REAL: Memecoins on a Treasury Floor

A launchpad whose bonding curves convert every purchase into yield-bearing real-world collateral

REAL Project

July 2026 — v1.1 (testnet)

Abstract

Every memecoin launchpad manufactures the same product: a token whose only asset is attention. When attention leaves, the price has nowhere to land — the terminal value of a launched coin is zero, and the ecosystem's defining failure, the rug, is just that terminal value arriving early. REAL changes what a launched coin is made of. On our curves, the proceeds of every buy are converted at once into a yield-bearing tokenized real-world asset — a tokenized 0–3 month Treasury fund at launch — custodied by the curve contract itself, which exposes no withdrawal path to any party. Each coin therefore carries two pricing engines and a hard landing zone: order flow sets the speculative premium, the collateral sets a redemption floor, and because the collateral earns yield, the floor and the coin's progress toward its liquidity migration rise on their own, trades or no trades. We call such tokens *anchored coins*. This paper derives the curve from two market-capitalization anchors, establishes a closed-form price-to-floor identity ($p/f = x_0/x$), proves that the liquidity holdback suffices on every migration path, quantifies what yield can and cannot do for a dying coin, and validates each claim — to exact token counts — on a live Robinhood Chain testnet deployment. Relative to designs that make the reserve a leveraged position, spot RWA collateral eliminates volatility decay and reserve-death risk, and pays for it with an oracle-scheduling constraint and a compliance obligation; we analyze both.

1 Introduction

A pump.fun-style launchpad is a distribution machine, and a good one: fixed supply, a public price path everyone buys along, automatic liquidity migration. What it distributes, however, is an empty box. Nothing obliges the proceeds of a launch to remain reachable by holders, so every coin's long-run value is zero and the only question is who exits before the box is opened.

REAL's premise is that the box should contain something. Concretely: net of a fee, every dollar paid into one of our bonding curves is converted in the same transaction into a tokenized real-world asset (RWA) and parked in the curve contract. The contract has no owner, no upgrade path, and no function that releases collateral except a holder selling back or the coin migrating to its locked liquidity pool. Three properties follow, each proved in this paper and observed on-chain:

1. **A floor instead of a zero.** At any moment the collateral can pay out every circulating token at the floor price f; the premium above it is exactly x_0/x, a pure function of curve progress (Proposition 3.4). An abandoned coin does not die; it idles on a growing pile of Treasuries.

2. **Two pricing engines.** A coin re-prices with its collateral even in the absence of trading, with unit elasticity (Proposition 3.2). Treasury-backed coins drift up at the bill yield; an equity-backed coin, when that tier ships, would move with its stock.
3. **Time works for the coin.** The migration trigger compares collateral *value* to a fixed target, so yield strictly shrinks the distance to migration — to the point that a coin parked near the target completes its launch with no trades at all (Section 5; performed live on testnet).

Positioning. The constant-product-over-virtual-reserves machinery is the industry-standard launchpad geometry, proven at scale in the pump.fun lineage. REAL's contribution is not a new curve but a new *reserve discipline* on top of a proven one: collateral that is spot, yield-bearing, and custodied where no one can reach it — plus the exact identities and sufficiency proofs that discipline makes possible. Designs that have instead placed volatile or leveraged instruments in the reserve buy amplified upside at the cost of rebalancing decay and the possibility of the reserve grinding toward zero; our coins are cushioned rather than amplified, and Sections 7 and 8 account for what that choice removes and what it adds.

Everything in Sections 3–5 is enforced by a 94-test suite that matches an independent reference simulation to within 10^{-6} relative error, and was exercised end-to-end on Robinhood Chain testnet (Section 9).

2 Protocol design

A small contract set built around a singleton BondingCurve — ownerless by construction — that prices, trades, and custodies every coin. A TokenFactory mints coins (fixed supply $S = 10^9$, delivered whole to the curve) for a flat \$2 fee; its owner's authority ends at curating the collateral-adapter allowlist and that fee. Each collateral type sits behind an IReserveAdapter (deposit / withdraw / price), so the curve is agnostic to what backs a given coin. Coins launch with $C = 750$M tokens on the curve and $L = 250$M reserved for the migration pool. The pool created at migration holds no LP tokens and exposes no withdrawal: its liquidity is locked the moment it opens.

The trading loop: a buyer pays the launchpad's USD token; 1% goes to the treasury; the remainder becomes collateral immediately. A seller's exit unwinds collateral at the current oracle price, less the same 1%. When either migration condition of Section 4 is met, the collateral is redeemed to USD, converted to WETH, and opens a standard token/WETH Uniswap v3 pool at exactly the curve's final price.

Two things are deliberately separable: what *backs* a coin and what it *trades against*. Through the whole curve the coin is USD-denominated and RWA-backed — the discipline that yields a stable floor and a fair ($\sim$2%) round trip. Only at migration is the reserve converted to ETH, so the coin lists on an ordinary token/WETH pool where liquidity lives and every wallet, bot, and aggregator trades it with no protocol-specific code. During the curve phase an unprivileged, stateless router (REALRouter) lets traders pay in native ETH, zapping ETH↔USD around the same buy/sell while the backing stays USD/RWA.

3 The bonding curve

3.1 State and pricing

Let x be the virtual token balance and y the virtual collateral balance, denominated in units of the backing asset. The curve maintains

$$x \cdot y = k \quad \text{(constant)}, \qquad p \;=\; \frac{y \cdot p_{\mathrm{RWA}}}{x}, \tag{1}$$

with p_{RWA} the oracle (Chainlink) price of one collateral unit. A buy of u USD net of fees adds $a = u/p_{\mathrm{RWA}}$ units: $(x, y) \to (k/(y + a), \, y + a)$, the buyer receiving the decrease in x; sells mirror this exactly. Trades move the state along one fixed hyperbola, so any sequence of trades composes losslessly (fees and integer rounding aside), and rounding is directed so dust can only accumulate in the curve's favor.

3.2 Seeding the curve from market-cap anchors

Two business quantities pin down all constants: the market capitalization at which coins open, M_0, and the one at which they migrate, M_g. With $p_0 = M_0/S$, $p_g = M_g/S$, and the requirement that selling exactly C tokens carries the price from p_0 to p_g:

$$\sqrt{k_\$} = \frac{C}{1/\sqrt{p_0} - 1/\sqrt{p_g}}, \qquad x_0 = \frac{\sqrt{k_\$}}{\sqrt{p_0}}, \qquad y_0^\$ = \sqrt{k_\$}\,\sqrt{p_0}, \tag{2}$$

where the virtual collateral seed is converted to asset units at creation, $y_0 = y_0^\$/p_{\mathrm{RWA}}(t_0)$ — so every coin opens at M_0 no matter where the collateral trades that day. Selling out the curve collects

$$R^\star = \sqrt{k_\$}\left(\sqrt{p_g} - \sqrt{p_0}\right) \tag{3}$$

of collateral value, and $R^\star$ doubles as the value trigger for migration. Deployed values ($S = 10^9$, $C = 7.5 \times 10^8$, $M_0 = \$6{,}000$, $M_g = \$69{,}000$):

$$x_0 = 1{,}063{,}654{,}642.25, \qquad y_0^\$ = \$6{,}381.93, \qquad R^\star = \$15{,}260.24,$$

an 11.5$\times$ price span over the curve and a migrating market-cap-to-collateral ratio of 4.5$\times$.

Remark 3.1 (The anchor that does not work)**.** *Fixing the collateral target at \$69,000 under the same \$6,000 opening — a tempting misreading of the headline number — forces* $x_0 = 798.9M$ *and a* $251\times$ *price span: the final fill costs* $259\times$ *the opening price, and the coin migrates at a \$1.5M capitalization standing on \$69k of assets (*$21.9\times$*). Anchoring on market capitalization keeps late entries sane and the capitalization honest relative to collateral.*

3.3 Two engines, one floor

Proposition 3.2 (Collateral pass-through)**.** *Holding* x, y *fixed (no trades),* $\partial p/\partial p_{\mathrm{RWA}} = y/x$*: the elasticity of a coin's price in its collateral's price is exactly one. Capitalization, floor, and collateral value scale together.*

Definition 3.3 (Redemption floor)**.** $f = (y - y_0)\, p_{\mathrm{RWA}}/(x_0 - x)$*: the per-token USD value the custodied collateral could return if every circulating token sold back into the curve.*

Proposition 3.4 (Price–floor identity)**.** *Everywhere on the curve, $p/f = x_0/x$.*

Proof. With $y = k/x$ and $y_0 = k/x_0$: $x(y - y_0) = k(x_0 - x)/x_0$ and $y(x_0 - x) = k(x_0 - x)/x$; divide. □

The speculative premium is thus not a sentiment statistic but a curve coordinate: $1\times$ at the start, $x_0/(x_0 - C) = 3.39\times$ at sellout. Any observer can audit it from two storage slots. (The live deployment reproduces the identity to every displayed digit.)

4 Migration

4.1 Two ways out of the curve

A coin leaves the curve when (i) the curve is sold out, $x_0 - x \geq C$, or (ii) the custodied collateral's *value* reaches the target, $(y - y_0)\, p_{\mathrm{RWA}} \geq R^\star$. Condition (ii) is checked on every buy and is also callable by anyone via a permissionless `graduate`() — yield drift must be able to finish a launch without a final trade. Oversized buys fill to exact sellout and refund the difference.

4.2 Opening the pool with no price gap

At migration the collateral unwinds to $R = (y - y_0)\, p_{\mathrm{RWA}}$ USD, the curve reads its own final price $p_f = y\, p_{\mathrm{RWA}}/x$, and pairs

$$t_{\mathrm{pool}} \;=\; R/p_f \;=\; x\Big(1 - \frac{y_0}{y}\Big) \tag{4}$$

tokens against the full R, opening the locked pool precisely at p_f; unpaired tokens (holdback excess plus any unsold curve stock) burn. Equation (4) contains no p_{RWA}: oracle moves scale R and p_f together, so the token side of the pool depends only on how far the curve got. (On testnet the sellout pairing is 221,162,934 tokens whether the collateral trades at \$1.00 or \$1.05.)

Denominating the pool in ETH rather than USD leaves (4) untouched. The USD reserve R is converted to $W = R/e$ WETH at the ETH price e, and the pool's final price expressed in WETH is p_f/e; the token side is $W/(p_f/e) = R/p_f = t_{\mathrm{pool}}$, independent of e. The migration hands off with no arbitrage gap regardless of the pair asset — ETH volatility between the redeem and the pool open shifts both the WETH deposited and the WETH-denominated opening price by the same factor.

4.3 The holdback is enough — provably

Theorem 4.1 (Holdback sufficiency)**.** *Substituting $y = k/x$, $y_0 = k/x_0$ into* (4) *gives the pairing requirement $t_{\mathrm{pool}}(x) = x - x^2/x_0$, a parabola peaking at $x^* = x_0/2$ with value $x_0/4$. Tokens on hand at migration are the holdback plus unsold stock, $A(x) = S - x_0 + x$. The margin*

$$m(x) \;=\; A(x) - t_{\mathrm{pool}}(x) \;=\; S - x_0 + \frac{x^2}{x_0}$$

increases over the feasible range $x \in [\,x_0 - C,\; x_0\,]$, so sufficiency on every migration path reduces to one inequality at the sellout end:

$$m(x_0 - C) \geq 0 \quad\iff\quad C\,(2x_0 - C) \;\leq\; S\,x_0. \tag{5}$$

Deployed numbers: $C(2x_0 - C) = 1.0330 \times 10^{18} \le S\,x_0 = 1.0637 \times 10^{18}$, with minimum margin $m(x_0 - C) = 28{,}837{,}066$ tokens — realized at full sellout, where it is exactly the observed burn. The parabola's peak requirement (265.9M at 71% sold) does exceed the 250M holdback in isolation; 218M unsold tokens stand next to it at that point. The fuzzing suite hunts for a violating migration path across random fills and oracle drifts, and finds none.

5 What yield does — and does not do

Let the collateral appreciate at rate r (a 0–3 month Treasury fund accretes roughly the bill yield; USDG lent on Morpho accrues lending yield).

The floor ratchets. By Proposition 3.2 an untraded coin's price, floor, and collateral value all compound at r. There is no decay channel to fight: spot collateral does not rebalance, so the slow bleed characteristic of leveraged reserves has no analogue here. Downside in p_{RWA} passes through symmetrically — a Treasury fund makes that negligible; an equity tier would not.

Migration distance only shrinks. A coin whose collateral value stands at fraction θ of $R^\star$ migrates with zero further trades after

$$T(\theta) = \frac{\ln(1/\theta)}{\ln(1+r)}, \tag{6}$$

giving, at $r = 5\%$: 2.2 years from $\theta = 0.90$, 5.9 years from 0.75, 14.2 years from 0.50. We state the numbers because the honest reading matters: yield is a floor-raiser always, a launch-finisher only near the target, and never a substitute for demand.

Where the yield goes. In this version it accrues inside the curve, which keeps every formula above exact. Routing it instead to buy-and-burn or to creator rewards is a one-keeper extension left for a later version.

6 Fee schedule

Fee	Amount	Charged on	Recipient
Creation	\$2 (USD token)	`createCoin`	treasury
Swap	1%	every curve buy	treasury
Swap	1%	every curve sell	treasury
Pool	0.3%	post-migration swaps	stays in pool

The swap fee is immutable — set at deployment, hard-capped below 10%, and raisable by nobody. The creation fee is owner-adjustable. A coin that reaches migration has produced at least $R^\star \cdot 1\% \approx \$153$ in buy-side fees before counting churn.

7 Risk analysis

What spot collateral removes. Rebalancing decay in choppy markets: gone (nothing rebalances). Reserve death: a Treasury fund cannot grind to zero, and there is no liquidation machinery to cascade. These are the two dominant risks of leveraged-reserve designs, and they simply have no counterpart here.

What it adds — oracle scheduling. Equity feeds on Robinhood Chain run 24/5 while curves trade continuously; an equity-backed coin would spend weekends trading against a stale mark and get picked off at Monday's open. Launch policy: NAV-smooth collateral only (Treasuries, stablecoin vaults), for which the gap is negligible. An equity tier needs open-auction fees or trading pauses around market open. The deployed code already rejects stale (>1 day), zero, and negative oracle answers and resumes when the feed recovers; L2 sequencer-uptime checks are on the mainnet list.

Collateral liquidity. Curve exits unwind collateral, so the binding constraint is the RWA's own market depth. Treasury-fund shares and lending-vault positions qualify today; tokenized single stocks depend on early DEX depth and wait.

Venue risk. The chain operator controls sequencing; the RWA issuer controls the legal wrapper of the collateral. Both are regulated companies with brands to protect from a memecoin venue. Not a protocol risk — a strategic one, and one more argument for the compliance-first collateral menu.

8 Compliance

The tokenized Treasury ETF (SGOV) and all Robinhood stock tokens are debt securities of a Jersey issuer: freely transferable ERC-20s on-chain, but prohibited to U.S. persons and restricted elsewhere. A permissionless curve holding them redistributes gated exposure — an application-layer and legal problem, not a technical one. Separately, any asset-backed, redeemable, yield-bearing token risks classification as an investment contract regardless of what backs it. Launch posture: USDG/Morpho collateral as the default tier everywhere; SGOV collateral geofenced at the application layer; equities deferred to counsel. None of this document is legal advice.

9 Implementation and live validation

Code. Five Solidity contracts (∼600 lines) on OpenZeppelin v5; the curve is reentrancy-guarded, ownerless, non-upgradeable. Source, tests, simulation, and deployment scripts live in the project repository.

Tests. 62 Foundry tests in three tiers. Tier one pins the implementation to an independent Python model of Sections 3–4 at 10^{-6} relative tolerance — seeds, fills, migration state. Tier two attacks edges: 1-wei trades, ±1000-wei probes around the sellout boundary, hundred-buy path-independence checks, full unwind back to the opening state, downward oracle drift with the sellout backstop, early value-trigger migration, oracle failure and recovery. Tier three is stateful fuzzing: four actors and up to five coins pushed through ∼4,600 random buys, sells, drifts in both directions, creations, migrations, and pool trades per invariant, after each of which the suite asserts *exact* custody (curve's collateral balance = $\sum_i (y_i - y_{0,i})$, to the wei), zero loose USD, token accounting that ties out, a constant product that never leaks value outward, and constant supply.

On-chain. The stack is deployed and source-verified on Robinhood Chain testnet (chain ID 46630). The recorded run shows: a sellout migration whose pool opened with exactly 221,162,934 tokens — the number predicted by (4) — against \$16,023 at 7.245×10^{-5}, i.e. 6.9×10^{-5} carried by the prevailing +5% oracle drift, with zero price gap; a \$20,000 buy that filled to sellout and refunded \$6,196; an untouched coin re-pricing exactly +5% on a drifted feed with no trades (Proposition 3.2, observed); the price/floor ratio equal to x_0/x in every reading (Proposition 3.4);

and a coin parked at \$14,849 of collateral completing its launch through a +3% drift and a permissionless `graduate()` — migration by yield, 6.3M tokens still unsold. Post-run supply accounting: $753{,}336{,}502 + 217{,}826{,}433 + 28{,}837{,}066 + 0 = 10^9$, exactly.

10 Limitations and roadmap

The migration pool is a purpose-built locked constant-product contract; a Uniswap sink replaces it once that deployment publishes Robinhood Chain addresses. Testnet collateral is mocked by necessity (no published testnet stock-token addresses). Mainnet requires: live SGOV and USDG/Morpho adapters (including USDG decimal normalization and sequencer-uptime checks), an equity-tier market-open policy, treasury custody in a multisig, an external audit, and account-abstraction onboarding (create, approve, and first buy in one sponsored transaction).

11 Conclusion

A launchpad does not have to sell empty boxes. Converting order flow into custodied, yield-bearing collateral gives a memecoin the one thing the category has never had — a landing zone — without dulling the thing that makes it a memecoin. The curve geometry is inherited and battle-tested; the identities and sufficiency condition proved here make the collateral mechanics exact rather than aspirational; the live deployment shows the whole loop closing, including a launch finished by yield alone. What remains between testnet and mainnet is mostly not engineering. The meme is the distribution mechanism; the Treasury bill is the content.

A Deployed parameters and derived constants

Quantity	Symbol	Value
Total supply per coin	S	1,000,000,000
Curve allocation	C	750,000,000
Pool holdback	L	250,000,000
Opening market cap	M_0	\$6,000
Migration market cap	M_g	\$69,000
Swap fee	—	1% (immutable)
Creation fee	—	\$2
Virtual token seed	x_0	1,063,654,642.25
Virtual collateral seed	$y_0^{\$}$	\$6,381.93
Collateral target	$R^\star$	\$15,260.24
Curve price span	p_g/p_0	11.5×
Sellout pairing	t_{pool}	221,162,934
Sellout burn	—	28,837,066
Peak pairing requirement	$x_0/4$	265,913,661 (at 71% sold)
Price/floor at sellout	$x_0/(x_0{-}C)$	3.39×

B Worked example: the first ten \$100 buys

Zero-fee curve at $p_{\mathrm{RWA}} = \$1.00$; reference-simulation values, matched by the contracts to 10^{-6}:

#	Tokens out	Price after	Mcap after	% of supply sold
1	16,409,542	$\$6.190 \times 10^{-6}$	\$6,190	1.64
2	15,909,587	$\$6.382 \times 10^{-6}$	\$6,382	3.23
3	15,434,466	$\$6.577 \times 10^{-6}$	\$6,577	4.78
4	14,982,477	$\$6.776 \times 10^{-6}$	\$6,776	6.27
5	14,552,062	$\$6.977 \times 10^{-6}$	\$6,977	7.73
6	14,141,786	$\$7.181 \times 10^{-6}$	\$7,181	9.14
7	13,750,325	$\$7.388 \times 10^{-6}$	\$7,388	10.51
8	13,376,454	$\$7.599 \times 10^{-6}$	\$7,599	11.85
9	13,019,035	$\$7.812 \times 10^{-6}$	\$7,812	13.15
10	12,677,008	$\$8.028 \times 10^{-6}$	\$8,028	14.41

Depth of entry: a \$100 buy pays 1.5× the opening price at 25% sold, 2.4× at 50%, 4.5× at 75%, and 11.4× for the final fill.