Stablecoins: Making Crypto Boring (On Purpose)

Three Roads to a Dollar Peg

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Learning Objectives

By the end of this lecture, you will be able to:

1. **Describe** the 3 stablecoin peg methods (fiat-backed, crypto-backed, algorithmic) [Understand]
2. **Explain** the stablecoin trilemma (decentralization, stability, capital efficiency) [Understand]
3. **Compare** USDT, USDC, DAI/USDS, and algorithmic stablecoins [Analyze]
4. **Evaluate** the sustainability of different stablecoin designs [Evaluate]

No math required. Main slides use only plain English and pictures.
Technical formulas are in the Appendix for those who want them.

Bloom's levels covered: Understand, Analyze, Evaluate. The Appendix adds Apply.

What You Need to Know Before This Lecture

Wallet
A phone app or USB device that stores the secret keys proving you own your crypto tokens.

Token
A digital asset on a blockchain. Can represent money, ownership, or a voting right.

Smart Contract
A program that runs on a blockchain. It executes automatically when conditions are met.

Collateral
Something valuable you lock up as a guarantee. Like a security deposit on an apartment.

Over-collateralization
Locking up MORE collateral than you borrow. Lock $150 to borrow $100 gives a safety buffer.

Key terms from previous DeFi lectures. If any term is unfamiliar, review the DeFi introduction deck first.

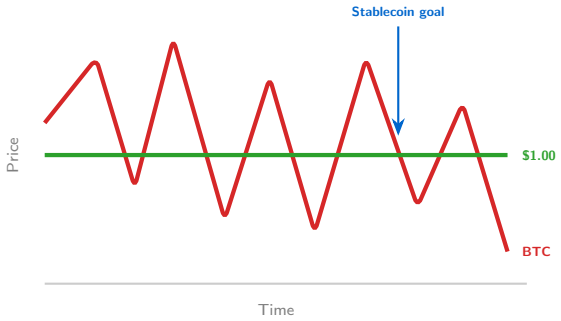
The Problem: Crypto Is Too Wild for Real Life

Bitcoin dropped 20% today. Rent is due tomorrow.

How do you keep your savings stable in a world where crypto prices can swing 20 percent overnight?

- You cannot pay rent with a coin that might halve by morning
- Businesses cannot price goods in a currency that jumps 10% daily
- DeFi protocols need a stable unit of account

The challenge: Build a digital dollar that is always worth one dollar, without needing a bank.



Volatility is crypto's biggest practical problem. Stablecoins are the solution.

Three Types of Stablecoin: An Analogy

Coat Check

Fiat-backed. Give one real dollar to the cashier. Get one token. Redeem the token, get your dollar back.

USDT, USDC

Pawn Shop

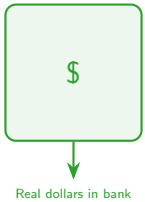
Crypto-backed. Lock up $150 of ETH as collateral. Mint $100 of stablecoins. Over-collateralized.

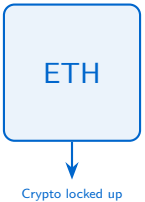
DAI, USDS

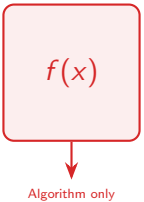
Promise

Algorithmic. No reserves. Math and incentives try to hold the peg. Most have failed spectacularly.

UST (dead)







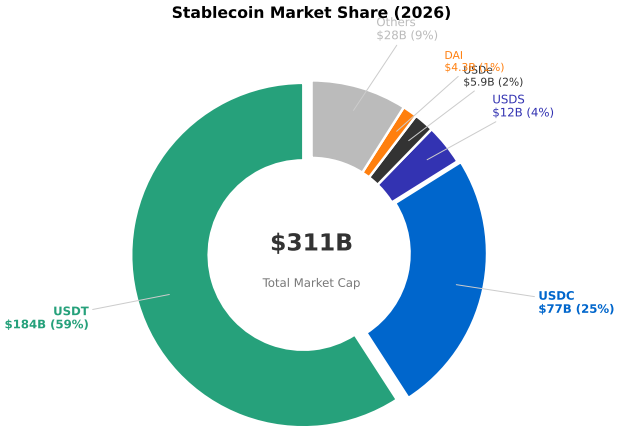
Each method has different strengths. No method is perfect. This lecture explores all three.

Stablecoins by the Numbers

The stablecoin market has grown to **$311 billion** (April 2026). Stablecoins are the most-used crypto tokens — more daily trading volume than Bitcoin.

Why so big?

- Bridge between crypto and real dollars
- Used in nearly every DeFi protocol
- Cross-border payments, 24/7
- Safe parking during market crashes



Stablecoins are the bridge between crypto and the real economy. Source: CoinGecko, April 2026.

The Big Three (Plus Two)

Stablecoin	Issuer	Market Cap	Type	Share
mlgreen!8 USDT	Tether	$184B	Fiat-backed	59.1%
mlgreen!8 USDC	Circle	$77B	Fiat-backed	24.8%
mlblue!8 USDS	Sky (MakerDAO)	$11.9B	Crypto-backed	3.8%
dfteal!8 USDe	Ethena	$5.9B	Delta-neutral	1.9%
mlblue!8 DAI	Sky (legacy)	$4.3B	Crypto-backed	1.4%
Others		$28B	Various	9.0%
Total		**$311B**		**100%**

USDT + USDC = 84% of the market. Two fiat-backed coins dominate the entire stablecoin landscape.

USDS is the successor to DAI after MakerDAO rebranded to Sky (August 27, 2024).

Method 1: Fiat-Backed (The Coat Check)

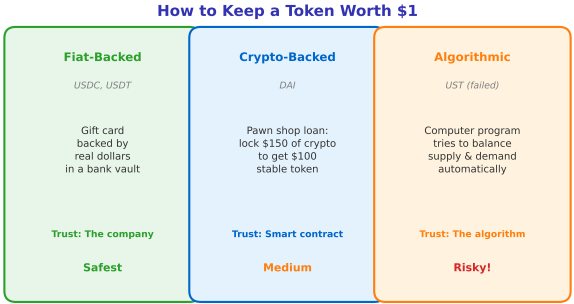
For every token, there is a real dollar in a bank account.

How it works:

1. Deposit 1 dollar with the issuer
2. Issuer mints 1 stablecoin on-chain
3. Redeem 1 stablecoin, get 1 dollar back

The catch:

- Centralized — the issuer controls everything
- Circle can freeze your USDC
- Tether can block your USDT
- You must trust the reserves are real



Simple and stable, but centralized. You are trusting a company, not code. See Appendix A1 for vault mechanics.

USDC and the SVB Scare

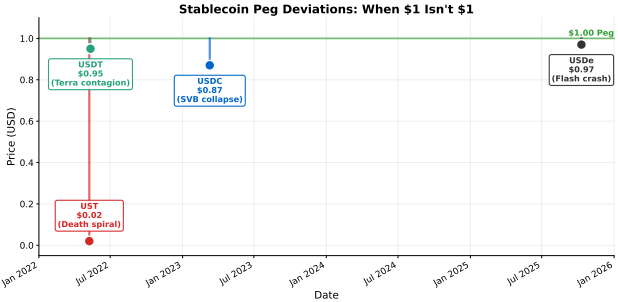
March 11, 2023: Silicon Valley Bank collapsed. Circle had **$3.3 billion stuck** inside.

USDC dropped to **$0.87** — a 13% depeg. Panic spread across DeFi.

What happened next:

- FDIC guaranteed all SVB deposits
- USDC recovered to $1.00 within days
- Circle moved reserves to other banks

Lesson: Even the "safest" stablecoin had a scare. No stablecoin is 100% risk-free.



USDC's depeg showed that fiat-backed stablecoins inherit banking risk. The peg depends on the bank.

Method 2: Crypto-Backed (The Pawn Shop)

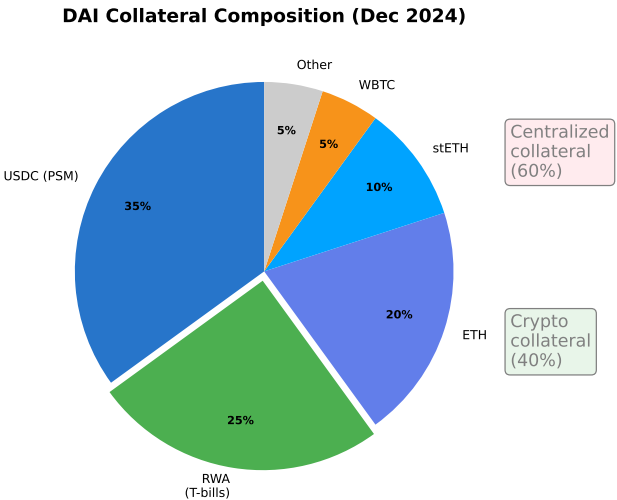
Lock up $150 of ETH, mint $100 of DAI.
Minimum collateral ratio: **150%**.

Why over-collateralize?

- ETH is volatile — it might drop 30% overnight
- The extra cushion absorbs price swings
- If collateral falls below 150%, you get liquidated

Who controls it?

Smart contracts on Ethereum. No single company can freeze your DAI or censor your vault.



Sky (formerly MakerDAO, rebranded Aug 27, 2024) manages DAI and the newer USDS. See Appendix A1 for a worked example.

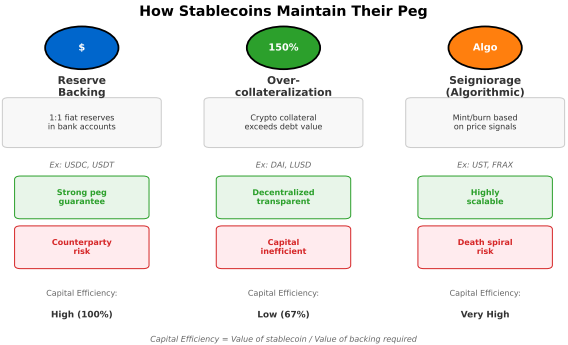
MakerDAO to Sky: A Rebrand

August 27, 2024: MakerDAO rebranded to **Sky**.

- DAI ($4.3B) — legacy stablecoin, still active
- USDS ($11.9B) — the new version
- Same over-collateralization model
- Combined TVL: $7.8B

Stability fee (the interest rate you pay on borrowed stablecoins): 2–5% per year, set by governance vote.

Fun fact: MakerDAO launched in 2017, making it one of the oldest surviving DeFi protocols.



Stability fee = 2–5% per year. Sky earns revenue from these fees, making it a profitable protocol. See Appendix A2.

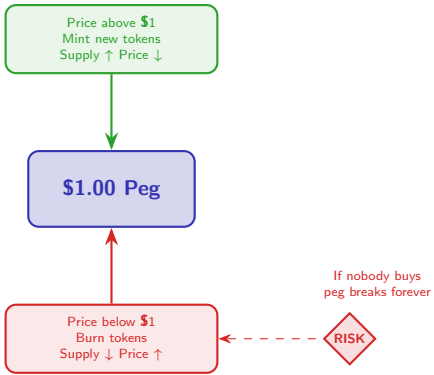
Method 3: Algorithmic (The Promise)

No reserves. An algorithm expands or contracts the token supply to hold the peg.

When price goes above $1:
Algorithm mints new tokens, increasing supply, pushing price down.

When price goes below $1:
Algorithm must convince people to buy. If nobody does, the peg breaks.

Warning: Most algorithmic stablecoins have **failed**. Terra/UST was the largest: $45 billion lost in May 2022.



Terra/UST was the largest algorithmic stablecoin. It collapsed in May 2022 ($45B lost). See Appendix A3.

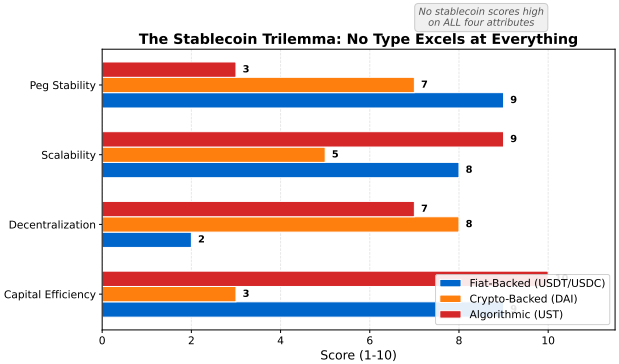
The Stablecoin Trilemma

Pick two of three:

1. **Decentralization** — no single entity controls it
2. **Price stability** — stays at $1.00 reliably
3. **Capital efficiency** — does not require huge collateral

No stablecoin achieves all three.

- USDC: stable + efficient but centralized
- DAI: decentralized + stable but capital-heavy
- UST: decentralized + efficient but unstable



Capital efficiency means: how much collateral do you need per $1 of stablecoin? USDC = $1, DAI = $1.50+, UST = $0.

Three Types Compared

Fiat-Backed

Centralized
A company holds real dollars in a bank.

Stable
Strong peg (backed 1:1).

Efficient
$1 collateral per $1 minted.

USDT, USDC

Crypto-Backed

Decentralized
Smart contracts, no company.

Stable
Strong peg (over-collateralized).

Inefficient
$1.50+ collateral per $1 minted.

DAI, USDS

Algorithmic

Decentralized
Code only, no reserves.

UNSTABLE
Peg can break permanently.

Efficient
$0 collateral per $1 minted.

UST (collapsed)

The trilemma in action: Each type sacrifices one of the three properties.

No stablecoin has solved the trilemma. New designs like USDe try novel approaches but introduce new risks.

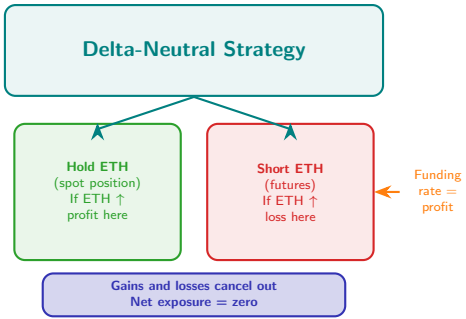
New Kid: USDe (Ethena)

What is USDe?

Ethena's USDe uses a "delta-neutral" strategy: holds ETH on one side and shorts ETH futures on the other. If ETH goes up, spot gains cancel futures losses (and vice versa). Net position is always flat.

Market cap: $5.9B
Profit source: Futures funding rates
Main risk: Custodian failure, negative funding

October 10, 2025: USDe dropped to $0.97 during a flash crash. Delta-neutral is not risk-free.



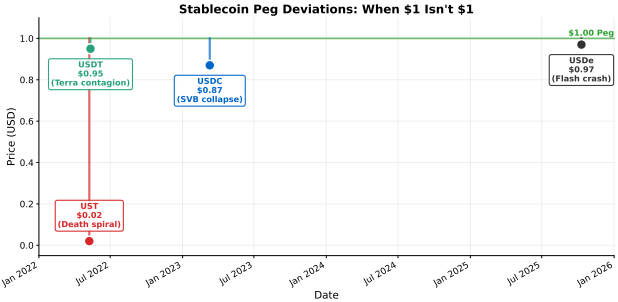
USDe is not truly decentralized — reserves are held by custodians (not on-chain). See Appendix A4 for details.

Peg Deviations: A History of Scares

Every stablecoin has broken its peg at least briefly. The question is whether it recovers.

Coin	Low	When
mlred!12 UST	$0.02	May 2022
USDT	$0.95	May 2022
USDC	$0.87	Mar 2023
USDe	$0.97	Oct 2025

UST never recovered — **death spiral**. The others recovered within days.



A temporary depeg is a scare. A permanent depeg is a death spiral. Know the difference.

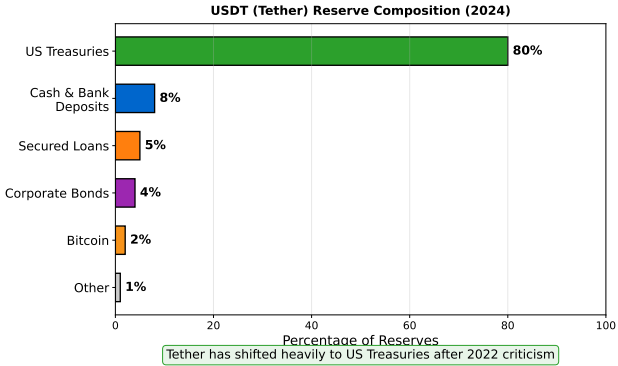
What Keeps USDT Stable?

Tether claims **$184 billion in reserves** backing every USDT token.

The transparency problem:

- Monthly “attestations” (not full audits)
- Reserves were once partially backed by commercial paper
- No Big Four accounting firm audits Tether
- Controversy has followed Tether since 2017

Paradox: USDT is the most used stablecoin but the least transparent. Markets trust it anyway — so far.



USDT is the most used but least transparent stablecoin. Trust is based on track record, not proof.

Regulation Is Coming

EU: MiCA

Full implementation **December 30, 2024**. Requires reserves, audits, and issuer licenses for stablecoins.

Status: Active law

US: Legislation

Stablecoin-specific bills advancing in Congress (2026). SEC and CFTC both claim jurisdiction.

Status: In progress

Impact

Regulation will likely favor fiat-backed stablecoins with audited reserves and licensed issuers.

Outlook: Pro-USDC

Key question: Will regulation kill decentralized stablecoins like DAI?
Or will it simply raise the bar for transparency and consumer protection?

MiCA (Markets in Crypto-Assets) is the world's first comprehensive stablecoin regulation. USDC was one of the first to comply.

Discussion Break: Which Stablecoin Would You Trust With Your Rent Money?

Scenario: You have $5,000 in crypto and need to park it safely for 3 months until your apartment deposit is due.

Your options:

A) USDC — Fiat-backed, regulated, can be frozen

Circle holds reserves in US banks. Compliant with MiCA.

B) USDS — Crypto-backed, decentralized, over-collateralized

No company can freeze your tokens. 150%+ collateral ratio.

C) USDe — Delta-neutral, higher yield, custodian risk

Potentially earn funding-rate yield, but less battle-tested.

Questions to consider:

1. Which risk scares you more: a company freezing your coins, or a smart contract bug?
2. Does the higher yield on USDe compensate for the custodian risk?
3. Would you split across multiple stablecoins?
4. Does MiCA regulation change your answer?

There is no "right" answer.
The right stablecoin depends on what risk you are most afraid of.

Take 5 minutes with a partner. Be ready to defend your choice with one sentence.

Try It Yourself

Step 1: Explore the Market

Visit `defillama.com/stablecoins`

Which stablecoin has the largest market cap?
Which one grew the fastest this year?

How much total value is in stablecoins?

Step 2: Check a Peg

Visit `coingecko.com` and search "USDT"

Look at the 1-year price chart.
Can you spot the May 2022 depeg?

How quickly did it recover?

Step 3: Compare Reserves

Visit `tether.to/transparency` and `circle.com`

Compare: What does Tether disclose vs. Circle?
Who provides attestations? Who provides full audits?

Which do you trust more?

Bonus: MakerDAO/Sky

Visit `sky.money`

What is the current stability fee?

What collateral types does Sky accept?

Watch the stablecoin market live. It tells you where money is flowing in crypto.

Key Takeaways

Three Peg Methods

Fiat-backed (coat check), crypto-backed (pawn shop), algorithmic (promise). Each sacrifices one leg of the trilemma.

The Trilemma

Pick two: decentralization, price stability, capital efficiency. No design achieves all three.

$311B Market

USDT ($184B) and USDC ($77B) dominate with 84% market share. Fiat-backed coins lead because they are simplest.

No Stablecoin Is Risk-Free

UST collapsed ($45B lost). USDC depegged to $0.87. USDT faces transparency questions. Every type has a failure mode.

Next lecture: When DeFi Breaks — crashes, hacks, and lessons from the 2022 meltdown.

Stablecoins are the foundation of DeFi. Understand their risks before you trust them with real money.

Quiz: Stablecoins (Q1–Q5)

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Answer: A — Fiat-backed means real currency reserves. USDC and USDT work this way.

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A) 100% B) 120% C) 150% D) 200%

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A) $50 billion B) $150 billion C) $220 billion D) $311 billion

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Answer: A — Silicon Valley Bank collapsed with $3.3B of Circle's reserves inside.

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Answer: C — Over-collateralization means capital is locked up and unavailable.

Appendix

Technical Deep Dives

The math behind stablecoin mechanisms

Click blue links in appendix slides to jump back to the main deck.

A1: DAI Vault Lifecycle (Worked Example)

You have 10 ETH worth $2,000 each ($20,000 total). You want to mint USDS stablecoins.

Step 1: Calculate maximum mint

- Minimum collateral ratio: 150%
- Maximum USDS $= \frac{\$20{,}000}{1.50} = \$13{,}333$

A1: DAI Vault Lifecycle (Worked Example)

You have 10 ETH worth $2,000 each ($20,000 total). You want to mint USDS stablecoins.

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- Your collateral ratio: $\frac{\$20{,}000}{\$10{,}000} = 200\%$ (safe buffer)

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Step 3: Monitor health factor

Health Factor $= \frac{\text{Collateral Value} \times \text{Liquidation Threshold}}{\text{Debt}}$

If ETH drops 25% to $1,500: $\text{HF} = \frac{\$15{,}000 \times 0.83}{\$10{,}000} = 1.245$ (still safe, but watch closely)

If ETH drops 45% to $1,100: $\text{HF} = \frac{\$11{,}000 \times 0.83}{\$10{,}000} = 0.913$ (**LIQUIDATED**)

← Back to main slide: Crypto-Backed

Liquidation sells your ETH to repay the debt. You lose the collateral. Always keep a safety buffer above 150%.

A2: Stability Fee Calculation

The **stability fee** is the annual interest rate you pay on borrowed USDS/DAI. It is set by Sky governance.

Example: Mint \$10,000 USDS at 3% annual stability fee.

Simple interest (1 year):

$$\text{Fee} = \$10{,}000 \times 0.03 = \$300$$

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Compounding formula (exact):

$$\text{Debt after } t \text{ years} = \text{Principal} \times (1 + r)^t$$

Time	Debt	Fee Paid	Effective Rate
6 months	$10,148.89	$148.89	1.49%
1 year	$10,300.00	$300.00	3.00%
2 years	$10,609.00	$609.00	6.09%
5 years	$11,592.74	$1,592.74	15.93%

Where does the revenue go? Sky uses stability fees to buy and burn SKY tokens (formerly MKR), reducing supply over time.

← Back to main slide: Crypto-Backed

Stability fees are Sky's primary revenue source. MakerDAO/Sky earned over $200M annualized in 2024.

A3: Algorithmic Stablecoin Mint/Burn Mechanics

The Terra/UST system used a two-token model: UST (stablecoin) and LUNA (volatile token).

Mint/burn mechanism:

- To mint 1 UST: burn $1 worth of LUNA
- To redeem 1 UST: burn 1 UST, receive $1 worth of LUNA
- Arbitrageurs profit from price deviations, pushing UST back toward $1

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The death spiral (May 7–13, 2022):

1. UST drops below \$1
2. Holders redeem UST for LUNA (burning UST, minting LUNA)
3. Massive LUNA minting: supply explodes from 350M to 6.5 **trillion**
4. LUNA price crashes from \$80 to \$0.0001
5. Less LUNA value = less backing for UST
6. UST falls further $\rightarrow$ more redemptions $\rightarrow$ repeat (reflexive loop)

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Key numbers: $45 billion in value destroyed. LUNA supply increased 18,571×. LFG's $750M Bitcoin defense failed.

← Back to main slide: Algorithmic

Once the reflexive loop started, it was mathematically impossible to stop without external capital injection.

A4: USDe Delta-Neutral Hedging Explained

Ethena's strategy in three steps:

Step 1: Deposit collateral and open positions

- User deposits 1 ETH (worth $2,000)
- Protocol holds 1 ETH spot **and** shorts 1 ETH in perpetual futures
- Net market exposure: zero ("delta-neutral")

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- Perpetual futures charge a "funding rate" every 8 hours
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- When market is bearish, shorts pay longs (Ethena pays)
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Step 3: Risks

- **Negative funding:** If rates stay negative for weeks, the protocol loses money
- **Custodian risk:** Collateral is held by centralized custodians (not on-chain)
- **Liquidation risk:** Extreme price moves could trigger liquidation of futures positions
- **October 10, 2025:** USDe dropped to $0.97 during a flash crash

← Back to main slide: The Trilemma

Delta-neutral means zero price exposure, but it does NOT mean zero risk. Funding rates, custodians, and liquidation are real dangers.

A5: Cryptoeconomics Lens: Stablecoins

PROBLEM

Crypto volatility makes tokens unusable for payments, savings, and pricing. A stable unit of account is needed for DeFi to function.

INCENTIVES

Issuers: Seigniorage (earn yield on reserves). Tether earns billions from US Treasury holdings. **Users:** Price stability, DeFi access.

BENEFITS / COSTS

Benefits: Price stability, 24/7 transfers, DeFi composability. **Costs:** Centralization risk (fiat), capital inefficiency (crypto), fragility (algo).

FAILURE MODES

UST death spiral ($45B). Bank run risk on fiat-backed coins (SVB). Negative funding rates draining delta-neutral reserves.

DESIGN CHOICES

Fiat-backed (simple, centralized) vs. crypto-backed (decentralized, capital-heavy) vs. algorithmic (efficient, fragile) vs. delta-neutral (novel, custodian risk).

ALTERNATIVES

CBDCs (central bank digital currencies). PayPal USD. Tokenized bank deposits. Or simply using fiat currency directly.

The cryptoeconomics lens: every stablecoin design is a set of trade-offs. There is no free lunch.