

# Stablecoins

The Dollar on a Blockchain

BSc Blockchain, Crypto Economy & NFTs  
Digital Finance Program

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*Follow Jonas as he discovers why some  
cryptocurrencies are designed to be boring.*

## **What you will learn:**

Three methods to keep a token at \$1  
The stablecoin trilemma  
How DAI vaults and delta-neutral strategies work  
SVB depeg, the Sky rebrand, and USDe's risks

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## 1 How to Use This Primer

This primer walks through stablecoins from the perspective of a student trying to understand which one to trust and why. It assumes no prior crypto experience, only basic arithmetic.

### Suggested reading path:

1. Read sections 1–4 in order.
2. Pay special attention to Section 5 (case studies), which shows how each design has failed at least once.
3. Work the DAI vault and delta-neutral calculations in Section 4 by hand.
4. Read Section 6 to understand the risk you are taking when using any stablecoin.
5. Attempt the practice problems. The design-challenge question (Exercise 10) is deliberately open-ended.

**Reading time:** 2.5–3.5 hours. Budget extra time for Section 5 and the case studies—they contain details that matter.

**A note on numbers:** All market caps and statistics are from early 2026. Stablecoin data changes rapidly. When in doubt, check DeFiLlama ([defillama.com/stablecoins](https://defillama.com/stablecoins)) for current values.

### What this primer is not:

- It is not financial advice. Do not use it as a buy/sell recommendation.
- It is not a complete regulatory guide. Regulation varies by jurisdiction and changes rapidly.
- It is not a technical implementation tutorial. For smart contract details, see the protocol documentation.

Jonas’s advice: “Understand what could break each stablecoin before you hold one. The boring sections (reserve composition, peg mechanism) are the most important.”

## 2 Meet Jonas

### Jonas’s Story

Jonas is a BSc student in Zurich. He works part-time at a coffee shop and saves CHF 1,200 per month for rent. Last semester, a friend convinced him to buy 1 ETH at \$2,000. One week later, ETH was at \$1,700. Jonas had just lost the equivalent of a month of coffee-shop shifts.

“I like blockchain,” Jonas says, “but I cannot afford this volatility. Is there a crypto that just... stays at one dollar?”

His friend laughs. “That is literally what stablecoins are for. Boring by design.”

## 3 The Story: Why Crypto Needs Stability

### Jonas’s Story

Jonas starts asking questions. If Bitcoin and Ethereum swing 10–20% in a week, how can anyone use crypto for actual payments? How do DeFi protocols quote loans and collateral values if everything moves?

He realizes that stablecoins are not a nice-to-have—they are the **foundation** of DeFi. Every lending protocol denominates debt in stablecoins. Every DEX has stablecoin pairs. Every yield farm pays out in stablecoins. Without them, DeFi is just speculation.

**Definition: Stablecoin**

A **stablecoin** is a cryptocurrency designed to maintain a stable value relative to a reference asset, typically the US dollar. The mechanism used to maintain this “peg” varies widely.

**Definition: Peg**

A **peg** is a target exchange rate. For a USD-pegged stablecoin, the peg is \$1.00. A **depeg** occurs when the market price deviates significantly from the target.

**Explain Like I’m 5**

A stablecoin is a crypto token with training wheels. It is designed to go nowhere—to stay at exactly \$1. Boring is the whole point. It lets you park money in crypto without the rollercoaster.

## 4 Key Concepts

### 4.1 The Peg: A Promise and a Mechanism

Before comparing peg methods, it helps to understand what a peg actually is.

**Definition: Pegging, Technically**

A **peg** is not a natural property of a token. It is the combined result of:

- A **promise** by the issuer (“1 token = \$1”).
- A **mechanism** that makes the promise credible (reserves, collateral, or algorithms).
- **Arbitrage incentives** that restore the peg when the market price deviates.
- **Market confidence** that the promise and mechanism will continue to function.

A peg breaks when any of these four elements fails: the issuer becomes insolvent, the mechanism runs out of capacity, arbitrage becomes unprofitable, or confidence evaporates.

**Explain Like I’m 5**

A peg is like a handshake agreement, except the handshake is backed by a vault of dollars (fiat-backed), a vault of crypto (crypto-backed), or a complicated promise that always pays (algorithmic). The vault you trust determines which stablecoin you use.

### 4.2 Why Stablecoins Matter (Economically)

Stablecoins are not just a convenience. They are the economic substrate of DeFi:

- **Unit of account.** Every DeFi lending, trading, and yield position is denominated in stablecoins. Without them, a “5% yield” is meaningless if the principal fluctuates 30%.
- **Settlement layer.** 70%+ of all DEX trading volume involves a stablecoin. They are the default quote currency.
- **Cross-border rails.** In countries with high inflation (Argentina, Turkey, Nigeria), stablecoins are used as dollar substitutes. By early 2026, estimates suggest stablecoin transfer volume exceeds Visa and Mastercard combined in some months.
- **On-ramp and off-ramp.** Users convert fiat → stablecoin → other crypto, and back. The stablecoin is the intermediate anchor.

Jonas realizes that stablecoins are the *least glamorous* part of crypto—and the most important.

### 4.3 Three Peg Methods

#### Definition: Fiat-Backed Stablecoin

A **fiat-backed** stablecoin is backed 1:1 by reserves of fiat currency (USD) or cash-equivalent assets (T-bills, commercial paper) held by a centralized custodian. Examples: USDT (Tether), USDC (Circle).

**Mint:** Send \$1 to issuer → receive 1 stablecoin.

**Redeem:** Return 1 stablecoin → receive \$1 from issuer.

#### Explain Like I'm 5

Fiat-backed = a cloakroom ticket. You hand your dollar coat to the attendant (Circle), get a ticket (USDC). The ticket trades freely. When you return it, you get your coat back. Works great—unless the attendant loses your coat.

#### Definition: Crypto-Backed Stablecoin

A **crypto-backed** stablecoin is backed by cryptocurrency locked in smart contracts, typically over-collateralized (150–200%). Example: DAI (MakerDAO/Sky).

**Mint:** Lock \$1.50+ of ETH in a vault → mint 1 DAI.

**Redeem:** Return 1 DAI + repay fees → unlock your ETH.

#### Explain Like I'm 5

Crypto-backed = a pawn shop with extra padding. You leave \$1.50 of jewelry to get \$1 of cash. The extra \$0.50 is a safety margin in case your jewelry drops in value.

#### Definition: Algorithmic Stablecoin

An **algorithmic** stablecoin uses a smart contract algorithm to expand and contract the token supply in response to demand, without holding real-world collateral. The most notorious example was UST/Terra.

**If price > \$1:** mint more tokens (increase supply, push price down).

**If price < \$1:** burn tokens (decrease supply, push price up).

#### Explain Like I'm 5

Algorithmic = a magic trick. No coat, no cloakroom. The token promises to stay at \$1 through clever supply manipulation. If confidence breaks, the trick collapses. Terra proved this in May 2022.

### 4.4 The Stablecoin Trilemma

#### Definition: Stablecoin Trilemma

Every stablecoin design faces a three-way trade-off. You can optimize for two of three properties, but not all three simultaneously:

1. **Stability** – How reliably does it hold the peg?
2. **Decentralization** – Can anyone use/mint it without permission?
3. **Capital efficiency** – How much collateral is locked per dollar of stablecoin?

**Worked Example: Trilemma Scores**

Stablecoin	Stability	Decentralization	Capital Eff.
USDC (fiat)	High	Low (Circle controls)	High (1:1)
DAI (crypto)	Medium	High	Low (150%+)
UST (algo)	Failed	High	High (no collateral)

USDC sacrifices decentralization. DAI sacrifices capital efficiency. UST tried to have all three and collapsed.

**4.5 DAI / MakerDAO Vaults**

**Worked Example: Opening a DAI Vault**

Jonas deposits 10 ETH at \$2,000/ETH into a MakerDAO vault.

Parameter	Value
Collateral value	$10 \times \$2,000 = \$20,000$
Minimum collateral ratio	150%
Maximum DAI mintable	$\$20,000 / 1.50 = \$13,333$
Jonas mints (conservative)	10,000 DAI (200% ratio)
Stability fee (annual)	~5%

At a 200% ratio, Jonas has a large buffer before liquidation.

**4.6 Delta-Neutral Stablecoins (USDe)**

**Definition: Delta-Neutral Strategy**

A **delta-neutral** position combines a long spot position with a short derivatives position to achieve zero net price exposure. Ethena’s USDe uses this: hold stETH (long) and short ETH perpetual futures. The yield comes from staking rewards plus funding rates.

**Explain Like I’m 5**

Hold ETH in one hand, bet against ETH with the other hand. If ETH goes up, one hand gains and the other loses—net zero. You earn money from the staking yield and from traders who pay you to keep the bet open (funding rate).

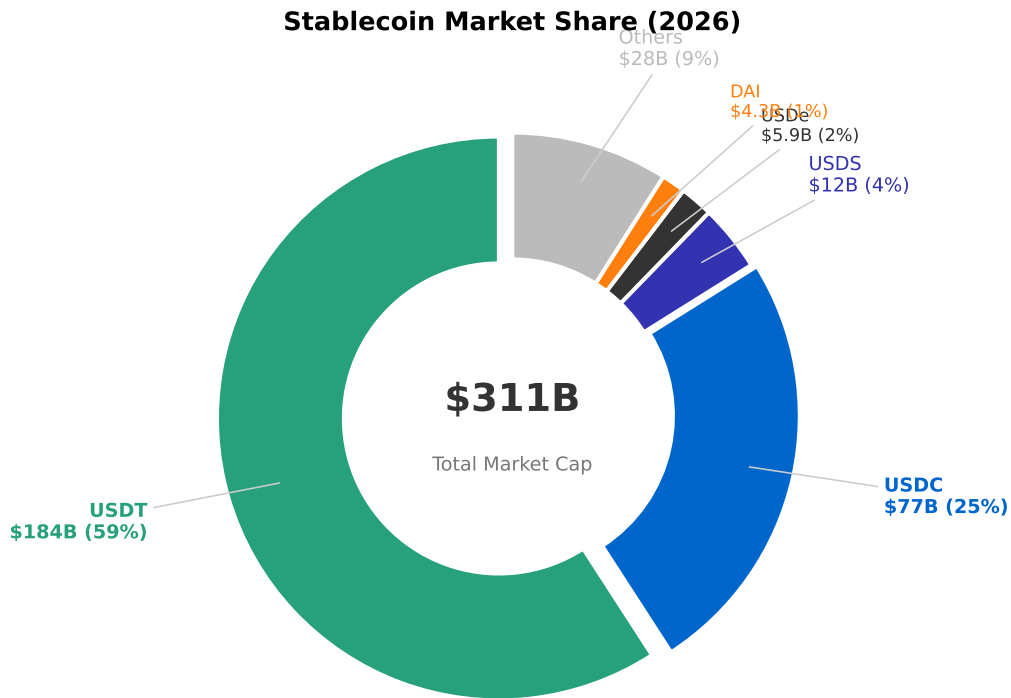
**4.7 Market Overview**

**Worked Example: Stablecoin Market (Early 2026)**

Stablecoin	Market Cap	Type
USDT (Tether)	\$142B	Fiat-backed
USDC (Circle)	\$56B	Fiat-backed
DAI/USDS (Sky)	\$5.4B	Crypto-backed
USDe (Ethena)	\$5.5B	Delta-neutral
FDUSD	\$2B	Fiat-backed
<b>Total stablecoin market</b>	<b>\$311B</b>	

Fiat-backed stablecoins dominate (>85% of total market).

## Stablecoin Market Share (2026)



## Self-Assessment Checkpoint

Can you name the three peg methods and give one example of each? Can you explain the stablecoin trilemma? Can you calculate the max DAI from a vault? If yes, continue.

## 5 How It Works: The Math

## Jonas's Story

Jonas decides to open a DAI vault to understand how crypto-backed stablecoins work from the inside.

## Formula: Collateral Ratio

$$\text{Collateral Ratio} = \frac{\text{Collateral Value (USD)}}{\text{DAI Minted}} \times 100\%$$

Must remain above the minimum ratio (e.g., 150% for ETH vaults).

## Formula: Maximum DAI

$$\text{Max DAI} = \frac{\text{Collateral Value}}{\text{Min Collateral Ratio}}$$

For 10 ETH at \$2,000 with 150% minimum:  $\frac{\$20,000}{1.50} = \$13,333$  DAI.

### Worked Example: Vault Liquidation

Jonas mints 10,000 DAI against 10 ETH (\$20,000). Collateral ratio = 200%.

ETH drops to \$1,600. Collateral =  $10 \times \$1,600 = \$16,000$ .

Ratio =  $\$16,000 / \$10,000 = 160\%$ . Still above 150%. Safe.

ETH drops to \$1,400. Collateral = \$14,000.

Ratio =  $140\% < 150\%$ . **Liquidation triggered.**

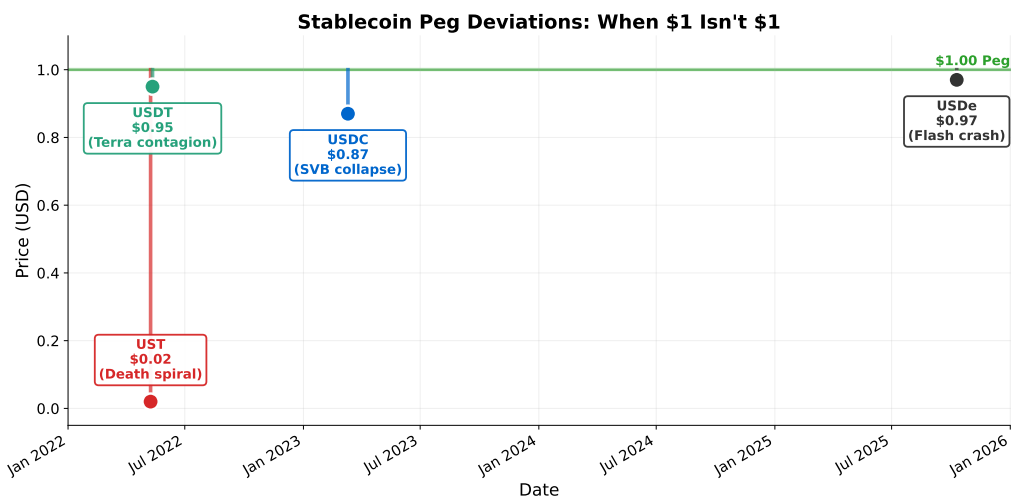
The vault is auctioned. A liquidator repays the 10,000 DAI debt and receives ETH collateral plus a 13% liquidation penalty.

### Worked Example: Delta-Neutral Hedge

Ethena's USDe mechanism:

1. Hold 1 stETH (worth \$2,000, earning 3.5% staking APY).
  2. Short 1 ETH perpetual future on a centralized exchange.
  3. If ETH goes to \$2,500: stETH gains \$500, short loses \$500. Net: \$0 price change.
  4. If ETH drops to \$1,500: stETH loses \$500, short gains \$500. Net: \$0 price change.
  5. Income: staking yield (3.5%) + funding rate (~8–15% in bull markets).
- Risk: funding rates can turn negative in bear markets, draining the reserve fund.

### Stablecoin Peg Deviations



### Key Takeaway

Fiat-backed stablecoins are simple but centralized. Crypto-backed stablecoins are decentralized but capital-inefficient. Algorithmic designs promise both but have repeatedly failed. Every design involves trust—the question is where you place it.

## 5.1 How Issuers Make Money

### Definition: Seigniorage

**Seigniorage** is the profit earned by the issuer of money. For fiat-backed stablecoin issuers, it comes from the yield on the reserve assets (primarily short-term US Treasuries) while the stablecoin itself pays zero interest to holders.

### Worked Example: Tether's Revenue

In 2023, Tether reported \$6.2B in profit. Back-of-envelope calculation:

- Average USDT supply 2023: ~\$85B.
- T-bill yield in 2023: ~5%.
- Gross yield:  $\$85\text{B} \times 5\% = \$4.25\text{B}$  from T-bills.
- Additional income from Bitcoin holdings and other assets.
- Operating costs: modest (small team, outsourced custody).

Profit per employee at Tether is reportedly the highest of any company in history. Users of USDT earn zero interest; the issuer keeps it all.

### Explain Like I'm 5

When you put \$1 into USDT, Tether invests it in US government bonds that earn 5%. You get a stablecoin worth \$1. Tether keeps the \$0.05 of interest every year. Multiply by 140 billion and you understand why stablecoin issuers are some of the most profitable companies in the world.

## 5.2 Regulation: MiCA and Beyond

### Definition: MiCA (Markets in Crypto-Assets)

**MiCA** is the European Union's comprehensive crypto regulation, fully effective December 30, 2024. For stablecoins, it requires:

- Issuers must obtain an Electronic Money Institution (EMI) license.
- 100% reserve backing with specific asset quality requirements.
- Monthly reserve attestations, quarterly full audits.
- Redemption rights at par for all holders.
- Circulation limits for non-Euro stablecoins (to protect the Euro).

### Worked Example: MiCA Impact on Major Stablecoins

Stablecoin	MiCA Compliant?	Action Taken
USDC (Circle)	Yes	Obtained EMI license in France
USDT (Tether)	Unclear	Some EU exchanges delisted
DAI/USDS (Sky)	Challenging	Decentralized governance clashes with licensing

MiCA is the first comprehensive stablecoin regulation globally. It is likely to influence future US and UK rules.

## 5.3 Yield-Bearing Stablecoins

### Definition: Yield-Bearing Stablecoin

A **yield-bearing stablecoin** passes reserve yield (or other income) to holders, making them competitive with money market funds. Examples: sDAI (MakerDAO/Sky), sUSDS, Mountain Protocol's USDM, Ondo Finance's USDY.

### Worked Example: Savings DAI (sDAI)

Jonas deposits 1,000 DAI into the DAI Savings Rate (DSR) contract. He receives 1,000 sDAI.

- Current DSR: 7%.
- Over one year, sDAI's exchange rate to DAI increases from 1.00 to 1.07.
- Jonas redeems 1,000 sDAI → 1,070 DAI.
- No lock-up: he can redeem anytime.

sDAI competes directly with bank savings accounts—and typically offers higher rates during high-interest periods.

## 6 Real-World Cases

### 6.1 Arbitrage Mechanisms: How Pegs Stay Pegged

#### Definition: Peg Arbitrage

Every well-functioning stablecoin has an **arbitrage mechanism**: if the market price deviates from \$1, profit-seeking traders have a direct incentive to restore the peg by interacting with the issuer.

#### Worked Example: Fiat-Backed Arbitrage (USDC)

Suppose USDC trades at \$0.99 on a DEX (below peg).

An arbitrageur:

1. Buys 1,000,000 USDC on the DEX for \$990,000.
2. Redeems 1,000,000 USDC with Circle, receiving \$1,000,000 in the bank.
3. Profit: \$10,000 minus fees and gas.

The act of buying pushes the DEX price back toward \$1. Repeat until the arbitrage is no longer profitable. This is how USDC stays at \$1.

#### Worked Example: Crypto-Backed Arbitrage (DAI)

Suppose DAI trades at \$1.01 on a DEX (above peg).

A vault operator:

1. Locks \$150 of ETH in a Maker vault.
2. Mints 100 DAI.
3. Sells 100 DAI on the DEX for 101 USDC.
4. Waits for DAI to return to peg, buys back 100 DAI for \$100, closes vault.
5. Profit: \$1 per 100 DAI minted.

The additional DAI supply pushes the DEX price down toward \$1.

#### Historical Case Study: USDC SVB Depeg (March 11, 2023)

On March 10, 2023, Silicon Valley Bank (SVB) collapsed—the second-largest bank failure in US history. Circle, the issuer of USDC, had \$3.3B of its reserves at SVB.

- Friday evening: Circle discloses the SVB exposure.
- USDC depegs to \$0.87 on DEXs as panicked holders sell.
- DAI, which held significant USDC backing, also depegged to \$0.90.
- Sunday: US government guarantees all SVB deposits.
- Monday: USDC returns to \$1.00. Full reserves confirmed.

**Lesson:** Fiat-backed stablecoins carry traditional banking risk. “Backed by dollars” means

backed by the banks that hold those dollars.

### Historical Case Study: MakerDAO to Sky Rebrand (Aug 27, 2024)

MakerDAO, the protocol behind DAI, rebranded to **Sky**:

- DAI → USDS (new stablecoin, 1:1 upgrade path).
- MKR → SKY governance token (1 MKR = 24,000 SKY).
- The rebrand was controversial. Many community members felt it diluted a strong brand.
- By early 2026, DAI/USDS combined market cap was \$5.4B.

**Lesson:** Governance decisions in DeFi can be as contentious as corporate mergers. Rebranding a protocol is not just a name change—it affects user trust, integrations, and liquidity.

### Historical Case Study: USDe Flash Crash (Oct 10, 2025)

Ethena's USDe briefly depegged to \$0.97 when funding rates turned sharply negative during a market selloff:

- The short ETH positions that back USDe began costing money (negative funding).
- The reserve fund absorbed losses, but traders panicked.
- USDe was sold heavily on Curve, pushing it to \$0.97.
- Recovery took 48 hours as funding rates normalized.

**Lesson:** Delta-neutral is not risk-free. Funding rates are market-dependent, and sustained negative rates can stress the entire model.

## 7 Stablecoins in Context: Not a Substitute for Banking

### Jonas's Story

Jonas's sister is skeptical of his growing interest in crypto. "Are you going to move your rent money into USDC?" she asks.

Jonas thinks about it carefully. "No," he answers. "Or at least—not all of it."

### Definition: When to Use Stablecoins (and When Not To)

Stablecoins are a tool, not a universal replacement for banks. Use them when:

- You need 24/7 settlement (banks are closed).
- You need global reach (banks are slow or expensive cross-border).
- You need composability with DeFi (using stablecoins as collateral, yield, or trading pairs).
- You live in a high-inflation country where the local currency is depreciating.

Use traditional banking when:

- You need consumer protection (FDIC or equivalent).
- You need easy conversion to cash (ATMs, physical branches).
- You cannot afford to lose any principal (deposit insurance matters).
- Your legal jurisdiction has unclear crypto regulations.

### Worked Example: Jonas's Allocation

Jonas has CHF 5,000 in savings. He decides to allocate:

- CHF 4,000 in a Swiss bank savings account (insured, zero crypto risk).
- CHF 500 in USDC on Coinbase (for learning and small crypto experiments).

- CHF 500 in USDC in a hardware wallet (to practice self-custody).  
Total crypto exposure: 20% of savings. Total loss if his entire crypto position vanishes: CHF 1,000—painful but not catastrophic.  
His rule: never put money in crypto that he would need within the next 6 months.

### Key Takeaway

Stablecoins are most useful when you understand their limitations. The question is not “is USDC better than a bank?” but “in what specific use case is USDC the right tool?” Sometimes the answer is “neither—use something else entirely.”

## 8 What Can Go Wrong

### Jonas’s Story

Jonas now understands that “stable” does not mean “risk-free.” He makes a risk checklist for each type.

### Important Caveat

**Depeg risk.** Every stablecoin can depeg. Fiat-backed: if the bank holding reserves fails (SVB). Crypto-backed: if collateral crashes faster than liquidations can execute (Black Thursday). Algorithmic: if confidence collapses (Terra). Delta-neutral: if funding rates stay negative (USDe).

### Important Caveat

**Reserve opacity.** Tether (USDT, \$142B) has faced years of skepticism about the quality and completeness of its reserves. Attestations (not full audits) are published quarterly. The risk: if reserves are insufficient, a bank-run-style depeg could occur.

### Common Misconception: “Stablecoins are always stable”

USDC dropped to \$0.87. DAI to \$0.90. UST went to \$0.00. Even the most trusted stablecoins can depeg temporarily. “Stable” describes the *design goal*, not a guarantee.

### Common Misconception: “Fiat-backed stablecoins are completely safe”

Fiat-backed stablecoins depend on: (1) the issuer’s honesty about reserves, (2) the solvency of banks holding those reserves, (3) regulatory approval to continue operating. SVB showed that item (2) can fail overnight.

## 9 The Cryptoeconomics Lens

Before applying the six questions, Jonas thinks about stablecoins as a philosophical question about money.

### Definition: What Is Money, Anyway?

Economists define money by three functions:

- **Medium of exchange** – accepted for goods and services.
- **Store of value** – maintains purchasing power over time.
- **Unit of account** – prices can be expressed in it.

Volatile cryptocurrencies (Bitcoin, Ether) excel as speculative assets but fail as money because their prices change too fast. Stablecoins aim to provide the unit-of-account and medium-of-exchange functions while accepting that the store-of-value function depends on trust in the issuer (or mechanism).

### Explain Like I'm 5

A good currency is boring. It does not make headlines. You can use it to buy bread today and expect the same amount of bread tomorrow. Stablecoins are trying to be the boring currency of crypto. The irony is that making something boring is actually very hard.

### Cryptoeconomics Lens

Apply the six cryptoeconomics questions to stablecoins:

1. **PROBLEM:** Crypto volatility makes payment, lending, and savings impractical. Stablecoins provide a stable unit of account within the crypto ecosystem.
2. **INCENTIVES:** USDT/USDC issuers earn yield on reserves (Tether earned \$6.2B profit in 2023 from T-bill interest). DAI vault creators pay stability fees for the privilege of minting. USDe holders earn yield from funding rates. Each participant's profit motive sustains the peg.
3. **BENEFITS / COSTS:** Users get dollar-equivalent tokens usable 24/7 on-chain. They bear depeg risk, smart contract risk, and regulatory risk. Issuers earn massive profits but face regulatory scrutiny.
4. **FAILURE MODE:** UST/Terra (\$45B destroyed). USDC SVB depeg. Iron Finance collapse. Every design has an "if-then-dead" scenario: for fiat-backed, it is reserve insolvency; for crypto-backed, it is oracle-collateral cascade; for algorithmic, it is confidence collapse.
5. **DESIGN:** Fiat-backed (centralized, capital efficient) vs. crypto-backed (decentralized, capital inefficient) vs. algorithmic (capital efficient, unstable) vs. delta-neutral (novel, funding-rate dependent). The trilemma forces every design into a trade-off.
6. **ALTERNATIVES:** CBDCs (central bank digital currencies) could provide stability without the counterparty risk of private issuers. Hybrid designs (partially collateralized, partially algorithmic) continue to be explored.

## 10 Deep Dive: Stablecoin Selection for Different Use Cases

Jonas wants a practical framework for choosing which stablecoin to use in different situations.

## 10.1 Use Case 1: Savings for Rent

### Worked Example: Which Stablecoin for Savings?

Jonas needs to store his \$600 monthly savings for rent. Priorities: stability, ease of conversion back to CHF, minimum risk.

**Option A: USDC on Coinbase.** Simple, insured against exchange failure. USDC is heavily regulated in the US and MiCA-compliant in the EU. Risk: exchange counterparty (Coinbase could fail). Depeg risk (SVB-style).

**Option B: USDC in a non-custodial wallet.** Eliminates exchange risk. Jonas holds the private key. Same depeg risk. Recovery impossible if the key is lost.

**Option C: DAI in Maker vault.** Decentralized, no single issuer. But requires managing a vault and understanding liquidation mechanics. Overkill for \$600.

**Jonas's choice:** Option B with a hardware wallet. Balances security and self-sovereignty.

## 10.2 Use Case 2: Earning Yield

### Worked Example: Yield on Stablecoins

Jonas has \$5,000 to earn yield on. Options:

Strategy	APY	Risk
USDC on Coinbase rewards	4%	Exchange + depeg
USDC supplied on Aave	3–5%	Smart contract + depeg
sDAI (Savings DAI)	7% (variable)	Protocol + depeg
USDe (Ethena)	10–15%	Delta-neutral + funding risk
LP in Curve 3pool	2–4% + CRV rewards	Impermanent loss + protocol

Higher yields correspond to higher risks. Jonas allocates: 50% Aave USDC (conservative), 30% sDAI (moderate), 20% USDe (aggressive).

## 10.3 Use Case 3: Cross-Border Payment

### Worked Example: Sending Money to Family Abroad

Jonas's cousin in Argentina needs \$500. Traditional bank wire: 3–5 days, \$25 fee, poor exchange rate. Stablecoin approach:

1. Jonas buys 500 USDC for \$500 on a Swiss exchange.
2. Sends 500 USDC to his cousin's wallet on Tron or BSC (low-fee chains).
3. Transfer settles in 5 seconds. Fee: \$0.10–\$1.
4. Cousin converts USDC to ARS via a local exchange or P2P trader.

Total cost: 0.3–0.5%. Total time: minutes. Same process with a bank would cost 5–8% and take days.

## 10.4 Use Case 4: Hedging Against Local Inflation

### Definition: Dollar Substitution

In high-inflation economies (Argentina, Turkey, Nigeria, Lebanon), residents increasingly use USD-pegged stablecoins as a **substitute for the US dollar**, which is often restricted or expensive to obtain through traditional channels. This is dollarization via technology.

### Worked Example: Argentine Peso vs. USDT

In 2024, the Argentine peso lost >50% of its value against the dollar. A worker in Buenos Aires:

- Receives monthly salary in pesos.
- Converts pesos to USDT within 48 hours of payday.
- Holds savings in USDT.
- Spends pesos only for daily expenses.

Without USDT, her savings would have lost 50% of purchasing power. With USDT, they held value in USD terms.

## 10.5 Red Flags: When Not to Use a Stablecoin

### Important Caveat

Avoid stablecoins with any of these red flags:

- No public reserve attestations.
- Anonymous issuing team.
- Algorithmic model with above-market yield.
- Heavy dependence on a single protocol or chain.
- History of depegs >5% that have not been fully explained.
- Heavy use of related-party lending (issuer lends to itself or affiliates).

## 11 Practice Problems

### Discovery Exercise 1

**Three peg types.** For each peg method (fiat-backed, crypto-backed, algorithmic), describe the mint/redeem mechanism in one sentence each.

### Discovery Exercise 2

**Trilemma scoring.** Score USDT on the stablecoin trilemma (1–5 for each dimension). Justify each score in one sentence.

### Discovery Exercise 3

**DAI vault math.** You deposit 20 ETH at \$2,500 into a MakerDAO vault with a 150% minimum ratio. (a) What is the max DAI you can mint? (b) If you mint 20,000 DAI, what is your collateral ratio? (c) At what ETH price does liquidation trigger?

### Discovery Exercise 4

**Market share.** USDT has \$142B and USDC has \$56B of the \$311B total stablecoin market. What percentage do these two fiat-backed stablecoins represent? What does this imply about decentralization in the stablecoin market?

### Discovery Exercise 5

**SVB depeg analysis.** If USDC held 6% of its reserves (\$3.3B of \$55B) at SVB, and USDC depegged to \$0.87, was the market's reaction rational? Calculate the "fair value" of USDC

assuming SVB deposits were worth \$0 and all other reserves were safe.

### Discovery Exercise 6

**Delta-neutral P&L.** Ethena holds 1,000 stETH (at \$2,000) and shorts 1,000 ETH futures. Staking yield is 3.5% annually. Funding rate averages +10% annually. Calculate the annual income. What happens if funding rate drops to -5%?

### Discovery Exercise 7

**Algorithmic failure.** Explain, in 4–5 sentences, why algorithmic stablecoins are vulnerable to death spirals. Use the UST/LUNA mechanism as your example.

### Discovery Exercise 8

**Reserve composition.** Tether's attestation shows reserves split across T-bills, bank deposits, commercial paper, and other assets. Why does the composition matter? What would be the safest possible reserve mix?

### Discovery Exercise 9

**Regulatory comparison.** MiCA (the EU regulation, effective December 2024) requires stablecoin issuers to hold liquid reserves and obtain licenses. How does this affect the trilemma? Which stablecoins benefit and which are disadvantaged?

### Discovery Exercise 10

**Design challenge.** Propose a stablecoin design that scores at least 4/5 on all three trilemma dimensions. What trade-offs does your design make? Is it realistic?

## 12 Glossary of Stablecoin Terms

### Algorithmic stablecoin

A stablecoin without collateral backing, relying on supply-adjusting algorithms. UST/LUNA was the most famous example.

### Anchor Protocol

The Terra-based lending protocol that offered 20% APY on UST, central to the Terra collapse.

### Attestation

A third-party statement confirming the existence and composition of reserves. Not equivalent to a full audit.

### Basis trade

A trade exploiting the difference between spot and futures prices, used by delta-neutral stablecoins.

### Circle

The US company issuing USDC. Public company since 2024 IPO.

### Collateral ratio

The ratio of collateral value to stablecoin debt. Must exceed a minimum (150% for DAI/USDS).

**Crypto-backed stablecoin**

A stablecoin collateralized by cryptocurrencies in a smart contract.

**DAI**

The original decentralized stablecoin, issued by MakerDAO. Now upgraded to USDS under Sky.

**Delta-neutral**

A position with zero net price exposure, typically combining long spot and short futures.

**Depeg**

Significant deviation of a stablecoin's market price from its target peg.

**DSR (DAI Savings Rate)**

The interest rate offered by MakerDAO for depositing DAI into the DSR contract.

**EMI license**

Electronic Money Institution license, required under MiCA for stablecoin issuers in the EU.

**Ethena**

The protocol behind USDe, a delta-neutral stablecoin using stETH and short ETH futures.

**Fiat-backed stablecoin**

A stablecoin backed 1:1 by fiat currency held in reserves.

**Funding rate**

Payments between long and short positions in perpetual futures. Positive when longs dominate.

**LFG (Luna Foundation Guard)**

The organization that held Terra's reserves, including Bitcoin intended to defend the UST peg.

**LUNA**

The volatile token paired with UST in Terra's mint/burn mechanism.

**MakerDAO**

The original DeFi stablecoin protocol, rebranded to Sky in August 2024.

**MiCA**

Markets in Crypto-Assets. EU regulation effective December 2024.

**Mint / burn**

Creating new tokens (mint) or destroying them (burn), used to adjust supply.

**Peg**

The target exchange rate of a stablecoin.

**Proof of Reserves**

A cryptographic attestation that an issuer holds sufficient reserves to cover liabilities.

**Reserve factor**

The mix of assets (cash, T-bills, commercial paper) backing a fiat-backed stablecoin.

**sDAI / sUSDS**

Yield-bearing versions of DAI/USDS, earning the DAI Savings Rate.

**Seigniorage**

Profit from issuing money, captured by stablecoin issuers via yield on reserves.

**Sky**

The rebranded MakerDAO protocol (August 2024).

**Stablecoin trilemma**

The three-way trade-off between stability, decentralization, and capital efficiency.

**Tether**

The company issuing USDT, the largest stablecoin by market cap.

**USDC**

USD Coin, a major fiat-backed stablecoin issued by Circle.

**USDT**

Tether, the largest stablecoin by market cap (\$142B).

**USDe**

Ethena's delta-neutral stablecoin.

**USDS**

The new Sky-protocol stablecoin replacing DAI (technically a rebrand with 1:1 upgrade path).

**Vault**

A MakerDAO/Sky smart contract holding collateral and minting DAI/USDS.

## Solutions

**Exercise 1.** Fiat-backed: send \$1 to issuer, receive 1 token; return token, receive \$1. Crypto-backed: lock \$1.50+ of crypto in a smart contract, mint 1 token; repay token + fee, unlock collateral. Algorithmic: smart contract expands supply when price > \$1 (mint) and contracts supply when price < \$1 (burn paired token).

**Exercise 2.** USDT: Stability 4/5 (strong peg history, but opacity risk), Decentralization 1/5 (Tether controls issuance, can freeze accounts), Capital Efficiency 5/5 (1:1 backing, no over-collateralization).

**Exercise 3.** (a)  $\$50,000/1.50 = 33,333$  DAI. (b)  $\$50,000/20,000 = 250\%$ . (c) Liquidation when ratio = 150%:  $\text{ETH price} = (20,000 \times 1.50)/20 = \$1,500$ .

**Exercise 4.**  $(\$142\text{B} + \$56\text{B})/\$311\text{B} = 63.7\%$ . Two centralized issuers control nearly two-thirds of the stablecoin market. This is a significant centralization risk—both are US-regulated entities that can freeze tokens.

**Exercise 5.** If \$3.3B of \$55B reserves were lost:  $\text{fair value} = (\$55\text{B} - \$3.3\text{B})/\$55\text{B} = \$0.94$ . The market priced USDC at \$0.87, which was an overshoot—the panic exceeded the fundamental loss. This shows that stablecoin pricing includes a fear premium during crises.

**Exercise 6.** Position value:  $1,000 \times \$2,000 = \$2,000,000$ . Staking yield:  $\$2\text{M} \times 3.5\% = \$70,000$ . Funding income:  $\$2\text{M} \times 10\% = \$200,000$ . Total annual income:  $\$270,000$  (13.5% APY). If funding drops to -5%:  $\text{funding cost} = \$2\text{M} \times 5\% = \$100,000$ . Net income =  $\$70,000 - \$100,000 = -\$30,000$  (loss). The reserve fund must cover the shortfall.

**Exercise 7.** UST maintained its peg through a mint/burn mechanism with LUNA. When  $\text{UST} < \$1$ , users could burn 1 UST to mint \$1 of LUNA. But in a panic, mass UST redemptions flood the market with new LUNA, crashing LUNA's price. As LUNA falls, each redemption mints *more* LUNA (since each unit is worth less), creating hyperinflation. This is the death spiral:  $\text{selling UST} \rightarrow \text{more LUNA} \rightarrow \text{LUNA price falls} \rightarrow \text{more LUNA per redemption} \rightarrow \text{LUNA worthless} \rightarrow \text{UST worthless}$ .

**Exercise 8.** Reserve composition determines liquidity risk and credit risk. T-bills are safest (US government-backed, highly liquid). Bank deposits carry counterparty risk (SVB). Commercial paper carries corporate credit risk. The safest mix: 100% short-term US T-bills, held in segregated custody with daily public attestations.

**Exercise 9.** MiCA improves stability (regulated reserves, mandatory audits) at the cost of decentralization (license requirements exclude small or anonymous issuers). USDC benefits (Circle already pursues compliance). DAI/USDS faces challenges (decentralized governance clashes with regulatory requirements). USDT faces the most uncertainty given its offshore structure.

**Exercise 10.** Open-ended. A strong answer acknowledges that scoring 4+ on all three dimensions is extremely difficult. Possible approaches: partial collateralization with algorithmic stabilization (e.g., 120% crypto collateral + algorithmic adjustments) or multi-asset backing with decentralized governance. The honest conclusion: no existing design has solved the trilemma completely, which is why the stablecoin landscape remains fragmented.

## Further Reading

### Papers and reports:

- Klages-Mundt, A., & Minca, A. (2020). "While Stability Lasts: A Stochastic Model of Stablecoins." Mathematical treatment of peg stability.

- Bank for International Settlements (2022). “The Stablecoin Conundrum.” Central bank perspective on stablecoin risks.
- IMF Working Paper (2023). “Crypto, Corruption, and Capital Controls.” Cross-country analysis of stablecoin adoption.
- Briola, A., et al. (2022). “Anatomy of a Stablecoin’s failure: The Terra-Luna case.” *Finance Research Letters*.

**Attestations and transparency reports:**

- Circle USDC monthly attestations ([circle.com/en/transparency](https://circle.com/en/transparency))
- Tether reserves attestation ([tether.to/en/transparency](https://tether.to/en/transparency))
- MakerDAO / Sky on-chain collateral dashboard ([daistats.com](https://daistats.com))
- Ethena reserve fund tracker ([ethena.fi](https://ethena.fi))

**Market data:**

- DeFiLlama stablecoins ([defillama.com/stablecoins](https://defillama.com/stablecoins)) – Market caps, chain distribution, peg stability.
- CoinGecko stablecoins category – Price history and deviations.
- The Block Research – Periodic stablecoin reports.

**Regulatory documents:**

- EU MiCA Regulation (Dec 2024) – The comprehensive EU framework.
- US GENIUS Act / Clarity Act (pending, as of early 2026) – Proposed US stablecoin frameworks.
- Monetary Authority of Singapore Digital Payment Token guidelines.
- Japan Payment Services Act stablecoin amendments.

**Jonas’s practical conclusion:**

After reading the literature and experimenting with small positions, Jonas adopts a simple policy: keep rent money in a licensed European bank (with deposit insurance), and use USDC on Base L2 for occasional crypto experimentation. The lesson is that stablecoins are powerful tools but not a substitute for regulated banking when you cannot afford to lose the funds. The trilemma is real, and no single solution works for every situation.