National Impact Velocity (NIV)

Catching Preliminary Systematic Stress Before Recessions

INDEPENDENT RESEARCH

MACROECONOMIC INDICATOR | RESEARCH TEAR SHEET

Validation Period: 1970–2024 (504 months)

Six Out-of-Sample Tests | Walk-Forward Protocol

CORE FRAMEWORK

$$NIV_t = (u_t \cdot P_t^2) / (X_t + F_t)^{\eta_t}$$

u = Thrust	P = Efficiency	X = Slack	F = Drag	η = Elasticity
Kinetic Impulse	Capital Productivity	Economic Headroom	Friction Forces	Scaling Parameter

0.8538	98.5%	41.71%	7 / 504
AUC @ 18-Month	False Alarm Filter	Orthogonal Variance	Critical Alerts
Discrimination Power	L2-Regularized Ensemble	Beyond Fed Yield Curve	42-Year Span

COMPONENT ARCHITECTURE

THRUST (u)

tanh(+1.0·ΔG + 1.0·ΔA – 0.7·Δr)

Investment YoY growth, M2 money growth, Fed Funds rate change. Bounded [-1,+1] via tanh.

EFFICIENCY (P)

P = (Investment × 1.15) / GDP

Regenerative capital proxy. Squared in formula (P²) to reward productive allocation.

SLACK (X)

X = 1 – TCU/100

Total Capacity Utilization headroom [0,1]. Idle capacity compounds negative margins.

DRAG (F)

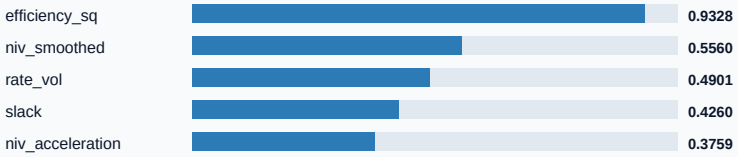
0.4·s + 0.4·max(0, r–π) + 0.2·σ

Yield inversion, real interest rate, rate volatility. Credit circulation inhibitors.

MULTI-HORIZON PERFORMANCE

Horizon	AUC	Brier	F1	α vs Log.
3-mo	0.7702	0.0949	0.3471	+0.0268
6-mo	0.7444	0.1160	0.2875	+0.0161
12-mo	0.8243	0.0972	0.3590	+0.0408
18-mo	**0.8538**	**0.0891**	**0.4545**	**+0.0309**

TOP FEATURE IMPORTANCE (Gini)



ENSEMBLE FALSE-ALARM SUPPRESSION

Model	Months >35%	Std Dev
Neural Network	474	0.1001
Logistic Regression	230	0.2418
Boosted Stumps	50	0.1675
Final Ensemble	**7**	**0.0883**

STRUCTURAL ONSET DIAGNOSTICS — LAST SIX CONTRACTION CYCLES

Era	Lead	NIV	Fed Sprd	Trigger	Context
~1979	7 mo	2.60	0.57	**Thrust**	Volcker-Era Shock
~1980	17 mo	–3.08	0.52	**Thrust**	Double-Dip Recession
~1989	9 mo	–1.01	1.89	**Thrust**	S&L / Gulf War Cycle
~2000	9 mo	6.75	0.91	**Thrust**	Dot-Com Unwind
~2006	19 mo	–0.31	1.28	**Thrust**	GFC Core Onset
~2019	3 mo	2.04	0.41	None	COVID (Exogenous)

GDP FORECAST BENCHMARK

NIV vs. Fed Yield Spread (10Y-3M)

NIV RMSE Std Dev	**0.0023**
Fed RMSE Std Dev	**0.0061**
NIV dominates at	**0-lag (+0.0083)**
Fed dominates at	**12-mo lag (–0.005)**
Stability advantage	**2.7× less volatile**

ORTHOGONALITY PROOF

Structural Independence from Bond Market

Correlation (ρ)	**0.7635**
R² overlap	**58.29%**
Orthogonal variance	**41.71%**
Hybrid allocation	**60% Fed / 40% NIV**
Hybrid RMSE delta	**+0.0024 (marginal)**

METHODOLOGY

Walk-Forward Out-of-Sample Protocol

Window	**Expanding (1970→)**
Retrain frequency	**Every 5 months**
Warm-up	**Through 1983**
Ensemble	**L2 LogReg + AdaBoost + NN**
Thresholds	**Yellow 12-35% | Red >35%**

FAIR COMPARISON TO ALTERNATIVE APPROACHES

Fed Yield Curve
Limitation: Sentiment-based; manipulated by QE/forward guidance
NIV Edge: NIV extracts 41.71% orthogonal physical-capital variance

Conference Board LEI
Limitation: Linear arithmetic averaging; mixes lagging data
NIV Edge: NIV ensemble detects non-linear regime breaks; 98.5% noise filter

DSGE Models
Limitation: Assumes equilibrium return; ignores financial friction
NIV Edge: NIV models friction accumulation; no equilibrium assumption

DISCLAIMER: This tear sheet presents independent academic research. Not investment advice. Past model performance does not guarantee future results.
Data Source: FRED (Federal Reserve Economic Data) | Validation: 504 months, 40 recession-labeled contractions, expanding-window walk-forward protocol.