

Cryptocurrencies as an Asset Class (Part I)

ECOM215: Blockchain Economics and Digital Assets

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Today's Agenda

From Technology to Investment

What Makes an Asset Class?

Crypto Market Structure

The Valuation Problem

Risk-Return Characteristics

Summary and Next Steps

From Technology to Investment

Where We Are in the Course

Weeks 1–6: We studied the **technology** and its **applications**.

- How blockchains work (consensus, cryptography, smart contracts)
- What you can build on them (DeFi, stablecoins, tokenized assets)
- What can go wrong (Terra/Luna, smart contract exploits, oracle failures)

Weeks 7–8: Now we ask a different question:

Should anyone **invest** in these things?

This requires a shift in perspective—from engineering and protocol design to **financial economics**: returns, risk, valuation, market structure, and portfolio construction.

The Two Big Questions

This lecture: Is cryptocurrency a legitimate asset class?

- How do crypto markets actually work?
- Can we value these assets?
- What are the risk-return characteristics?

Next lecture: How do investors access crypto?

- The 2024 spot ETF approvals and their implications
- Institutional adoption and custody
- Investment vehicles (direct and indirect)
- Market integrity and manipulation risks

Approach

We apply standard asset pricing intuition throughout. Crypto is not a special universe—it either meets the criteria we apply to any investment, or it doesn't.

What Makes an Asset Class?

Asset Class: Definition and Criteria

An **asset class** is a group of investments with similar characteristics, subject to similar economic forces and regulatory treatment.

Four criteria for evaluating any asset class:

1. **Return potential**: What drives returns? Are they compensation for risk?
2. **Risk characteristics**: Volatility, tail risk, drawdowns
3. **Liquidity**: Can you trade at scale without moving the price?
4. **Regulatory framework**: Is there investor protection? Legal clarity?

A fifth consideration for portfolio construction:

- **Correlation structure**: Does the asset provide diversification?

We will evaluate cryptocurrencies against each of these criteria. The answer is not straightforward.

Where Do Cryptocurrencies Fit?

Cryptocurrencies are typically classified as **alternative investments**, alongside hedge funds, private equity, real estate, and commodities.

But the analogy is imperfect:

- Unlike real estate or commodities, most cryptoassets **generate no cash flows**
- Unlike hedge funds or PE, there is **no fund manager** making allocation decisions
- Unlike gold, the “store of value” narrative is **contested and empirically fragile**
- Unlike equities, there are **no earnings, dividends, or buybacks** to anchor valuation

Key Tension

The institutional investment case for crypto rests on (i) attractive risk-adjusted returns and (ii) low correlation with traditional assets. We will examine the evidence for both claims.

Crypto Market Structure

How Crypto Markets Work: An Overview

Crypto markets differ from traditional financial markets in several fundamental ways:

Traditional equities:

- Centralised exchanges (NYSE, LSE)
- Regulated market makers
- Consolidated tape (one price)
- Trading hours (9:30–16:00)
- T+1 settlement
- Regulated custody (broker-dealer)

Cryptocurrency:

- Multiple venues (CEX + DEX)
- Unregulated or lightly regulated
- No consolidated tape (fragmented)
- 24/7/365 trading
- Near-instant or on-chain settlement
- Self-custody or third-party custodian

Each of these differences creates both **opportunities** and **risks** for investors.

Centralised Exchanges (CEXs)

CEXs are the dominant trading venues: Binance, Coinbase, Kraken, OKX, Bybit.

How they work:

- Traditional limit order book model (similar to stock exchanges)
- The exchange holds custody of user funds (“not your keys, not your coins”)
- Matching engine pairs buy and sell orders
- Revenue from trading fees (typically 0.01%–0.60% per trade)

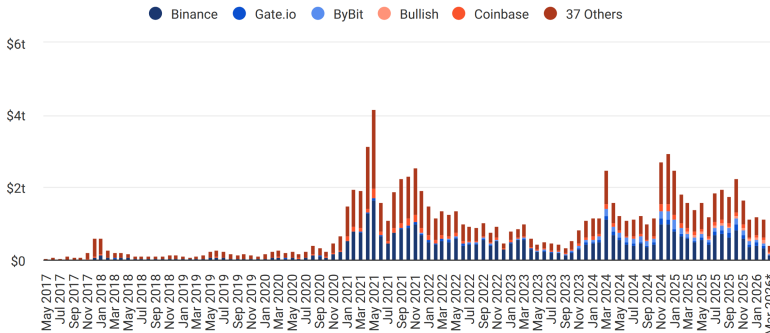
Key risks:

- **Counterparty risk:** Exchange insolvency (FTX, 2022) or hacks (Mt. Gox, 2014)
- **Commingling:** Some exchanges mix customer and proprietary funds
- **Regulatory arbitrage:** Many exchanges operate from loosely regulated jurisdictions

Centralised Exchanges (CEXs)



Cryptocurrency Monthly Exchange Volume



SOURCE: THE BLOCK
UPDATED: MAR 13, 2026

Figure: Monthly spot trading volume across major CEXs. Source: theblock.co

Decentralised Exchanges (DEXs)

DEXs use the AMM model we studied in Week 4 (Uniswap, Curve, etc.)

Key differences from CEXs:

- No centralised order book—liquidity pools and automated pricing
- Non-custodial: users retain control of their assets (connect wallet, trade, disconnect)
- Transparent: all trades visible on-chain
- Permissionless: anyone can list a token (which is also a risk)

Market share: DEXs account for approximately 15–20% of total spot volume, growing but still far behind CEXs.

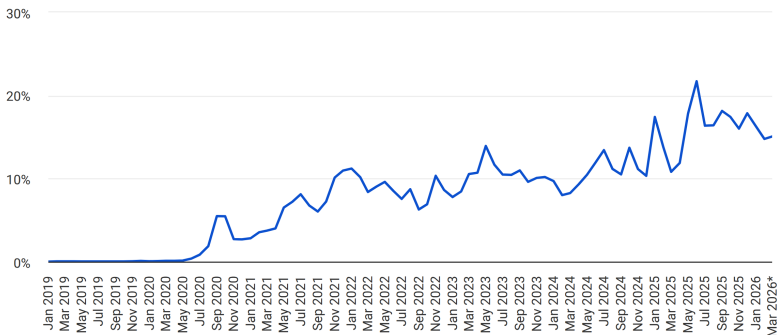
Economic trade-off:

- **No counterparty risk** (no exchange can freeze your funds)
- **Higher costs** for large trades (slippage, gas fees)
- **Smart contract risk** replaces counterparty risk

Decentralised Exchanges (DEXs)



DEX to CEX Spot Trade Volume (%)



SOURCES: THE BLOCK, DEFILLAMA

UPDATED: MAR 13, 2026

Figure: DEX vs. CEX spot trade volume ratio over time. Source: theblock.co

Market Fragmentation and Price Discovery

Unlike equities, there is **no consolidated tape** for crypto prices.

What this means:

- The “price of Bitcoin” depends on which exchange you look at
- Price differences across venues create arbitrage opportunities
- Arbitrageurs link prices across exchanges, but not perfectly

Consequences for investors:

- **Execution quality varies:** Different price on different venues
- **Reference price ambiguity:** Which price do ETFs, futures, and indices use?
- **Manipulation risk:** Easier to manipulate price on a single venue when there is no consolidated reference

Liquidity: Bid-Ask Spreads and Slippage

Liquidity determines how cheaply and quickly you can trade.

Two key measures:

- **Bid-ask spread:** The gap between the best buy and sell price. Tighter spreads = more liquid market.
- **Slippage:** How much the execution price moves against you for a given order size. Relevant for institutional-sized trades.

Crypto liquidity stylised facts:

- BTC and ETH on major exchanges: spreads comparable to mid-cap equities
- Altcoins: spreads can be 10–100× wider
- Liquidity evaporates during stress events (“liquidity illusion”)
- 24/7 trading means liquidity varies by time of day and day of week

Liquidity: Bid-Ask Spreads and Slippage

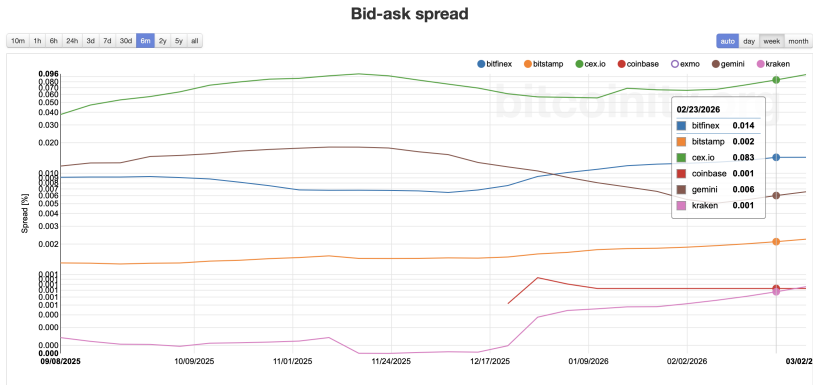


Figure: Bid-ask spreads and slippage costs across major exchanges. Source: Kaiko via theblock.co

The Custody Problem

Custody = who holds the assets and how are they secured?

In traditional finance, custody is a solved problem: regulated broker-dealers and custodian banks hold securities on behalf of investors, with legal protections and insurance.

In crypto, custody is a **first-order risk**:

Self-custody:

- User controls private keys
- No counterparty risk
- But: loss of keys = permanent loss of assets
- Not practical for institutions

Third-party custody:

- Coinbase Custody, Fidelity Digital Assets, BitGo
- Regulated qualified custodians
- Required for ETFs and institutional mandates
- Re-introduces counterparty risk

The development of **institutional-grade custody** was a prerequisite for the 2024 ETF approvals—the SEC needed assurance that the underlying Bitcoin was held securely. We will return to this in next lecture.

The Valuation Problem

How Do You Value a Cryptocurrency?

Traditional asset valuation is grounded in **discounted cash flows**:

- Equities: Present value of expected dividends/earnings
- Bonds: Present value of coupon payments and principal
- Real estate: Present value of rental income

The fundamental problem with most cryptoassets:

There are no cash flows to discount.

Bitcoin pays no dividends, generates no earnings, and has no contractual obligation to return capital. Its value depends entirely on what someone else will pay for it in the future.

This does not mean crypto is worthless—gold also generates no cash flows. But it means that **standard valuation tools do not directly apply**, and we need to think carefully about what drives value.

Valuation Framework 1: Network Value

Idea: A blockchain's value derives from the size and activity of its network, analogous to how the value of a telephone network or social platform grows with users.

Metcalfe's Law: The value of a network is proportional to n^2 , where n is the number of users.

- Applied to Bitcoin: more users → more liquidity → more utility → higher value
- Some empirical support: Bitcoin's market cap has historically tracked active address counts

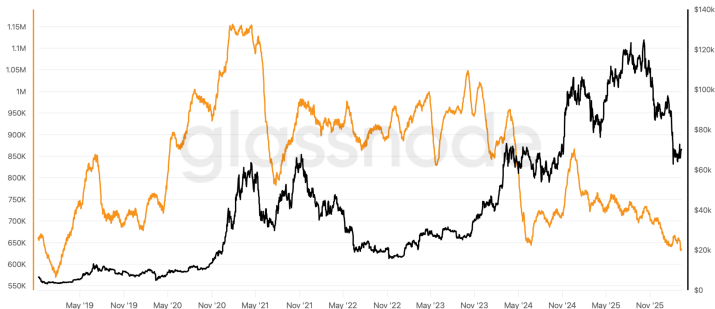
Limitations:

- Active addresses \neq active users (one person, many wallets)
- Circular reasoning: price increases attract users, not just the reverse
- Does not give you a *target price*—only a directional relationship
- Metcalfe's Law was developed for communication networks; the analogy to monetary networks is debatable

Valuation Framework 1: Network Value

BTC: Number of Active Addresses (30d Moving Average)

● BTC: Number of Active Addresses (30d sma) ● BTC: Price [USD]



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Figure: Bitcoin market cap vs. active addresses (30d MA). Source: Glassnode

Valuation Framework 2: Stock-to-Flow

Idea: Bitcoin's value should be related to its scarcity, measured by the **stock-to-flow ratio**:

$$\text{Stock-to-Flow} = \frac{\text{Existing supply}}{\text{Annual new production}}$$

The higher the ratio, the scarcer the asset. Gold has a high stock-to-flow (≈ 60); Bitcoin's increases after each halving.

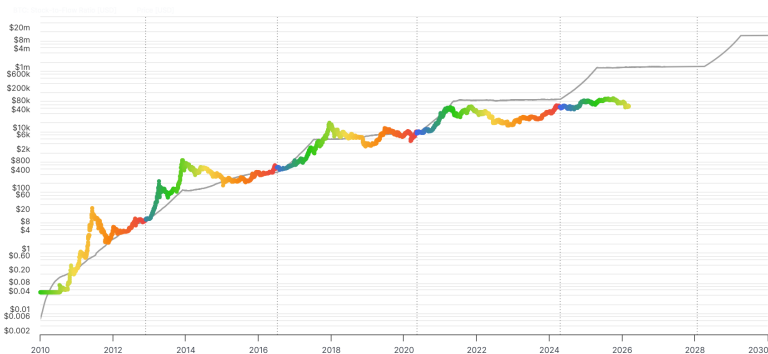
The model: Regress $\log(\text{price})$ on $\log(\text{S2F})$. This produced impressive in-sample fits in early work (PlanB, 2019).

Why the model failed:

- Post-2021, Bitcoin's price significantly underperformed the S2F prediction
- The model implies price goes to infinity as flow approaches zero—economically nonsensical
- Confuses scarcity with *demand*: scarcity is *necessary* but not *sufficient* for value. Demand matters too—and for crypto, demand is driven by speculation, adoption, and narrative, not by supply schedules alone.

Valuation Framework 2: Stock-to-Flow

BTC: Stock-to-Flow Ratio



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Figure: Stock-to-flow is defined as the ratio of the current stock of a commodity (i.e., the circulating Bitcoin supply) to the flow of new production (i.e., newly mined bitcoins). Source: Glassnode

Valuation Framework 3: Cost of Production

Idea: Bitcoin's "fundamental value" is anchored by the cost of mining it.

The argument:

- Mining requires electricity and hardware—real economic costs
- Rational miners will not mine at a loss for long
- Therefore, the cost of production acts as a price floor

Why this is incomplete:

- Causality runs both ways: higher prices attract more miners, *raising* the cost of production. The cost adjusts to the price, not only the other way around.
- Difficulty adjustment ensures block production continues regardless of price or hashrate level
- Does not apply to Proof-of-Stake tokens at all

Useful insight: After halvings, less efficient miners are forced out, creating short-term supply pressure. The April 2024 halving reduced the block reward from 6.25 to 3.125 BTC.

Valuation Framework 4: Tokenomics

For tokens beyond Bitcoin, **tokenomics**—the economic design of the token—matters for valuation.

Key tokenomics factors:

- **Supply schedule:** Fixed (BTC), inflationary (early ETH), deflationary (post-EIP-1559 ETH with fee burning)
- **Token distribution:** How concentrated is ownership? Insider share?
- **Utility:** Is the token *required* to use the protocol? (ETH for gas fees) Or is it purely governance/speculative?
- **Value capture:** Does protocol revenue flow to token holders? (e.g., fee-sharing, buyback-and-burn mechanisms)

The ETH case is instructive:

- Post-Merge: stakers earn $\sim 3\text{--}4\%$ yield (real economic return)
- EIP-1559: Base fees are burned, reducing supply
- This creates something *closer* to a cash-flow asset

Bottom Line

There is no single “correct” crypto valuation model. Investors must combine multiple frameworks and remain honest about uncertainty.

Risk-Return Characteristics

Return Characteristics

Cryptocurrency returns have been extraordinary over long horizons, but extremely uneven:

Key facts:

- Bitcoin: $\sim 150\%$ annualised return since 2013, but with multiple $>50\%$ drawdowns
- Ethereum: Even higher returns since 2015, with even higher volatility
- Most altcoins: The majority have delivered *negative* lifetime returns

Survivorship bias warning: Focusing on BTC and ETH overstates the returns an average crypto investor earned. CoinGecko lists over 13,000 tokens; most are effectively dead.

Volatility

Crypto volatility is substantially higher than that of traditional asset classes.

Typical annualised volatility ranges:

Asset	Annualised volatility (approx.)
S&P 500	15–20%
Gold	12–18%
Crude Oil	25–40%
Bitcoin	50–80%
Ethereum	70–100%
Typical altcoin	100–200%+

Important nuance: Bitcoin's volatility has been *declining* over time as the market matures. 30-day annualised volatility regularly exceeded 100% before 2020; it has mostly stayed in the 40–70% range since 2023.

Drawdowns and Tail Risk

High volatility is one thing. **Extreme drawdowns** are another—and crypto has experienced some of the largest in the history of financial markets.

Major Bitcoin drawdowns:

Period	Peak-to-trough	Recovery time
Dec 2017 – Dec 2018	−84%	~3 years
Apr 2021 – Jun 2021	−55%	~6 months
Nov 2021 – Nov 2022	−77%	~2 years

For comparison: The S&P 500's worst drawdown during the 2008 financial crisis was approximately −57%, and during COVID-19 (March 2020) approximately −34%.

Economic implication: An investor who allocated 10% of a portfolio to Bitcoin at the November 2021 peak would have seen that position fall to ~2.3% of portfolio value by November 2022—a loss large enough to meaningfully drag overall portfolio returns.

Drawdowns and Tail Risk

BTC: Price Drawdown from ATH (30d Moving Average)



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Figure: BTC drawdown from all-time high (30d MA). Source: Glassnode

Interpretation: high average returns reflect high **risk compensation**, not free money. We need to examine the risk side carefully.

Correlation with Traditional Assets

The diversification argument: If crypto returns are uncorrelated with equities and bonds, even a small allocation improves portfolio efficiency (higher return per unit of risk).

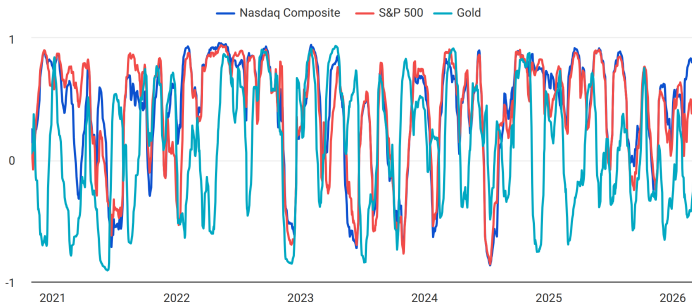
What the data shows:

- Pre-2020: BTC-S&P 500 correlation was near zero on average—consistent with the diversification narrative
- 2020–2022: Correlation spiked significantly during COVID and the subsequent tightening cycle, reaching 0.5–0.7 at times
- 2023–2025: Correlation has moderated but remains higher than the pre-2020 baseline

Correlation with Traditional Assets



BTC Pearson Correlation (30D)



SOURCES: CRYPTOCOMPARE, YAHOO FINANCE
UPDATED: MAR 13, 2026

Figure: BTC rolling 30-day correlation with equities and gold. Source: theblock.co

Why Did Correlations Increase?

The rise in BTC-equity correlation after 2020 is not accidental. Several structural factors explain it:

1. **Institutional participation:** As hedge funds, family offices, and asset managers entered crypto, the same portfolio rebalancing flows that move equities now also move Bitcoin.
2. **Risk-on / risk-off dynamics:** In a flight to safety, investors sell *all* risky assets—crypto included. In a risk-on environment, liquidity flows into *all* risky assets.
3. **Leverage:** Leveraged positions in crypto are often funded with the same capital that funds equity positions. Margin calls force simultaneous liquidation.

Implication for portfolio construction: The “uncorrelated alpha” argument for crypto has weakened. Crypto may still offer diversification at certain frequencies or horizons, but it is not a reliable hedge against equity drawdowns.

What About Bitcoin as “Digital Gold”?

A popular narrative positions Bitcoin as a **store of value** and **inflation hedge**, analogous to gold.

Arguments in favour:

- Fixed supply (21 million cap) vs. fiat money printing
- Not controlled by any government or central bank
- Portable, divisible, verifiable

What the evidence shows:

- During the 2021–2023 inflation episode, Bitcoin *fell* while inflation rose—inconsistent with an inflation hedge
- BTC-Gold correlation is low and unstable (sometimes positive, sometimes negative)
- Bitcoin’s volatility ($\sim 60\%$) is roughly $4\times$ that of gold ($\sim 15\%$)—a very “noisy” store of value

Summary and Next Steps

Key Takeaways

- 1. Crypto markets are structurally different from traditional markets**
 - Fragmented, 24/7, varying regulation, custody is a first-order problem
- 2. Valuation is fundamentally challenging**
 - No cash flows for most tokens; alternative frameworks (network value, S2F, cost of production) are suggestive but not reliable
 - Tokenomics and utility provide partial anchors for some assets (ETH)
- 3. Returns have been high but so has risk**
 - Extreme volatility, large drawdowns, fat-tailed distributions
 - Sharpe ratios are sample-dependent and misleading for non-normal returns
- 4. The diversification benefit is weaker than advertised**
 - Correlations with equities increased post-2020
 - “Digital gold” narrative not supported by inflation-episode evidence
- 5. None of this means crypto is uninvestable**—but it means investors need to go in with clear eyes about what they are buying and why

What's Next

Week 8: Cryptocurrencies as an Asset Class (Part II)

- The 2024 Bitcoin and Ethereum spot ETF approvals
- How ETFs work: structure, fees, flows, and price discovery
- The regulatory battle that made ETFs possible (SEC, Grayscale)
- Institutional adoption: custody solutions, prime brokerage, corporate treasuries
- Investment vehicles: direct, indirect, and derivatives
- Market manipulation and integrity risks

Preparation:

- Think about: Why did the SEC resist approving a Bitcoin spot ETF for over a decade? What changed?
- Explore: Look up the current AUM of the iShares Bitcoin Trust (IBIT) and compare it to major gold ETFs

Questions?