



August 2019

Crypto Liquidity Report

Measuring crypto liquidity using high-resolution order book data



Key Findings

Slippage is a better indicator of liquidity than volume.

The most liquid asset is 600x more liquid than the least liquid asset.

Higher market cap assets and stablecoins have better liquidity.



Measuring Liquidity

To measure liquidity, we use **SLIPPAGE**, which measures the price impact of a buy or sell order.

WHAT IS SLIPPAGE?

Slippage is the difference between the expected price of a trade and the price at which the trade is actually executed. Deep, liquid order books have low slippage, while thin, illiquid order books have high slippage.

HOW WE CALCULATE SLIPPAGE

First, we take high-resolution order book snapshots every hour. Then, we calculate slippage for a \$10,000 order and average over the month. For more details, see [Methodology](#).

SLIPPAGE VS VOLUME

Slippage is an ex-ante indicator for liquidity, while volume is ex-post. Using volume to measure liquidity also creates perverse incentives to generate fake volume. We believe that slippage is a superior metric.

Dataset

Info about our dataset: assets, sources, time period, and resolution.

ASSETS

Base assets with BTC-based and USDT-based trading pairs. For assets with both BTC and USDT trading pairs, we weighted slippage by volume in each trading pair.

SOURCES

For this report, we used August 2019 data from Binance. Future versions of the report may include data from additional exchanges.



RESOLUTION

Order book data with per-diff resolution (diff: anytime an order book changes, typically 3x per second).



Slippage of Ethereum (ETH)

2.4x

of Bitcoin slippage



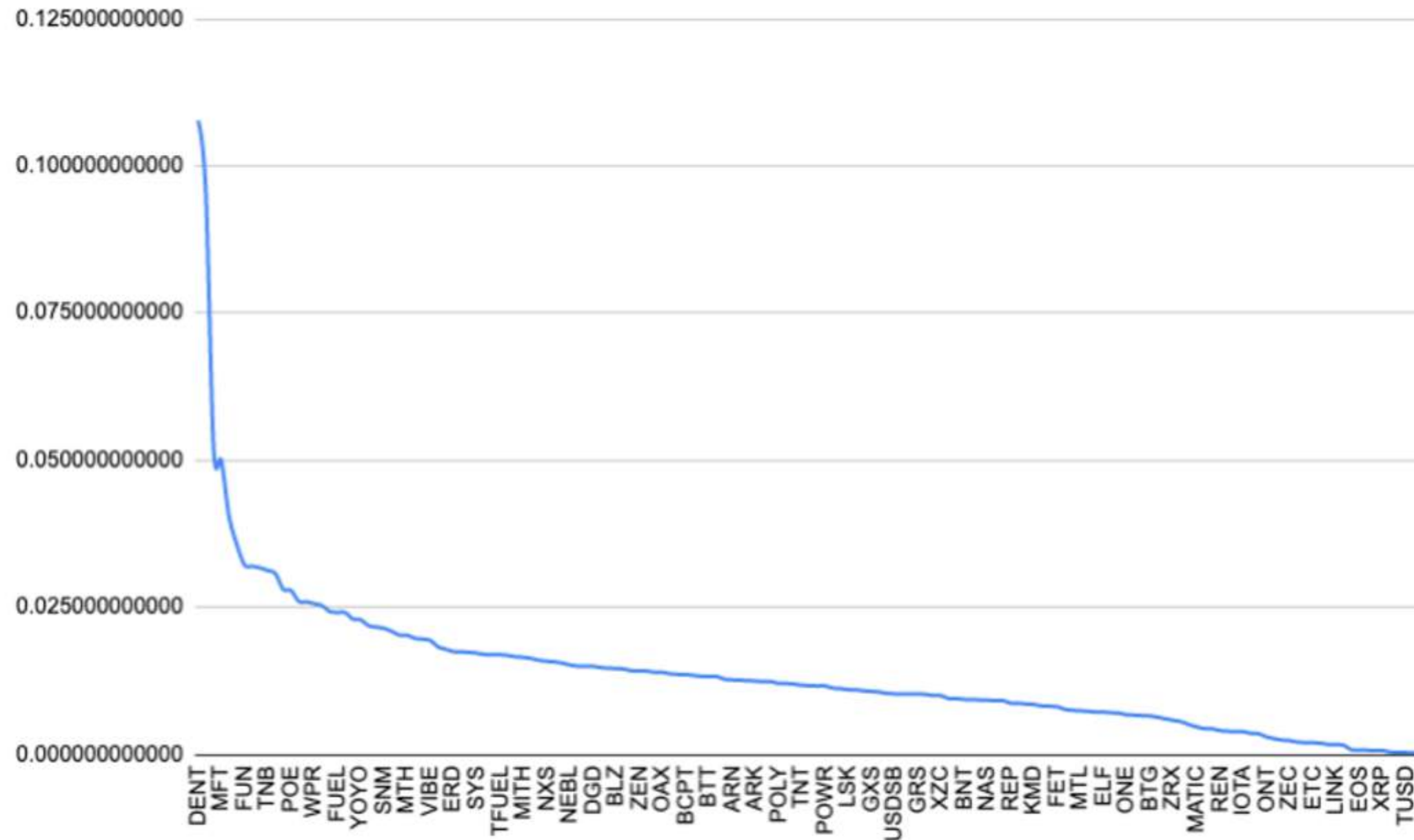
Slippage of Dentacoin (DENT)

600x

of Bitcoin slippage

Distribution of crypto liquidity

Slippage for \$10k bid order*



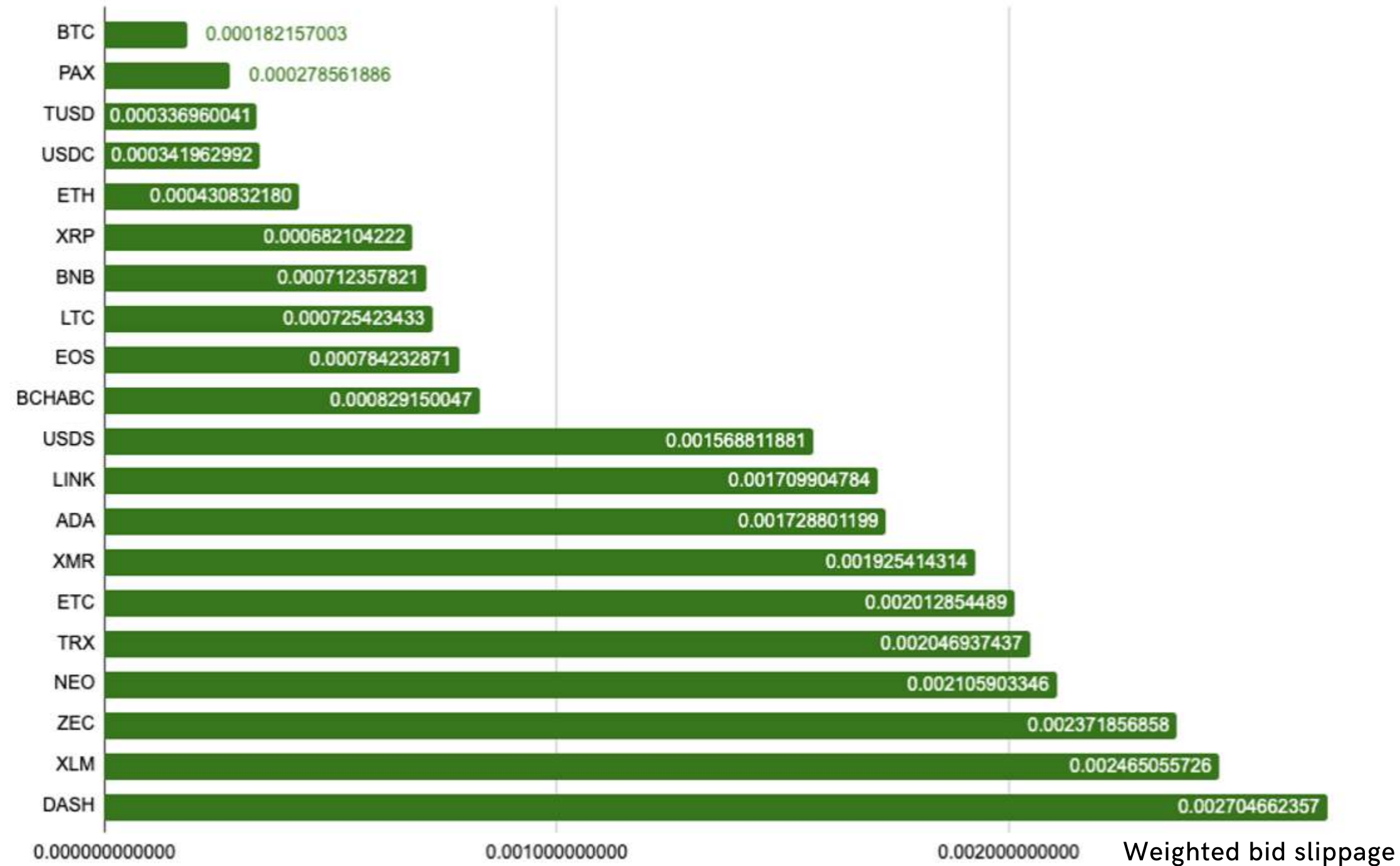
LIQUIDITY FOLLOWS A POWER LAW DISTRIBUTION

Over 80% of assets have >0.5% slippage, and over 60% have >1% slippage.

* The distribution is based on bid slippage. Using ask slippage produces similar results. For details, see Appendix.

The 20 most liquid crypto assets

Rank by descending bid slippage for a \$10k order*



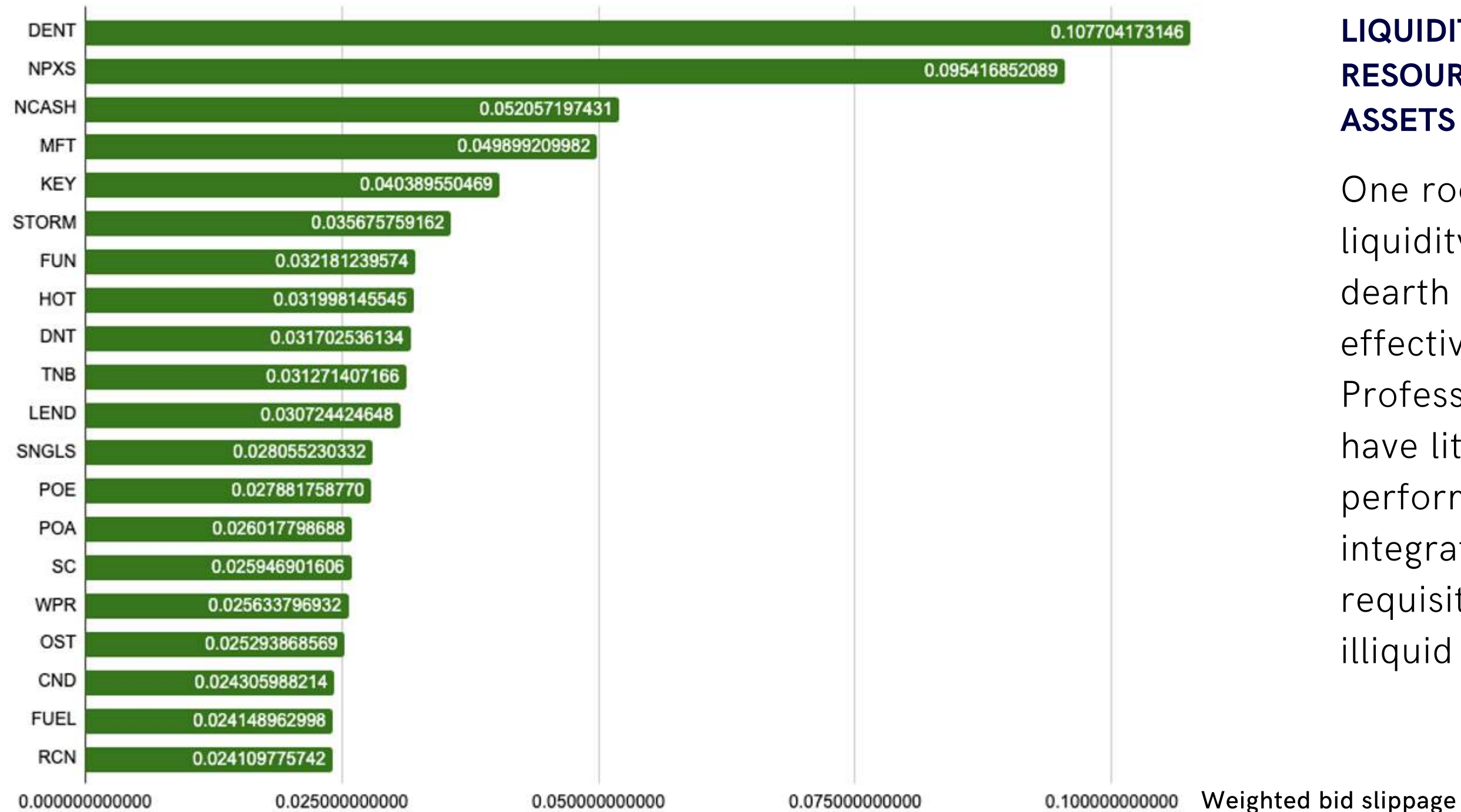
BITCOIN, ETHEREUM AND STABLECOINS ARE THE MOST LIQUID ASSETS

Even among the most liquid tokens, slippage varies dramatically. The #11 asset almost doubles the slippage of the #10. Bitcoin's slippage is 15x better than the #20 asset.

* The rank is based on weighted bid slippage. Ranking based on weight ask slippage produces similar results. For details, see Appendix.

The 20 least liquid crypto assets

Rank by ascending bid slippage for a \$10k order*

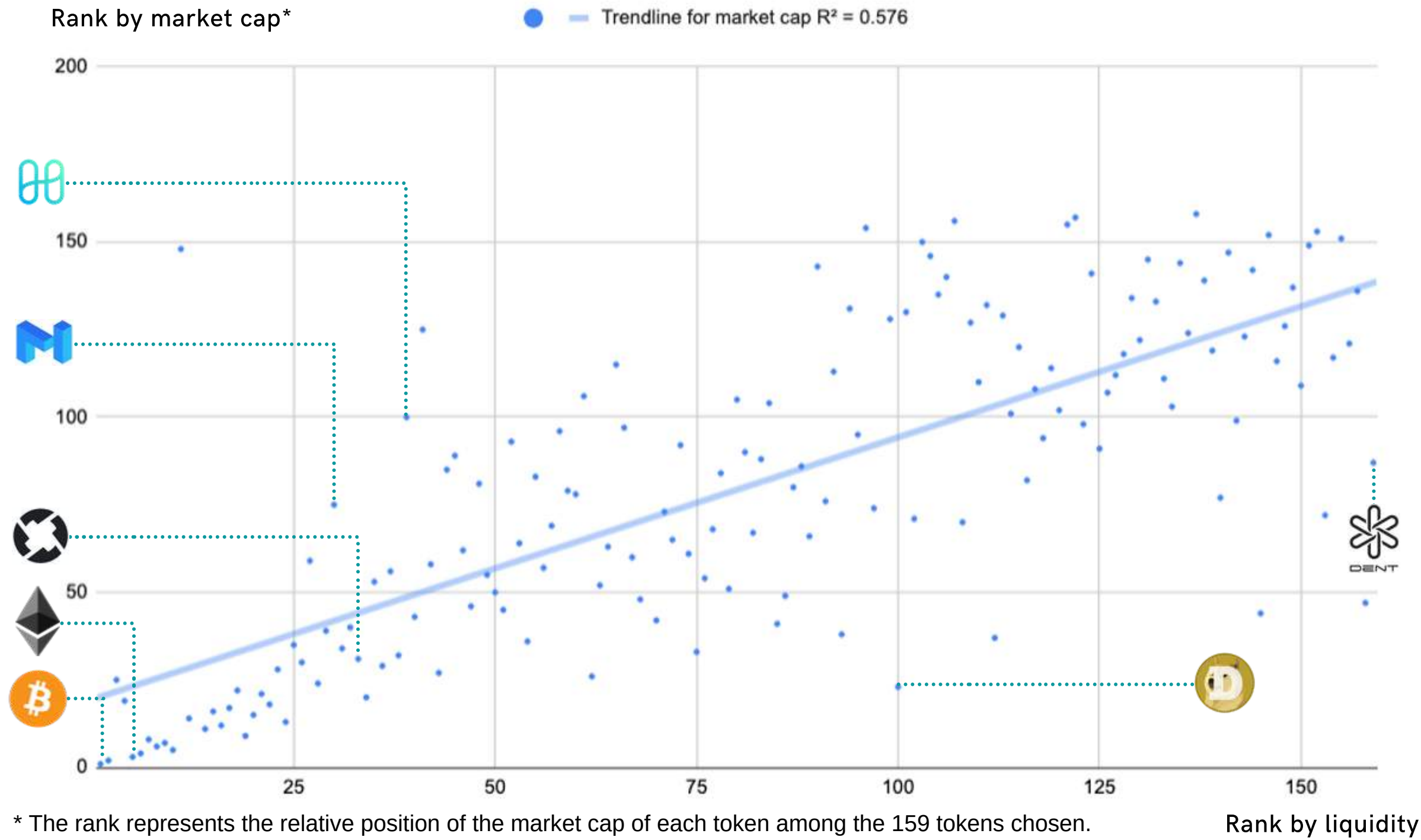


LIQUIDITY IS SCARCE RESOURCE FOR LONG-TAIL ASSETS

One root cause of the liquidity problem is the dearth of affordable and effective market makers. Professional market makers have little incentive to perform the technical integration and maintain the requisite inventory for illiquid long-tail assets.

* The rank is based on weighted bid slippage. Ranking based on weight ask slippage produces similar results. For details, see Appendix.

Correlation with market cap



STRONG POSITIVE CORRELATION**

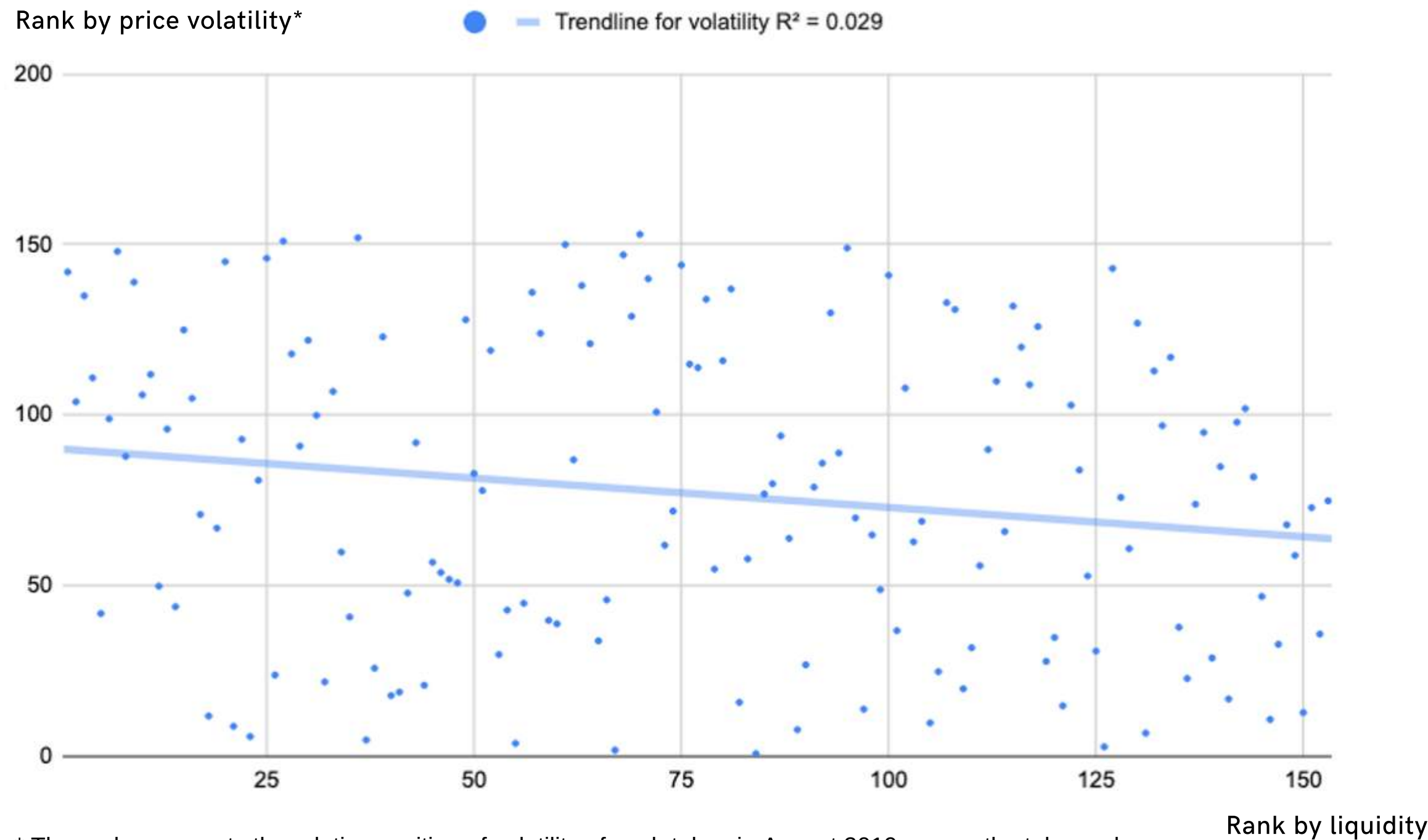
In August, liquidity has a 0.76 correlation with market capitalization.

However, outliers exist. Harmony Protocol (ONE) and Matic Network (MATIC) have surprisingly lower slippage given their market caps, while DogeCoin (DOGE) and Dent (DENT) have higher slippage.

* The rank represents the relative position of the market cap of each token among the 159 tokens chosen.
Market capitalization data source: coinmarketcap.com

** Correlation coefficient=0.76>0 with $R^2=0.58$ and p-value < 2.2e-16, meaning strong positive correlation

Correlation with price volatility



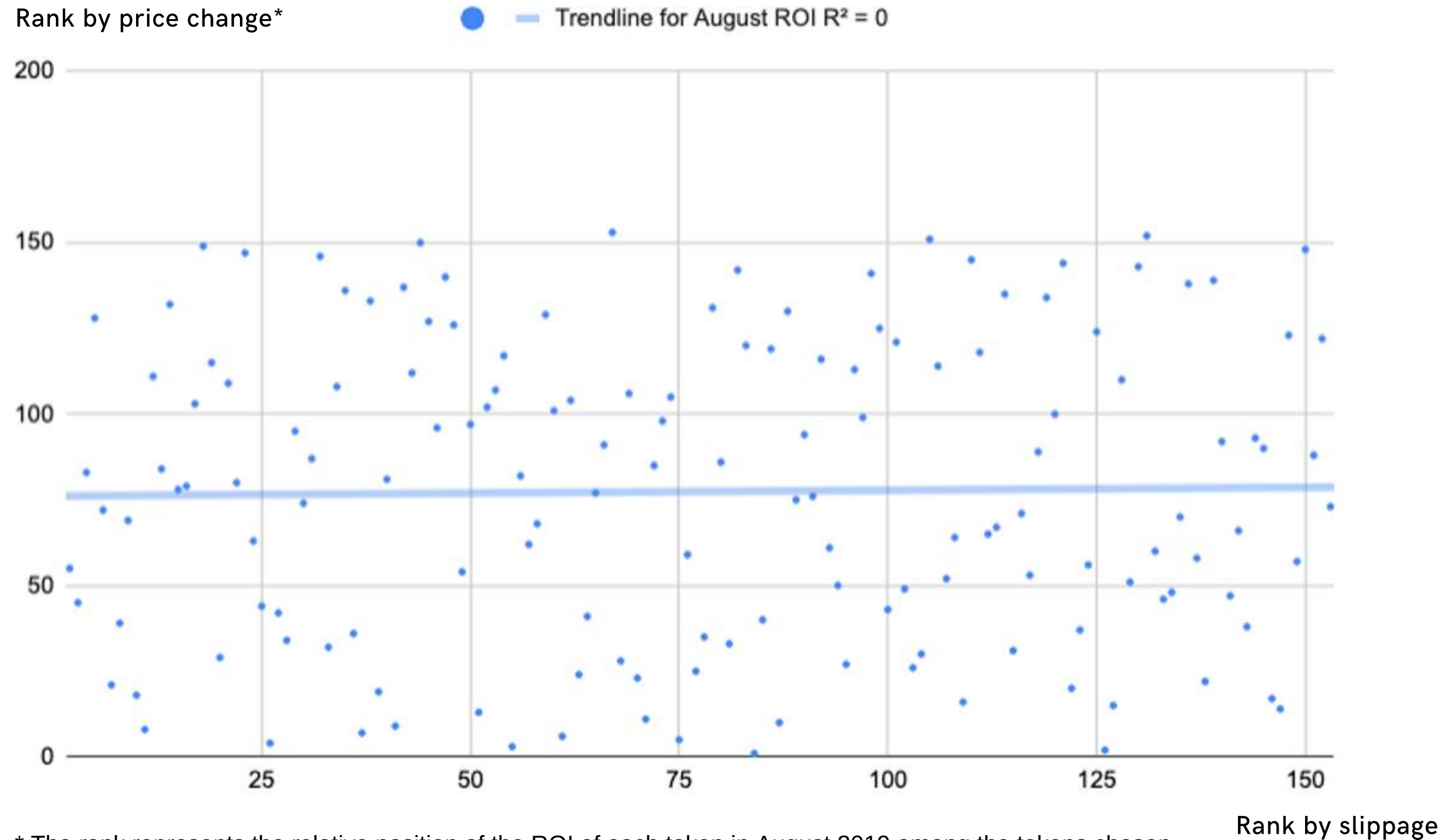
WEAK NEGATIVE CORRELATION**

In August, liquidity has a -0.17 correlation with price volatility, which means the higher slippage and lower liquidity an asset has, the more volatile its price.

* The rank represents the relative position of volatility of each token in August 2019 among the tokens chosen excl. all stablecoins. Data source: CoinGecko

** Correlation coefficient= -0.17<0 with $R^2=0.03$ and p-value=0.03, meaning weak negative correlation

Correlation with price change



NO SIGNIFICANT CORRELATION**

The price change of August 2019 appears not to be correlated with liquidity since cryptocurrencies tend to move in the same direction as the market moves in a short period of time.

* The rank represents the relative position of the ROI of each token in August 2019 among the tokens chosen excl. all stablecoins. Data source: CoinGecko

** Correlation coefficient=0.033 with $R^2=0.001$ and p-value=0.68, meaning no significant correlation

Methodology

SLIPPAGE CALCULATION

We collected per-diff order book data and full trade data for every single trading pair on Binance using their WebSocket API. This allows us to replay Binance order books and trades during August 2019. We then take an order book snapshot every hour and calculated slippage as the percentage difference between mid price and execution price, where:

- mid price = (price of lowest ask order + price of highest bid order) / 2
- execution price = actual price for a \$10,000 market order

We calculate bid slippage and ask slippage and average the two to derive per-snapshot slippage for a trading pair.

AGGREGATION

Since we take order book snapshots every hour, we have 720-744 slippage metrics for a given month. We then take an arithmetic average over the month to calculate monthly slippage for a trading pair.

For assets with both BTC and USDT trading pairs, we weight slippage by volume in each trading pair.

Appendix - raw data

trading_pair	base	quote	bid_slippage	ask_slippage	traded_volume (\$)
ADABTC	ADA	BTC	0.001818505653	0.001814348489	159040521.9
ADAUSDT	ADA	USDT	0.00160212122	0.001735122916	112619557
ADXBTC	ADX	BTC	0.01371495388	0.03076499804	5109956.598
AEBTC	AE	BTC	0.008203986518	0.01490759643	7225713.348
AGIBTC	AGI	BTC	0.01171162858	0.01720293749	27509561.92
AIONBTC	AION	BTC	0.0136197345	0.01476120104	22324826.33
ALGOBTC	ALGO	BTC	0.003947392492	0.004707474455	123312162.2
ALGOUSDT	ALGO	USDT	0.003824376135	0.004670338185	127718172.5
AMBBTC	AMB	BTC	0.014779099	0.02907317867	3933179.009
ANKRBTC	ANKR	BTC	0.01447768446	0.01576764901	29009208.74
ANKRUSDT	ANKR	USDT	0.01595120838	0.02796188606	17417262.65
APPCBTC	APPC	BTC	0.01699648733	0.03180435533	4773423.766
ARDRBTC	ARDR	BTC	0.0102995617	0.0210910119	5500358.986
ARKBTC	ARK	BTC	0.01248219591	0.0177354367	6529344.903
ARNBTC	ARN	BTC	0.01269122081	0.02531995817	14388748.13
ASTBTC	AST	BTC	0.01423137172	0.02344049124	7415041.947
ATOMBTC	ATOM	BTC	0.003684787507	0.004037724776	36767660.65
ATOMUSDT	ATOM	USDT	0.003365951156	0.003861458134	30928833.05
BANDBTC	BAND	BTC	0.003544242689	0.005595401707	0
BANDUSDT	BAND	USDT	0.0006453375318	0.009910181503	0
BATBTC	BAT	BTC	0.004054458186	0.004444862612	55379851.88
BATUSDT	BAT	USDT	0.005274420509	0.006043648783	19543685.38

trading_pair	base	quote	bid_slippage	ask_slippage	traded_volume (\$)
BCDBTC	BCD	BTC	0.01554574381	0.01455788448	4203204.873
BCHABCBTC	BCHABC	BTC	0.0009119747716	0.0009342074777	206442696.1
BCHABCUSDT	BCHABC	USDT	0.0007859441143	0.0007762973324	395745636.1
BCPTBTC	BCPT	BTC	0.01360876954	0.02970108139	6787807.848
BEAMBTC	BEAM	BTC	0.01395537624	0.01379271352	0
BEAMUSDT	BEAM	USDT	0.001155810125	0.01229299425	0
BLZBTC	BLZ	BTC	0.01462661564	0.03438625433	6935274.262
BNBBTC	BNB	BTC	0.0006756117774	0.000572594341	985465697.2
BNBUSDT	BNB	USDT	0.0007456824369	0.0005872748234	1086643147
BNTBTC	BNT	BTC	0.009379164414	0.01504298337	1900971.781
BQXBTC	BQX	BTC	0.01417534706	0.02903083953	9411108.895
BRDBTC	BRD	BTC	0.009154442413	0.01280180327	6916488.142
BTCTUSD	BTC	TUSD	0.0008414554075	0.0008214438417	219032013.2
BTCUSDC	BTC	USDC	0.0005444201351	0.0005457082145	727198104.6
BTCUSDT	BTC	USDT	0.0001520843073	0.0001452763796	13561954180
BTGBTC	BTG	BTC	0.006544569306	0.009981265293	13840193.85
BTSBTC	BTS	BTC	0.01238559013	0.01607760016	3545612.35
BTTBTC	BTT	BTC	0.08011296646	0.07996664592	16541393.26
BTTUSDT	BTT	USDT	0.003338222645	0.003208451609	111501660.9
BUSDUSDT	BUSD	USDT	0.0005364698456	0.0004502025912	0
CDTBTC	CDT	BTC	0.01603029984	0.0220999429	15248101.45
CELRBTC	CELR	BTC	0.008621393975	0.009098409132	43381013

The full spreadsheet: bit.ly/liquiditydata

About us

Hummingbot is an open source software client that allows anyone to create and customize automated, algorithmic trading bots for making markets on both centralized and decentralized digital asset exchanges, but also a global community of passionate crypto traders and developers, as well as a marketplace that bring community-driven liquidity provided by individual liquidity miners to digital asset exchanges and crypto projects.

Our mission is to give everyone access to superpowers of algorithmic trading that were previously available only to large financial institutions. We believe this will lead to a more open, fair, and inclusive financial world.

TEAM BACKGROUND



**Goldman
Sachs**

J.P.Morgan

Stanford



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