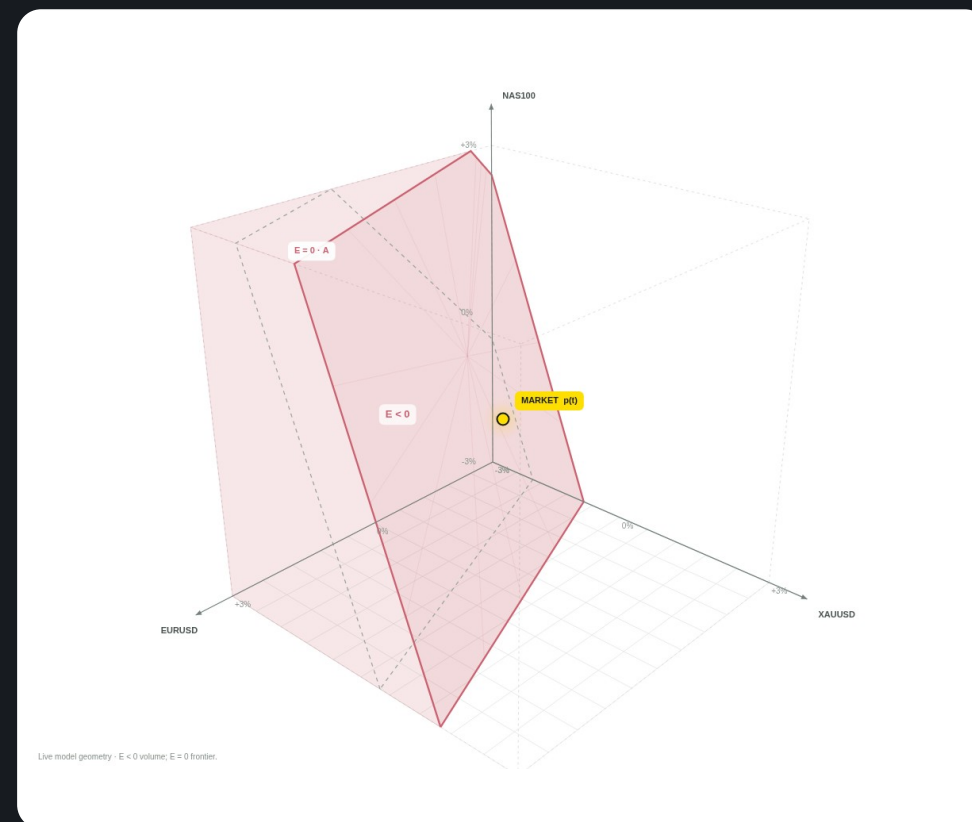


NBC Geometry Lab

Account state.
Market jumps.
A visible mechanism.

A LOCAL, INTERACTIVE RESEARCH EXPERIENCE



Study the state, not only the trades.

Three mechanisms must be modeled separately, then reconciled.

01 / CONTROL

Account state

Cash and signed positions define an equity function and a negative domain.

02 / MARKET

A discontinuity

A price or execution jump can skip the zero-equity frontier.

03 / SETTLEMENT

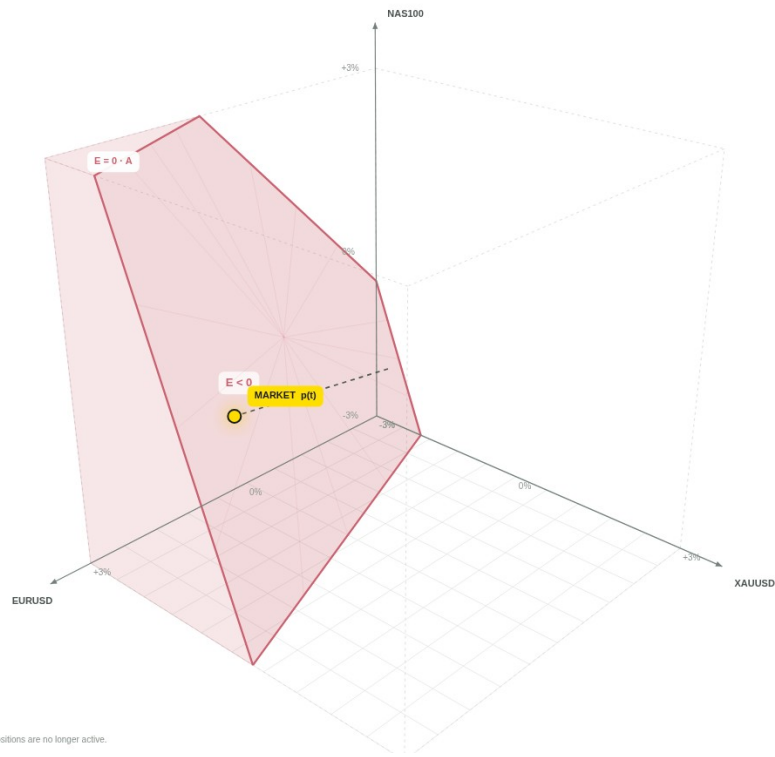
Deficit and credit

Closing determines the deficit. The selected policy determines the modeled NBC.

Research question: which admissible state changes alter the expected covered deficit?

One visual language for the entire project.

Keep market movement, state transformation and cash settlement visually distinct.



MARKET POINT

Yellow point: $p(t)$ in price space.

DOMAIN

Coral volume: $E < 0$.

FRONTIER

Coral plane: $E = 0$.

ORIGINAL STATE

Grey outline: initial geometry.

AFTER CLOSE

Frozen geometry is explicitly labeled.

Cash and the signed position vector are the controls.

Equity, used margin and free margin are computed state indicators.

$$\mathbf{u}_t = (\mathbf{D}_t , \mathbf{W}_t , \Delta \mathbf{v}_t)$$

$v_i > 0 \rightarrow$ long

$v_i < 0 \rightarrow$ short

$v_i = 0 \rightarrow$ no net exposure

Deposit or withdraw cash. Increase, reduce or reverse positions.
Every action must be checked at its execution state.

Buying can reduce a short. “Larger position” refers to $|v_i|$, not simply a larger signed number.

Equity is an affine function of prices.

Baseline: linear USD contracts and explicit fixed conversion assumptions.

$$E_s(p) = E_o + w^T(p - p_o)$$

$w_i = \kappa_i v_i$ is the signed cash sensitivity to an asset price.

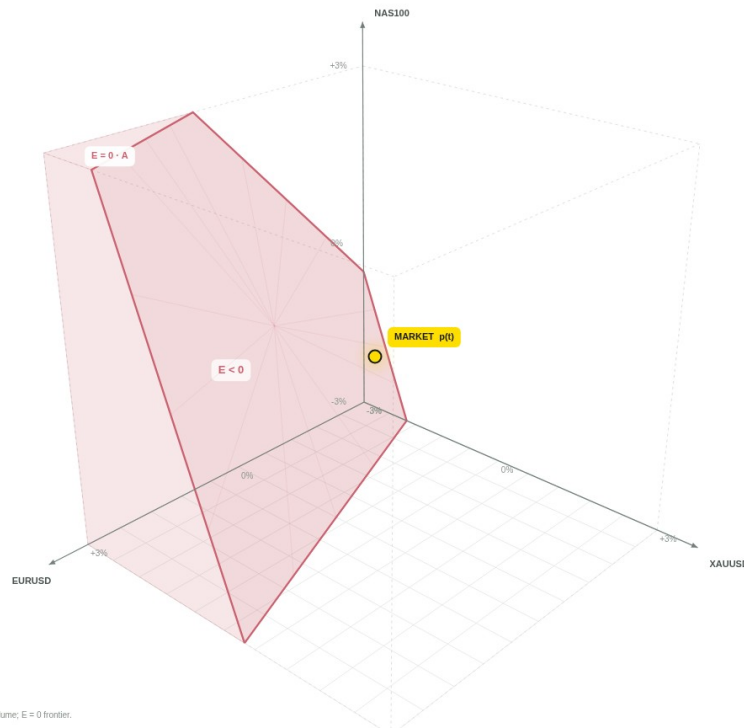
κ_i includes the contract multiplier and fixed currency conversion.

Changing leverage settings is not an extra multiplier on an already specified trade volume.

Open exposure, effective leverage and margin leverage are different quantities.

The domain and the frontier are different objects.

A positive compensation requires a strictly negative final deficit.



$$D_s = \{ p : E_s(p) \leq 0 \}$$

$$F_s = \{ p : E_s(p) = 0 \}$$

On the frontier, NBC = 0.
Inside $E < 0$, a deficit is possible.
Coverage is a separate assumption.

One asset: the frontier is a price threshold.

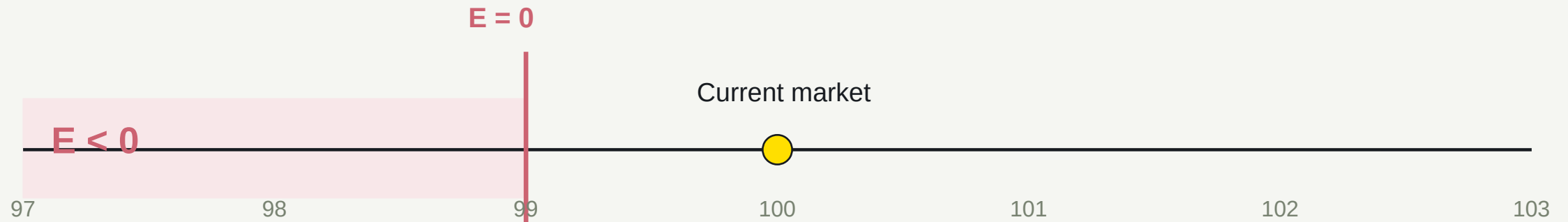
A long position has its negative domain below the threshold; a short has it above.

$$p^* = p_0 - E_0 / w$$

Illustration

$p_0 = 100 \cdot E_0 = \$10,000$

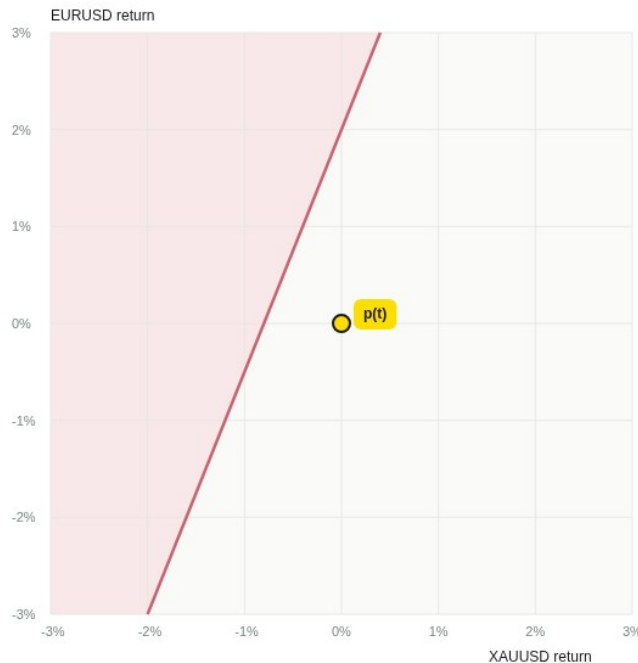
10,000 units long $\rightarrow p^* = 99$



At 99 the account reaches zero. A next executable quote below 99 can create a deficit.

Two assets: a line divides the price plane.

The third coordinate is held fixed in this conditional slice.

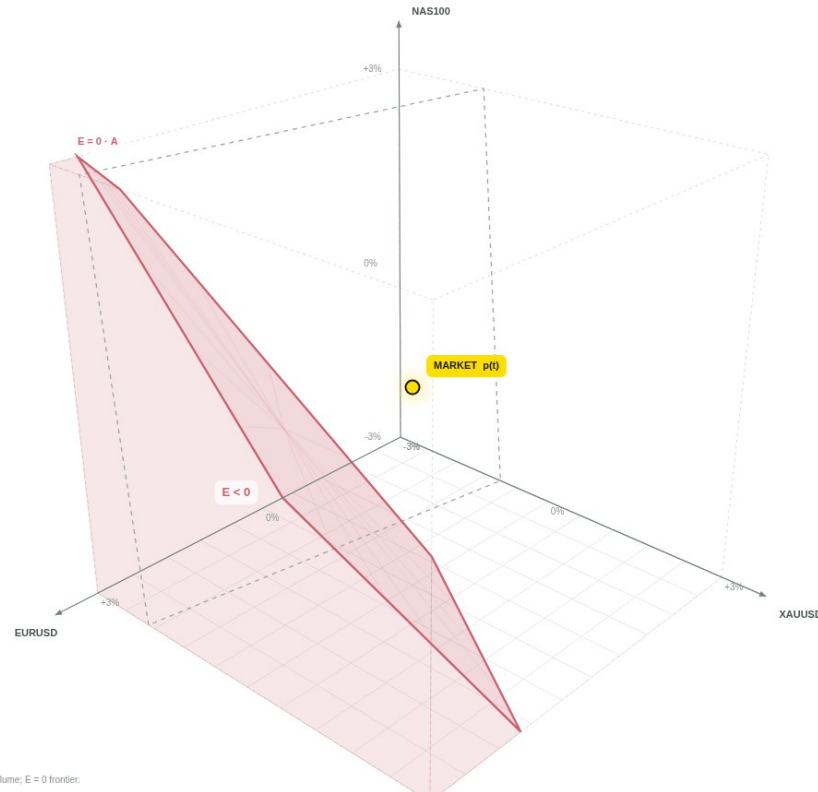


2D slice $\neq$ a projection that discards risk.

The fixed coordinate still contributes to equity through the intercept. Moving it shifts the line.

Three asset prices. Not an equity mountain.

The height axis is NAS100 price. Equity is encoded by the domain and the account cards.



$$p = (p_1, p_2, p_3)$$

Orbit the camera.
Inspect the volume.
Keep the math fixed.

For N assets, show an honest conditional slice.

The app supports imported scenarios with three to eight assets and a selectable three-axis view.

$$\mathbf{E} = \tilde{\mathbf{c}} + \mathbf{n}_1 \mathbf{r}_1 + \mathbf{n}_2 \mathbf{r}_2 + \mathbf{n}_3 \mathbf{r}_3$$

$$\tilde{\mathbf{c}} = \mathbf{c} + \sum \mathbf{n}_i \mathbf{r}_i \quad \text{for all hidden coordinates}$$

Relabel the three visible axes as 1, 2 and 3.
Keep every hidden asset's current P&L in the intercept.

A 3D picture of an N-dimensional state must say which coordinates are held fixed.

Every action changes the same equity function.

Cash moves shift the level; executed trades change the signed sensitivities.

$$E_s'(p) = E_s(p) + D - W - K + \Delta w^T(p - p_t)$$

DEPOSIT

Raises current equity.
Shrinks the negative domain.

WITHDRAW

Lowers current equity.
Expands the negative domain.

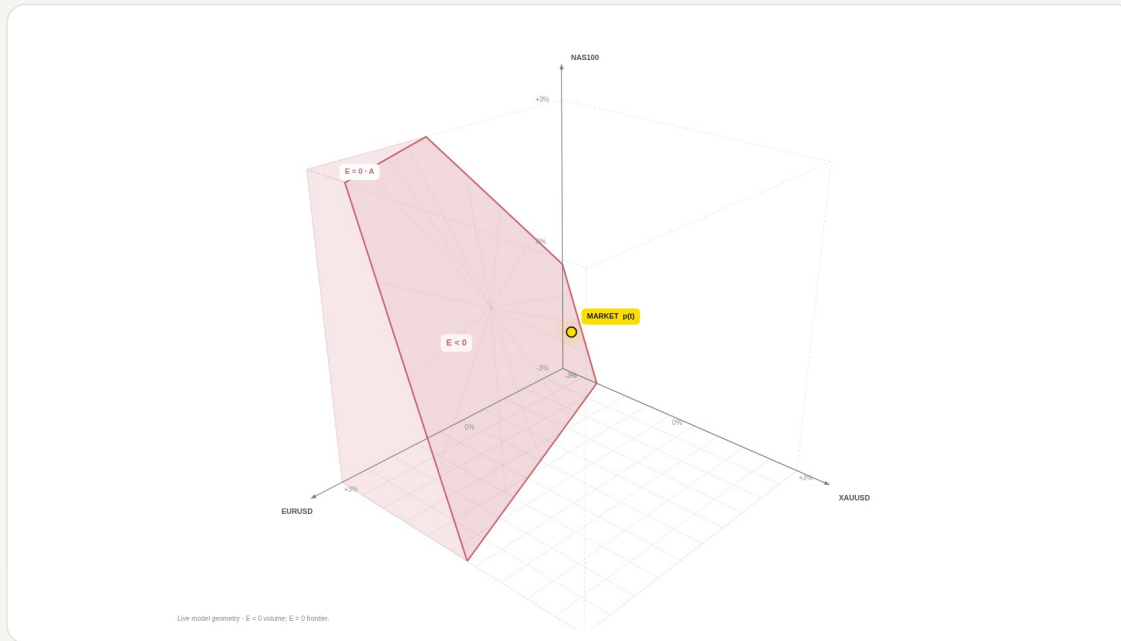
CHANGE v

Changes orientation and slope.
Not uniformly safer or riskier.

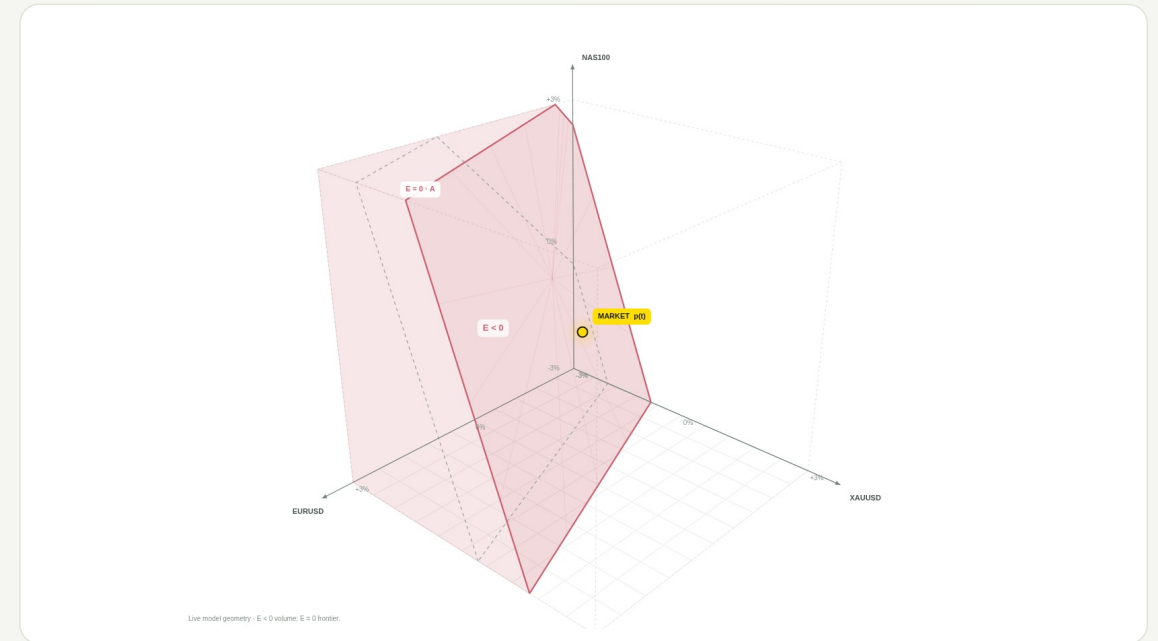
The formula assumes execution at p_t ; K captures explicit execution costs.

Withdraw cash: the point stays still.

The same market and the same positions; only account cash changes.



Before: equity \$10,000

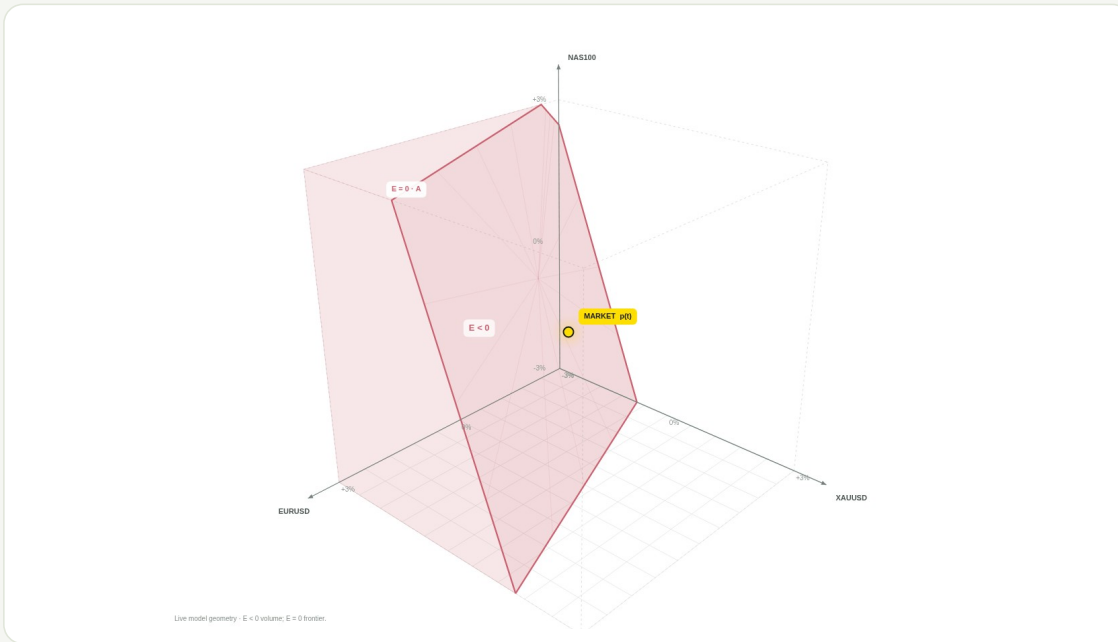


After: equity \$4,000

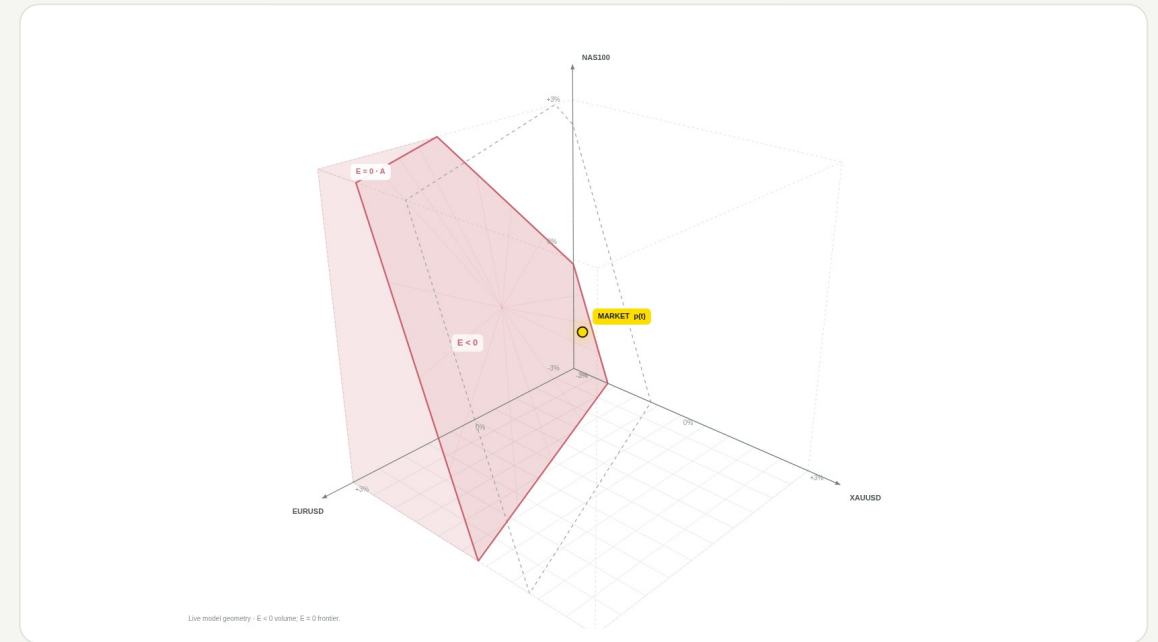
A \$6,000 withdrawal moves to reserve. Total capital is still \$15,000.

Deposit cash: move the frontier away.

Cash comes from the shared reserve rather than appearing as trading profit.



Before: equity \$4,000

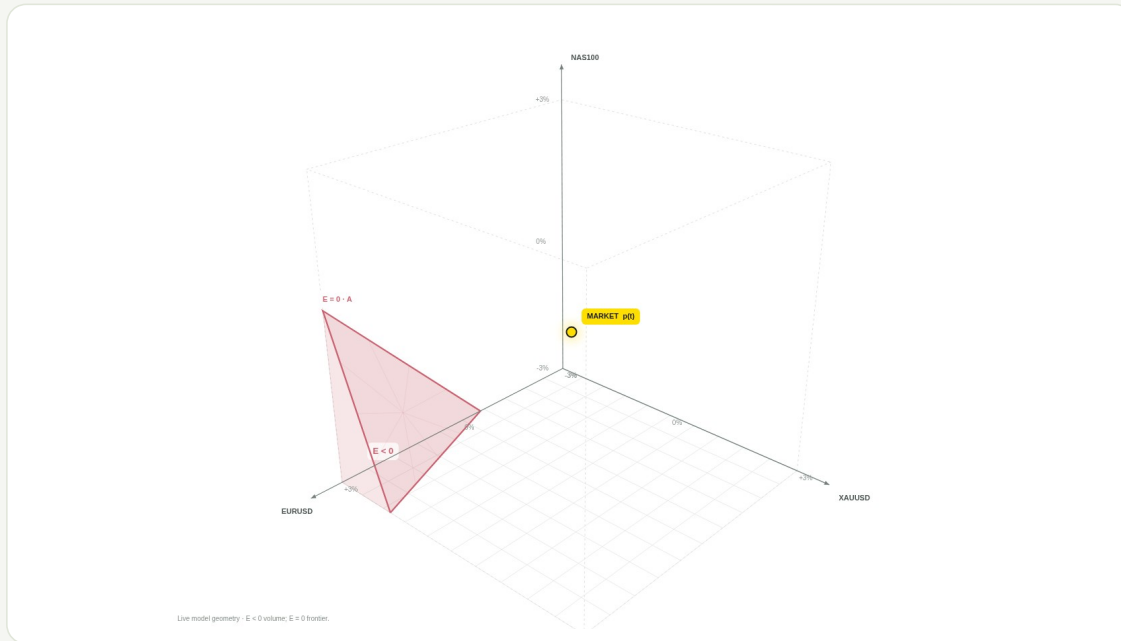


After: equity \$10,000

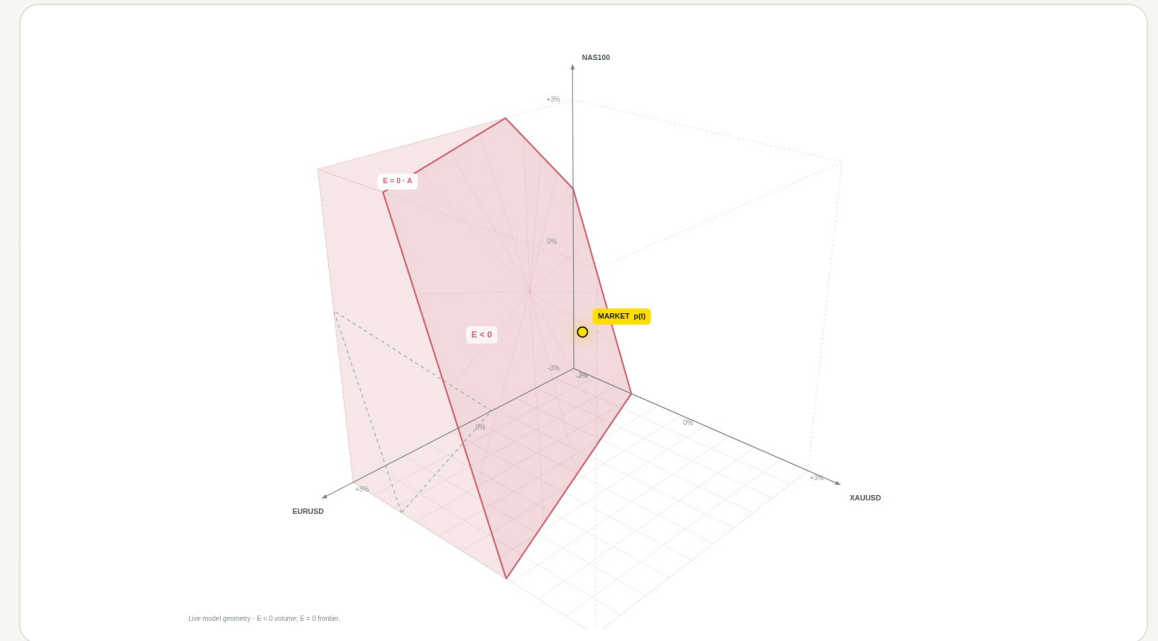
The same later jump leaves \$4,600 equity instead of a \$1,400 deficit.

Increase positions: a steeper loss profile.

Proportional exposure changes preserve current equity in a zero-cost, fixed-price example.



Before: \$450k gross exposure

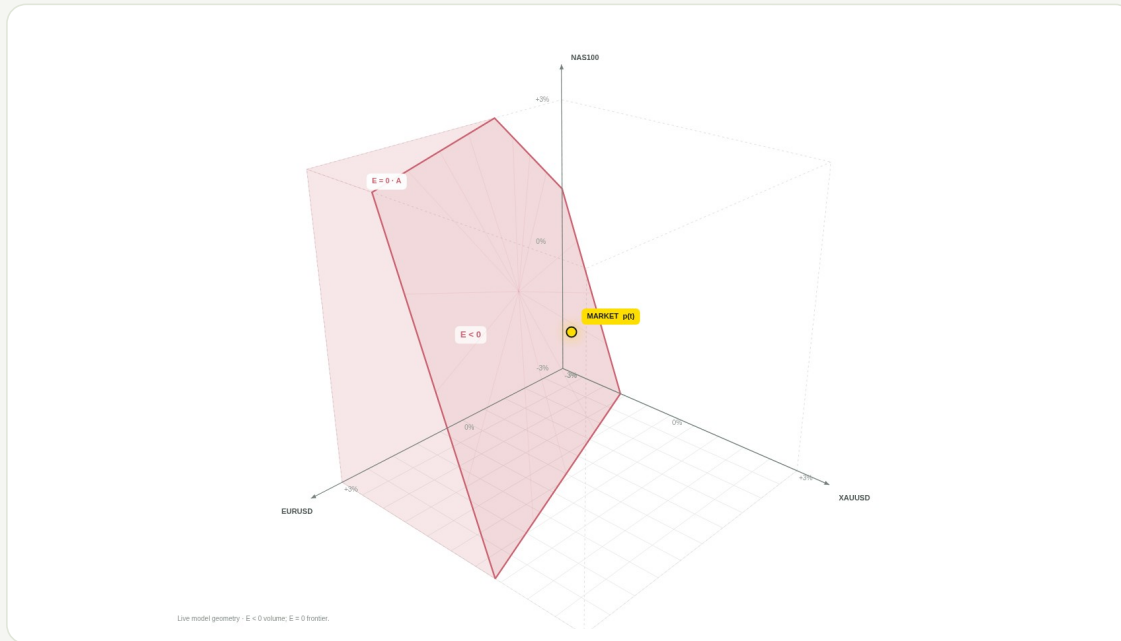


After: \$1.35m gross exposure

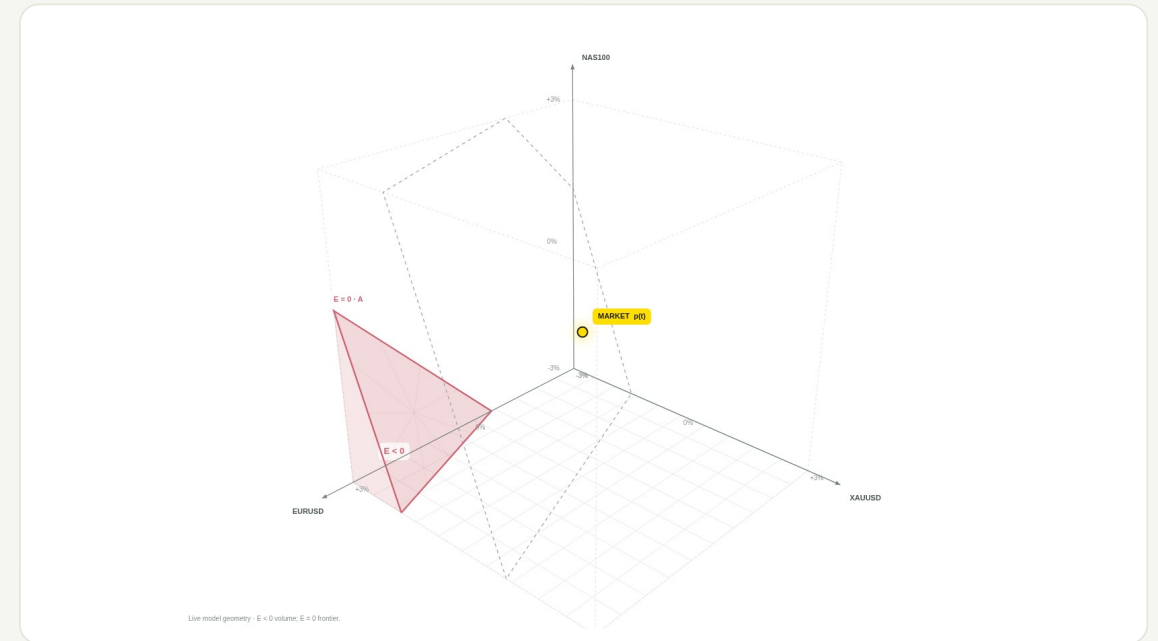
The same joint jump produces a \$9,800 deficit after increasing the position vector.

Reduce positions: keep equity, change sensitivity.

Closing part of a position does not create equity that was not already present.



Before: \$1.35m gross exposure

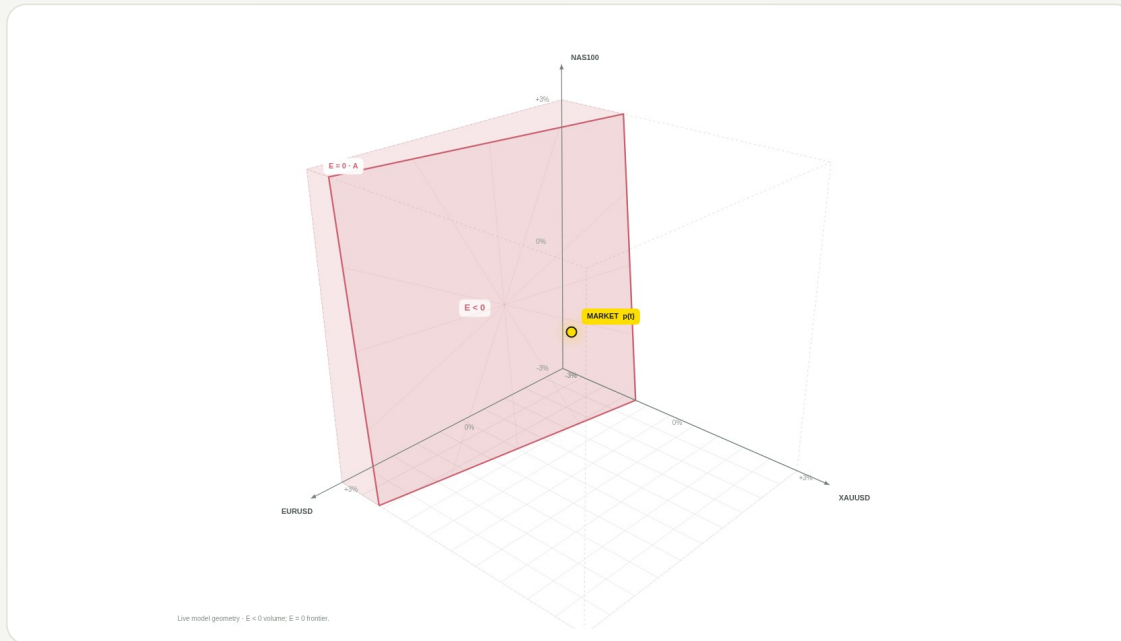


After: \$450k gross exposure

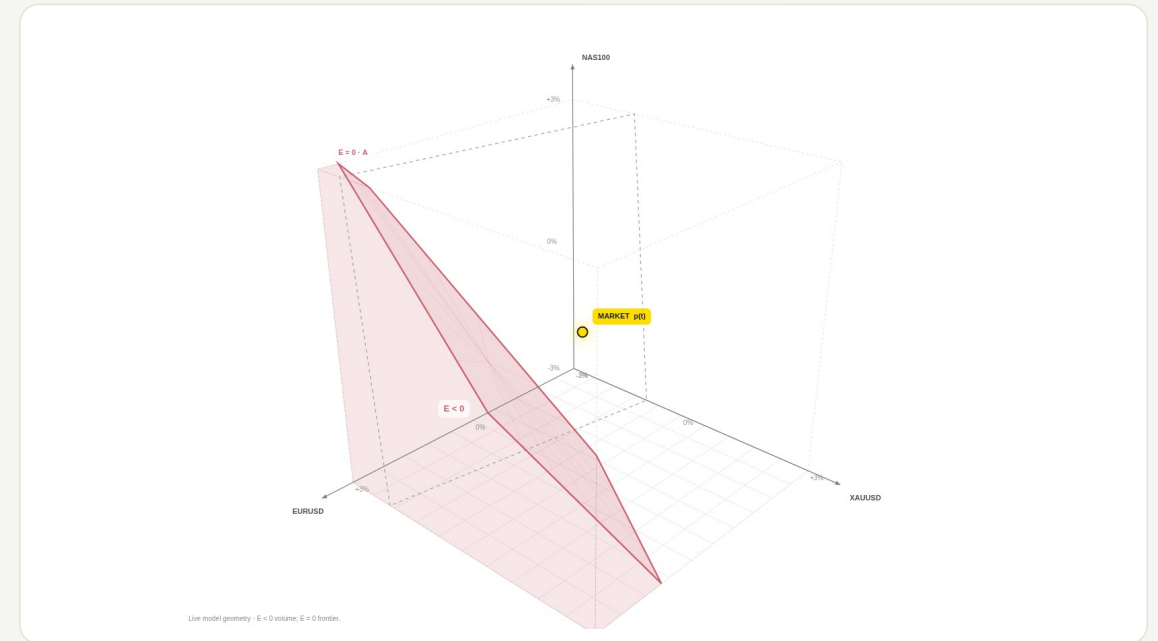
At the same jump, the reduced position survives with \$3,400 equity.

Reallocate positions: rotate the frontier.

The exposure vector is also the normal vector of the zero-equity plane in price space.



Before: long all three assets



After: EURUSD turns short

For this specified joint jump, the new exposure vector produces a \$5,000 deficit.

The admissible state space is constrained.

Every action is checked on its execution state, not against stale free margin.

$$0 \leq W \leq \max(E - M, 0)$$

$$E \text{ after withdrawal} \geq M$$

Deposits require cash in the shared reserve.

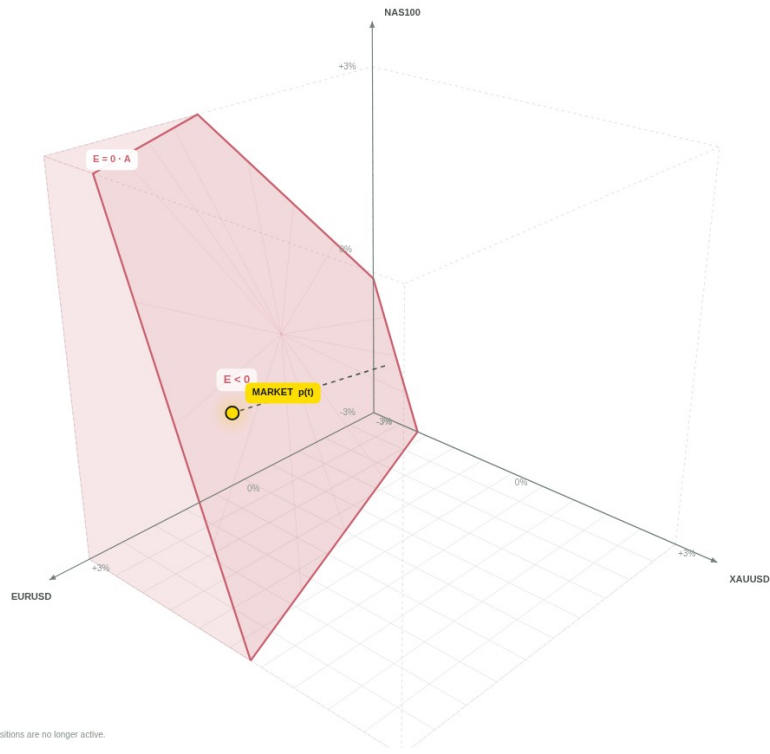
Rebalances must satisfy post-trade margin.

Rejected actions must leave state and ledger unchanged.

A declaration of intent is not an executed action.

A market jump crosses the account's geometry.

Use the actual position vector carried immediately before the event.



$$E^+ = E^- + w^T J$$

Strict deficit condition
 $w^T J < -E^-$

Jump size alone is insufficient.
Its direction relative to w matters.

Reaching zero is not the same as overshooting it.

With continuous equity and ideal instant zero-cost close at $E = 0$, NBC is zero.

Continuous path + exact zero close $\rightarrow$ NBC = 0

A positive deficit needs an adverse overshoot in liquidation value: a price gap, unavailable intermediate execution, delayed checks, slippage or explicit closing costs.

The fundamental discontinuity can be in price or in the ability to execute.

Expected NBC is frequency times deficit depth.

Use a distribution of executable outcomes, not the visual size of the shaded region.

$$\mathbb{E}[\text{NBC}] = P(E < 0) \times \mathbb{E}[-E \mid E < 0]$$

3.75%

Probability of a positive deficit

\$5,453

Conditional mean deficit

\$204

Expected modeled NBC

Illustration: 2,000 fixed-seed synthetic draws. Uncalibrated. Not a forecast.

The same frontier can hide different deficit sizes.

Geometry alone does not determine the cash scale of compensation.

$$E_2(p) = k \cdot E_1(p), \quad k > 0$$

DOMAIN

$$D_2 = D_1$$

FRONTIER

$$F_2 = F_1$$

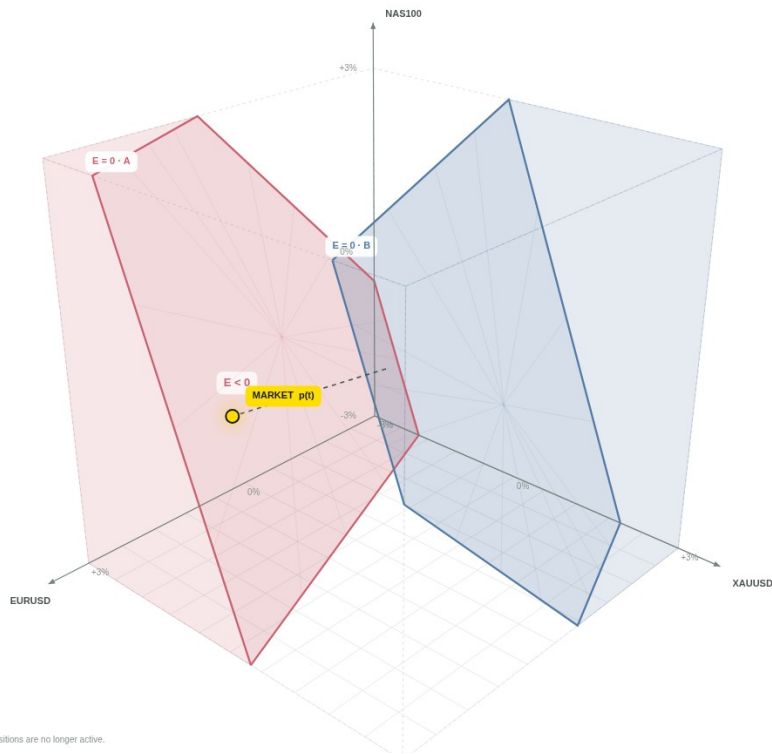
COMPENSATION

$$NBC_2 = k \cdot NBC_1$$

Always pair frontier geometry with exposure sensitivity and total capital.

Simple Mirror: two domains, one market point.

Opposite exposures are held on independently modeled accounts.



\$3,200

Account A / final deficit

\$23,200

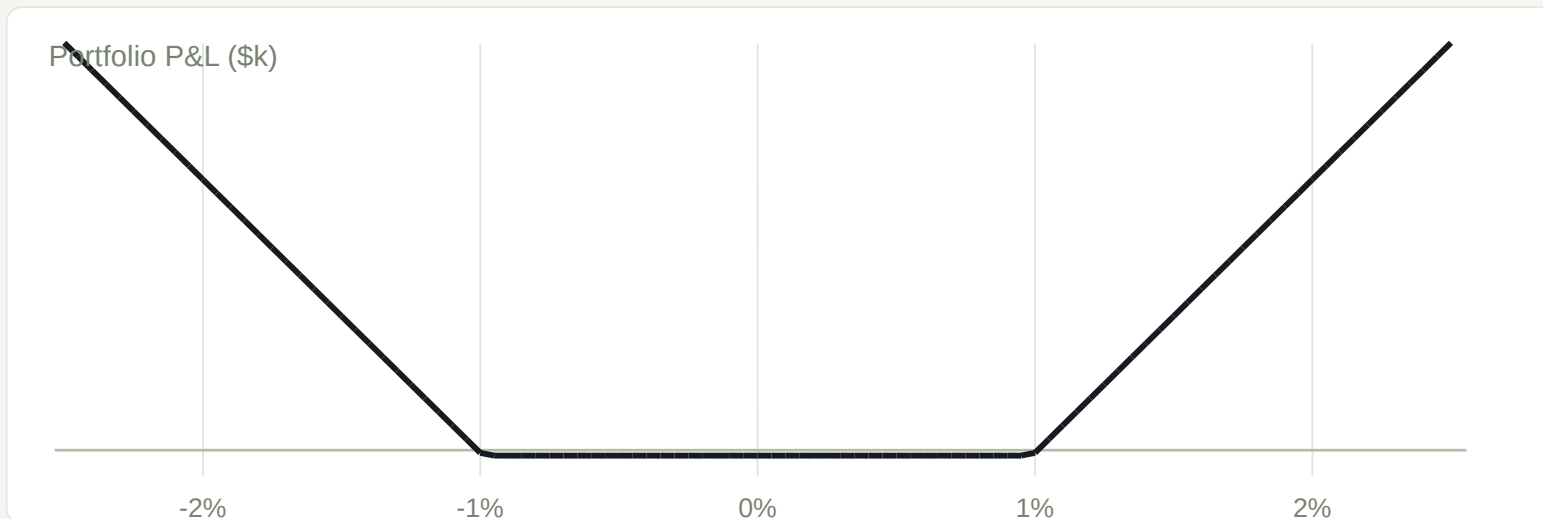
Account B / equity at same quote

The model credits A once.
It does not net A and B together.

The ideal pair has a conditional payoff—not a guarantee.

Separate analytic example: B = \$10k and N = \$1m on each account; \$100 costs per side.

$$\Pi(r) = \max(N|r| - B + c, 0) - 2c$$

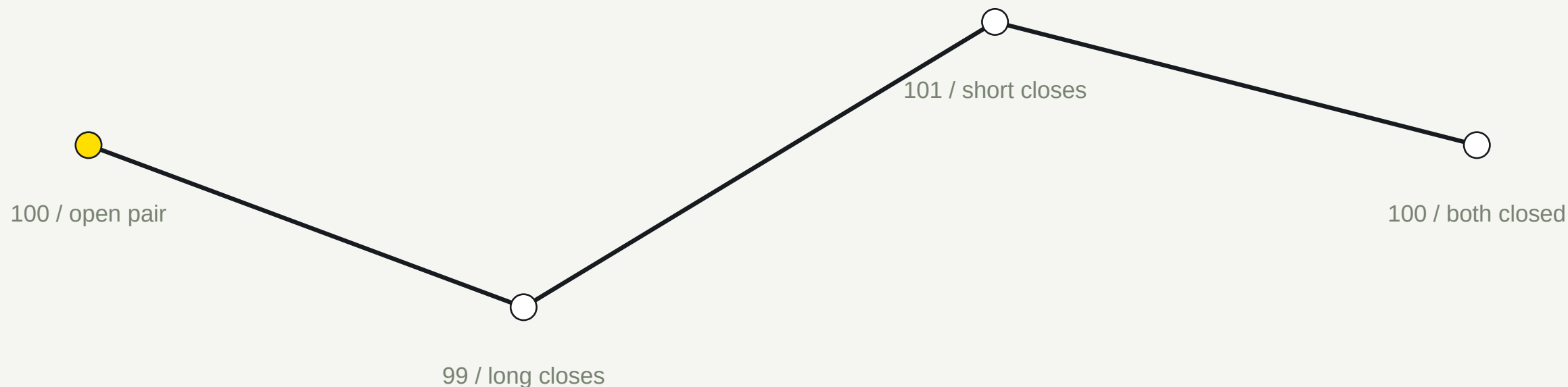


NBC > 0
|r| > 0.99%

Net profit > 0
|r| > 1.01%

A round trip in price can destroy both accounts.

Same final price. Different irreversible account states.



Final P&L: -\$20,000

Total NBC: \$0

High and Low rules reshape carried exposure.

Original semantics are preserved; these are illustrative demo parameters.

ASSYM HIGH

**If $RL \geq 150\times$
close 5% of current units.**

Demo open leverage: 100×
Four adjustments before the gap.

ASSYM LOW

**If $RL \leq 100\times$
add 5% of current units.**

Demo open leverage: 200×
Five adjustments before the gap.

Risk check → scheduled close → at most one RL action per observed model second.

Cash transfers are not economic returns.

One finite capital pool contains every account and the shared reserve.

$$\text{Capital} = \Sigma \text{ account equity} + \text{reserve}$$

ACCOUNTS

\$10,000 → \$4,000

SHARED RESERVE

\$5,000 → \$11,000

TOTAL CAPITAL

\$15,000 → \$15,000

A modeled NBC credit is a separate ledger event and is counted exactly once.

NBC20 is a frozen-position diagnostic.

Start the clock at actual modeled liquidation τ , not at the scheduled news time.

$$E_{20} = B\tau \text{ before credit} + \sum q_i(P_{i,\tau+20} - P_{i,\text{fill}})k_i$$

\$3,200

Credit at liquidation

\$6,000

Frozen equity after recovery

\$0

NBC20 after 20 seconds

Never add NBC20 to the balance, actual model credit or economic P&L.

A scenario space, not a collection of anecdotes.

Test interactions between market paths, account policies and trader actions.

MARKET

No jump · one gap · reversal
Multiple jumps · spread moves

EXECUTION

Partial fills · rejection
Delay · slippage · stale quotes

ACCOUNT

Cash constraints · leverage
Margin changes · separate
credit

STRATEGY

Static · asymmetric · High/Low
Mixed or multi-account
portfolios

CAPITAL

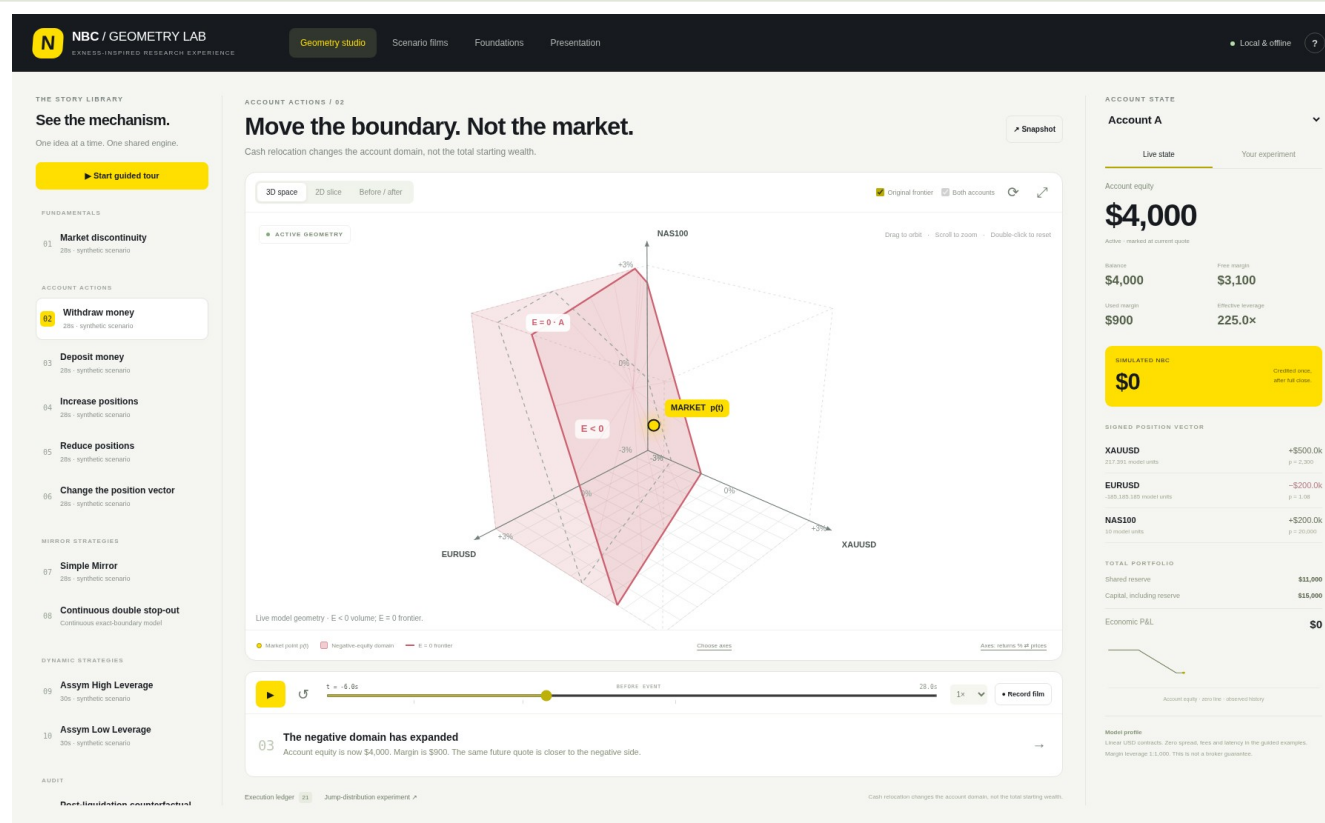
Independent event study
Continuous finite-capital
portfolio

EVIDENCE

Synthetic truth cases
Historical replay · stress tests

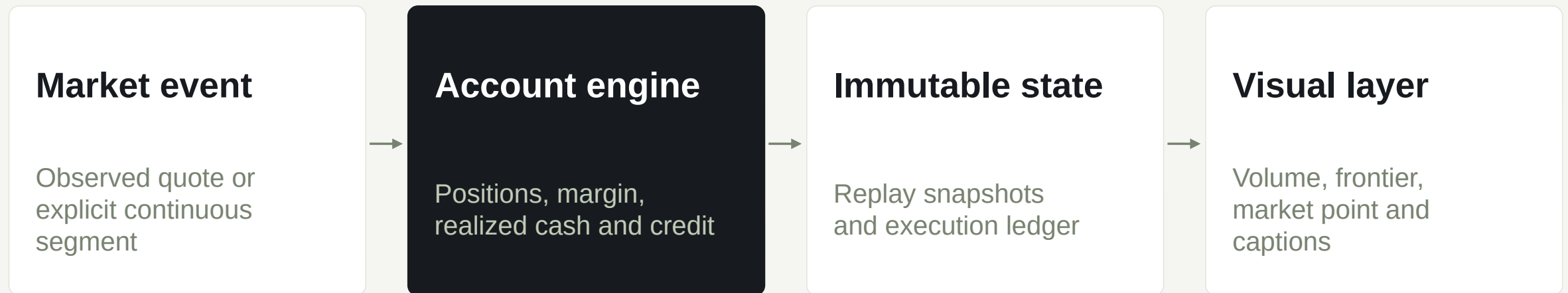
One synchronized workspace, built to explain.

The scenario, 3D geometry, account state, captions and ledger share one deterministic state.



The renderer must never decide the financial result.

Every image and every film is derived from the same explicit account state.



Scrubbing changes the displayed snapshot. It does not execute the strategy again.

Historical research needs the first executable event.

A first post-gap quote must not be silently replaced with the last price of that second.

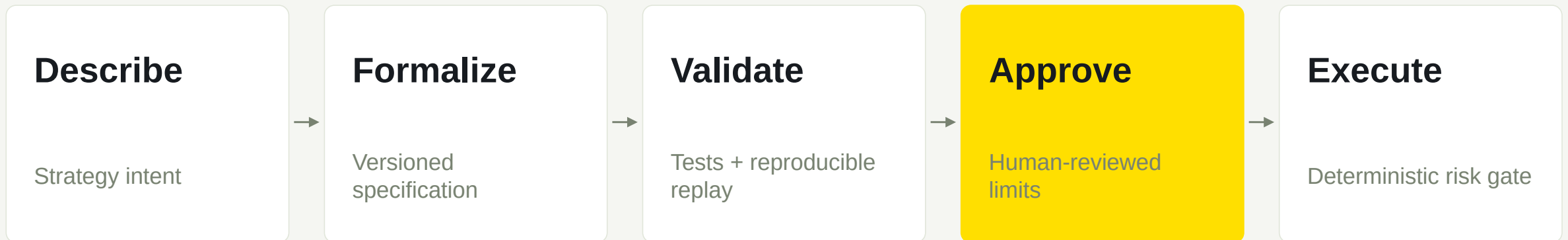
Pre-gap state → first observed quote → fills → final deficit

Preserve source time, received time and event ordering.
Keep raw prices separate from display normalization.
Version contract, margin and coverage assumptions.
Missing data must be explicit, not a fabricated flat path.

A quoted price alone does not prove that the full position could fill there.

AI proposes. Deterministic code calculates and executes.

The existing on-prem Qwen can become a specification and research agent—not an unrestricted order sender.



No brokerage API, autonomous order agent or AI model is required or connected in this release.

Open locally. Explore immediately.

The complete project works without a cloud service, CDN, API key or model download.

ZERO INSTALL

OPEN_NBC_LAB.html

Unzip the project.
Double-click the file.
Your browser opens the studio.

LOCALHOST EDITION

START_MAC.command

Uses Python 3.9+ if available.
No packages to install.
Falls back to standalone on Mac.

Included: English presentation, 11 captioned MP4s, source code, scenario JSON and tests.

What has been verified—and what has not.

Correct arithmetic, visible assumptions and clear boundaries are part of the product.

34

Automated JavaScript engine tests

12

Python launch, HTTP and Decimal tests

38

Browser interaction checks

Verified in the build environment: cash conservation, full-account NBC, exact-boundary control cases, scenario outputs, perspective interaction, timeline, sandbox rejections and responsive layouts.

Not verified: the user's Mac, real broker fills, real NBC eligibility or historical profitability.

Definitions first. Evidence and provenance always.

The implementation keeps synthetic examples separate from broker policy and real performance.

PROJECT FOUNDATION

The project owner's NBC / Mirror definitions.
Prior High / Low semantics and NBC20 convention.
Included engine.js, scenarios.js and regression tests.

PUBLIC IMPLEMENTATION REFERENCES

Exness: "Introducing the next level of Exness" — visual inspiration.
MDN: MediaRecorder and isTypeSupported — browser recording.
Full source links, assumptions and reproducibility notes: docs/SOURCES.md.



**Move the state.
Watch the frontier.
Audit the outcome.**

One model. One replay. Every number traceable.