Decomposing Global Fear

Expected uncertainty, risk aversion, and sovereign spreads in emerging market economies

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Overview

- The VIX is the standard barometer of expected volatility in global financial conditions but it bundles **two different measures**: how much risk there is (expected uncertainty), and how much investors charge for it (risk aversion).
- We separate the two measures for **77 emerging economies, 1993–2024**, and trace each into EMBI sovereign spreads.
- **On impact**: both expected uncertainty and risk aversion shocks widen spreads by roughly 25–30 basis points.
- **Over one year**: Response to a risk aversion shock is not statistically significant after six months; expected uncertainty shock is significant at each monthly horizon through 12 months.
- **Transmission is not uniform.** Low reserves, low per capita income and high external debt amplify the expected uncertainty channel.
- A separate country trait: **exposure to global bad states (kappa)** explains which sovereign spreads reprice most when the price of risk moves. It is a distinct and measurable vulnerability.

> **The practical question is not "did the VIX move?" but "which part of VIX moved?"**

One index, two components

VIX-squared = expected uncertainty + risk aversion (Bekaert, Hoerova and Lo Duca, 2013)

Quantity of risk

Expected uncertainty (UC)

- Forecast of how volatile the financial markets will be.
- Transmits through the **probability of default**: a wider distribution of future repayment resources pushes more mass past the default boundary.
- Should bite hardest where the sovereign is **already close to that boundary**: high debt, thin reserves.
- It is a **persistent state**: rho = 0.83, half-life 3.7 months.

Price of risk

Risk aversion (RA)

- Variance premium: what investors charge above expected uncertainty for bearing that variance.
- Transmits through **covariance pricing**: what matters is how a sovereign's payoff lines up with global bad states.
- Should bite hardest where that **exposure kappa** is high, which need not be where debt is high.
- It is a **transient state**: rho = 0.66, half-life 1.7 months.

> Both components are derived from the **same option prices on the same index**. What separates them is not the data source but the implications and, as it turns out, the horizon over which they matter.

Identification strategy based on Bekaert et al. (2013)

Variables (monthly)

- **Global/business cycle:** $BC_t = \Delta \log(IP_t)$
- **Monetary policy:** MP_t (Real FFR)
- **Volatility decomposition (unique t):**

$$RV_t = a + b\, IV_{t-22} + c\, RV_{t-22} + e_t, \quad \widehat{RV}_t \text{ fitted}$$

$$UC_t = \log(\widehat{RV}_t), \qquad RA_t = \log(IV_t - \widehat{RV}_t)$$

Standardization (unique time series)

$$z_x = \frac{x - \bar{x}}{sd(x)} \quad \text{for } x \in \{BC, MP, RA, UC, EMBI\}.$$

Identification (Cholesky)

$$u_t = P\varepsilon_t, \quad P = \mathrm{chol}(\Sigma_u)$$

Order: $BC \to MP \to RA \to UC \to EMBI$

Panel SVAR with exogeneity

$$y_t = \begin{bmatrix} zBC_t \\ zMP_t \\ zRA_t \\ zUC_t \\ zEMBI_t \end{bmatrix}, \qquad y_t = \sum_{\ell=1}^{p} A_\ell\, y_{t-\ell} + u_t.$$

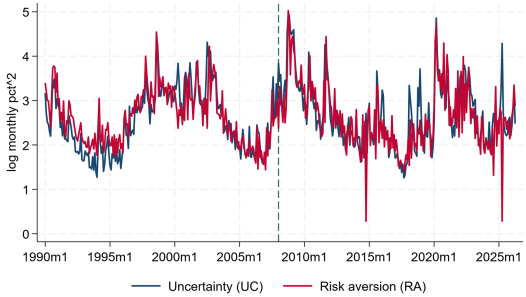
- **Global matrix (unique t):** OLS VAR(p) for (zBC, zMP, zRA, zUC)
- **Aggregate outcome:** $EMBI_t$ = cross-country average, ordered fifth
- **Exogeneity:** five shocks are mutually orthogonal

Shocks and inference

- **Shocks applied:** $\varepsilon^{MP}, \varepsilon^{RA}, \varepsilon^{UC}$
- **Outcome in panel LPs:** country-level $EMBI_{i,t}$
- **Inference:** country-cluster bootstrap; 68/95% CIs
- **Variance shares:** FEVD over $\{MP, RA, UC\}$ (global shocks only)

Measuring the two components

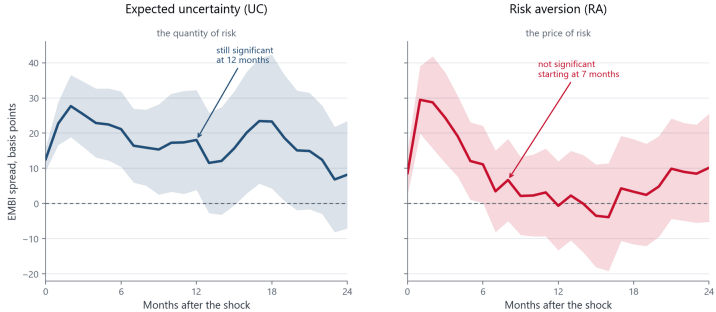
Project next-month realized variance on implied and realized variance (fit is UC, residual gap is RA)



Implied variance = VIX-squared / 12. **Realized variance** = sum of squared 5-minute S&P 500 returns within the month.
UC = ln(fitted conditional variance). **RA** = ln(implied − conditional variance), the variance premium.

Sources: J.P. Morgan EMBI sovereign spread, Import cover and Real GDP per capita (WDI), External debt (WB Fiscal Space); FirstRateData

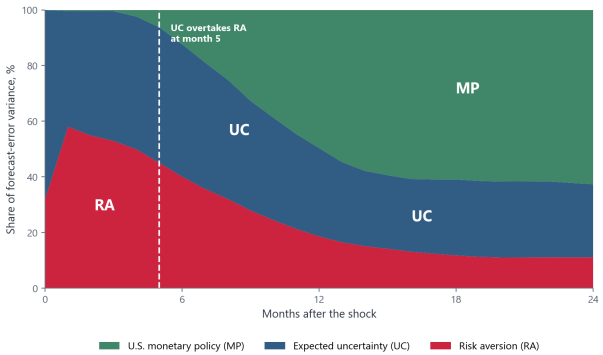
Baseline response of EMBI spreads to shocks



Cumulative response to a one-standard-deviation shock. Shaded areas: 90% confidence bands, standard errors clustered by month.

The impact of an expected uncertainty shock on spreads peaks at **27.7 bp** and is **significant and positive at every horizon from 0 to 12 months**, and for a portion of the horizon from 12 to 24 months. The impact of a risk aversion shock peaks slightly higher, at **29.5 bp**, but is **indistinguishable from zero from month 7 onward**.

What explains spread variance, and when



Reading the chart

- **On impact**, UC accounts for about **68%** of the variance the three global shocks explain.
- RA takes over almost immediately, explaining a peak of **58% of the variance at one month**.
- **UC overtakes RA again** at month 5 and continues to explain a larger share of variance in spreads than RA at every horizon thereafter.
- From after **10 months, U.S. monetary policy dominates**, accounting for roughly 60% by month 15.

Shares computed from the local-projection impulse responses as the cumulative sum of squared responses, renormalized over the three shocks shown.

Smooth-transition specification

State variable $F_{i,t-1} \in [0,1]$ is sigmoid-transformed (import cover, external debt to GDP, GDP per capita)

Let $F_{i,t-1} \in [0,1]$ be a sigmoid-transformed state variable. The panel local projection becomes:

$$\Delta \mathrm{EMBI}_{i,t+k} = c_i^k + F_{i,t-1}\left(\beta_k^A z_t + \theta_k^A X_{i,t}\right) + (1 - F_{i,t-1})\left(\beta_k^B z_t + \theta_k^B X_{i,t}\right) + \varepsilon_{i,t+k},$$

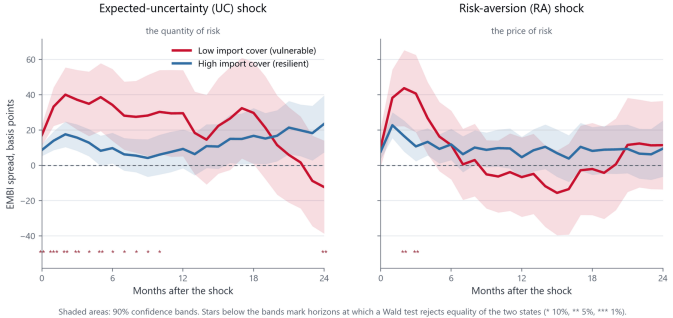
where z_t collects (z_t^{mp}, z_t^{ra}, z_t^{uc}). Impulse responses vary smoothly across regimes rather than switching discretely.

- $X_{i,t}$ includes lags of the outcome, leads and lags of the shocks (to handle overlapping horizons), and domestic risk controls.
- Country fixed effects included in all specifications.
- Standard errors two-way clustered by country and by month.

When $F_{i,t-1} = 1$ the sovereign is fully in regime A (e.g., low reserves); when $F_{i,t-1} = 0$ it is fully in regime B. Intermediate values are weighted combinations, so no country is hard-assigned to a single state.

Reserve adequacy

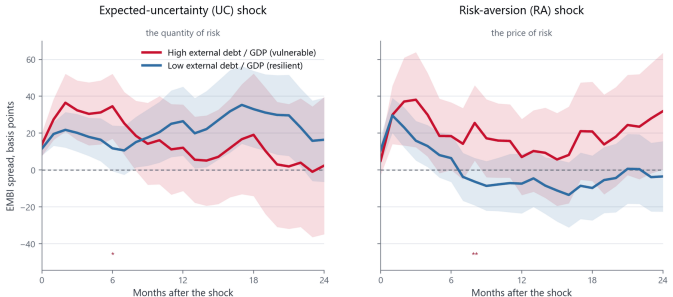
Response by months of import cover



Sovereigns with low reserve cover see an expected uncertainty shock widen spreads by **40 bp**, against **18 bp** where reserve cover is ample; the response in the two states remains statistically significantly different through roughly the first ten months. For risk aversion the gap is sharper but **only significant in months 2 and 3**: reserves blunt a panic; they do not insulate against a lasting rise in expected uncertainty.

External debt

Response by external debt as a share of GDP

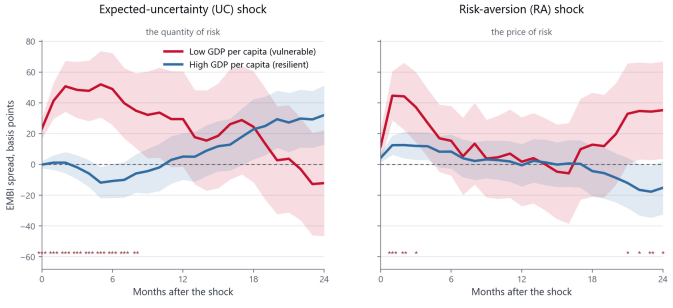


Shaded areas: 90% confidence bands. Stars below the bands mark horizons at which a Wald test rejects equality of the two states (* 10%, ** 5%, *** 1%).

Spreads in high debt sovereigns reprice by roughly **30–35 bp** to an expected uncertainty shock over the first half-year, against a milder response where debt is low, but the two states separate statistically only around the **six-month** horizon. For a risk aversion shock the regime evidence is weaker still, and concentrated near **eight months**.

Income level

Response by real GDP per capita



The sharpest split of the three. In lower-income sovereigns, spreads widen by roughly **45–50 bp** over the first half-year following an expected uncertainty shock while the response of spreads in higher-income sovereigns remains near zero, with the states statistically significantly different for about **nine months**. Risk aversion produces a comparable short-run gap that closes at intermediate horizons.

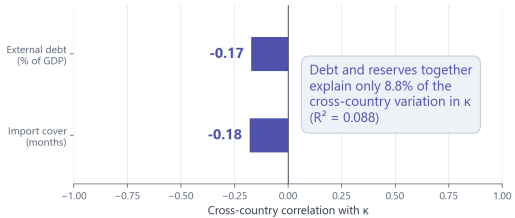
A vulnerability that debt and reserves do not capture

What κ is

- For each country, the **downside beta of its spread to global implied volatility**: the monthly change in the spread regressed solely on increases in ln(VIX).
- A high κ means the sovereign reprices sharply **when global conditions turn bad**, the covariance the pricing kernel charges for.
- κ is fixed by country, standardized, and fed into the same smooth-transition machinery as the balance-sheet states.

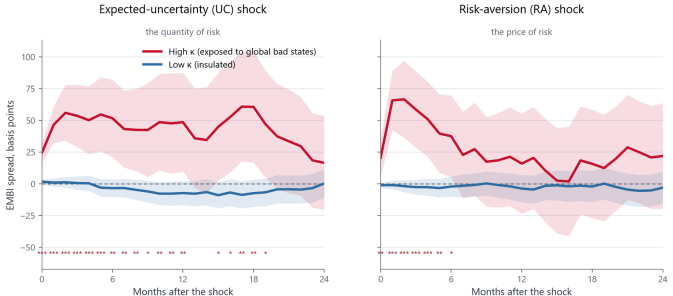
Why it is a separate margin

- κ correlates only $-$**0.17 with external debt** and $-$**0.18 with import cover**.
- Together, debt and reserves explain **8.8%** of its cross-country variation.
- A sovereign can look sound on the standard indicators and still be highly exposed.



Exposure determines the response

Smooth-transition local projections conditioning on κ

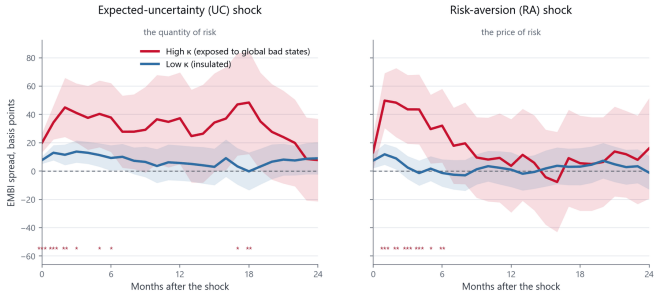


Shaded areas: 90% confidence bands. Stars mark horizons at which a date-clustered Wald test rejects equality of the two exposure states (* 10%, ** 5%, *** 1%).

After a risk-aversion shock, the response of spreads in high-κ sovereigns exceeds low-κ ones by **22 bp on impact** and **61 bp at three months**. The corresponding expected uncertainty gradient is **23 bp** and **53 bp** so κ amplifies both, but it is the **only** state variable that cleanly sorts the short-run risk-aversion response.

Is the response mechanical?

κ re-estimated by purged five-fold cross-fitting, $\pm$36-month embargo around each fold



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The concern
κ is estimated from EMBI–VIX comovement, and the shocks come from the VIX. Some of the gap could be mechanical.

The fix
Estimate each observation's κ outside its own time fold and outside a $\pm$36-month embargo longer than both the 24-month projection horizon and the 12 monthly lags.

The result
Impact gap collapses to **6 bp**, not significant. The three- and six-month gaps survive at **41 bp** and **33 bp** ($p = 0.008$ and 0.049; two-way clustered 0.082 and 0.063).

Expected uncertainty gaps also remain: 27 bp at three months and 29 bp at six months.

What the results mean for debt management

- **Read the shock, not just the index**
  A VIX spike driven by the risk aversion is a liquidity-and-appetite event: historically the window reopens inside a quarter. A spike driven by a shock to expected uncertainty is a repricing of default risk that is still visible a year out. The two call for different issuance decisions. From after 10 months, U.S. monetary policy dominates, accounting for roughly 60% by month 15.
- **Reserves buy time; they do not buy immunity**
  Import cover sharply compresses the response to a risk-aversion shock, but the low- and high-cover states remain statistically distinguishable through roughly ten months following an expected uncertainty shock. Buffers are a bridge across panics, not insurance against a durable rise in perceived risk.
- **Debt levels bite at medium horizons**
  External debt shows up both in the conditional mean and in the six-month state contrast. It is the margin that governs how much of a persistent global shock ends up in the sovereign's cost of funds.
- **Monitor exposure to global bad states as a standalone indicator**
  Kappa is nearly orthogonal to debt and reserves and is the strongest differentiator of short-run risk-aversion transmission. A sovereign can look sound on conventional ratios and still be in the exposed group.

Conclusions

- Treating the VIX as one global risk factor **combines two shocks with different persistence profiles**.
- Risk aversion delivers a **sharp, short repricing**; expected uncertainty delivers a **smaller-peaked but durable** repricing that remains significant over twelve months and dominates the variance decomposition from month five to month ten.
- Beyond ten months, **U.S. monetary policy** is the largest single source of spread variance — a reminder that the global financial cycle is not only about fear.
- Transmission is **systematically uneven**: reserve adequacy, per capita income and external debt shape how much of a global shock a sovereign absorbs.
- **Exposure to global bad states (κ)** is a distinct and measurable vulnerability, nearly unrelated to the standard ratios, and it survives a purged cross-fitting design built to remove mechanical correlation.
- For empirical work: a single VIX regressor is not a sufficient statistic for global financial conditions. For policy: **the composition of a fear shock is a debt-management variable.**

Thank you