



Making Crypto Assets Accountable

Pricing in Highly Fragmented Markets

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Presentation Outline

- How the crypto market works today
- Accounting challenges for crypto assets
 - Technical: Tracking and consolidation of crypto assets
 - Conceptual: Characterization of crypto as an asset class
- Lukka methodology for pricing crypto assets
 - Fair value
 - Dynamic determination of the principal market

How Equity Markets Work



NYSE

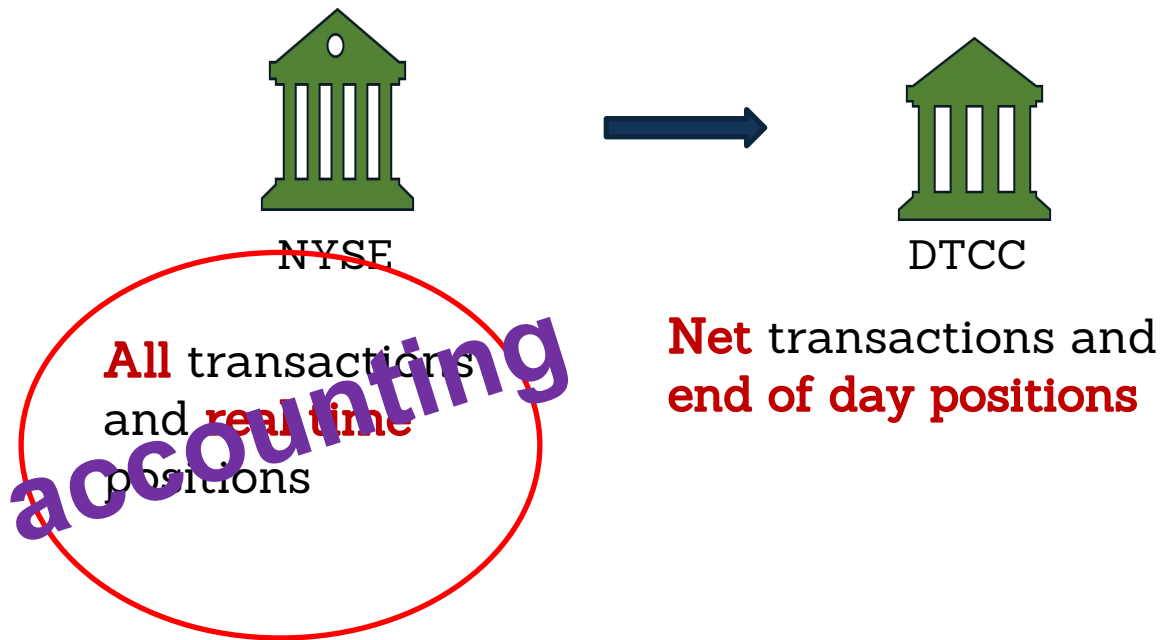
All transactions
and **real time**
positions



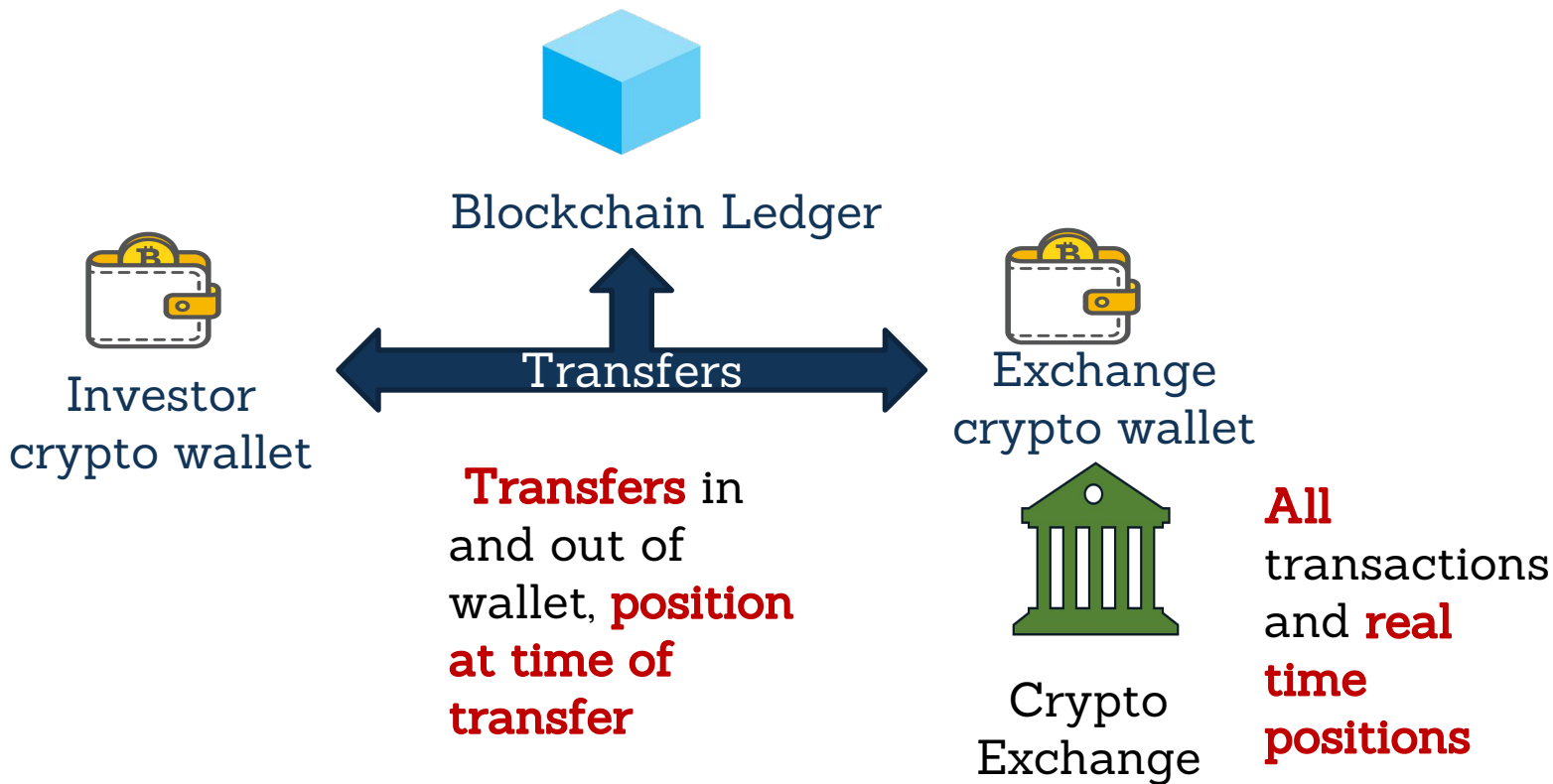
DTCC

Net transactions and
end of day positions

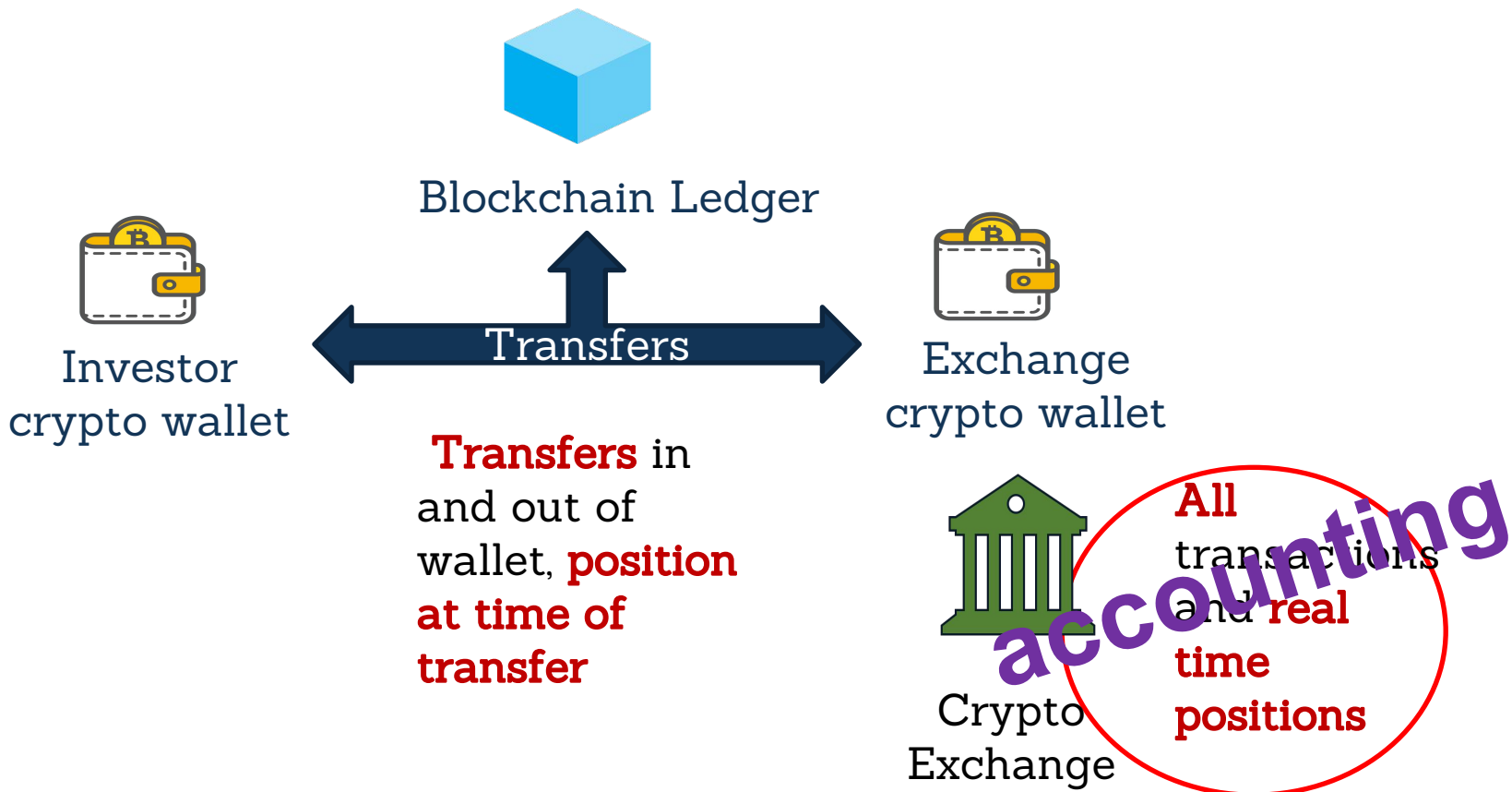
How Equity Markets Work



Transactions and Transfers



Transactions and Transfers

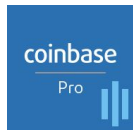


Global Exchanges

- Crypto exchanges are spread across the globe
- Most venues trade crypto to crypto
- Few venues trade crypto to local fiat
- Many crypto assets trade on only a few venues



Implication for Accounting: \$ value of intermediate transfers



USD-->BTC



BTC-->EOS



EOS-->BTC

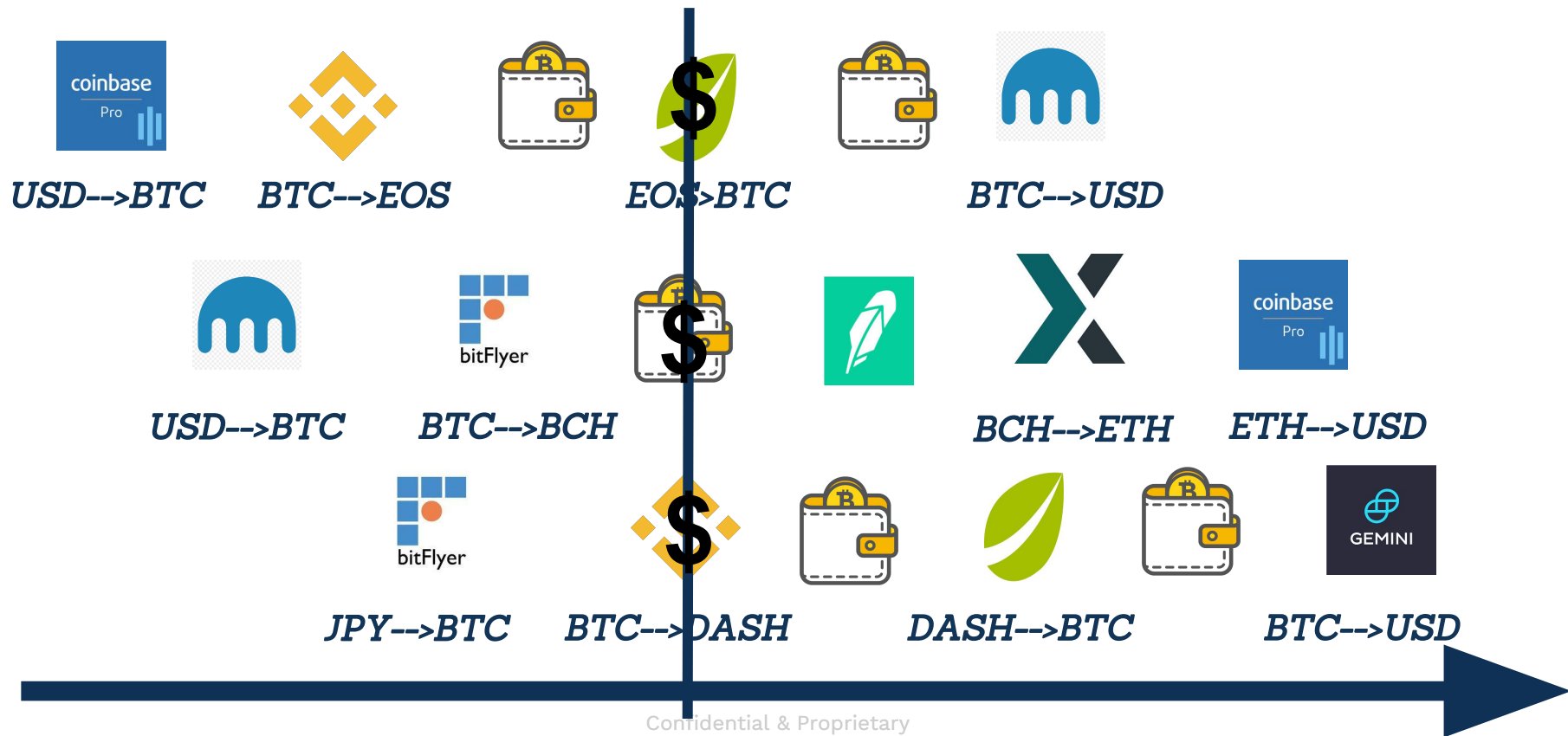


BTC-->USD

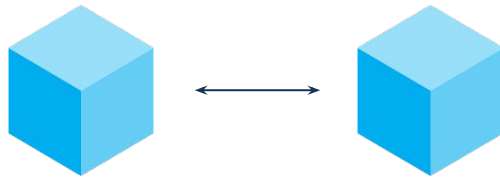


Tax Reporting

Implication for Accounting: \$ value at a given point of time



Implication



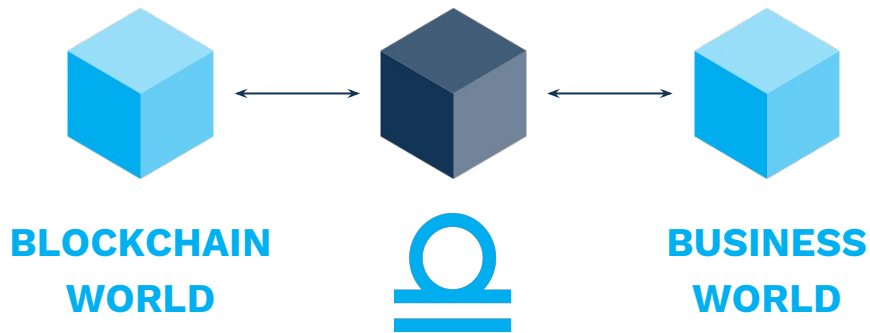
- Using only information available on the ledger would not meet the GAAP and IFRS standards
- For financial and tax reporting purposes information must be collected and consolidated from exchanges, wallets, custodians, OTC etc.
- Reports must be augmented with additional information, in particular conversion price reference

Lukka - who we are

- Named after Luca Pacioli, the father of double entry accounting, Lukka is the **leading** crypto native middle and back office software and data service provider for institutions
- Lukka built the world's **first** crypto tax calculator in 2014 - LibraTax
- **Customers** include - Funds & Fund Administrators, OTC & Proprietary Trading Firms, Crypto Exchanges, Miners and Accounting Firms



Lukka's Mission



Transform distributed and decentralized crypto asset data into auditable financial information to improve operations, create financial statements and provide regulatory reporting and transparency.

IRS Note for Tax Reporting

Q-5: How is the **fair market value** of virtual currency determined?

A-5: For U.S. tax purposes, transactions using virtual currency must be **reported in U.S. dollars**. Therefore, taxpayers will be **required to determine the fair market value** of virtual currency in U.S. dollars as of the date of payment or receipt. If a virtual currency is listed on an exchange and the exchange rate is established by market supply and demand, **the fair market value of the virtual currency is determined by converting the virtual currency into U.S. dollars** (or into another real currency which in turn can be converted into U.S. dollars) at the exchange rate, in a reasonable manner that is consistently applied. An individual or entity subject to US tax laws must be able to evaluate his holding portfolio for financial reporting

(IRS Notice 2014-21)

GAAP and IFRS Standards

- Presently, no formal accounting standards exist for cryptocurrencies under either US GAAP or IFRS
- Current practices vary but are moving towards accepting the fair value model
- A detailed discussion can be found in pricing white paper available on Lukka website: <https://lukka.tech>

Fair Value ---- what and where?

Excerpt from Accounting Standards Codification

Fair Value Measurement—Overall

Definition of Fair Value

The Transaction

820-10-35-3

A fair value measurement assumes that the asset or liability is exchanged in an orderly **transaction** between market participants to sell the asset or transfer the liability at the measurement date under current market conditions.

820-10-35-5

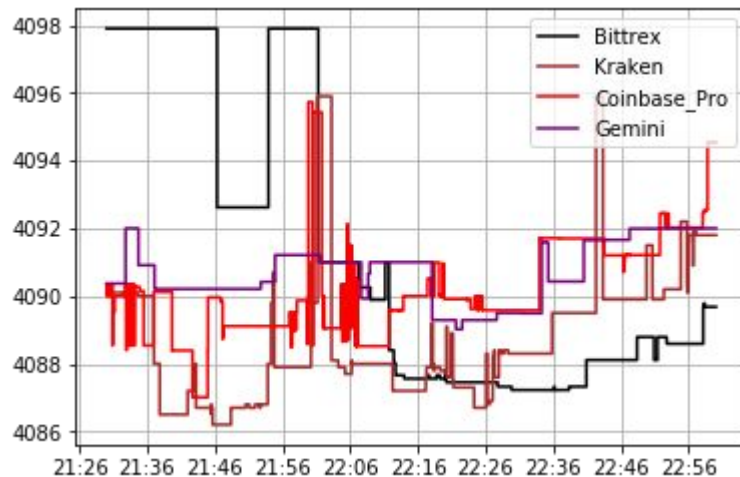
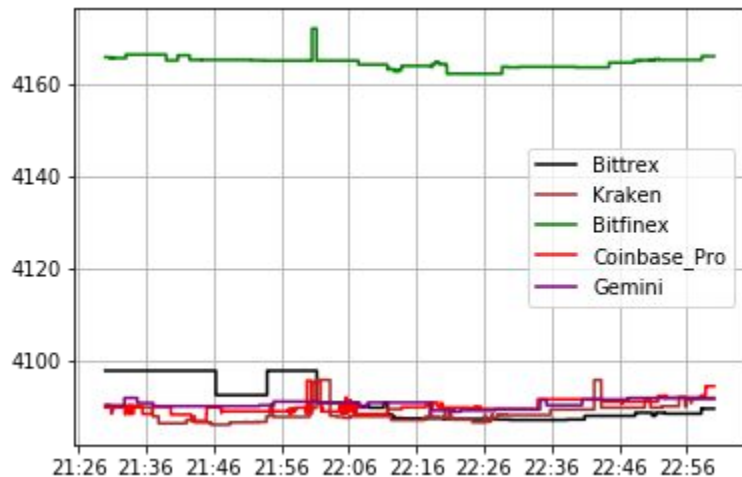
A fair value measurement assumes that the transaction to sell the asset or transfer the liability takes place either:

- a. In the **principal market** for the asset or liability
- b. In the absence of a principal market, in the **most advantageous** market for the asset or liability

Market Fragmentation

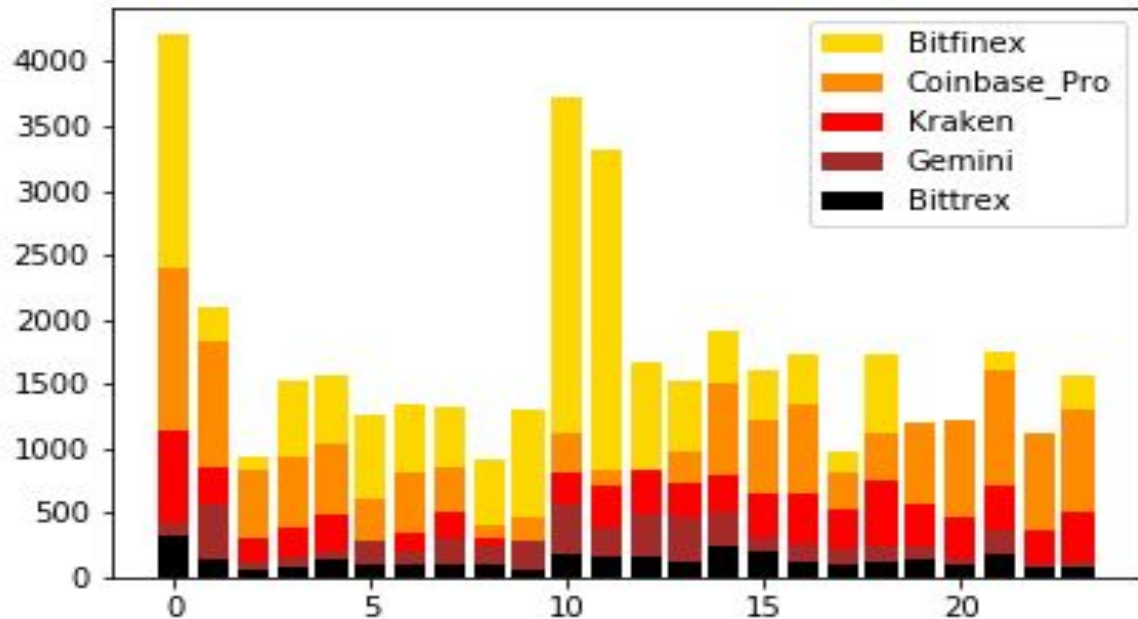
Bithumb South Korea, Liquid (Cryptos) Japan, SFOX USA, Cumberland DRW LLC USA, Abucoins Poland, Bitwise USA, Bitpoint Japan, Deribit The Netherlands, Bilaxy China, Crypto Facilities UK, UEX Singapore, DigiFinex Singapore, Coineal China, P2PB2B Switzerland, BW Exchange, BeQuant UK, ACX Australia, AidosMarket, Allocoin Canada, Altcoin Trader South Africa, Bancor Network Israel, BCEX Canada, Bisq, Bitbank Japan, BitcoinToYou Brazil, BitcoinTrade Brazil, Bitflip Thailand, BitForex Singapore, Bitkonan The Netherlands, Bitlish UK, BitMarket Poland, Bits Blockchain China, AEX UK, Bibox Estonia, BigONE USA, Bit-Z China, BitBay Poland, Bitonic The Netherlands, Bitsane UK, Bitso Mexico, Bittylicious UK, Brazillex Brazil, BTC-Alpha UK, BTC Markets Australia, BTCTurk Turkey, Buda Chile, BX Thailand Thailand, C-CEX Germany, CoinCorner UK, CoinEgg UK, CoinExchange USA, CoinFalcon UK, Coinfloor UK, Coinhouse France, Coinnest South Korea, Coinrail South Korea, Coinroom Poland, CoinsBank UK, Coinsquare Canada, Coinsuper China, CoinTiger Singapore, COSS Singapore, Cryptonex UK, CryptoX UK, CoinMate UK, BitGrail Italy, Ouoinex Japan, Bitcoin Indonesia Indonesia, Coinbase USA, Bittrex USA, Bitfinex China, Binance Malta, bitFlyer Japan, Coinbase Pro (GDAX) USA, Bitstamp UK, Bit2C Israel, BitMEX Seychelles, BitShares Asset Exchange, Coinone South Korea, DDEX Cayman Islands, EthFinex, Exrates Armenia, EXX China, Fargobase USA, FatBTC China, Gatecoin China, Gatehub UK, HitBTC UK, IDAX Mongolia, Gemini USA, Huobi China, Exmo UK, Velox Exchange UK, Vaultoro UK, BL3P The Netherlands, Bleutrade Brazil, ChaoEX China, Cobinhood USA, Coinbene Singapore, Coingi, Coinut Singapore, CryptoBridge, Fisco Japan, Foxbit Brazil, FreiExchange, GOPAX South Korea, IDEX Panama, Independent Reserve Australia, Koineks Turkey, Koinex India, Koinim Turkey, Korbit South Korea, Kucoin China, LakeBTC China, LAToken Cayman Islands, Lbank China, Livecoin UK, LocalTrade UK, Luno UK, Kraken USA, Lykke Exchange Switzerland, Mercado Bitcoin Brazil, Mercatox UK, itBit USA, Burst Asset Exchange, BtcTradeim China, CoolCoin Australia, EtherDelta USA, GetBTC Saint Vincent and the Grenadines, DSX UK, BTC China China, Gate.io USA, BitMart Cayman Islands, Chilebit Chile, Coincheck Japan, Coindeal Cyprus, CEX.IO UK, OKCoin China, EthexIndia India, ExtStock UK, Graviex Russia, LocalBitcoins Finland, Shapeshift Switzerland, VBTC Vietnam, TRUSTdex UK, Surbitcoin Venezuela, Remitano Seychelles, ANXPRO China, LiteBit.eu The Netherlands, Mr. Exchange Japan, OBTC Cayman Islands, Stocks.Exchange, Bitinka Peru, BTCBOX Japan, Negocie Coins Brazil, NovaExchange Tanzania, OEX Singapore, OKEx China, OpenLedger DEX, Paribu Turkey, Paymium France, Poloniex USA, Radar Relay USA, RightBTC UAE, Ripple China China, RippleFox China, Simex Russia, TDAX, The Rock Trading Italy, Tidebit China, Tidex UK, Token Store, TOPBTC Australia, Trade Satoshi UK, Tux Exchange Canada, Unocoin India, Upbit South Korea, Waves Decentralized Exchange Russia, WEX Singapore, xBTCe Saint Kitts and Nevis, YoBit Russia, Zaif Japan, ZB.COM Samoa

Market Fragmentation – Price Discrepancies



BTC-USD prices on March 31st

Market Fragmentation – Substantial Intraday Dynamic



10 am – Bitfinex
10 pm – Coinbase Pro

Lukka Pricing

- **Lukka Prime Price** is the price of the *last transaction* on a *dynamically designated principal exchange*
- **Principal exchange** is designated by a publicly known *algorithm* abiding by GAAP and IFRS requirements using publicly available data
 - **Algorithm** scores exchanges based on fixed and dynamic factors
 - **Scoring** is responsive to information on three separate time scales

Base Credit Score (BCS)

- ☐ Regulated
- ☐ Know Your Client
- ☐ Mechanism
 - Implementation
 - Platform
 - Microstructure noise
- ☐ Fee structure
- ☐ Data quality
 - Latency
 - Transparency

Exchange Monitored by Lukka	Base Credibility Score (BCS)
Exchange 1	70
Exchange 2	100
Exchange 3	55
Exchange 4	0
Exchange 5	40
Exchange 6	50
Exchange 7	100
Exchange 8	60
Exchange 9	50

Volume Adjusted Credibility Score (VACS)

- Score re-adjusted per currency based on the relative share of reported volume of exchange
- Monthly re-adjustments based on the previous month volume
- Under unusual circumstances (exchange collapse) re-adjustment may be done earlier

Exchange Monitored by Lukka	Base Credibility Score (BCS)	Volume Adjusted Credibility Score (VACS)
Exchange 1	70	20.10
Exchange 2	100	43.95
Exchange 3	55	2.71
Exchange 4	0	0
Exchange 5	40	0
Exchange 6	50	0
Exchange 7	100	11.18
Exchange 8	60	22.05
Exchange 9	50	0

Decayed Volume Adjusted Credibility Score (DVACS)

At a given point of time the score of each exchange will be decayed proportional to the length of time since the last trade on the exchange

Exchange Monitored by Lukka	Base Credibility Score (BCS)	Volume Adjusted Credibility Score (VACS)	Decayed Volume Adjusted Credibility Score (DVACS) 2019.03.02 23:28:25.382	Decayed Volume Adjusted Credibility Score (DVACS) 2019.03.02 23:28:28.455	Decayed Volume Adjusted Credibility Score (DVACS) 2019.03.08 16:34:15.409
Exchange 1	70	20.10	17.44344	17.43847	17.99402
Exchange 2	100	43.95	12.29275	42.08395	9.97693
Exchange 3	55	2.71	0.7558662	0.7556512	2.742311
Exchange 4	0	0	0	0	0
Exchange 5	40	0	0	0	0
Exchange 6	50	0	0	0	0
Exchange 7	100	11.18	11.0908	11.08771	11.38387
Exchange 8	60	22.05	21.80368	21.79747	4.979898
Exchange 9	50	0	0	0	0
Principal Exchange			Exchange 8	Exchange 2	Exchange 7

Challenges Moving Forward

Exchanges

- Volume misreporting
- Quality of data
 - Data structure
 - Reference data
 - Monitoring
 - Warehousing
- Mechanism
 - Continuous order book
 - Frequent auctions
- Fees

Measurement

- Snapshots
- Benchmarks
 - Length of window
 - Aggregation method
- Liquidity
- Volatility
- Microstructure noise

Trending

- Stablecoins
- Futures and Derivatives
- Real estate tokens
- Smart contracts



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