise-grade data infrastructure. Kaiko's comprehensive and granular market datasets are sourced from 100+ crypto exchanges, comprising 95,000+ spot and derivatives instruments. All historical and live data is consolidated and accessible through a REST API and livestream WebSocket or in downloadable CSV files.

TERMS AND CONDITIONS

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