L31: Token Classification and Valuation

Module D: Tokenomics

Blockchain & Cryptocurrency

December 2025

- Understand the Howey Test and securities classification
- Distinguish between utility and security tokens
- Apply valuation frameworks to crypto assets
- Analyze network value metrics (NVT, Metcalfe)
- Case Study: SEC vs. Ripple

Why Classification Matters

Regulatory Implications:

- Securities require registration with SEC (in US)
- Investor protections apply
- Trading restrictions (accredited investors only)
- Disclosure requirements

Market Implications:

- Exchange listings (securities can't list on most exchanges)
- Global accessibility
- Tax treatment

Bottom Line: Misclassification can lead to enforcement actions, delisting, and legal penalties.
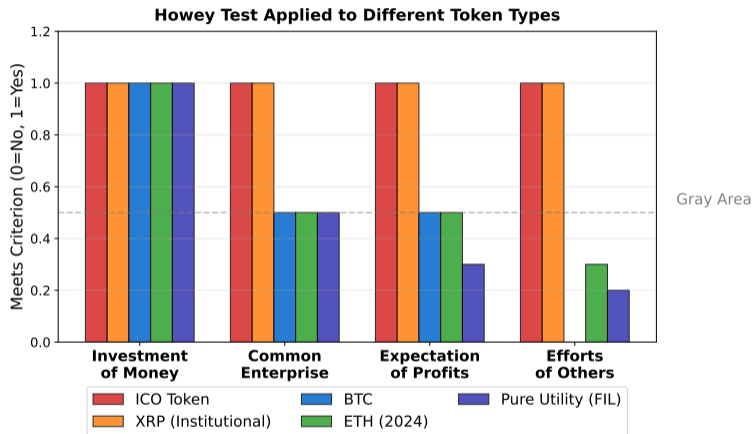
The Howey Test (1946)

Origin: SEC v. W.J. Howey Co. (Supreme Court case)

An investment is a security if it involves:

1. **Investment of Money** - Investors provide capital
2. **In a Common Enterprise** - Pooled funds or shared outcome
3. **With Expectation of Profits** - Investors seek financial return
4. **Derived from Efforts of Others** - Profits depend on promoter/third party work

All four criteria must be met for classification as a security.

Howey Test Applied to Different Token Types

BTC and ETH largely avoid "efforts of others" due to decentralization

Utility Token

- Access to product/service
- Not marketed as investment
- Value from usage, not speculation
- Examples: BNB, FIL

Howey Test:

- Fails "efforts of others" if decentralized

Security Token

- Investment contract
- Promise of profits
- Centralized management
- Examples: Tokenized stocks

Howey Test:

- Meets all four criteria

Reality: Most tokens exist on a spectrum, not binary classification.

Case Study: SEC vs. Ripple

Background:
- Ripple Labs created XRP (2012)
- Used for cross-border payments
- Ripple holds 50% of XRP supply
- $1.3B raised from XRP sales (2013-2020)

SEC Complaint (Dec 2020):
- XRP is an unregistered security
- Ripple raised funds through illegal securities offering

Ripple's Defense:
- XRP is a currency, not a security
- Network is decentralized (1,000+ validators)

Judge Torres Decision - Partial Victory for Ripple:

1. **Institutional Sales = Securities**
   - XRP sold to VCs/hedge funds = securities
   - Buyers had expectation of profits from Ripple's efforts
2. **Programmatic Sales (Exchanges) = NOT Securities**
   - XRP sold on public exchanges = not securities
   - Buyers didn't know they were buying from Ripple
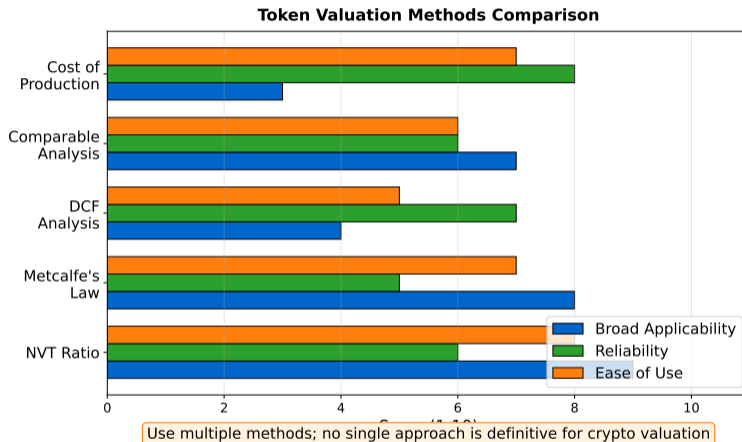3. **Employee Compensation = NOT Securities**

Impact: First major ruling that distinguished sale context matters.

Why Traditional Valuation is Hard:
- No cash flows (most tokens)
- No earnings or revenue
- No tangible assets
- Highly speculative markets
- Network effects hard to quantify

Approaches:
1. Network Value to Transactions (NVT)
2. Metcalfe's Law
3. Discounted Cash Flow (DCF) - for productive assets
4. Comparable Analysis
5. Cost of Production (mining)

Token Valuation Methods Comparison

NVT is most widely applicable; DCF only works for yield-generating tokens

Formula:

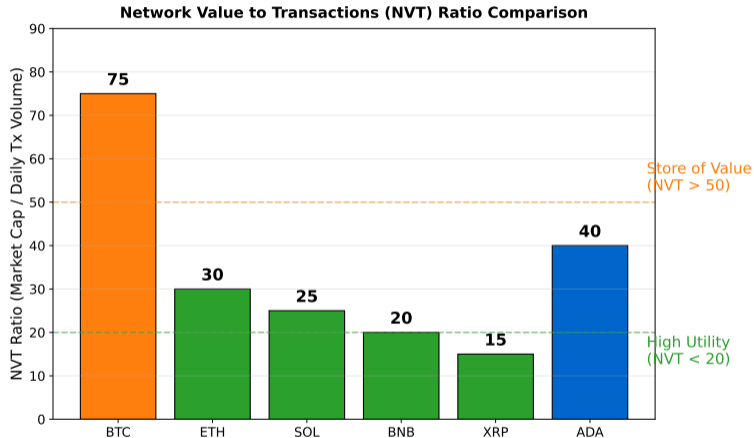$$\text{NVT Ratio} = \frac{\text{Market Cap}}{\text{Daily Transaction Volume}}$$

Interpretation:
- Similar to P/E ratio in stocks
- High NVT = overvalued relative to usage
- Low NVT = undervalued or high utility

Typical Ranges:
- BTC: 50-100 (higher = store of value, not payment)
- ETH: 20-40 (more transactional)
- Payment tokens: ¡20 (high transaction volume)

Network Value to Transactions (NVT) Ratio Comparison

BTC's high NVT reflects store-of-value use; lower NVT indicates payment utility

Concept: Network value grows with the square of the number of users.

Formula:

$$V \propto n^2$$

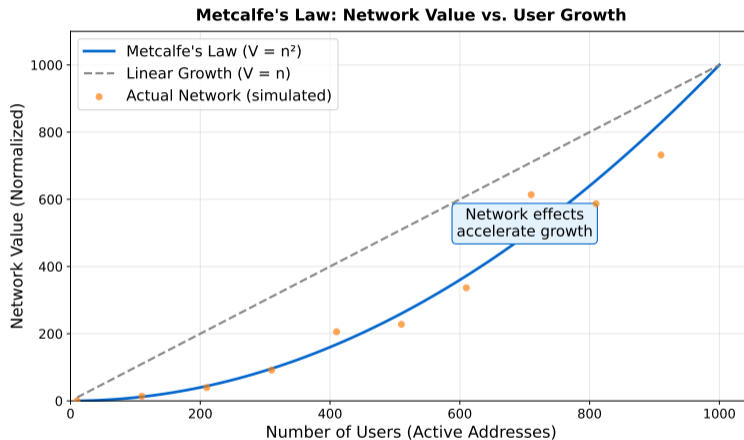where V = network value, n = number of users.

Application to Crypto:
- More users = exponentially more connections
- Active addresses proxy for n
- Studies show BTC/ETH follow Metcalfe's Law loosely

Limitations:
- Not all users create equal value
- Doesn't account for quality of usage

Metcalfe's Law Visualization

Metcalfe's Law: Network Value vs. User Growth

Legend:
- Metcalfe's Law ($V = n^2$)
- Linear Growth ($V = n$)
- Actual Network (simulated)

Network effects accelerate growth

X-axis: Number of Users (Active Addresses)
Y-axis: Network Value (Normalized)

Network effects create exponential value growth as user count increases

Discounted Cash Flow (DCF)

When to Use: Tokens with cash flow generation (staking rewards, fee sharing).

Formula:
$$\text{Value} = \sum_{t=1}^{n} \frac{\text{CF}_t}{(1+r)^t}$$

where CF_t = cash flow in year t, r = discount rate.

Example: Staking Token
- Expected annual staking reward: $100
- Discount rate: 10%
- Perpetual reward assumption

$$\text{Value} = \frac{100}{0.10} = \$1,000$$

Market Cap:

$$\text{Market Cap} = \text{Price} \times \text{Circulating Supply}$$
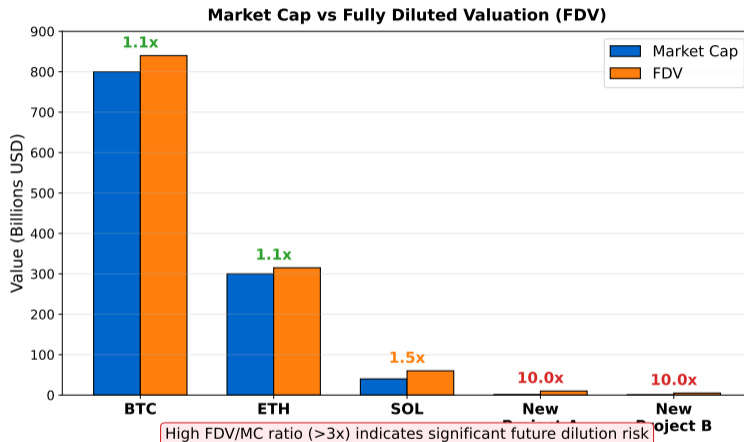
Fully Diluted Valuation (FDV):

$$\text{FDV} = \text{Price} \times \text{Total Supply (Max)}$$

Example:

- Token price: $10, Circulating: 100M, Total: 1B
- Market Cap: $1B
- FDV: $10B

Warning: Large FDV/MC ratio indicates future dilution risk.

Market Cap vs Fully Diluted Valuation (FDV)

New projects often have 10x+ FDV/MC ratio indicating massive dilution ahead

Step-by-Step Analysis:

1. Determine token type and purpose (utility, governance, etc.)
2. Check regulatory status (security vs. non-security)
3. Calculate NVT ratio (compare to peers)
4. Analyze on-chain metrics (addresses, transactions, TVL)
5. Review tokenomics (supply, inflation, unlock schedule)
6. Compare market cap to fundamentals (revenue, usage)
7. Assess FDV vs. Market Cap (dilution risk)

Output: Informed estimate of fair value range (not precise number).

Key Takeaways:

- Howey Test determines security classification (4 criteria)
- Context of sale matters (Ripple case precedent)
- NVT ratio helps assess value relative to transaction volume
- Metcalfe's Law suggests network value grows with users squared
- DCF applicable only to tokens with cash flows
- Comparable analysis useful for relative valuation
- Always compare Market Cap to FDV (dilution risk)
- Crypto valuation is imprecise - use multiple methods

1. Apply the Howey Test to a token you're familiar with. Is it a security?
2. Why did the Ripple ruling distinguish between institutional and exchange sales?
3. Calculate the NVT ratio for Bitcoin and Ethereum. What does it tell you?
4. What are the limitations of using Metcalfe's Law for token valuation?
5. How would you value a governance token with no direct cash flows?