

# 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

# 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

### ④ Buybacks

- Protocol buys tokens from market
- Example: MakerDAO buying back MKR

# 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

## Characteristics:

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

## Ethereum Example (Post-Merge):

- New ETH issued to validators: 0.5% annually
- ETH burned via EIP-1559: 0.5-2% annually
- Net effect: slightly deflationary to neutral

## Advantages:

- Ongoing incentives for network security
- Flexibility to adjust issuance
- Can fund ecosystem development

# Supply Models: Deflationary

## Characteristics:

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

## BNB Burn Mechanism:

- Auto-Burn: based on BNB Chain gas fees
- Real-Time Burn: 10% of gas fees immediately burned
- Target: burn until 100M BNB remains (from 200M initial)
- Current supply: 144M BNB (Dec 2024)

## Risks:

- Excessive deflation may discourage spending
- Burns must be backed by genuine demand
- Can be manipulated if not transparent

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

# 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

**Implication:** If  $V$  increases while  $PQ$  (network activity) stays constant,  $M$  (token value) must decrease.

**Solutions:**

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

**Goal:** Align interests of all participants (users, developers, investors, validators).

## Stakeholders:

- **Users:** Want low fees, good UX, reliable service
- **Developers:** Need funding, want protocol adoption
- **Token Holders:** Seek value appreciation
- **Validators/Miners:** Require adequate compensation

## Mechanisms:

- ① **Fee Sharing:** Users pay fees, validators/holders earn
- ② **Governance:** All stakeholders can propose changes
- ③ **Vesting:** Long-term alignment for team/investors
- ④ **Liquidity Mining:** Bootstrap network effects

## Token Sinks (Removal)

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

**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
- User incentives

**Effect:** Increase supply, incentivize participation.

## 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

**Result:** ETH became an ultrasound money meme due to net deflation.

## Good Tokenomics

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

## Bad Tokenomics

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

## Red Flags:

- Excessive token supply to insiders ( $>30\%$ )
- No burns or deflationary mechanisms
- Unsustainable yield promises ( $>100\%$  APY)
- Complex mechanisms to hide inflation

## 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?