HUMAN BIOLOGY INVESTMENTS, L3C

IMPACT TERMINAL · MARKET INSIGHTS

HBIL3C Impact Volatility Index

Complementary reserve asset for global holders of North American Treasuries.

social — /swap.sh

SOCIAL/SWAP

Vignette #2 — a county takes the fixed leg on a recidivism budget spike. HBIL3C books the floating, prices it off reentry exits, and lets the rolloff into Year-3 print the surplus that conventional credit would miss.

environmental — /option.sh

ENVIRONMENTAL /OPTION

Vignette #3 — a port city buys long-dated calls on flood-overrun deltas. The fund writes the calendar against deployed green infrastructure. Payoff convexes the moment the next FEMA event prints.

industrial — /future.sh

INDUSTRIAL/FUTURE

Vignette #4 — a regional grid operator sells fixed against a microgrid sleeve. Outage-cost spikes that used to bleed ratepayers now redirect into the term structure. The fix-vs-float spread is the cash flow.

commercial — /swap.sh

COMMERCIAL/SWAP

Vignette #5 - a mid market manufacturer takes the fixed leg on production drag from a fractured supplier tier. HBIL3C books the floating against verified integration savings the reconciled chain prints.

```
~ % ./ivndx --domain all --emit publication
```

// SYSTEM OPERATORS

~ % ./incorporation --dual mandate: deploy capital where verified public deltas add to market sources of return

PRIVATE BUSINESSES

Outcome-contracts creating a B2G demand pipeline of revenue based on verified public need. Qualifying enterprises also access debt & equity financing from HBIL3C, offering small and private businesses growth capital on top of outcome-linked revenue.

GROWTH

NONPROFITS

Access to long-term multi-year service provider delivery contracts can add to fiscal government & corporate grant cycles. HBIL3C provides nonprofits with defined verification terms opposed to nonguaranteed grant renewals.

CONTRACT SECURITY

CORPORATIONS

Provide outcomes that highlight operational efficiencies and diversified revenue uncorrelated with market cycles. HBIL3C projects and contracts add to consumer/enterprise demand alongside existing revenue as another market valuation signal.

DIVERSIFICATION

// ~ % tree

~ % ls -la ./sections # eight files

// click any section to jump — links embedded.

§ 1

ORIGINATION

input → eval → price → emit

```
~ % cd ./sections/1.origination
```

§ 1.1 ACCELERATION PREMIUM

~ % describe acceleration_premium

Public budgets grow based on appropriation cycles, high-cost failure baselines accelerate on demographic and behavioral compounding. A widening gap, or delta, opens between the two: cost of doing nothing and the cost of contracting an outcome. IVNDX prices that gap across all cause areas before underwriting

SIGNAL

Costs compounding faster than the budgets funding them. The steeper the slope, the wider to capture.

WINDOW

Verified intervention bends the slope before the next budget cycle locks it in. The bend is the delta.

SETTLEMENT

Independent evaluation converts the delta into cash. The premium is pre-appropriated government spend.

~ % status: LIVE – premium confirmed, no mock data

§ 1.2 VALUATION STACK

~ % stack --show layers

L1

SURPLUS CAPITALIZATION

The principal floor — discounted real cost avoided, verified by independent evaluation.

L2

PAYBACK VELOCITY

How fast verification clears and triggers payout. Velocity compresses term risk into returns.

L3

INDEX-LINKED OPTIONALITY

Convex layer payout from municipalities and regions when IVNDX subindices print above strike bands.

~ % stack --sum -> the value of an outcome-linked position

§ 2

SURFACE

the index plotted in three axes

```
~ % cd ./sections/2.surface
```

// surface = drift x volatility x convexity

§ 2.1 THREE-AXIS READ

```
~ % ivndx surface --axes amplitude,persistence,propagation
```

AMPLITUDE

How wide is the swing in baseline costs?

Measures peak-to-trough distance a high-cost baseline moves in each timespan. The spike a municipal/state budget did not price.

PERSISTENCE

How long the swing stays above the path trajectory?

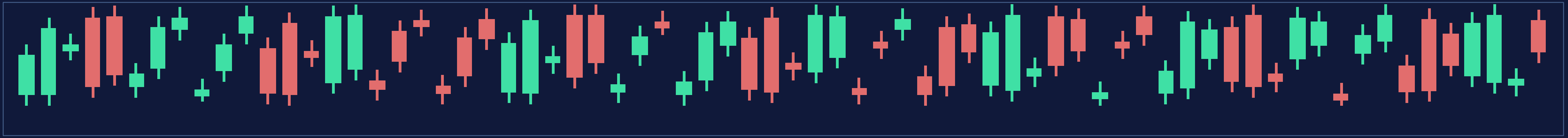
Measures cycles the overshoot survives without intervention; dwell time of an elevated baseline. Each cycle the carry inflates and the appropriation lags, amplifying structural drift.

PROPAGATION

How many domains move together?

Measures cross-cause correlation; how a stress in one cause-area cross-infects others at the fund level — ED visits raise correctional intake, raise housing instability, raise ED visits. Clusters trigger biomimetic hedging signals.

// this panarchic instrumentation simultaneously uses an orthogonal axis for microscopic and telescopic market lens.



§ 2.2 CROSS-LEDGER FISCAL STRESS

~ % source ivndx domain deals --biomimetic hedging strategies

MARKET SURFACE

```
//the gap that identifies the market

Condition_Ledger != Cost_Ledger
Exposure_Ledger !=Payer_Ledger
Social_Determinant != Budget_Line_Item

// IVNDX traces the process back to
//investable intervention entry points
```

→

BASELINE

```
#baseline aggregates across disconnected
public ledgers, not only municipal/state
appropriations

B(g,t) - f (
municipal_budget,
state_aid,
Medicaid_and_public_health_claims,
hospital_uncompensated_care,
school_absenteeism,
environmental_exposure,
food_access,
incarceration_and_reentry,
commercial_vacancy, infrastructure_decay
)
```

→

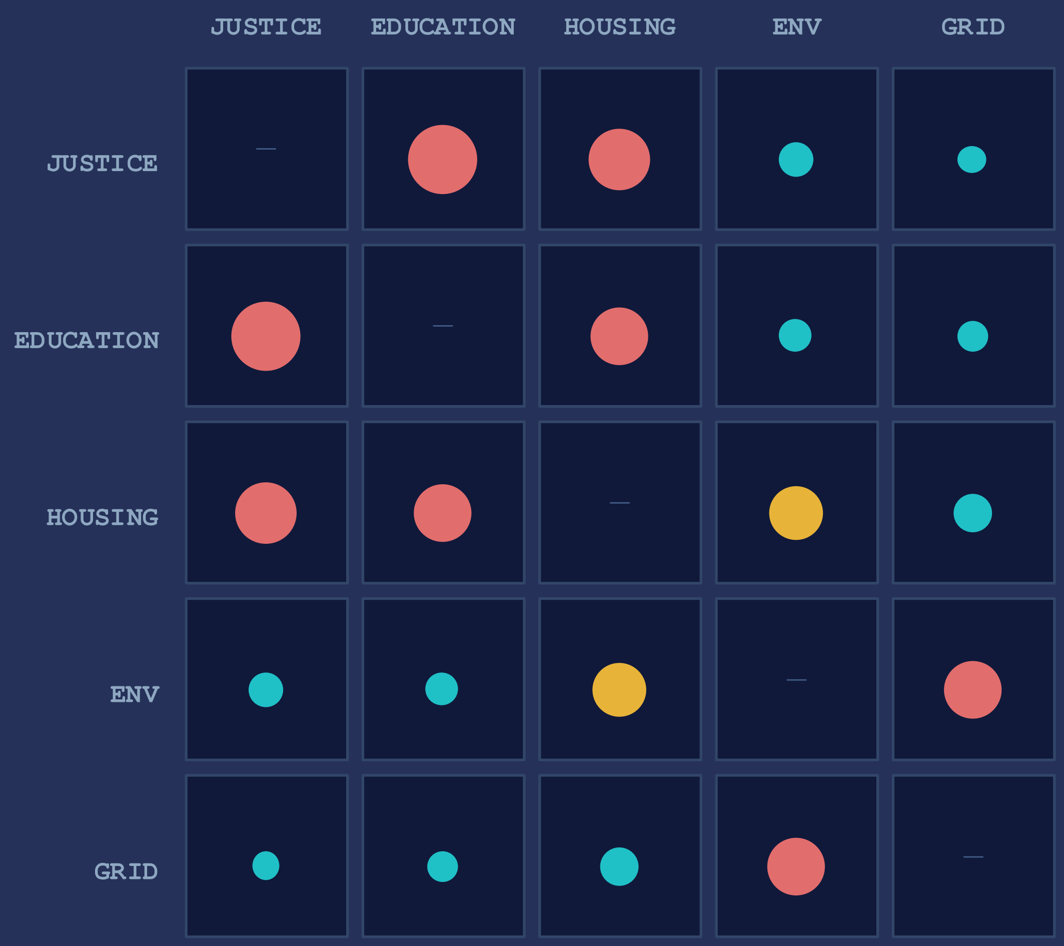
GOVERNMENTS

```
//debt_t+1=debt_t + (primary_deficit_t +
interest_t) - surplus_t

//allocate capital where
(future_debt)/(baseline_cost) is largest

// for each North American municipality:
Stress = IVNDX(municipality) //composite
across social/env/commercial/industrial
if stress > threshold:
deploy_outcome_capital(municipality)
bind_contracts(health, justice,
education, environment)
hedge_failure_risk_via_IVNDX_derivatives
()
if outcomes_verified():
route_savings_to([municipal_budget_relie
f,LP_return,reinvestment_pool])
decrement_projected_nat'l_debt_path()
```

//non-government data widens the signal correlating domain-specific exposure with worsening social determinants

§ 2.3 PROPAGATION MATRIX

```
~ % ivndx propagation --print --upper-triangle
```



commercial — /option.sh

COMMERCIAL/OPTION

Vignette #6 — anchor buys long-dated calls on local supplier-network resilience. The manufacturing sleeve write puts against verified continuity metrics; convexity strikes on the next trade disruption that the integration absorbs.

commercial — /note.sh

COMMERCIAL/NOTE

Vignette #7 — two trading partners upgrade how their systems talk. a note pays holders as duplicated back-office work drops out and audited operational efficiency gains print on the delta captured.

// READ

dot magnitude coupling ranges = β-ij propagation coefficient. row stresses column. cross-domain coupling is the surface IVNDX prices. Values normalized by cause area.

- β > n high / elevated baseline
- β n moderate / transitional
- β < n low / monitored

values absent from municipal and state balance sheets: asthma vs. manufacturing / waste-dumping ZIP codes; chronic illness vs. food deserts; incarceration vs. commercial deserts; maternal morbidity vs. provider access

// the matrix is the volatility surface read.

§ 3

RUNTIME

throughput, throughput, throughput

~ % cd ./sections/3.runtime

// bending the cost curves

§ 3.1 SETTLEMENT WATERFALL

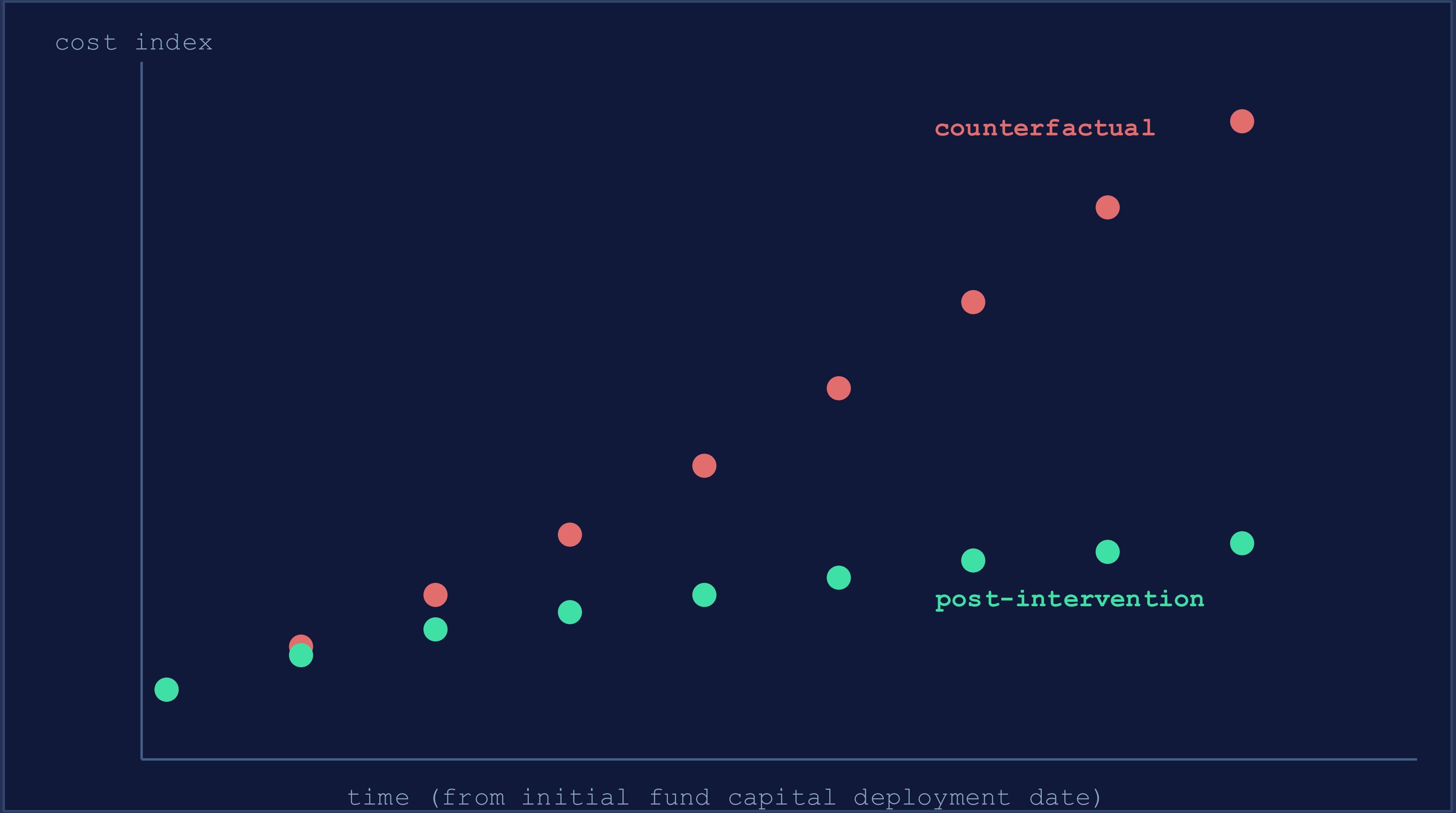
~ % settle --waterfall --counterparty municipal

TIER 1	**PRINCIPAL FLOOR** verified savings clear up to original capital — first-loss buffer absorbed by guarantor sleeve.
TIER 2	**BASE COUPON** annual outcome payments throw a fixed coupon while investments are at play.
TIER 3	**PERFORMANCE TRIGGER** verified surplus past the threshold flips on the variable leg — the investor's actual yield.
TIER 4	**OPTIONALITY KICKER** index-linked tail — pays only when the same architecture replicates horizontally project/contracts.

~ % every tier clears against an independent evaluation’s audit; payment lines not enacted within verification windows

§ 3.2 BENDING THE CURVES

~ % plot -high-cost baseline counterfactual --vs intervention



FUNCTION

All HBIL3C investment domain cause areas have a counterfactual baseline that compounds. Private capital funds the intervention that bend the curve; investors are paid in the area between the two.

commercial — /future.sh

COMMERCIAL/FUTURE

Vignette #8 — a regional trade corridor books forward pricing on on friction in freight. The contract settles when the next integration removes the delay it was priced against.

~ % area between the two curves = the surplus, or delta, the carrier prints.

§ 4

TIMECHAIN

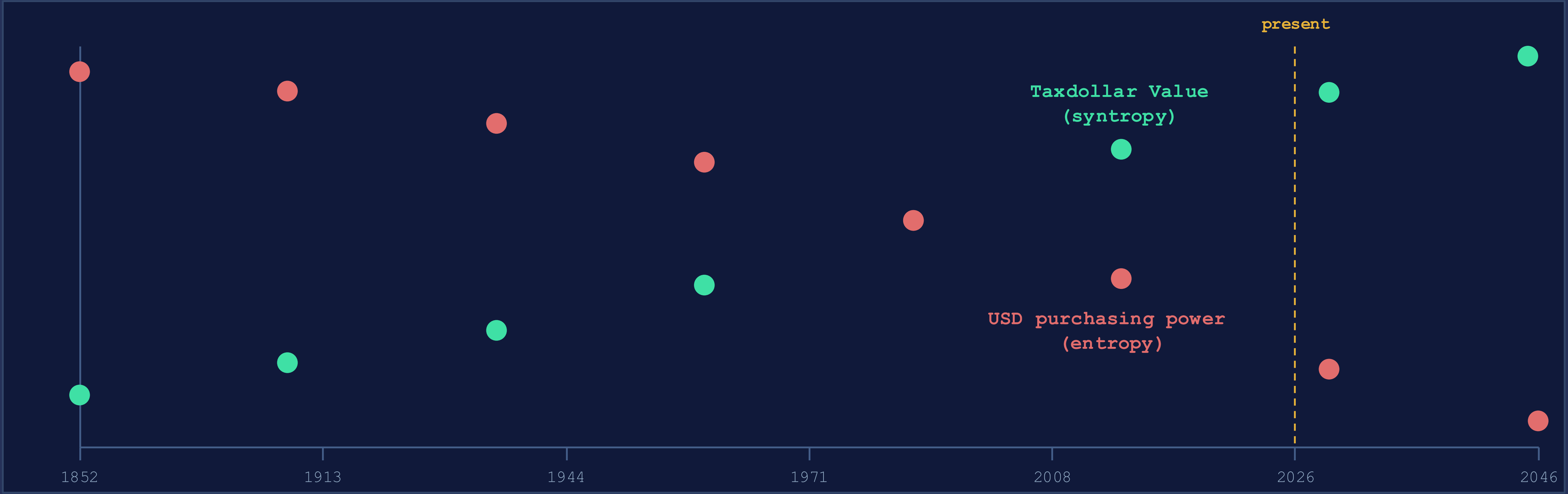
USD </> Taxdollar Value

~ % cd ./sections/4.timechain

// USD </> Taxdollar Value : entropy </> syntropy

§ 4.1 USD </> TAXDOLLAR VALUE — CONVEX

~ % plot --series usd_purchasing_power,taxdollar_value --range 1852-2046



ENTROPY LEG

The USD is the counterfactual and erodes monotonically with purchasing-power decay being the carry of inaction. Domestic inflationary USD erosion + international debasement.

SYNTROPY LEG

Taxdollar Value compounds the worse entropy gets, being convex and counter-cyclical against the USD. Outcomes denominate in avoided appropriated costs that appreciate with deterioration.

§ 4.2 INVERSE MANDATES ON ONE TIMELINE

~ % diff --mandate entropy syntropy

1977 MANDATE (ENTROPY)	2023 MANDATE (SYNTROPY)
stabilize prices + maximize employment	price outcomes + bend high-cost baseline curves
tools: rates, open market, forward guidance	tools: pay-for-results, evaluator-audited deltas
feedback loop: lagging indicators	feedback loop: independently verified outcomes
horizon: cyclical	horizon: multidecade
outcome: monotonic dilution	outcome: convex appreciation
settlement: USD	settlement: Taxdollar Value

```
//dual_mandate.py – HBIL3C <-> FRB

// dual_mandate.py – HBIL3C <-> FRB
FRB.mandate = (price_stability, max_employment) // demand side
HBIL3C.mandate = (failure_cost_stability, fiscal_solvency) // expenditure side

assert corr(FRB,policy_rate, HBIL3C.IVNDX_signal) ≈ inverse
assert shape(HBIl3C.return.curve | dollar_debasement) == convex

// when 1977 dual mandate tightens to damp CPI, IVNDX rises because health, corrections, education,
// infrastructure baselines outpace CPI by multiples
```

// the 1977 mandate is the end of one chapter, the 2023 mandate source codes next.

§ 5

COMMERCIAL

SOCIAL

OPCODES

four domains, lettered opportunities

~ % cd ./sections/5.opcodes

INDUSTRIAL

ENVIRONMENTAL

// strategic opportunities -- four domains

§ 5.1 STRATEGIC OPPORTUNITIES

~ % ls ./opportunities --domain commercial,social,industrial,environmental

A

COMMERCIAL

outcome-linked operators whose revenue is contractually paid by verified public savings — the operating layer of the new asset class.

B

SOCIAL

pay-for-success on populations whose entrenched failure costs cities are already paying — recidivism, ED super-utilizers, chronic homelessness, early childhood education<->employment correlates.

C

INDUSTRIAL

energy reliance sleeves where blackout cost was always the carry — now it can be sold to early adopters willing to underwrite innovative offsets to taxpayers.

D

ENVIRONMENTAL

EXTRACT:REPLINISH ratios involving the North American interior, forests, waterways, coastal and storm-overrun sleeves where capital deployed is the floating leg local budgets could never structure.

E

BIOMIMICRY

Vehicles that exploit the propagation matrix. Fund-level cross-cause negative correlation. — VERTICAL and HORIZONTAL BIOMIMETIC HEDGING strategies.

F

LICENSING & MGR SEEDING

IVNDX itself, licensed to external managers — the index is the product while high-cost baselines are the recognized surface areas.

§ 5.2 STRATEGY VEHICLES

~ % vehicles --status raising,planned --print

VEHICLE	STATUS	MANDATE	TERM(S)
Camden Social Impact Bond Fund	RAISING NOW	social domain SPV · public health, reentry, education, fiscal repair · VERTICAL BIOMIMETIC HEDGING	60mo · market rate target-IRR
N. America Impact Volatility Fund I/II	Post-Camden SIB	multi-city · IVNDX development · longer holding periods · HORIZONTAL BIOMIMETIC HEDGING	10yr · IVNDX-linked
Impact Terminal	The Big Long: Phase 2	manager methodology licensing · benchmarks · IVNDX terminal development · research and pricing	open-ended
Human Biology Investments Fund I/II	The Big Long: Phase 2	co-investment in IVNDX-linked operator sleeves · indexed notes · AGGRESSIVE BIOMIMETIC HEDGING	10yr · equity
Permanent Capital Vehicle	The Big Long: Phase 3	long-duration capital · strategy · municipal counterparties	open-ended

// Camden Social Impact Bond Fund, LP is the sole vehicle currently being raised. Listing is illustrative; not an offer or solicitation.

§ 6

BUILD

the index, its inputs, its kernel

~ % cd ./sections/6.build

// architecture pipeline

§ 6.1 THE BUILD

```
~ % make ivndx --pipeline --verbose
```

INPUTS	→	KERNEL	→	EMITS
· CMS claims (Medicaid, dual-eligible)		· baseline forecast (counterfactual)		· IVNDX composite level (daily)
· CDC chronic disease surveillance		· drift / volatility decomposition		· subindex (Ed/J/H/I/C/Env) levels
· BJS recidivism & corrections feeds		· three-axis surface fit		· underwriting tear-sheets
· HUD AHAR + PIT counts		· propagation matrix update		· pay-for-success term sheets
· Census ACS + LEHD wage records		· payback-velocity solver		· swap / option / future quotes
· state + municipal budgets		· outcome-evaluator validator		· outcome-linked note schedules
· NERC reliability events		· counterparty appropriation model		· ETF basket weights (licensed)
· FEMA NRI + IBNR loss records		· cohort replication tracker		· publication artifacts
· outcome-payer SLA telemetry		· amplitude estimation		· mapping by cause area
· counterparty fiscal capacity		· acceleration premium scaler		· warrant strike advisories
· cross-domain correlation datasets		· persistence filter		· methodology license & notes
· audited public cost streams				

// every input is terminal-installable; every emit is a future tradeable artifact.

§ 6.3 SUBINDEX FAMILY

~ % ivndx subindex --list

IVNDX-Ed — Education

first-1000-days outcomes; reaches into K-12 attainment and lifetime Medicaid load. Early child education continuity contracts indexed to long and short-horizon baselines

IVNDX-J — Criminal Justice

post-incarceration wraparound supports with employer-based wage attachments ; cuts corrections re-admit cost on a 36-month verification clock. wage-floor crossings tracked via LEHD; pays on durable workforce bridges.

IVNDX-H — Public Health

high-utilizer cohorts chronic disease drives the bulk of CMS spend. dual claims and non-communicable disease trajectory bend. broadband + telehealth utilization; pays on access-to-outcome conversion. population health bundles.

IVNDX-Ind — Industry

outage cost above engineered tolerance; carrier sells reliability; max efficient harnessing, souring, and distribution of elements for energy consumption technologies; grid impermeability

IVNDX-Comm — Commerce

Interconnections & integrations, manufacturing, trade, operational efficiency gains, supply chains

IVNDX-Env — Environment

flood losses below positive savings; infrastructure fortification; EXTRACT:REPLIENISH-Ratios

§ 7

SCRATCHPAD

open canvas for working notes

~ % cd ./sections/7.scratchpad

// workspace -- editable canvas

§ 7.1 VIGNETTES — SOCIAL DOMAIN

~ % cat ./vignettes/justice/health/education/*.sh

social — /swap.sh

JUSTICE/SWAP

Vignette #9 - a county takes the fixed leg on recidivism budget spikes. the fund carries the float against reentry exit-counts. when the cohort prints, the spread compounds into the term.

social — /option.sh

JUSTICE/OPTION

Vignette #10 - foundation-funded calls hedge against policy-driven incarceration regressions. premium is paid to the reentry operator; carrier collects on the tail.

social — /future.sh

EDUCATION/FUTURE

Vignette #11 - a school district books forward pricing on early childhood attainment. IVNDX-Ed settles as verified reading/comprehension and attendance gains lower the district's downstream remediation and Medicaid costs.

social — /etf.sh

HOUSING/ETF

Vignette #12 - supportive housing basket wraps outcome-linked operators paid on chronic homelessness exits. Stable placements audited biannually; the vehicle is the receipt for verified fiscal repair.

// editable scratchpad

>_

§ 7.2 VIGNETTES — ENVIRONMENTAL DOMAIN

~ % cat ./vignettes/environmental/*.sh

environmental — /swap.sh

ENVIRONMENTAL/SWAP

Vignette #13 - a coastal state takes the fixed leg on flood-overrun deltas. the fund deploys green infrastructure as the float — the moment FEMA loss-records print, the spread settles.

environmental — /option.sh

ENVIRONMENTAL/OPTION

Vignette #14 - a port-city buys long-dated calls on storm damage. climate funds write the resilience puts. the convexity is the storm itself.

environmental — /future.sh

ENVIRONMENTAL/FUTURE

Vignette #15 - utilities and industrials hedge climate-related infra cost via IVNDX-Env futures. the calendar prices the next NRI revision.

environmental — /etf.sh

ENVIRONMENTAL/ETF

Vignette #16 - resilience basket — climate-native and climate-adaptive operators weighted by their realized IVNDX-Env contribution. licensed downstream.

// editable scratchpad

>_

§ 7.3 VIGNETTES — INDUSTRIAL DOMAIN

```
~ % cat ./vignettes/industrial/*.sh
```

industrial — /swap.sh

INDUSTRIAL/SWAP

Vignette #17 - a grid operator pays fixed against a microgrid sleeve. blackout cost that used to hit ratepayers redirects to the carrier on every recorded NERC event.

industrial — /option.sh

INDUSTRIAL/OPTION

Vignette #18 - large industrials buy calls on outage risk above engineered tolerance. microgrid funds sell reliability puts and book the premium.

industrial — /future.sh

INDUSTRIAL/FUTURE

Vignette #19 - energy firms trade IVNDX-Ind futures to manage grid-volatility exposure. the curve prices reliability investment cycles.

industrial — /etf.sh

INDUSTRIAL/ETF

Vignette #20 - Grid Reliability ETF: storage, demand-response, distributed energy assets weighted by stability contribution.

// editable scratchpad

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§ 8

MANIFEST

disclosures, disclaimers

~ % cd ./sections/8.manifest

// legal & notices

§ 8.1 DISCLOSURES & DISCLAIMERS

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// ~ % exit

Saving session...

...copying shared history...

...saving history...truncating history files...

...completed

[Process completed]

// $ ipfs hbil3c publish --key=humanbiologyinvestments -ttl=24h /ipfs/Market-Insights-Q3-2026-CID