

Volatility in cryptocurrency markets

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Cryptocurrencies - a highly volatile asset class



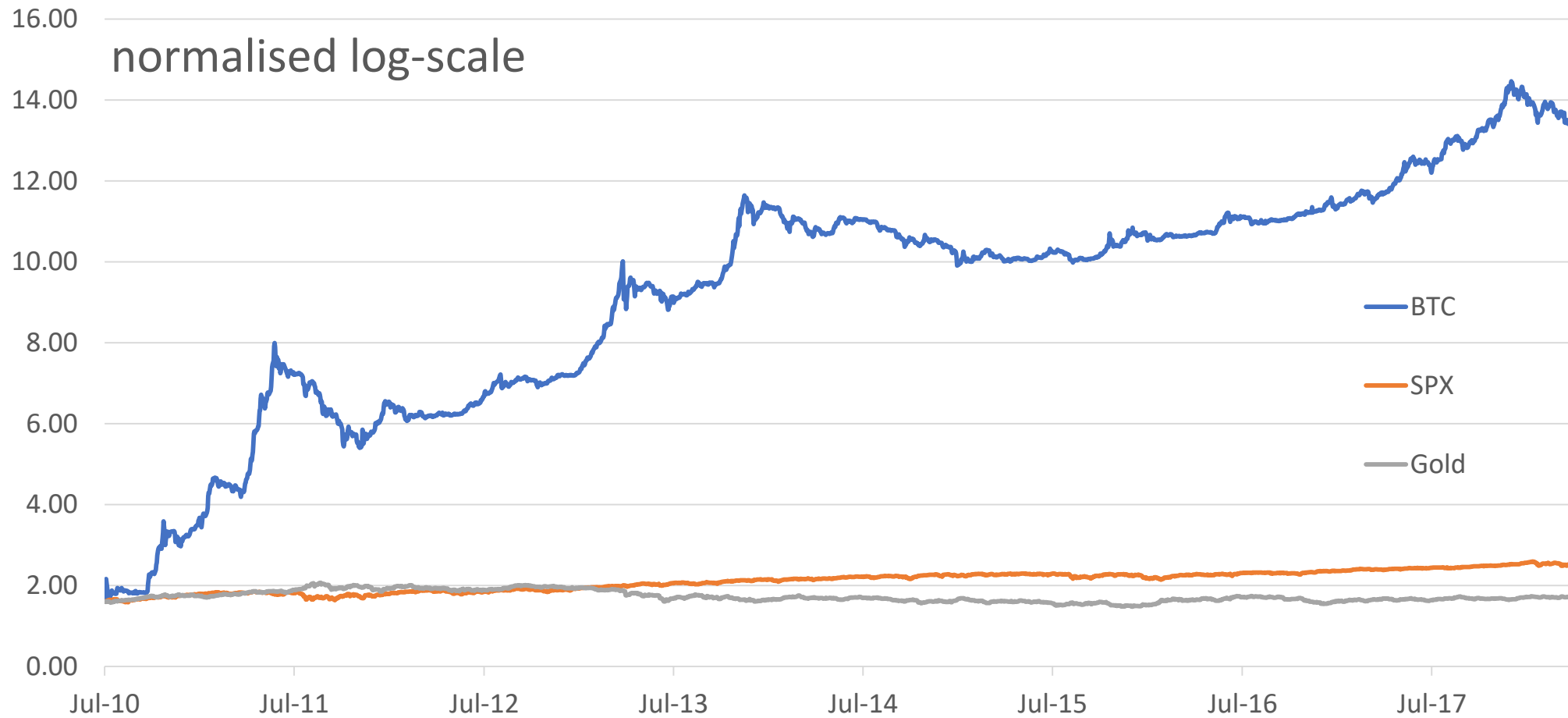
Cryptocurrency trading - venues

- Spot markets on unregulated trading platforms ('exchanges')
- Market highly fragmented with dozens of exchanges
- Accounts, market data feeds and APIs free
- High trading fees (up to 25 bps)

Cryptocurrency trading - markets and products

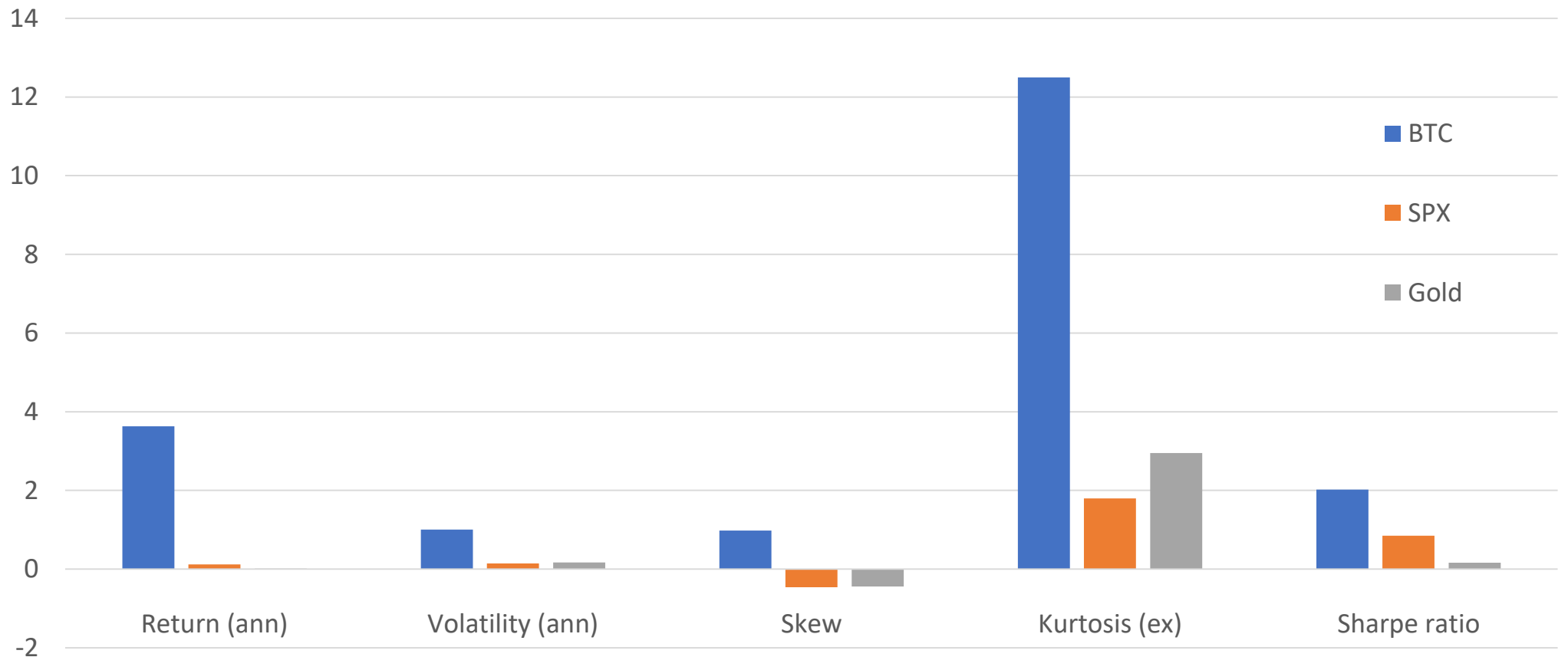
- Retail driven market: anyone can sign (subject to KYC/AML)
- Limit order books, market orders, sometimes stop-loss etc
- Leveraged trading often possible (margin provided by exchanges)
- Regulated: futures on CBOE, CME; swaps and option on LedgerX
- Further products in crypto-to-crypto markets

Cryptocurrencies vs other asset classes



Cryptocurrencies vs other asset classes

Return distribution moments



Data: Jul 2010 - present

Investor's perspective

How can we explain these statistics?

- Immature asset class -> low market capitalisation
 - Cryptocurrencies (total): \$ 0.25 tn
 - Bitcoin: \$ 0.12 tn (< \$1m in 2010!)
 - SPX: \$23 tn
 - Gold: \$ 7.7 tn
- Investors take risks:
 - Technology -> scalability (decentralised network, transactions)
 - Utility -> adoption
 - Security -> hacks, counterparty risk
 - Market -> price volatility, fat tails, extended bear markets, liquidity

Investor's perspective – allocation & correlation

- Historically, allocating a small percentage of overall assets to cryptocurrencies (assuming a standard 60/40 equities/bonds portfolio) would have resulted in enhanced risk-adjusted returns in most years

Correlations	BTC	SPX	Gold
BTC	1	0.03	0.02
SPX	0.03	1	-0.02
Gold	0.02	-0.02	1

Data: Jul 2010 - present

Trader's perspective – risks and opportunities

Some risks are can be more pronounced for (short-term) traders than for (long-term) investors:

- Hacks and security breaches
- Counterparty risk

But volatility and market fragmentation can be an opportunity for certain types of trading businesses, e.g. market makers that provide liquidity to exchanges

Trader's perspective – arbitrage matrices

13 Dec 2017	Bitfinex	Coinbase	Gemini	ItBit	Kraken
Bitfinex	0%	3.26%	2.21%	2.06%	0.14%
Coinbase	-3.15%	0%	-1.01%	-1.16%	-3.02%
Gemini	-2.16%	1.02%	0%	-0.15%	-2.03%
ItBit	-2.02%	1.17%	0.15%	0%	-1.88%
Kraken	-0.14%	3.11%	2.07%	1.92%	0%

4 Apr 2018	Bitfinex	Coinbase	Gemini	ItBit	Kraken
Bitfinex	0%	-0.01%	0.05%	0.09%	0.01%
Coinbase	0.01%	0%	0.06%	0.10%	0.02%
Gemini	-0.05%	-0.06%	0%	0.04%	-0.05%
ItBit	-0.09%	-0.10%	-0.04%	0%	-0.08%
Kraken	-0.01%	-0.02%	0.05%	0.08%	0%

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