What Are Algorithmic Stablecoins?

The design that tried to hold a dollar with code instead of collateral — the three variants, why regulators have now closed the category, and the successor that gets confused with it.

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An algorithmic stablecoin attempts to hold a peg using code and market incentives rather than assets held in reserve. Instead of promising that a dollar sits somewhere backing each token, it adjusts supply, issues a companion asset, or offers arbitrage opportunities designed to push the price back toward par whenever it strays. The ambition was serious and the intellectual appeal was real. The record is not: the category has produced the largest and fastest losses in the history of this asset class, and it has now been effectively closed by regulation in the major markets. This report explains how the designs worked, why they failed, and what has replaced them — which is not the same thing, however often it is described that way. It assumes you know what a stablecoin is.

AT A GLANCE

THE IDEA **Hold a peg with code, not reserves**	THREE VARIANTS **Rebase, two-token, fractional**	THE APPEAL **Capital efficiency, no issuer**
THE FLAW **Reflexivity under stress**	STATUS NOW **Excluded by major regimes**	CONFUSED WITH **Delta-neutral synthetic dollars**

01

Three things called algorithmic

The label covers several distinct mechanisms, and separating them clarifies which failed and why. The first is *rebasing*: rather than adjusting price, the protocol adjusts the number of tokens in every holder's wallet. If the token trades above target, everyone's balance

increases; below, everyone's balance decreases. The unit price drifts toward par, but the value of your holding still moves — which makes a rebasing token a poor store of value dressed as a stable one, and the design has largely remained a curiosity.

The second and most consequential is the *two-token* or seigniorage model. A stablecoin is paired with a volatile companion token, and the protocol allows each to be exchanged for a fixed dollar's worth of the other. Arbitrageurs are expected to profit from any deviation and restore the peg in the process. The third is *fractional*: a hybrid holding partial collateral, with an algorithmic mechanism covering the uncollateralised remainder, and often a governance-adjustable ratio between the two. The two-token design is what produced the catastrophic failures; the fractional designs performed considerably better, for reasons that turn out to be instructive.

02

Why anyone tried this

It is worth taking the motivation seriously rather than treating the whole category as folly, because the problems it addressed are genuine. A reserve-backed stablecoin requires a company holding assets in a bank — which means a counterparty who can fail, a jurisdiction that can seize, and an entity that can freeze tokens or refuse service. For anyone whose interest in this technology was avoiding exactly those dependencies, a fully-backed token issued by a regulated company answered the wrong question.

There was also a capital argument. Over-collateralised designs are inefficient: locking up substantially more value than is issued limits how large such a system can grow. An algorithmic design promised a dollar of stable value without a dollar of assets sitting idle, which would allow the supply to scale with demand rather than with available collateral. Put together, the pitch was a stable unit that was censorship-resistant, capital-efficient, and dependent on no company at all. That is a coherent and attractive goal. The question was always whether the mechanism could survive the conditions under which people would most want it to work.

03

Why the mechanism inverts

It could not, and the reason is structural rather than a matter of poor implementation. The mechanism is covered in detail in how stablecoins stay pegged, so the essential point in

brief: the arbitrage that defends the peg pays out in the companion token, whose value depends on confidence in the system that the stablecoin anchors. Redeeming a falling stablecoin therefore issues more of a token that is falling for the same reason, and the supply expansion drives it lower still.

What makes this fatal rather than merely inefficient is that the failure accelerates precisely when the mechanism is most needed. In calm conditions the loop is stabilising and the design looks elegant; under a loss of confidence it becomes a pump running in reverse, and the collapse can be measured in days. Two secondary features made it worse in practice. Demand for these tokens was frequently manufactured by high advertised yields, meaning much of the supply was held by people with no attachment to the system and every incentive to leave first. And the systems were most often tested during broad market stress, when the companion token was falling for unrelated reasons anyway.

> *A reserve-backed stablecoin redeems into an asset. An algorithmic one redeems into a claim on confidence in itself. That is the entire difference, and it is invisible in calm markets and total in a crisis.*

04

The variants that partly worked

The fractional designs deserve separate treatment because they did not simply repeat the failure. By holding real collateral against a portion of supply, they retained something for arbitrage to converge toward even when confidence in the protocol's own token weakened — a floor beneath the reflexive loop rather than nothing at all.

What happened next is the instructive part. Under sustained pressure, and after the wider category's collapse, several such systems moved their collateral ratio steadily upward until they were, in effect, fully collateralised — abandoning the algorithmic component precisely when it would have been tested. That is a revealing outcome. It suggests the uncollateralised portion functions acceptably as an efficiency optimisation in good conditions and is the first thing rationally discarded in bad ones, which means it was never really doing the load-bearing work its designers claimed. The surviving descendants of this branch are largely conventional collateralised systems with algorithmic tooling around the edges.

05

The regulatory verdict

The decisive development is that regulators have not merely warned about this category — they have closed it. The United States framework for payment stablecoins requires reserves in high-quality liquid assets, which purely algorithmic designs by definition do not hold, leaving them without a path to authorisation; state regimes have followed by excluding algorithmic tokens from licensable categories outright. The European framework operates on a similar basis, and other jurisdictions have moved to prohibit the category explicitly.

This is a more significant outcome than a market judgement. A design that investors have soured on can return in a later cycle with better marketing; a design that cannot be lawfully issued or offered by regulated service providers in the major markets has a far narrower future. The practical effect is that anything calling itself an algorithmic stablecoin now exists outside the regulated perimeter by construction — which is a fact about its accessibility and its legal recourse, not only about its mechanism. The statutory requirements are set out in our note on the federal stablecoin framework.

06

The successor that is not the same thing

Into the space left behind has come a different instrument, frequently and wrongly filed under the same heading: the *synthetic dollar*. These maintain a dollar value not through supply games but by holding a crypto asset and simultaneously taking an offsetting short position in derivatives, so that gains on one leg cancel losses on the other. The combined position is designed to be worth a stable amount regardless of the underlying's price — a hedge, not an algorithm.

The distinction is genuine and important. There are real assets backing the position, and the stability comes from a market-neutral structure rather than from confidence in a companion token, which means the reflexive death spiral described above does not apply. But the risks are simply different rather than absent: the design depends on derivatives venues remaining solvent and accessible, on the funding payments that make the hedge economic remaining favourable, on the custody arrangements holding the collateral, and on the hedge being executable at scale during exactly the volatility that would stress it — the mechanics covered in position sizing with leverage on a perps DEX. Calling these algorithmic obscures both what they are and what could go wrong with them.

07

And why they are also under pressure

Regulators have noticed the distinction and are not uniformly reassured by it. At least one major jurisdiction has moved to prohibit not only algorithmic designs but tokens whose stability relies on derivative hedging — explicitly capturing the synthetic dollar category alongside its predecessor. The reasoning is that a dollar claim backed by a derivatives position at trading venues is a different kind of promise from one backed by government bills held at a custodian, whatever the mathematics says in normal conditions.

The industry's response has been telling: the leading issuers in this category have launched a second, separate, conventionally-backed product designed to satisfy the regulated markets, while keeping the synthetic instrument for jurisdictions and use cases that permit it. That two-product structure is the clearest available evidence of where things stand. When the people building the innovative instrument also build a fully-reserved one for the regulated market, they are conceding which design the mainstream financial system will actually accept.

08

Recognising the category in disguise

Since the label has become unattractive, the mechanism appears under other names, and a short test cuts through the branding. Ask what you receive on redemption. If the answer is an external asset — dollars, government paper, another party's obligation — the design has an anchor. If the answer is another token issued by the same system, the design is reflexive regardless of what it is called.

Three further questions help. Where does any advertised yield come from, since an unusually high rate on a stable instrument is usually paying you to accept a risk that has not been named — and in the historical failures, it was the yield that gathered the supply that then ran. What happens to the mechanism if the protocol's own token falls sharply: designs that answer "it adjusts" without explaining the source of new value are describing the death spiral. And can the thing be issued lawfully where you live, because that increasingly determines your access and your recourse rather than merely your convenience. Judged this way, the category is not a scam so much as a serious experiment that produced a clear result — which is worth remembering the next time an elegant version of it appears.

“Riches certainly make themselves wings; they fly away as an eagle toward heaven.”

Methodology & Sources

This report describes a category of design and its regulatory status as at the date of publication; it contains no project names, token names, market capitalisations, yields, collateral ratios, or loss figures — readers should consult primary accounts of specific protocols and current regulatory texts. The taxonomy used — rebasing designs adjusting holders' balances, two-token seigniorage designs pairing a stablecoin with a volatile companion token exchangeable at a fixed dollar value, and fractional designs holding partial collateral alongside an algorithmic component — is the conventional classification. The reflexive failure mechanism described, in which redemption issues more of a companion token whose value depends on confidence in the stablecoin, reflects the documented record of the category, including its largest collapse in 2022. The observation that several fractional designs increased collateral ratios toward full backing under pressure reflects publicly documented protocol governance decisions. Regulatory characterisations — that the United States payment stablecoin framework requires high-quality liquid asset reserves and therefore affords no authorisation path to purely algorithmic designs, that certain state regimes exclude algorithmic tokens from licensable categories, and that at least one further jurisdiction has moved to prohibit both algorithmic and derivative-hedged designs — reflect legislation and proposals as publicly reported; frameworks continue to evolve and specific status should be verified against current official sources. Delta-neutral synthetic dollars are described as a structurally distinct category maintaining value through offsetting derivatives positions rather than supply adjustment, carrying venue, funding, custody and execution risks rather than reflexive collapse risk. Nothing here is a recommendation regarding any token, protocol, or trade.

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