Tokenomics: Designing Token Economies That Last

Mini-Lecture — 30 Minutes

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Blockchain, Crypto Economy & NFTs

Learning Objectives:

1. Describe the four token types and their economic roles
2. Explain how fees, staking, and burns create value accrual
3. Calculate implied token price using the equation of exchange (MV=PQ)
4. Compare vesting schedules and identify distribution red flags

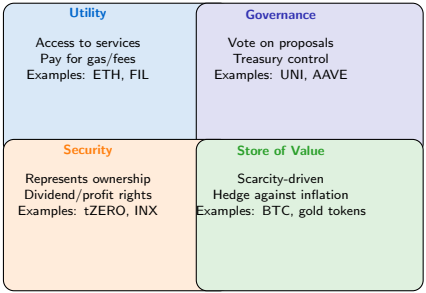
What Is Tokenomics? — The Four Token Types

Definition

Tokenomics is the study of how crypto tokens are designed, distributed, and incentivized to create sustainable economic systems.

Key design levers:

- Supply model (fixed, inflationary, deflationary)
- Distribution (team, investors, community)
- Value accrual (fees, burns, staking)
- Governance rights and utility



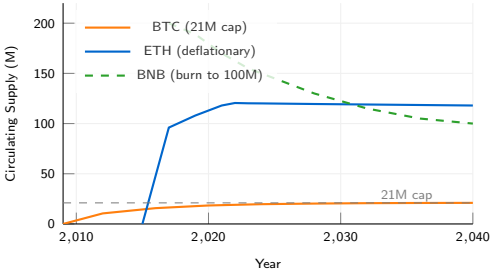
A single token can span multiple types — ETH is both utility (gas) and store of value.

Supply Models: Fixed, Deflationary, and Burn-Based

Three monetary policies:

- **BTC (fixed)**: halving every 210k blocks, capped at 21M coins. Currently $\sim$19.8M mined.
- **ETH (deflationary)**: post-Merge (Sep 2022) + EIP-1559 burns. Net issuance $\sim -0.2\%$/year.
- **BNB (burn-based)**: quarterly burns using 20% of profits. Target: reduce from 200M to 100M.

Why it matters:
Supply model = monetary policy. It determines long-term scarcity, inflation expectations, and holder incentives.



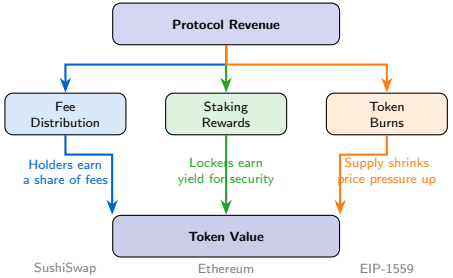
BTC's fixed supply is the purest digital scarcity; ETH and BNB use active supply reduction to create deflation.

Value Accrual: How Tokens Capture Protocol Revenue

Three mechanisms:

- **Fee distribution**: protocol fees paid to token holders (e.g., SushiSwap's xSUSHI earns 0.05% of trades)
- **Staking rewards**: lock tokens to secure network, earn yield (e.g., ETH staking ∼3–4% APR)
- **Token burns**: permanently remove supply, increasing scarcity (e.g., ETH EIP-1559 burns base fee)

Key insight:
Without value accrual, a token is just a speculative chip. The best designs combine multiple mechanisms.



Tokens without fee capture or burn mechanics rely solely on speculation — a fragile foundation.

The Velocity Problem: MV = PQ

Equation of Exchange (Fisher)

$$\underbrace{\text{Token Supply (M)}}_{\text{circulating tokens}} \times \underbrace{\text{Velocity (V)}}_{\text{turnover rate}} = \underbrace{\text{Price Level (P)}}_{\text{per-unit value}} \times \underbrace{\text{Volume (Q)}}_{\text{transactions}}$$

Rearranging for token price:

$$\text{Price per token} = \frac{\text{Transaction Volume (PQ)}}{\text{Supply (M)} \times \text{Velocity (V)}}$$

Worked example:

- M = 100M tokens, V = 10, PQ = **$**500M
- Price = **$**500M / (100M × 10) = **$0.50**

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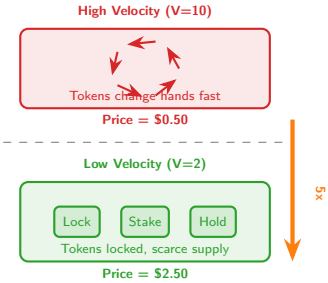
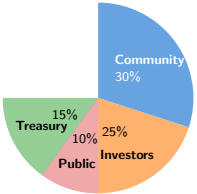
Reduce velocity to V = 2 (via staking):

- Price = **$**500M / (100M × 2) = **$2.50** — a 5x increase

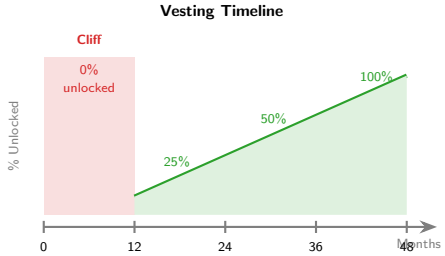


Staking, governance locking, and utility sinks all reduce velocity — the single biggest lever for token price.

Token Distribution and Vesting Schedules



Typical Allocation



Red flag: Insider allocation >30% with <12-month cliff signals dump risk.

Well-designed vesting aligns team incentives with long-term token health — 4-year vest with 1-year cliff is industry standard.

Tokenomics Red Flags and the Terra/Luna Collapse

Five red flags in token design:

1. **No utility** — token exists only for speculation
2. **High insider allocation** — team holds >30% with short vesting
3. **Unsustainable yield** — 20%+ APY with no revenue source
4. **Circular dependencies** — token A backs token B which backs token A
5. **No burn/lock mechanism** — high velocity, nothing reduces supply

The test:
If you remove speculation, does the token still have a reason to exist?

Terra/Luna: $40B Lost in 72 Hours (May 2022)

What happened:

- UST (stablecoin) maintained $1 peg via LUNA minting/burning
- Anchor Protocol offered 20% APY on UST deposits — funded by reserves, not revenue
- $2B UST withdrawal triggered death spiral: UST depegged → LUNA hyperinflated from $80 to $0.0001

Red flags present: 3, 4, and 5 above.
Root cause: Algorithmic peg with circular collateral and unsustainable yield.

Terra/Luna hit 3 of 5 red flags — any project matching 2+ should trigger deep due diligence.

Token Valuation: NVT Ratio and FDV

NVT Ratio

Network Value to Transactions

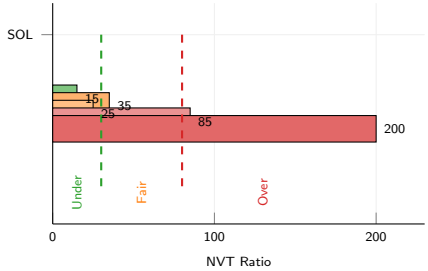
$$\text{NVT} = \frac{\text{Market Cap}}{\text{Daily Transaction Volume}}$$

Interpretation:

- **NVT $<$ 30**: potentially undervalued — high usage relative to cap
- **NVT 30–80**: fairly valued
- **NVT $>$ 80**: potentially overvalued or speculative

Market Cap vs FDV:
FDV = Price $\times$ Total Supply
Market Cap = Price $\times$ Circulating Supply

Large gap = future dilution risk.



Illustrative NVT values. Actual NVT varies daily. Source: CoinMetrics.

NVT is the crypto equivalent of a P/E ratio — high NVT means the market prices in future growth, not current usage.

The Howey Test: Is This Token a Security?

SEC's four-part test (1946):
A token is a **security** if it involves:

1. An **investment of money**
2. In a **common enterprise**
3. With an **expectation of profits**
4. Derived from the **efforts of others**

Implication:
Meeting all 4 criteria → SEC registration required, exchange listing restrictions, investor protections apply.

Why it matters:
XRP lawsuit (2020–2023) cost Ripple $125M+ in legal fees.
Classification determines which rules apply.

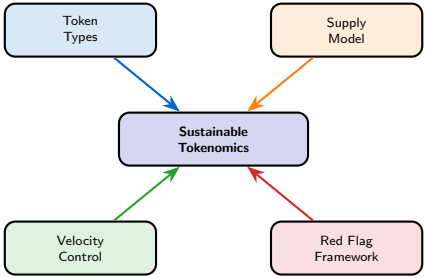
Criterion	BTC	ETH	XRP
1. Investment of money	Yes	Yes	Yes
2. Common enterprise	No	Debated	Yes
3. Expectation of profits	No	Debated	Yes
4. Efforts of others	No	Debated	Yes
Score / Result	**Not a security**	**Debated**	**Likely security**

The SEC ruled BTC is not a security (commodity). ETH's status remains debated. XRP was found a security in institutional sales (2023).

Key Takeaways

Four Core Lessons

1. **Token types determine regulatory treatment and value potential** — utility tokens power platforms, security tokens require registration, governance tokens control treasuries
2. **Supply models are monetary policy** — fixed (BTC), deflationary (ETH post-Merge), burn-based (BNB). Each creates different scarcity dynamics
3. **MV=PQ: reduce velocity to increase price** — staking, governance locking, and utility sinks keep tokens out of circulation, boosting value per token
4. **The 6-question red flag framework evaluates any token's sustainability** — no utility, high insider allocation, unsustainable yield, circular dependencies, and no supply reduction are warning signs



Tokenomics is economic engineering — every design choice creates incentives, and incentives drive behavior.

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A) $0.40 B) $2.00 C) $10.00 D) $0.10

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A) 1 B) 2 C) 3 D) 0
B – Two red flags: high insider allocation (>30%) and no lock/vesting mechanism.

Answers reveal on click. Review any incorrect answers before proceeding.

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A) Maximum initial supply and no burns B) 100% team allocation C) Multiple value accrual mechanisms plus long vesting D) Highest possible APY

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C – Sustainable tokens use fee sharing, staking, and burns together with multi-year vesting to align incentives.

Score: 9–10 Excellent | 7–8 Good | 5–6 Review slides | <5 Re-watch lecture.