

L29: Token Economics Fundamentals

Module D: Tokenomics

Blockchain & Cryptocurrency

December 2025

- Understand different token types and their purposes
- Analyze value accrual mechanisms in token economies
- Evaluate token supply models and their implications
- Apply tokenomics principles to real-world projects

What is Tokenomics?

Definition: The study of the economic systems governing the creation, distribution, and management of tokens in blockchain ecosystems.

Key Components:

- Token design and purpose
- Supply and distribution mechanics
- Incentive structures
- Value capture mechanisms
- Governance and utility

Why It Matters: Tokenomics determines the long-term sustainability and success of crypto projects.

1. Utility Tokens

- Access to platform services
- Payment for network fees
- Examples: BNB, LINK, FIL

2. Security Tokens

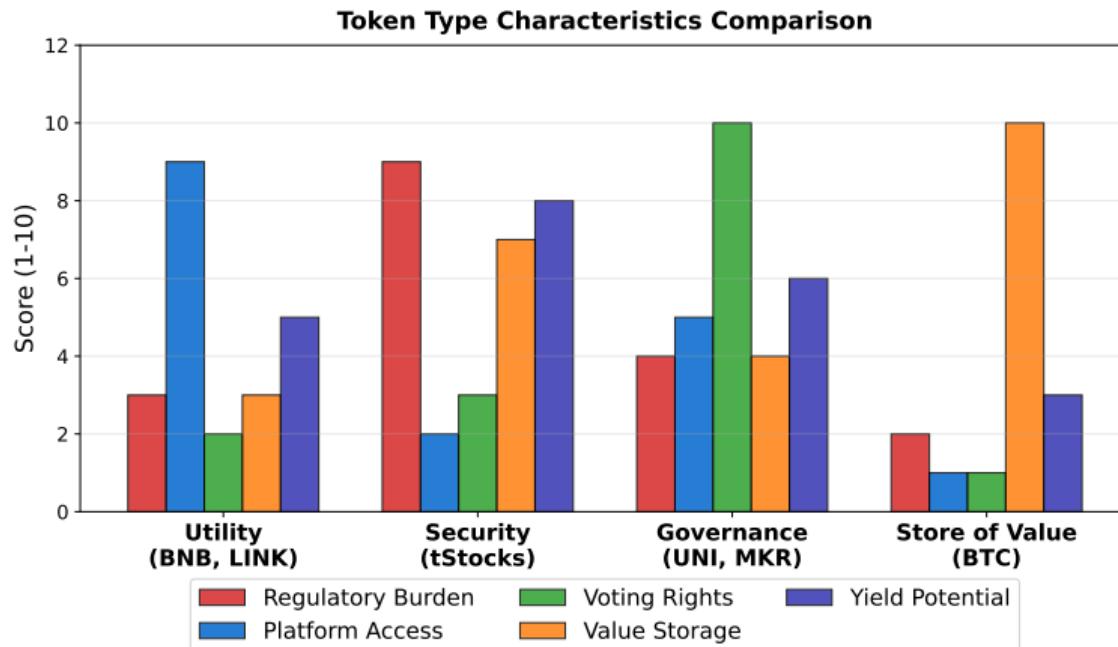
- Represent ownership/dividends
- Subject to securities laws
- Examples: tokenized stocks, bonds

3. Governance Tokens

- Voting rights on protocol changes
- DAO participation
- Examples: UNI, AAVE, MKR

4. Store of Value Tokens

- Digital gold analogy
- Limited supply
- Example: BTC



Security tokens have highest regulatory burden; governance tokens offer strongest voting rights

Utility Tokens: Deep Dive

Purpose: Grant access to specific products or services within an ecosystem.

Characteristics:

- Not designed as investments
- Required for platform interaction
- Value linked to platform usage
- May offer fee discounts

Example: Binance Coin (BNB)

- Trading fee discounts on Binance exchange
- Gas fees on BNB Chain
- Participation in token sales (Launchpad)
- Quarterly token burns based on trading volume

Definition: Tokens that represent investment contracts and are subject to securities regulations.

Howey Test Criteria:

- ① Investment of money
- ② In a common enterprise
- ③ With expectation of profits
- ④ Derived from efforts of others

Implications:

- Must comply with SEC regulations (in US)
- Require registration or exemption
- Investor protections apply
- Limited to accredited investors (often)

Purpose: Enable decentralized decision-making in protocols.

Voting Rights:

- Protocol parameter changes
- Treasury allocation
- Fee structure modifications
- Smart contract upgrades

Example: Uniswap (UNI)

- Governance over protocol fee switch
- Treasury management (billions in assets)
- Grant program decisions
- 1 UNI = 1 vote (with delegation)

How do tokens capture value from protocol success?

① Fee Distribution

- Protocol fees shared with token holders
- Example: GMX distributes 30% of trading fees

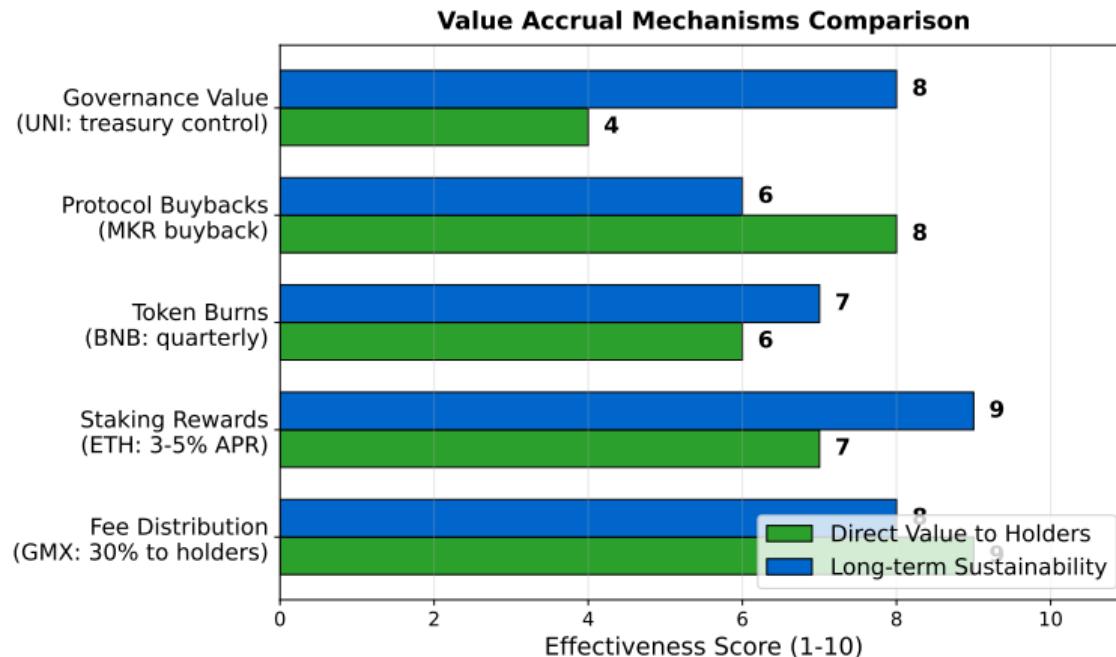
② Staking Rewards

- Lock tokens to earn yield
- Example: Ethereum validators earn ETH rewards

③ Token Burns

- Reduce circulating supply
- Example: BNB quarterly burns, ETH EIP-1559

Value Accrual Mechanisms Comparison



Fee distribution provides direct value; staking rewards offer best sustainability

Supply Models: Fixed Supply

Characteristics:

- Predetermined maximum supply
- No new tokens created after cap
- Deflationary if tokens are burned

Bitcoin Example:

- Maximum supply: 21 million BTC
- Current supply: 19.5 million (as of 2024)
- Halving every 210,000 blocks (4 years)
- Final BTC mined around year 2140

Advantages:

- Scarcity creates potential value appreciation
- Predictable monetary policy
- Protection against inflation

Supply Models: Inflationary vs. Deflationary

Inflationary:

- New tokens continuously created
- Inflation rate may be fixed or decreasing
- Incentivizes staking/participation

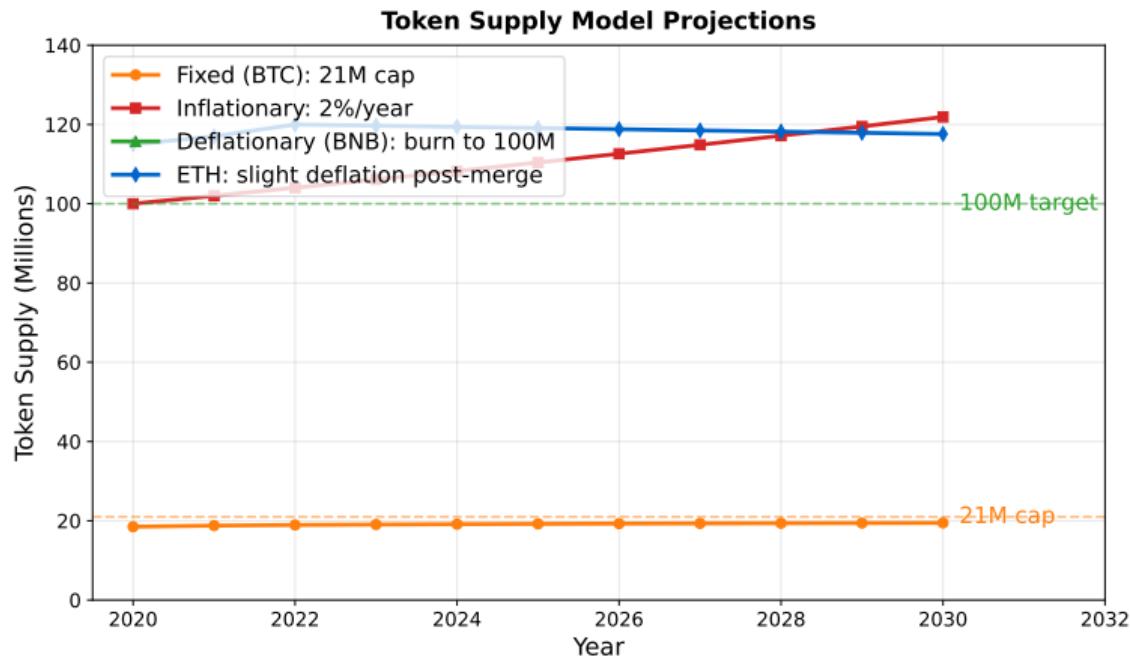
Deflationary:

- Circulating supply decreases over time
- Tokens removed through burns
- Creates scarcity pressure

BNB Burn Mechanism:

- Auto-Burn: based on BNB Chain gas fees
- Target: burn until 100M BNB remains (from 200M initial)
- Current supply: 144M BNB (Dec 2024)

Supply Model Projections



BTC approaches 21M cap; BNB burns toward 100M; ETH slightly deflationary post-merge

How tokens enter circulation over time:

1. Linear Emission

- Constant rate of new tokens
- Predictable but perpetual inflation

2. Decreasing Emission

- Halving events (Bitcoin model)
- Gradually reducing inflation

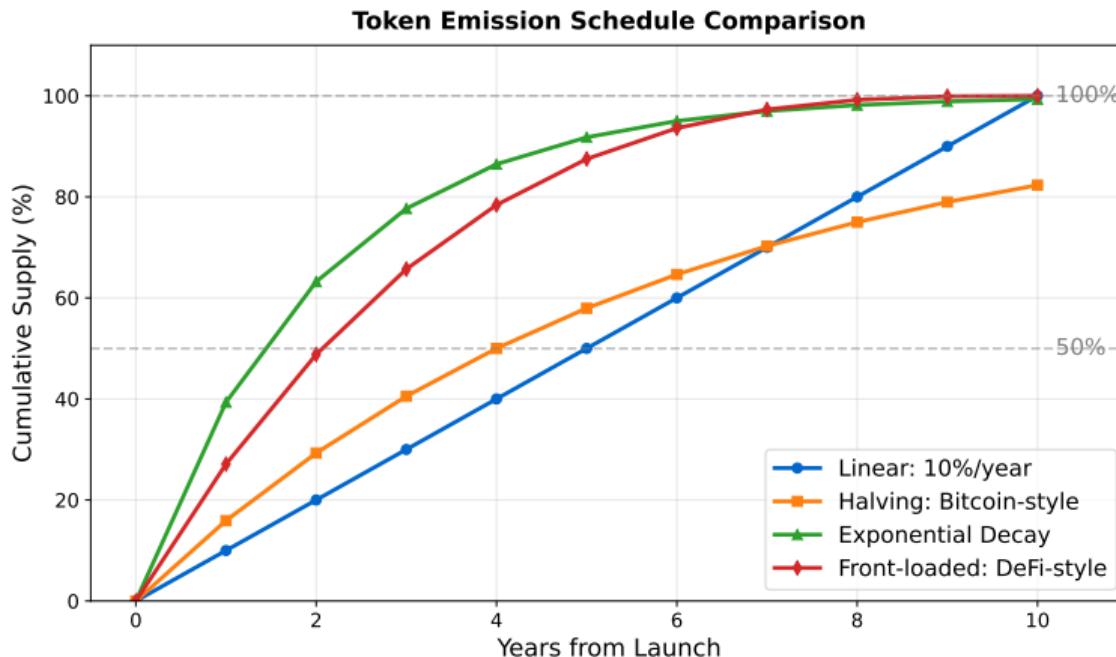
3. Exponential Decay

- Rapid initial distribution
- Asymptotically approaches max supply

4. Algorithmic Adjustment

- Based on network metrics
- Example: Ethereum's variable issuance

Emission Schedule Comparison



DeFi protocols often use front-loaded emission; Bitcoin uses halving model

Token Velocity Problem

Problem: High token velocity (frequent buying/selling) can suppress token price.

Equation of Exchange:

$$MV = PQ$$

where:

- M = Money supply (token supply)
- V = Velocity (transaction frequency)
- P = Price level
- Q = Quantity of goods/services

Solutions:

- Staking mechanisms (reduce velocity)
- Vesting periods
- Utility that requires holding (governance, fee discounts)

Token Sinks vs. Faucets

Token Sinks (Removal)

- Transaction fee burns
- Protocol penalties (slashing)
- Staking locks
- Governance participation locks

Effect: Reduce circulating supply, increase scarcity.

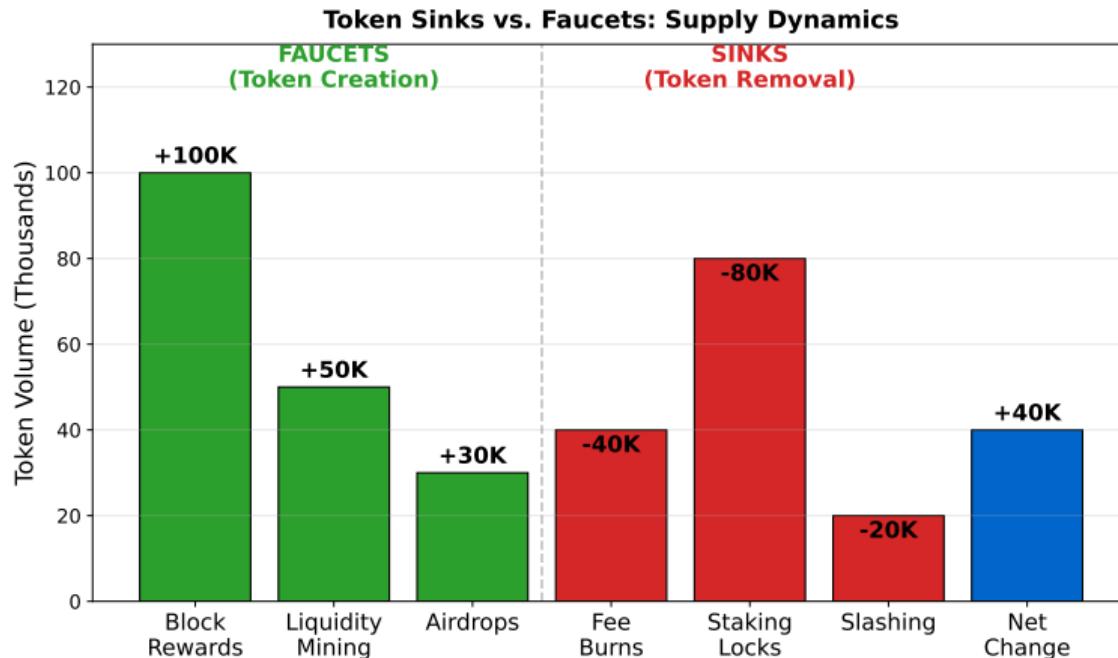
Balance: Healthy tokenomics requires equilibrium between sinks and faucets.

Token Faucets (Creation)

- Block rewards
- Liquidity mining rewards
- Airdrops
- Developer grants

Effect: Increase supply, incentivize participation.

Token Supply Dynamics



Healthy tokenomics balances faucets (creation) with sinks (removal)

Pre-EIP-1559 (Before Aug 2021):

- Inflationary: 4.5% annual issuance
- All fees go to miners
- Unpredictable fee market

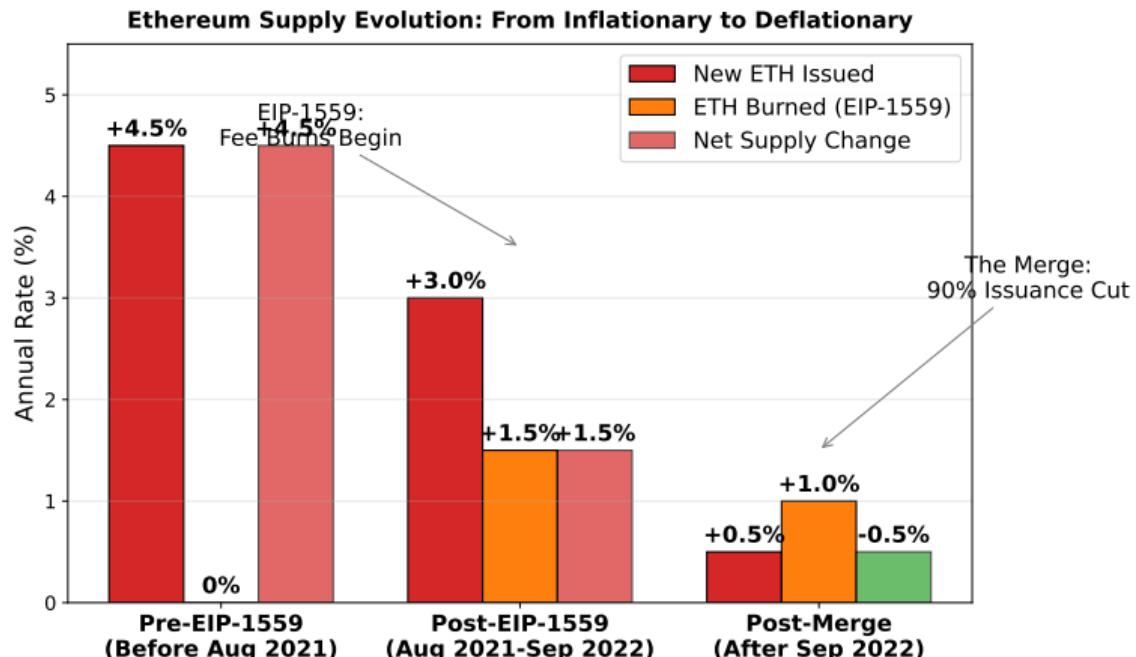
Post-EIP-1559:

- Base fee burned (deflationary mechanism)
- Priority tips to miners
- More predictable fees

Post-Merge (Sept 2022):

- Issuance reduced 90% (from 4.5% to 0.5%)
- Net deflationary during high activity
- Staking yields: 3-5% APR

ETH Supply Evolution



EIP-1559 introduced burns; The Merge cut issuance 90%, achieving net deflation

Good Tokenomics

- Clear value accrual
- Sustainable incentives
- Low initial team/VC allocation
- Long vesting periods
- Transparent distribution
- Real utility beyond speculation

Bad Tokenomics

- No clear value capture
- Ponzi-like dynamics
- High team/insider allocation
- Short/no vesting
- Opaque distribution
- Pure speculation

Red Flags:

- Excessive token supply to insiders ($>30\%$)
- Unsustainable yield promises ($>100\%$ APY)

① Circulating Supply vs. Total Supply

- Large difference indicates future dilution

② Token Distribution

- Top holder concentration
- Team/VC percentage

③ Inflation Rate

- Current and projected annual inflation

④ Value Accrual Mechanisms

- Fee sharing, burns, staking rewards

⑤ Unlock Schedule

- When do vested tokens enter circulation?

Key Takeaways:

- Token type determines purpose and regulatory treatment
- Value accrual mechanisms connect token price to protocol success
- Supply models (fixed, inflationary, deflationary) have trade-offs
- Good tokenomics aligns incentives across all stakeholders
- Token velocity must be managed to maintain value
- Transparent distribution and vesting are crucial

Next Lecture: Distribution and Vesting - How tokens are allocated and released over time.

Questions for Reflection

- ① How does Bitcoin's fixed supply model compare to Ethereum's flexible issuance?
- ② What are the trade-offs between utility tokens and governance tokens?
- ③ How can a protocol reduce token velocity without harming liquidity?
- ④ Why might high team/VC allocations be problematic?
- ⑤ What role do token burns play in value accrual?