Is Policy Uncertainty Objective Uncertainty?

Sydney C. Ludvigson[1]

[1]New York University, CEPR, and NBER

Based on Joint Work with Francesco Bianchi (Johns Hopkins), Sai Ma (Fed Board), Bill Shu (NYU)

AMEC Symposium on The Economic Implications of Heightened Uncertainty

Heightened Uncertainty

"The global economy [has entered] a 'new era of heightened uncertainty.'"

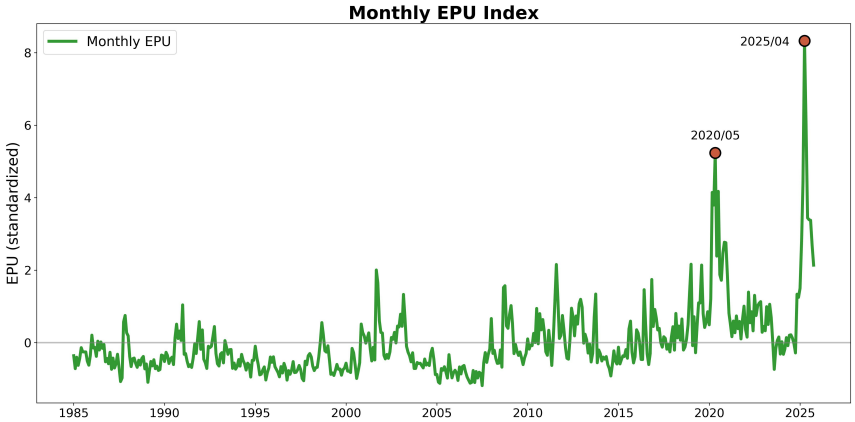
— World Economic Forum Summary of *Chief Economists' Outlook*, Oct 23, 2025

Symposium premise: heightened uncertainty

There is one piece of indisputable evidence...

Economic Policy Uncertainty

- EPU index: news-based article count measure



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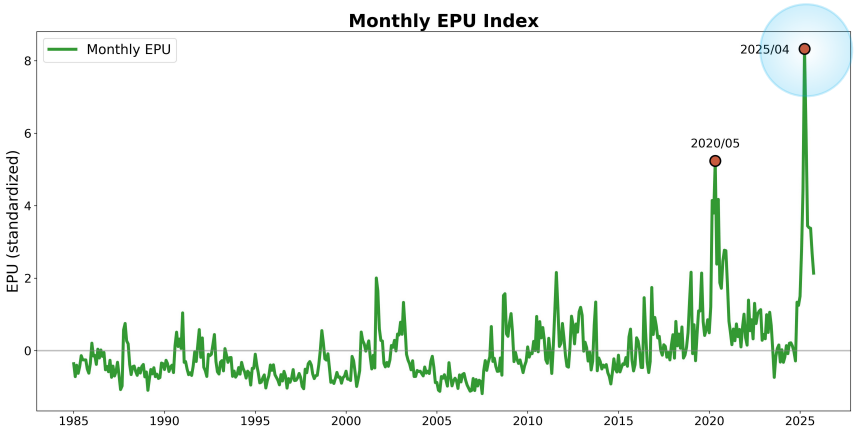

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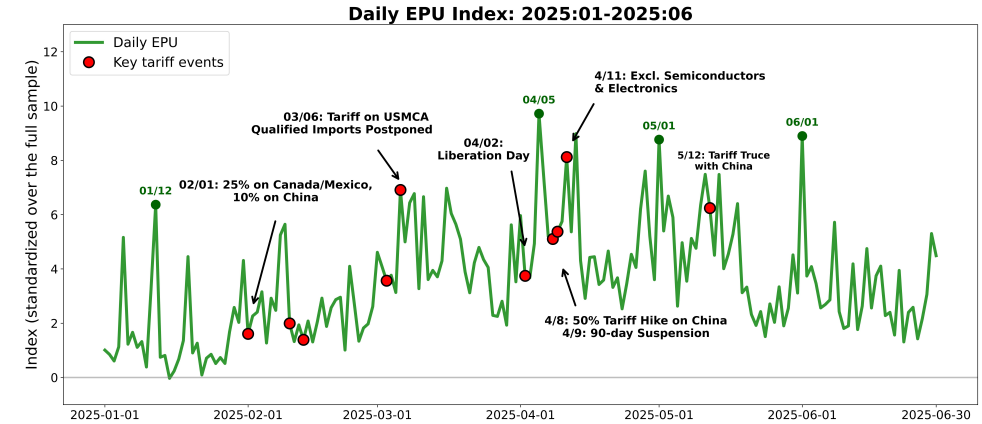
Economic Policy Uncertainty in 2025

- Extremely elevated and volatile in 2025, ranging from 0 to 10 std above historical mean



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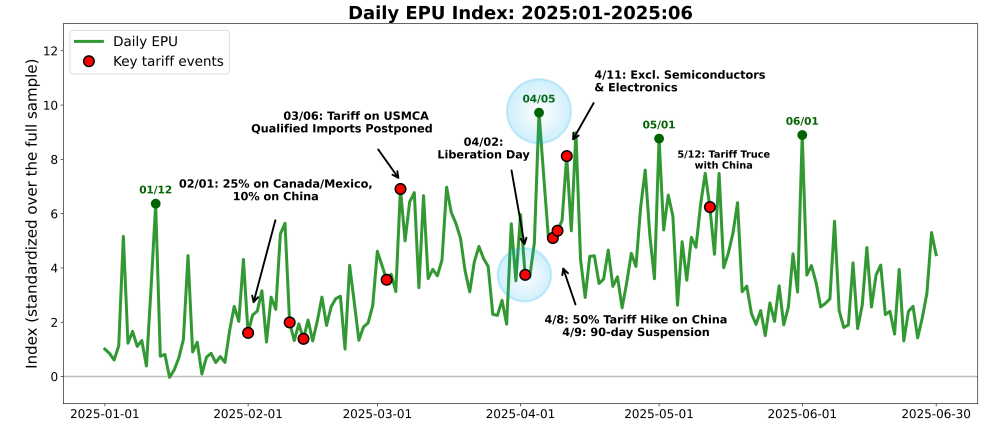
Economic Policy Uncertainty in 2025

- Daily spikes don't always align with key events and often have "wrong sign"



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- Is this uncertainty *objectively* speaking?

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- What *is* **objective** uncertainty?

Objective Uncertainty: A Definition

From Jurado, Ludvigson, and Ng (2015) (JLN) and Ludvigson, Ma, and Ng (2021) LMN

- "Big data"vector of economic data: $y_{jt}^C \in Y_t^C = (y_{1t}^C, \ldots, y_{N_y t}^C)'$ of category C
- Consider horizon: h-month-ahead uncertainty in y_{jt}^C
- Uncertainty is **conditional volatility** of *unforecastable* component of y_{jt+h}^C:

$$\mathcal{U}_{jt}^C(h) \equiv \sqrt{\mathbb{E}\left[\left(y_{jt+h}^C - \mathbb{E}[y_{jt+h}^C \mid I_t]\right)^2 \middle| I_t\right]}$$

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- If your expectation today (conditional on I_t) of the squared error in forecasting y_{jt+h} rises, you are by definition more uncertain about future y_j

Objective Uncertainty in Category C

An **index of uncertainty** in category C formed by aggregating $\mathcal{U}_{jt}^{C}(h)$ at each t:

$$\mathcal{U}_{t}^{C}(h) \equiv \text{plim}_{N_C \to \infty} \sum_{j=1}^{N_C} \frac{1}{N_C} \mathcal{U}_{jt}^{C}(h) \equiv \mathbb{E}_C \left[\mathcal{U}_{jt}^{C}(h) \right]$$

- Key categories: Macro, Financial, and Real
- Objective uncertainty is estimated machine learning/econometric techniques
- Systematized approach, relatively free from human judgement

Objective Uncertainty: What it is *Not*

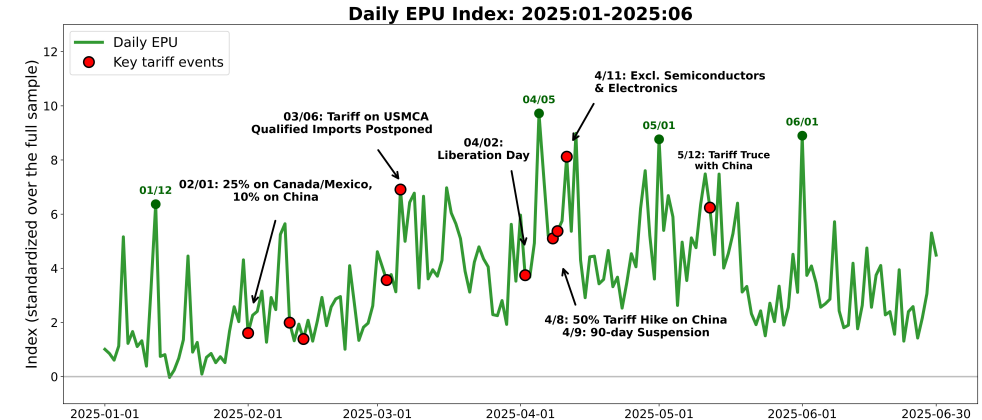
- Does *not* presume real world agents–whose behavior generates the data–are fully rational
- Uncertainty not the same as what a counterfactual RE model would produce
- Rather it is what an objective forecaster observing the economy would predict

JLN/LMN Measures of Objective Uncertainty

- Macro uncertainty (U_m) from Jurado, Ludvigson, and Ng (2015) (JLN)
  - U_M: 134 series selected to represent broad categories of macroeconomic time series (real activity measures (most numerous), and price indices and some financial series)
- Financial (U_F) and Real uncertainty (U_R) from Ludvigson, Ma, and Ng (2021) (LMN)
  - U_F: 148 measures of monthly financial indicators (not just stocks)
  - U_R: 73 real activity variables from the macro dataset
- Focus here on U_F and U_R for $h = 12$ months ahead

EPU vs Objective Uncertainty in 2025

- Recall: In 2025, EPU jumped to 6+ std from historical mean & highly volatile



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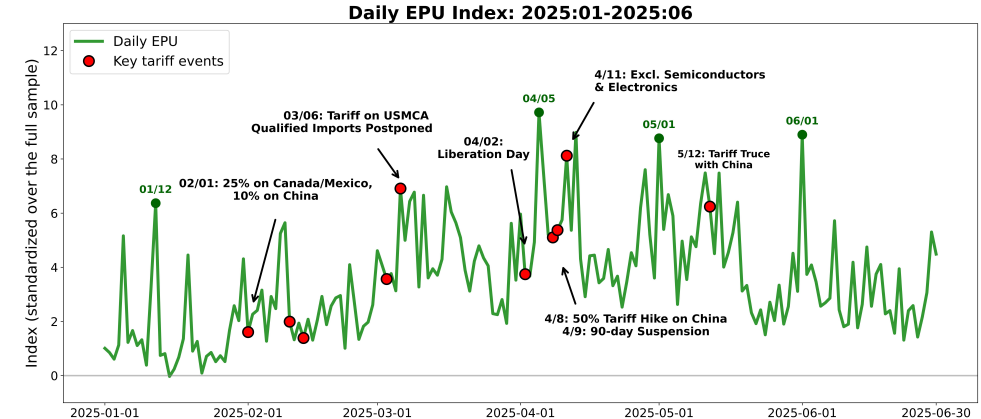
EPU vs Objective Uncertainty in 2025

- How many StDev did U_{Ft} jump in 2025?



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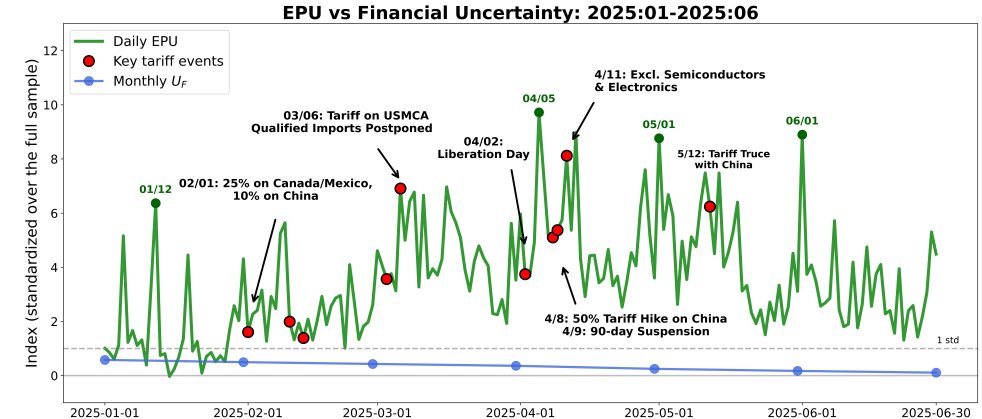
Puzzle: EPU vs Objective Uncertainty in 2025

- **Less than 1 standard deviation**. But didn't VIX go crazy?



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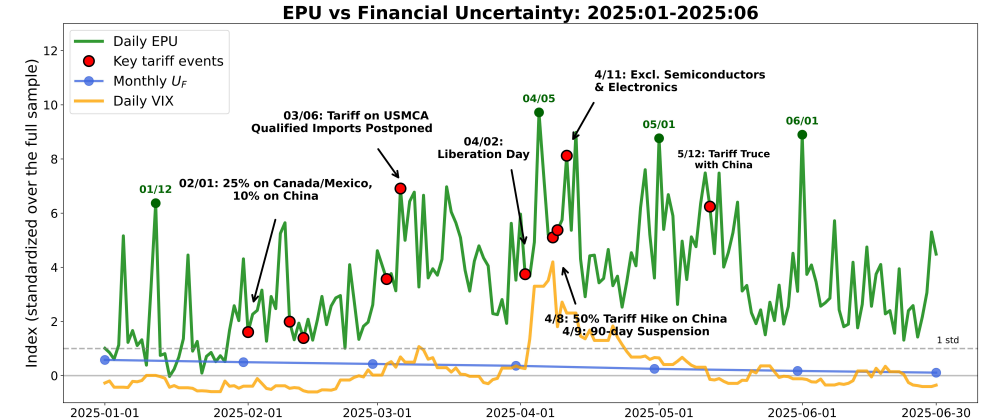
Puzzle: EPU vs Objective Uncertainty in 2025

- Reminder: $U_{Ft} \neq VIX_t$



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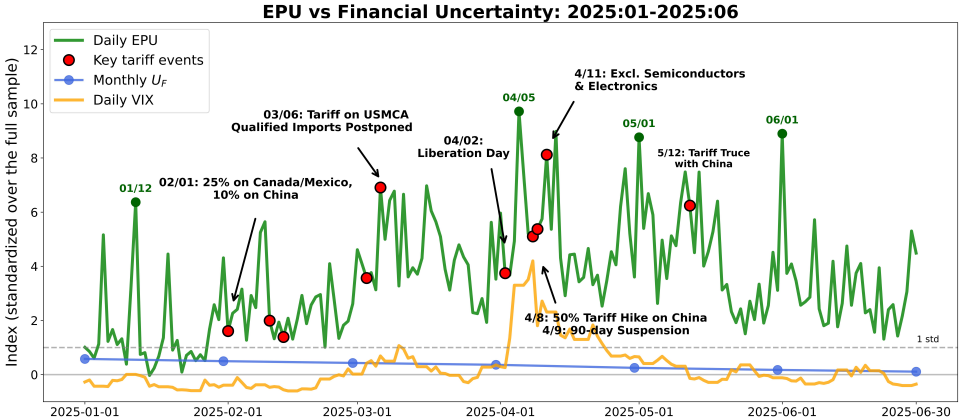
Puzzle: EPU vs Objective Uncertainty in 2025

- VIX spiked only in early April & was never as elevated or volatile as EPU in 2025



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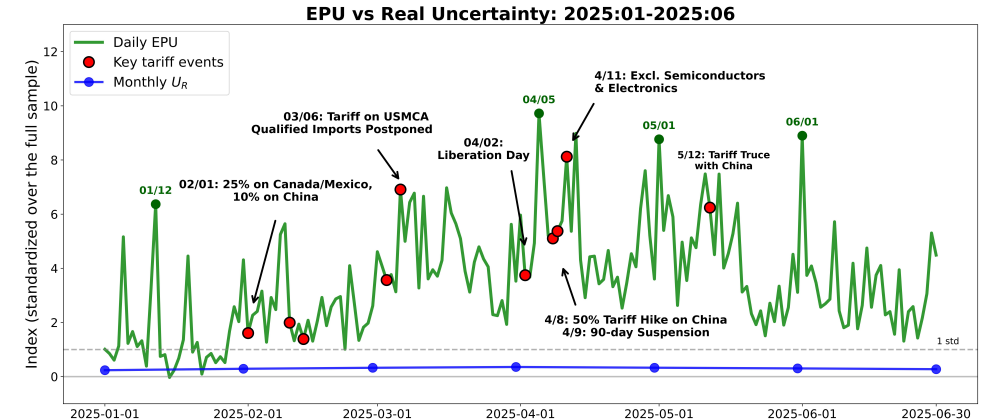
Puzzle: EPU vs Objective Uncertainty in 2025

- How about real uncertainty? Again < 1 std and *no unusual volatility*



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A Possible Counterargument

- U_{Ft} and U_{Rt} are **monthly** measures
- Maybe they don't capture highly transitory jumps well?

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- Maybe they don't capture highly transitory jumps well?
- Now have one way to obtain high-freq changes from Bianchi, Ludvigson, and Ma (2022)
- Approach combines:
  1. High-frequency, forward-looking data
  2. Estimated mappings to lower-freq data
- Obtain daily (or higher-freq) jumps in lower-freq series, e.g., U_{Mt}, U_{Ft}, U_{Rt}

MxFS Approach: Expansive Datasets

Mixed-freq structural (MxFS) approach

- Low-frequency dynamics:
  - **From e.g., VAR, DSGE** disciplined by *forward-looking* series $=>$ valuable additional *signals*
  - Estimates of **dynamic relations** must be consistent with *additional* signals (e.g., surveys, futures mkts, spot mkts, etc.) summarizing **expectations**

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- High-frequency dynamics:
  - Data: *jumps* in dozens high-freq, forward-looking series around events or days
  - Mapped onto **dynamic model**, providing estimates of *why* **markets react** to news
  - **Filter** out high-freq bf revisions in *lower frequency* data & states (e.g., monthly U_{Mt}, U_{Ft}, U_{Rt})

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- Interpretation of HF revisions: *nowcasts*
  - Revisions due to jumps in forward-looking, high-freq data mapped to model give us...
  - ...*intra*month revisions in what investors expect U_{Ft}, U_{Rt} to be at **month-end** = **nowcasts**

MxFS Dynamics and Data

Dynamic model: monthly VAR(6) (companion form)
MxFS approach: empirical model in **state space** form

$$S_t = C + TS_{t-1} + R\epsilon_t \quad \text{(state eqn)}$$
$$X_t = D + ZS_t \quad + Uv_t \quad \text{(obs eqn)}$$

X_t includes **29 series**; D, Z map X_t onto VAR dynamics, U_t diagonal matrix w/ std of OBS errors.

$$S_t = \begin{bmatrix} \Delta \ln(\text{GDP}_t) \\ \text{Inflation}_t \\ \text{Federal Funds Rate}_t \\ \ln(\text{S\&P 500 Return}_t) \\ \text{Financial Uncertainty}_t \\ \text{Real Uncertainty}_t \end{bmatrix}$$

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With all data available, X_t contains:

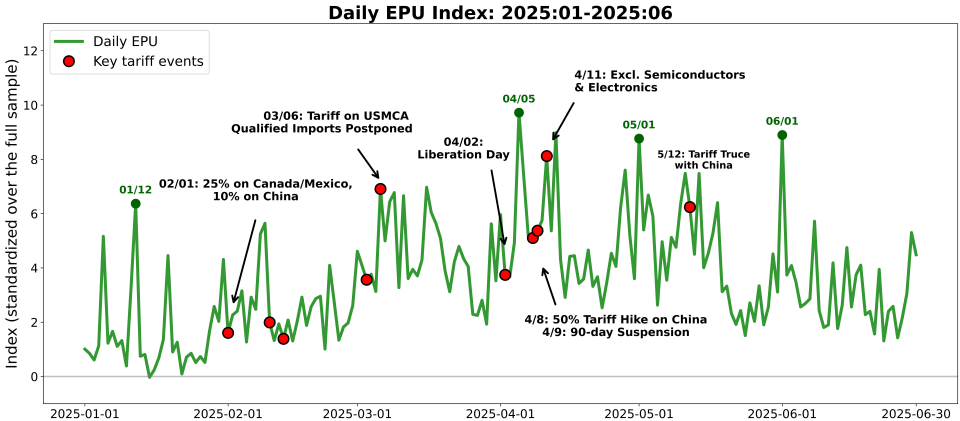
- **Monthly/quarterly** data: (macro/real and financial) uncertainty, $\Delta \ln(GDP)$, π, *surveys*: SPF, BC, LIV, BBG π forecasts & SPF, LIV GDP growth forecasts + month-end values of:
- **High-freq**: (minutely): S&P 500, FFF (0,6,10,20,35 months), ED & SOFR futures (1,2,4,8 quarters), & (daily): FFR, VIX plus *surveys*: BBG π & *GDP* nowcasts & forecasts

High-Frequency Variation in 2025?

- With daily nowcasts in hand, we can now return to the question:
- Perhaps monthly uncertainty measures fail to capture highly transitory jumps?
- Do our daily measures of U_{Ft} and U_{Rt} display more volatility?

Are Daily U_{Ft} & U_{Rt} Nowcasts More Volatile in 2025?

- Here is EPU again



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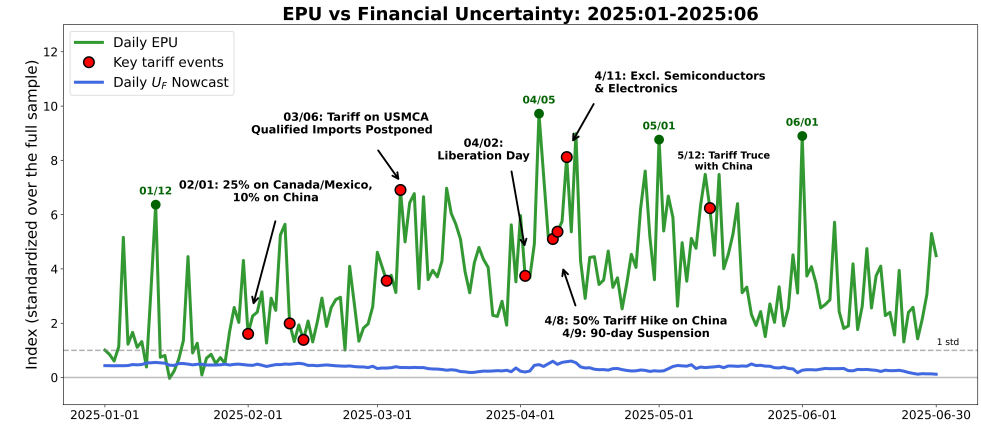
- And here is our daily U_{Ft} nowcast...



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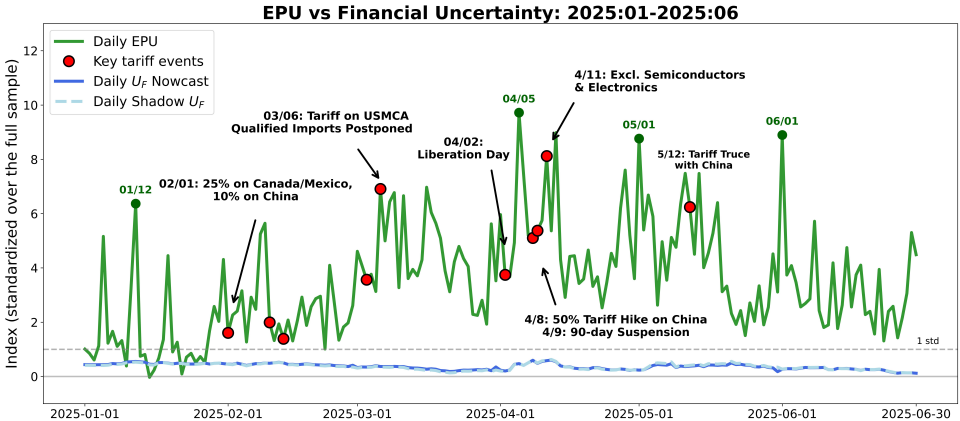
Are Daily U_{Ft} & U_{Rt} Nowcasts More Volatile in 2025?

- Disparity cannot be explained by full-sample procedures & data
- "Shadow" $U_{F,t}$ uses only real-time data & no look-ahead aspects in estimation



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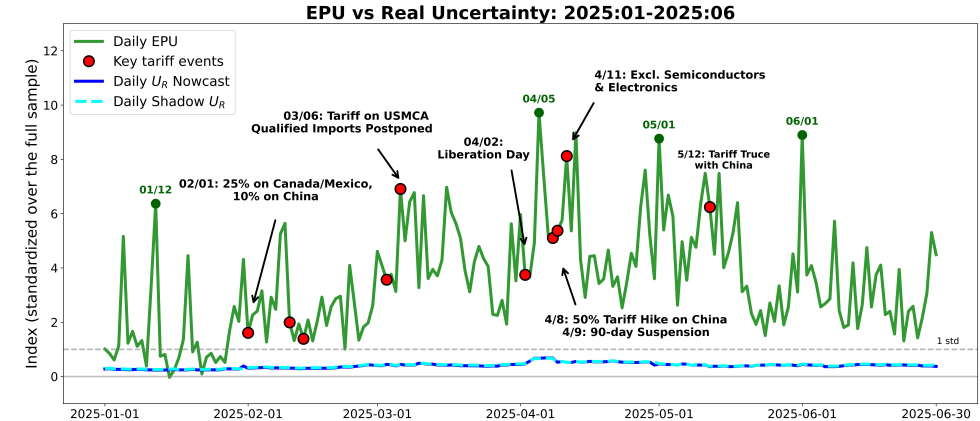
- Similar story for daily shadow nowcasts of U_{Rt}



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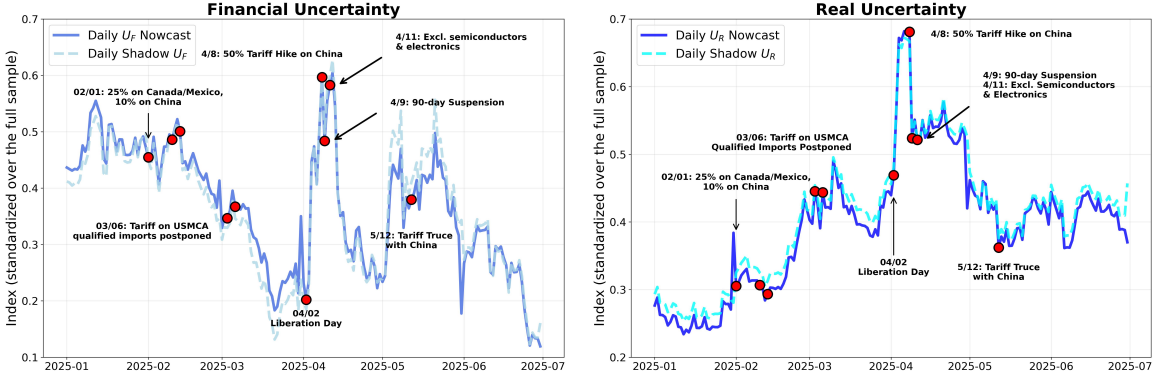
Daily Nowcasts of Real and Financial Uncertainty in 2025

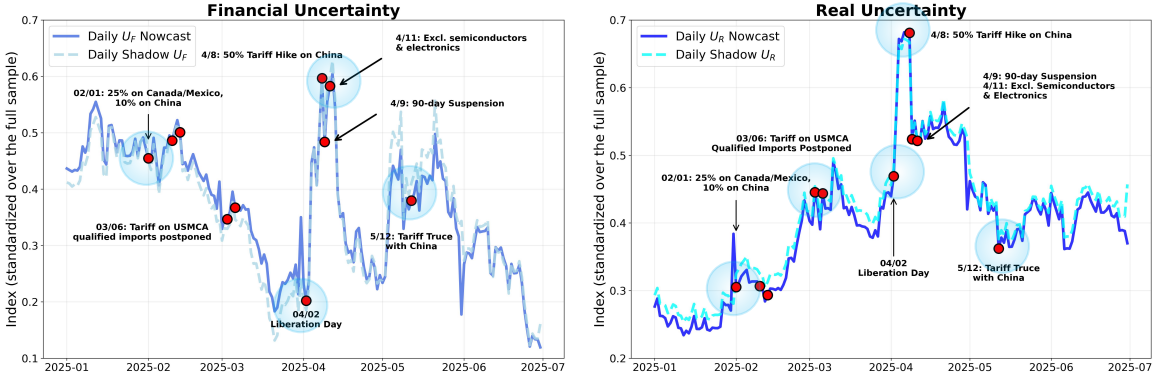
- Hard to see any variation when juxtaposed with EPU



Financial and real uncertainty in 2025. This figure plots daily real and financial uncertainty nowcasts from the mixed frequency structural approach applied to the VAR model. The shadow values are computed using only real-time data and no look-ahead estimation features. Index standardized using the full-sample mean and standard deviation from 1985:01 to 2025:06. The sample period plotted is 2025:01 - 2025:06. The red dots indicate key tariff-related events in 2025. Liberation day announcement occurs after market close on 04/02.

Daily Nowcasts of Real and Financial Uncertainty in 2025

- On their own, see spikes in 2025 around key tariff events...



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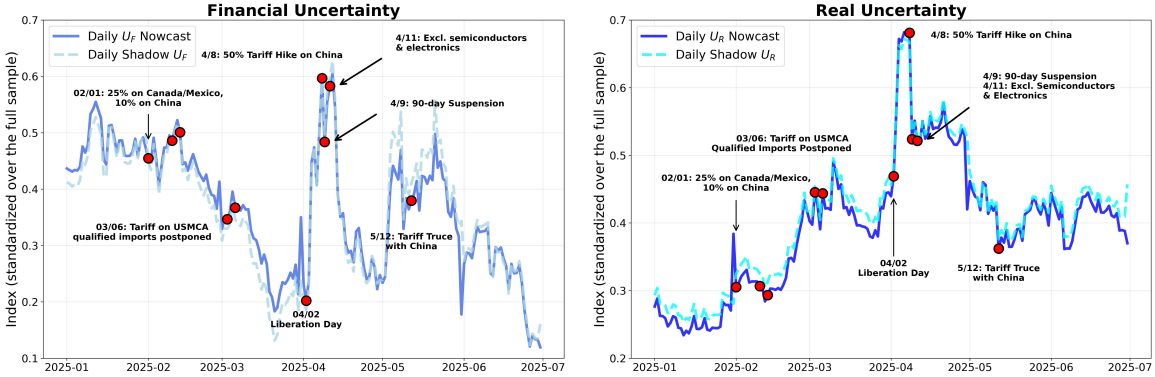
- ...but note the y-axis units!



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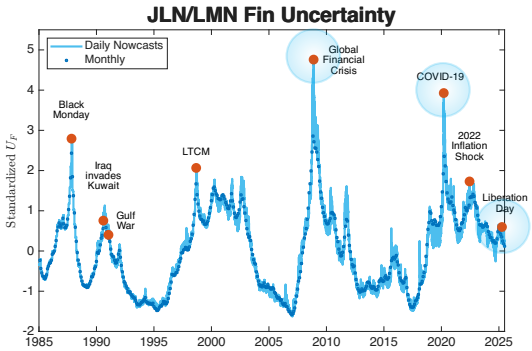
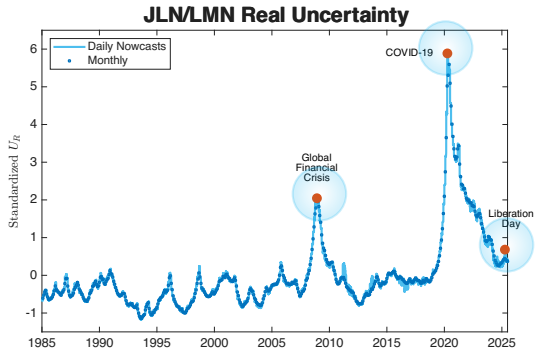
Real and Financial Uncertainty: Full Sample

- Uncertainty in 2025 not nearly as high as in the GFC or COVID periods





Financial and real uncertainty over time. The dark blue dots report the monthly financial and real uncertainty series from Ludvigson, Ma, and Ng (2021). The solid light blue line plots our filtered daily nowcasts from the mixed frequency structural approach applied to the VAR model described below. The sample period is 1985:01 - 2025:06.

Tight Windows around Tariff-related News: Jan-Jun 2025

- One more try: does story change if we look even more tightly around tariff news?
- All "key"*materialized* tariff events from Congress' list of Presidential 2025 Tariff Actions
- **One hour windows** where possible (exceptions: weekend & early closures in which case use nearest close-to-open mkt values around news)

Description	Tariff Announcement Date	Daily S&P Return	Event Time	Window Start	Window End	HF S&P Return
25% Tariff on Canada/Mexico, 10% on China	**Feb 1, 2025**	**-0.76%**	Feb 1 5:07pm	Jan 31 5pm	Feb 2 6pm	**-1.39%**
Proclamation on Steel and Aluminum tariff	Feb 10, 2025	0.03%	5:37pm	5:27pm	6:27pm	-0.25%
"Reciprocal Trade and Tariffs" Memo	**Feb 13, 2025**	**1.04%**	1:47pm	1:37pm	2:37pm	0.38%
Proceed with Canada/ Mexico Tariffs, Increases China Tariff to 20%	**Mar 3, 2025**	**-1.76%**	2:58pm	2:48pm	3:48pm	**-1.28%**
Tariffs on USMCA Qualified Imports Postponed	**Mar 6, 2025**	**-1.78%**	11:29am	11:19am	12:19am	**-1.08%**
"Liberation Day"	**Apr 2, 2025**	**-4.84%**	4:14pm	4:04pm	5:04pm	**-2.85%**
Raises China "Reciprocal" Rate from 34% to 84%	**Apr 8, 2025**	**-1.57%**	1:25pm	1:15pm	2:15pm	-0.33%
90-day Suspension for all Countries except China	**Apr 9, 2025**	**9.52%**	1:18pm	1:08pm	2:08pm	**5.81%**
Exclusion of Certain Semiconductors and Electronics	**Apr 11, 2025**	**0.79%**	10:36pm	Apr 11 5pm	Apr 13 6pm	**1.06%**
90-day Tariff Truce with China	**May 12, 2025**	**3.26%**	3:02am	2:52am	3:52am	**0.97%**

Timing key tariff events. High-frequency (HF) event windows are constructed around major tariff announcements. Event timing is based on Factiva and targeted news searches. Where possible, each window spans 10 minutes before to 50 minutes after the news release. Deviations occur during weekends when both spot and E-mini futures markets are closed; in those cases, we use nearest futures market close-to-open price change around the event. For daily returns around events outside of spot market hours, returns are measured from the previous spot trading-day close to the subsequent spot trading-day close. All times are in Eastern Time (ET).

Tight Windows around Tariff-related News: Jan-Jun 2025

- One more try: does story change if we look even more tightly around tariff news?
- All "key" *materialized* tariff events from Congress' list of Presidential 2025 Tariff Actions
- **One hour windows** where possible (exceptions: weekend & early closures in which case use nearest close-to-open mkt values around news)

Description	Tariff Announcement Date	Daily S&P Return	Event Time	Window Start	Window End	HF S&P Return
25% Tariff on Canada/Mexico, 10% on China	**Feb 1, 2025**	**-0.76%**	Feb 1 5:07pm	Jan 31 5pm	Feb 2 6pm	**-1.39%**
Proclamation on Steel and Aluminum tariff	Feb 10, 2025	0.03%	5:37pm	5:27pm	6:27pm	-0.25%
"Reciprocal Trade and Tariffs" Memo	**Feb 13, 2025**	**1.04%**	1:47pm	1:37pm	2:37pm	0.38%
Proceed with Canada/ Mexico Tariffs, Increases China Tariff to 20%	**Mar 3, 2025**	**-1.76%**	2:58pm	2:48pm	3:48pm	**-1.28%**
Tariffs on USMCA Qualified Imports Postponed	**Mar 6, 2025**	**-1.78%**	11:29am	11:19am	12:19am	**-1.08%**
"Liberation Day"	**Apr 2, 2025**	**-4.84%**	4:14pm	4:04pm	5:04pm	**-2.85%**
Raises China "Reciprocal" Rate from 34% to 84%	**Apr 8, 2025**	**-1.57%**	1:25pm	1:15pm	2:15pm	-0.33%
90-day Suspension for all Countries except China	**Apr 9, 2025**	**9.52%**	1:18pm	1:08pm	2:08pm	**5.81%**
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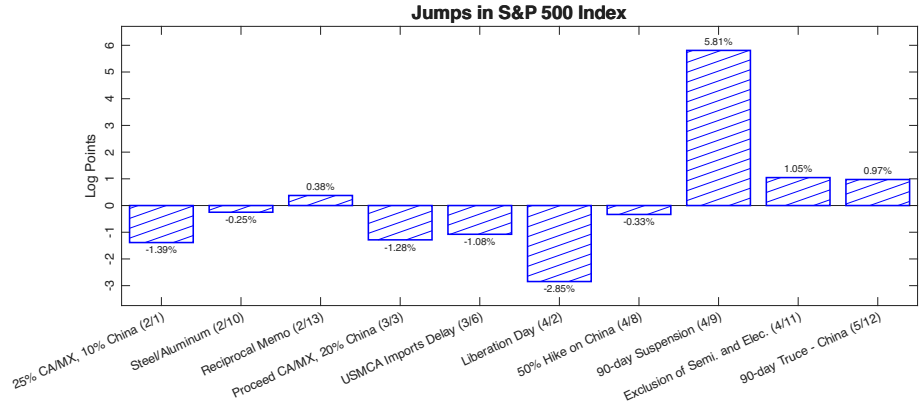
Stock Market Jumps in 1-hour Windows

- Biggest jump down: Liberation Day (4/2); Biggest jump up: 90-day suspension (4/9)



Stock market jumps and tariff events. See previous table. This figure plots the jump in the S&P 500 index from tick-level data in 1-hour windows (as possible) around 10 key tariff events. For trades outside the regular market trading hours, we use E-mini S&P 500 front-month futures contract, with deviations due to futures market closures on weekends.

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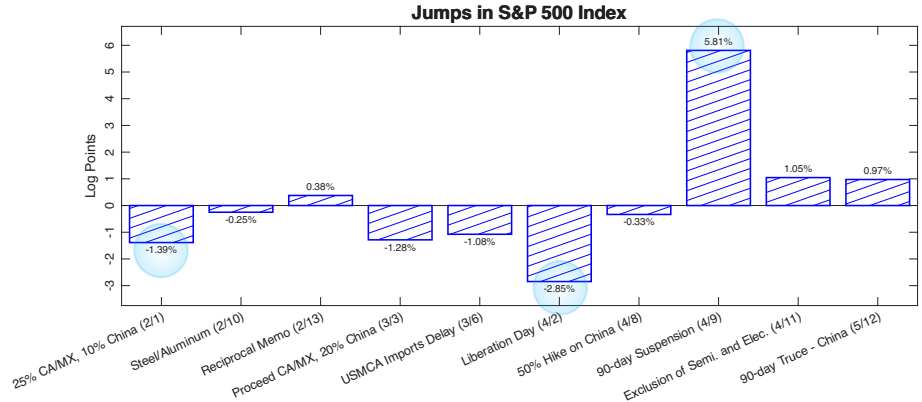

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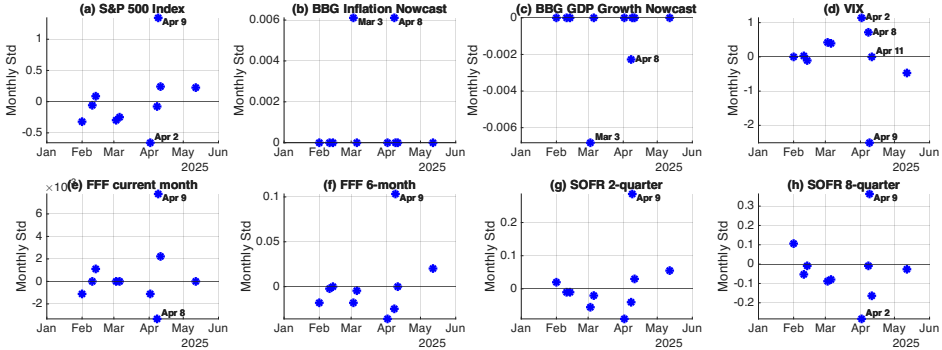
Jumps in High-Frequency Data around Key Tariff Events

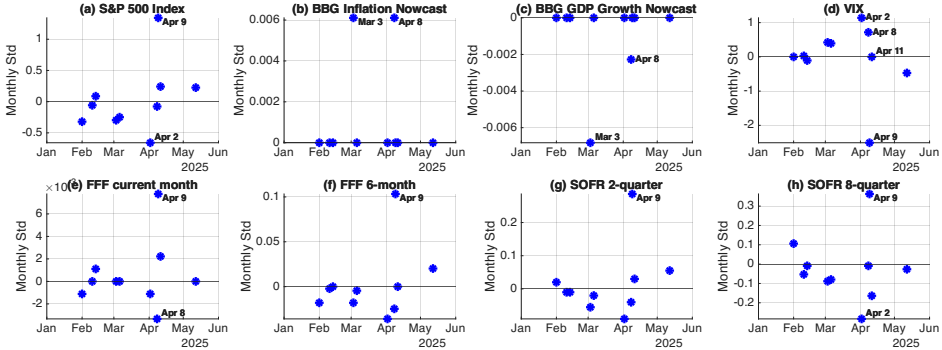
- S&P 500, FFF, SOFR are minutely & show jumps around one hour windows. Other variables are available daily & show changes from day before to day after.



Jumps in high-frequency data Figure plots changes in high-freq data around 10 tariff-related events in the first half of 2025. For high-frequency jumps in FFR, we use current month FFF data. For tick-level data in panel (a), (e)-(h), this corresponds to a change measured from 10 minutes before to 50 minutes after the news is first released, unless markets are closed, in which case we use the last available trade before window start and first available trade after window end. For daily data in panels (b)-(c), changes from one day before to one day after the event are plotted. For the VIX, changes are computed from the previous trading-day close to the next trading-day close.

Jumps in High-Frequency Data around Key Tariff Events

- Relatively modest jumps in forward-looking data (y-axis in monthly std units)



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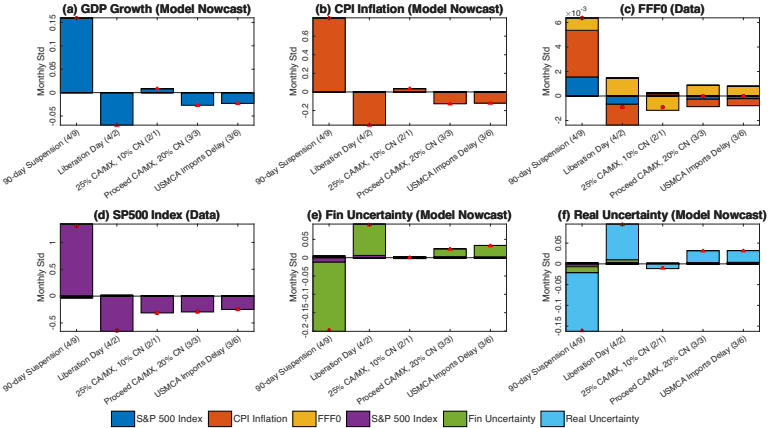
Reactions to Tariff Events in 1-hour Windows

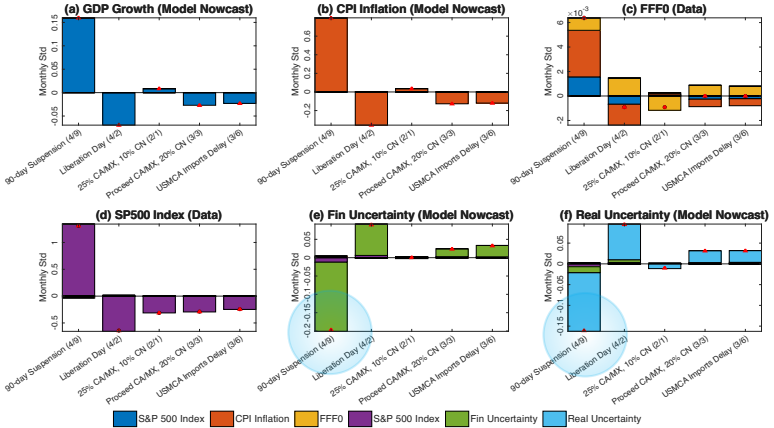
- **Decompositions** tell *why* (through lens of model) HF data & model nowcasts jump



Shock Decompositions. Decomposing jumps in data and model nowcasts pre- and post-large tariff-related events into components attributable to the VAR shocks, orthogonalized using Cholesky decomposition. For each event specified in the panel title, the high-frequency window runs from 10 minutes before the event start time to 50 minutes after, unless constrained by data availability. The figure reports shock decomposition for the 5 tariff events associated with the largest absolute change in stock market. For stock market trades outside the regular trading hours, we use the E-mini S&P 500 futures front-month contract.

Reactions to Tariff Events in 1-hour Windows

- Despite the uncertainty series being placed last in the VAR, small contribution coming from the other state variables



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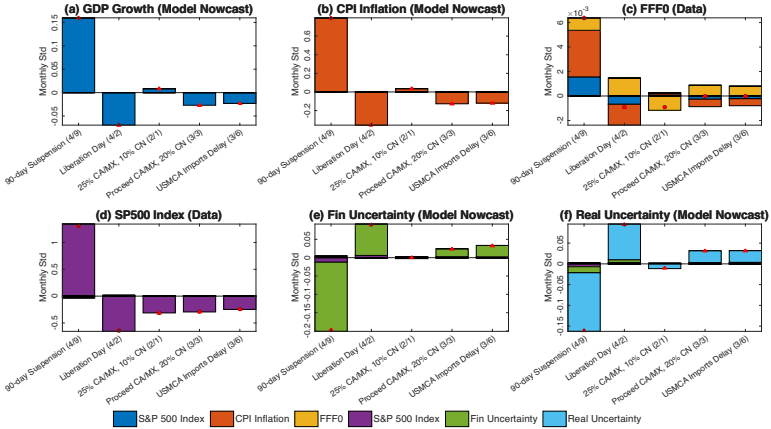
Reactions to Tariff Events in 1-hour Windows

- Despite the uncertainty series being placed last in the VAR, small contribution coming from the other state variables
- Speaks to small changes in other variables when benchmarked against typical monthly variation



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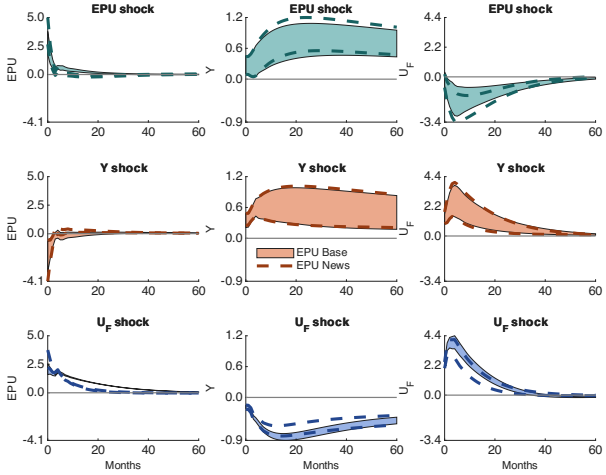
Financial Markets and Policy Uncertainty Interactions

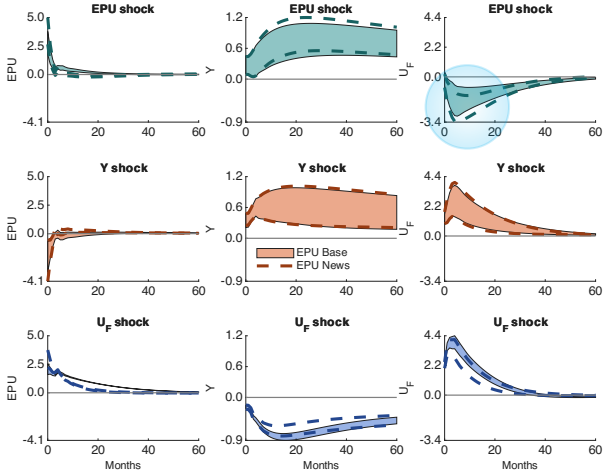
- Do financial markets react to policy uncertainty differently than to other sources of volatility?



IRF to EPU, Y, and U_F Shocks. This figure is adapted from Figure 7 in Ludvigson, Ma, and Ng (2021), which displays identified sets of impulse responses to positive 1 std shocks from EPU, production, and financial uncertainty. The sample covers the period 1987:01 to 2015:04.

Financial Markets and Policy Uncertainty Interactions

- Do financial markets react to policy uncertainty differently than to other sources of volatility?
- A shock to policy uncertainty drives *down* financial uncertainty



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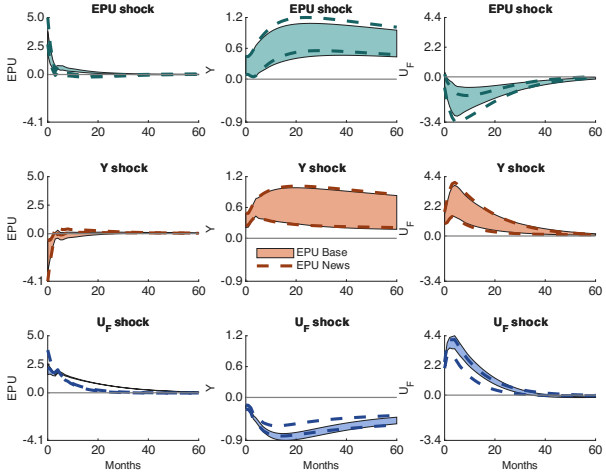
Financial Markets and Policy Uncertainty Interactions

- Do financial markets amplify policy uncertainty?



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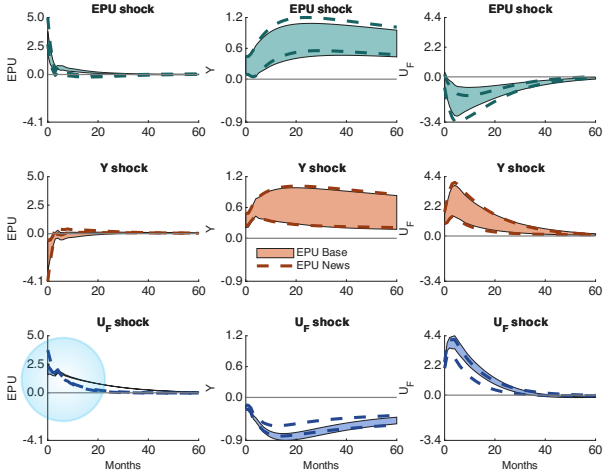
Financial Markets and Policy Uncertainty Interactions

- Do financial markets amplify policy uncertainty?
- Yes, EPU is amplified by financial uncertainty shocks



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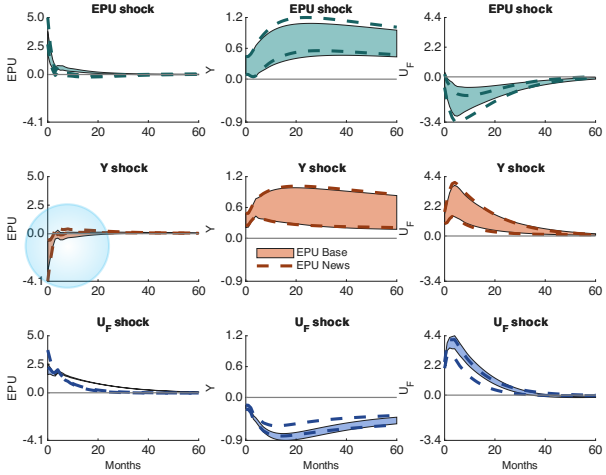
Financial Markets and Policy Uncertainty Interactions

- Note: The rise in EPU during downturns is **entirely** the result of negative shocks to Y driving up EPU, $\Longrightarrow$ high EPU is **a consequence rather than a cause** of recessions



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Financial Markets and Policy Uncertainty Interactions

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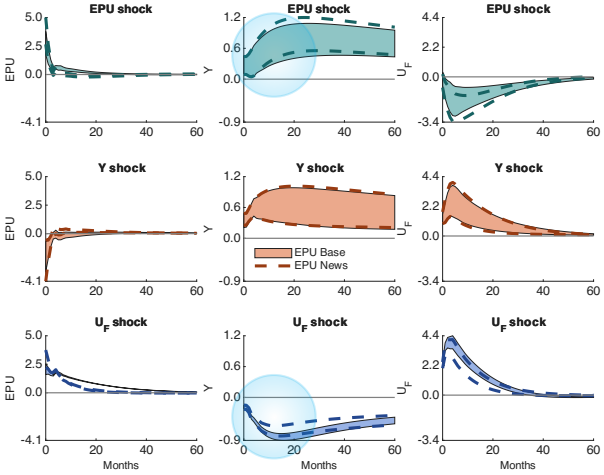
- Positive EPU shocks drive *up* Y, whereas positive U_{Ft} shocks drive it down



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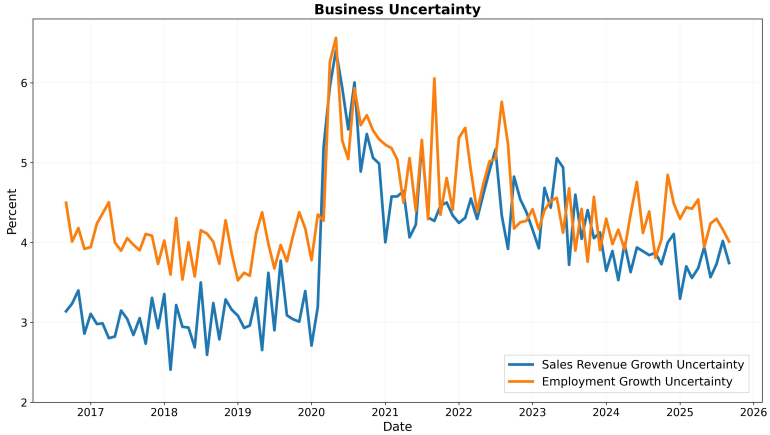
Survey-based Business Uncertainty

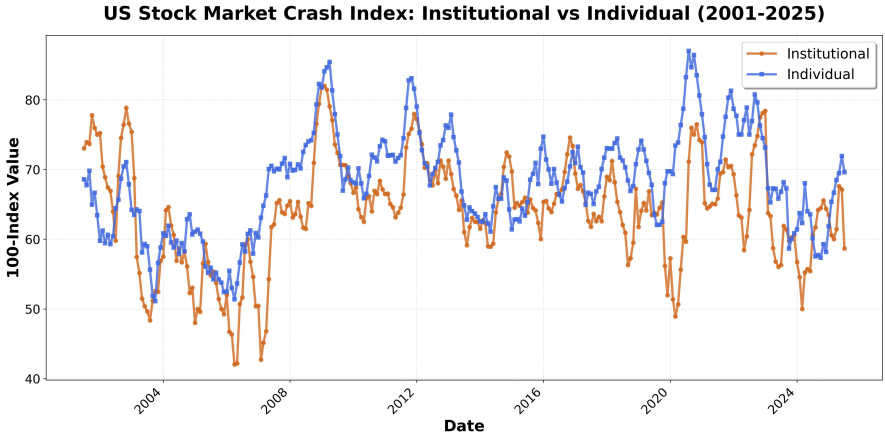
- Business managers also reported relatively low levels of perceived uncertainty



This figure plots the unsmoothed business uncertainty series from the Survey of Business Uncertainty (SBU), which measures one-year-ahead expectations and uncertainties that firms have over their own employment and sales (Altig, Barrero, Bloom, Davis, Meyer, and Parker (2022)). The Federal Reserve Bank of Atlanta fields the Survey of Business Uncertainty in partnership with Nick Bloom (Stanford) and Steven Davis (Chicago Booth). The monthly survey goes to about 2,200 panel members (as of August 2024), who occupy senior finance and managerial positions at U.S. firms. As of August 2024, 27.7% (3.5%) of the panel have more than 100 (1000) employees. The panel of firms is broadly representative of the distribution of activity in the U.S. by size and industry. The sample spans 2016:09 to 2025:09.

Measures of Perceived Risk: Crash Confidence Index

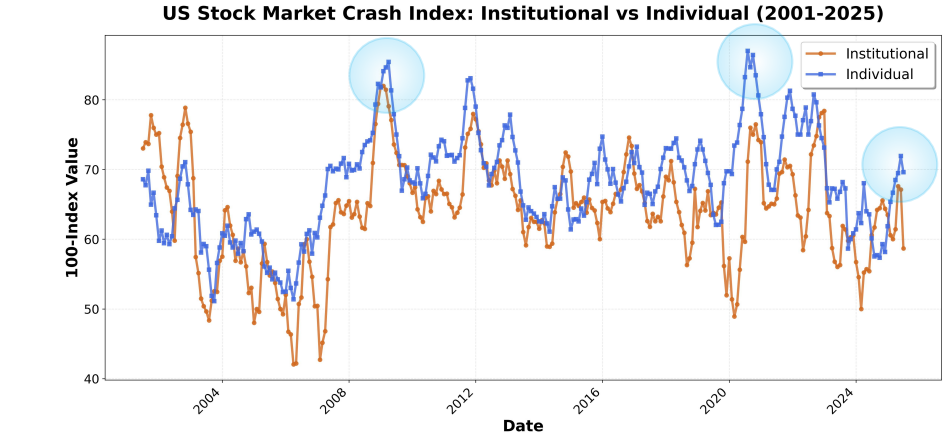
- Low value on the plot $\implies$ low confidence in the stock market and high perceived risk



This figure plots 100 minus the Crash Confidence Index from Yale International Center for Finance. The Crash Confidence Index measures the percent of respondents that believe there is less than 10% chance of a stock market crash in the next six months. The survey provides two indices based on two separate samples: a sample of wealthy individual investors, and another sample of institutional investors. The vertical axis plots 100 minus the raw index value as a proxy for individual and institutional investors' perceived risk. The monthly sample spans 2001:07 to 2025:09.

Measures of Perceived Risk: Crash Confidence Index

- Spike in April 2025 was not as pronounced as around GFC and COVID



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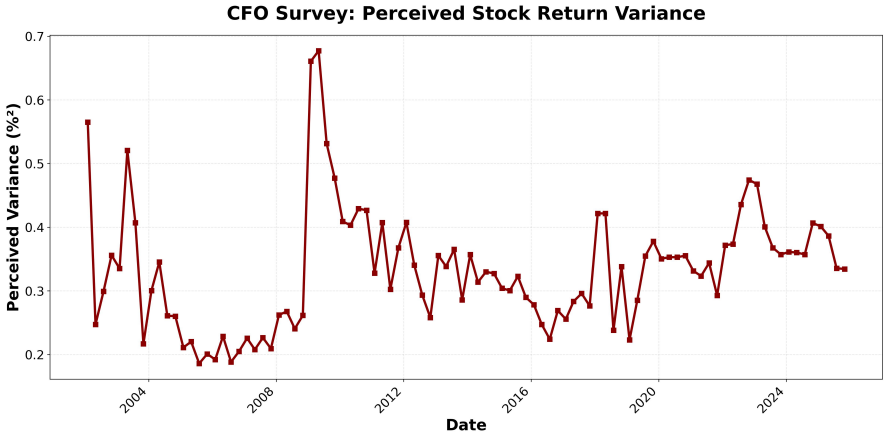
Measures of Perceived Risk: CFO Perceived Stock Return Variance

- No spike in the CFOs' perceived variance of US stock market return



This figure plots CFOs' perceived variance of S&P 500 stock returns derived from the CFO survey (by Duke Fuqua, the Richmond Fed and the Atlanta Fed). The measure is calculated from the difference between the 90th and 10th percentile forecasts and represents the uncertainty/disagreement among CFOs about future stock market returns. The sample spans 2002Q1 to 2025Q3.

Conclusion

- Is policy uncertainty objective uncertainty? Evidently no.
- The era of heightened uncertainty is upon us in the world of policy discussion and perception...

Conclusion

- Is policy uncertainty objective uncertainty? Evidently no.
- The era of heightened uncertainty is upon us in the world of policy discussion and perception...
- ...but not (yet anyway) in the world of objective economic analysis

Thank you!

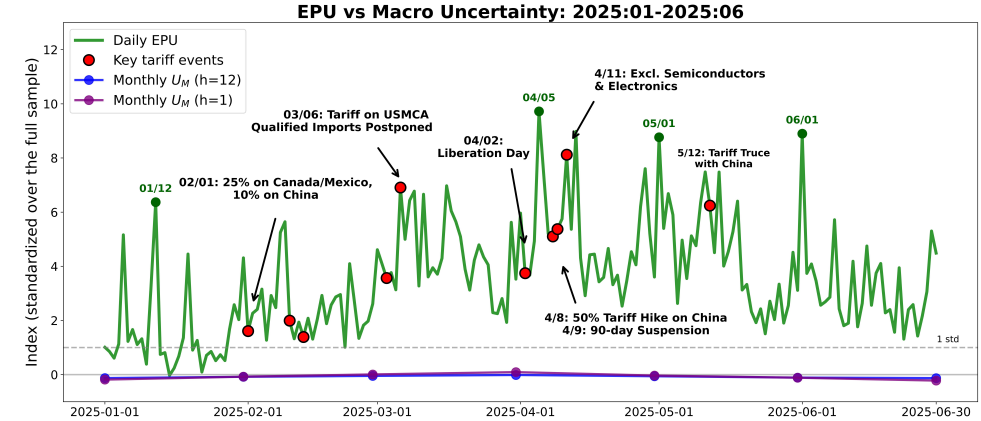
APPENDIX

Economic Policy Uncertainty

- The U.S. Economic Policy Uncertainty (EPU) Index measures the scaled monthly frequency of articles in leading U.S. newspapers that contain terms related to "uncertainty" or "uncertain," "economic" or "economy," and at least one policy term such as "congress," "regulation," "federal reserve," "legislation," or "deficit," with article counts normalized by each paper's total volume and standardized over time before aggregation.

Puzzle: EPU vs Objective Uncertainty in 2025

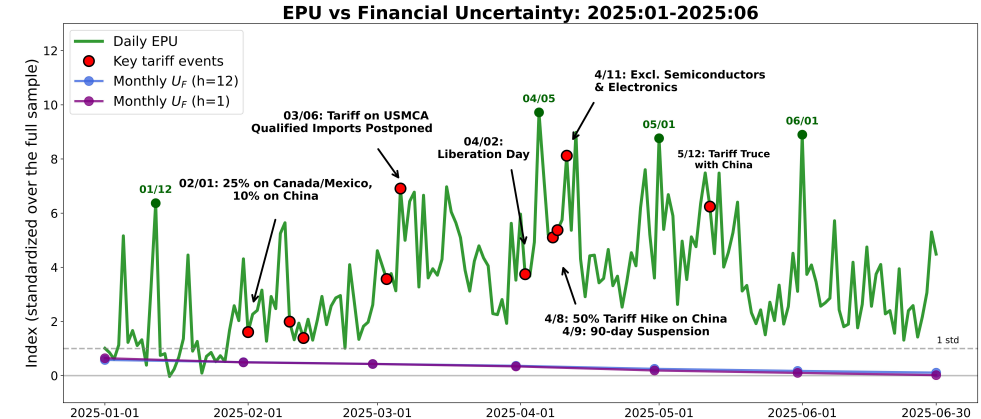
- EPU versus macro uncertainty $U_{M,t}$ with horizon $h = 1, 12$ months



This figure plots the daily U.S. Economic Policy Uncertainty (EPU) index from Baker, Bloom, and Davis (2016) and the monthly macro uncertainty index from Jurado, Ludvigson, and Ng (2015) with horizon $h = 1$ and $h = 12$. Both indices are standardized using the full-sample mean and standard deviation from 1985:01 to 2025:06. The sample is 2025:01 to 2025:06.

Puzzle: EPU vs Objective Uncertainty in 2025

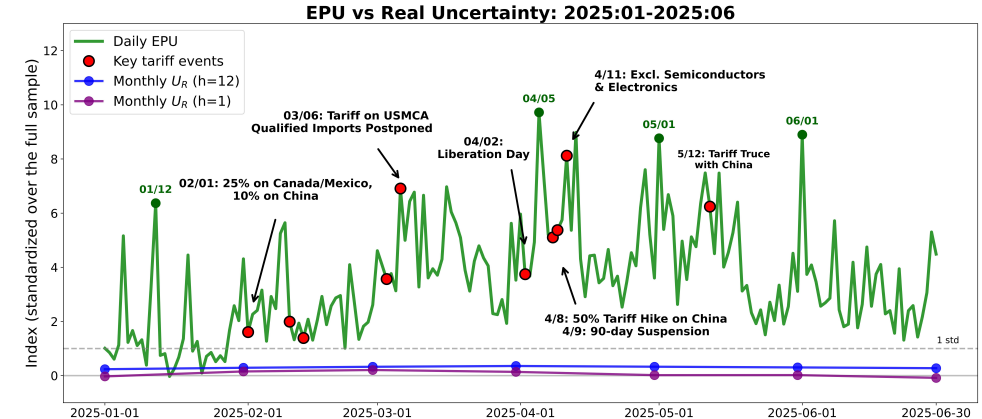
- EPU versus financial uncertainty $U_{F,t}$ with horizon $h = 1, 12$ months



This figure plots the daily U.S. Economic Policy Uncertainty (EPU) index from Baker, Bloom, and Davis (2016) and monthly financial uncertainty index from Ludvigson, Ma, and Ng (2021) with horizon $h = 1$ and $h = 12$. The indices are standardized using the full-sample mean and standard deviation from 1985:01 to 2025:06. The sample plotted is 2025:01 to 2025:06.

Puzzle: EPU vs Objective Uncertainty in 2025

- EPU versus real uncertainty $U_{FR,t}$ with horizon $h = 1, 12$ months



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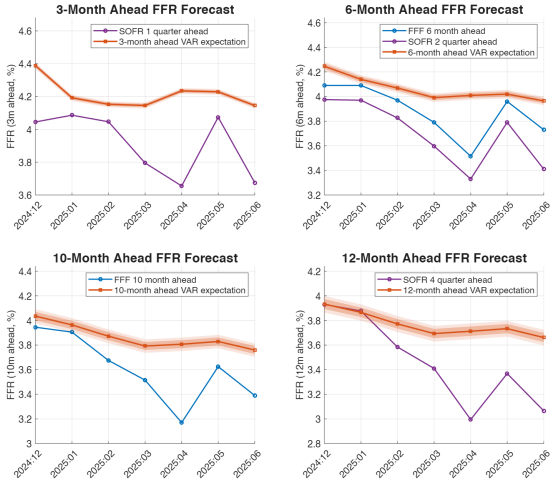
FFR Expectations: VAR vs Futures Data

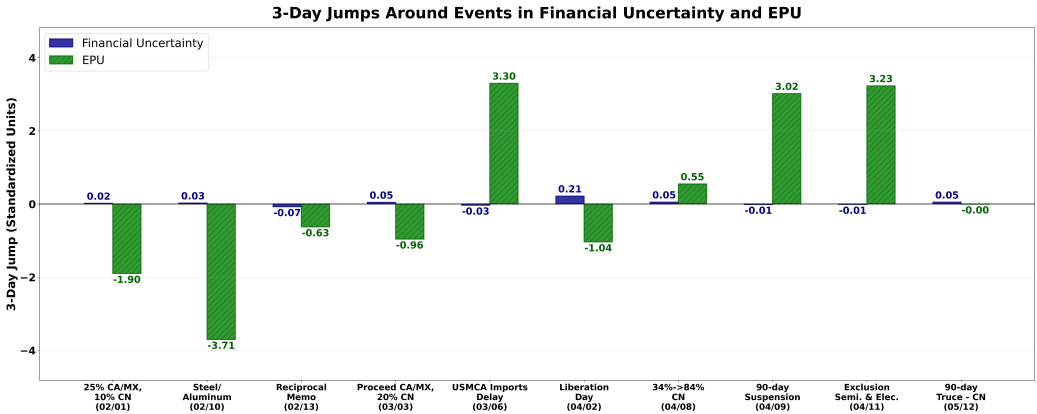
- Market expectations of future interest path consistent below model forecast with a widening gap in April 2025



VAR vs Futures FFR Expectations. This figure plots the h-month-ahead expectations for the Federal Funds Rate from the VAR model ($h = 3, 6, 10, 12$) alongside expectations implied by Federal Funds Futures (FFF) and SOFR futures from 2024:12 to 2025:06. Shaded areas indicate 90% (dark) and 68% (light) credible sets for the VAR expectations.

Daily U_F Nowcast vs EPU: 2025 Tariff Events

- EPU exhibits much larger jumps (though these do not always correspond directly to the realization of tariff events)



Uncertainty jumps and tariff events. This figure plots the 3-day jumps (from day before to two days after) in the daily financial uncertainty nowcasts and in the EPU index on the dates of ten key tariff events.

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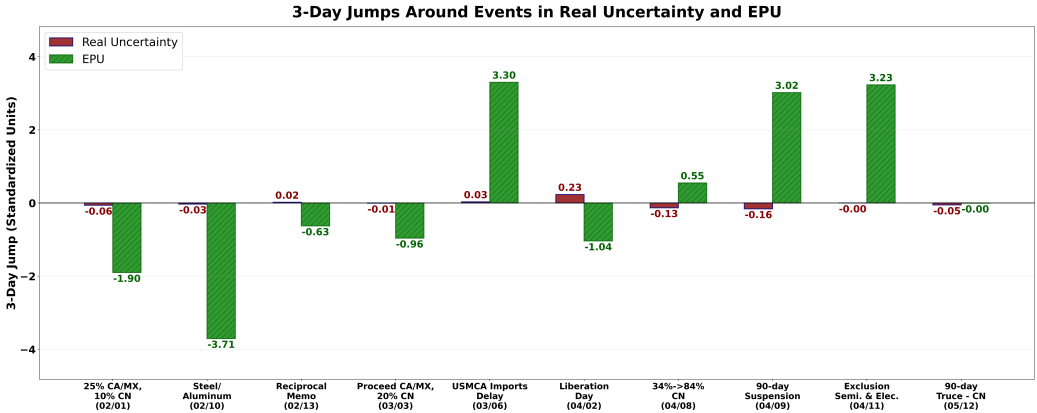
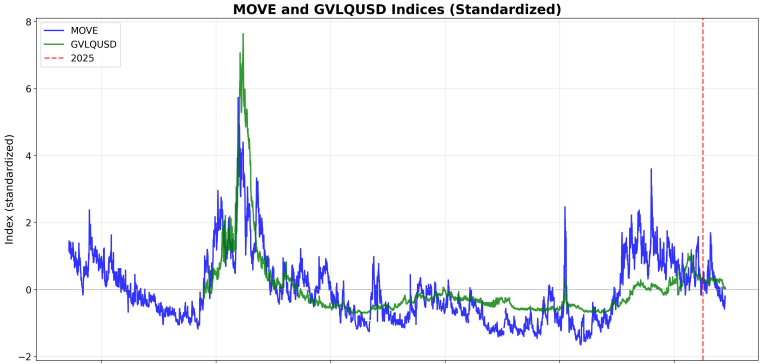


Uncertainty jumps and tariff events. This figure plots the 3-day jumps (from day before to two days after) in the daily real uncertainty nowcasts and in the EPU index on the dates of ten key tariff events.

Measures of Treasury Market Stress

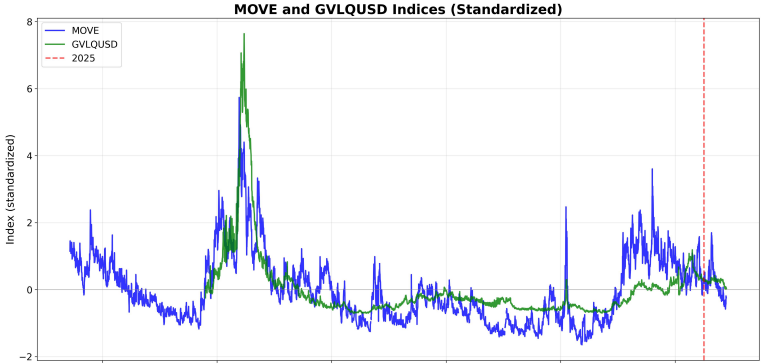
- Higher levels of MOVE / GVLQ $\Longrightarrow$ higher levels of volatility / illiquidity



This figure plots the standardized monthly values of the Merrill Lynch Option Volatility Estimate (MOVE) Index and the Bloomberg U.S. Government Securities Liquidity Index (GVLQUSD). The MOVE Index is constructed from an options-pricing model that aggregates implied volatilities from one-month, over-the-counter options on 2-, 5-, 10-, and 30-year U.S. Treasury securities, providing a weighted-average measure of expected Treasury market volatility. The GVLQUSD Index represents the equally weighted average of yield fitting errors across all U.S. Treasury notes and bonds with remaining maturities of one year or longer, based on Bloomberg's intraday relative-value curve fitter. A higher value of the GVLQUSD Index indicates less favorable liquidity conditions (i.e., wider yield deviations). Both series are standardized relative to their full-sample means and standard deviations. The sample for the MOVE Index spans 2002:11–2025:10, and the sample for the GVLQUSD Index spans 2007:08–2025:10.

Measures of Treasury Market Stress

- Have we observed signs of the "safe and liquid" status of U.S. government securities deteriorating since the start of the year?



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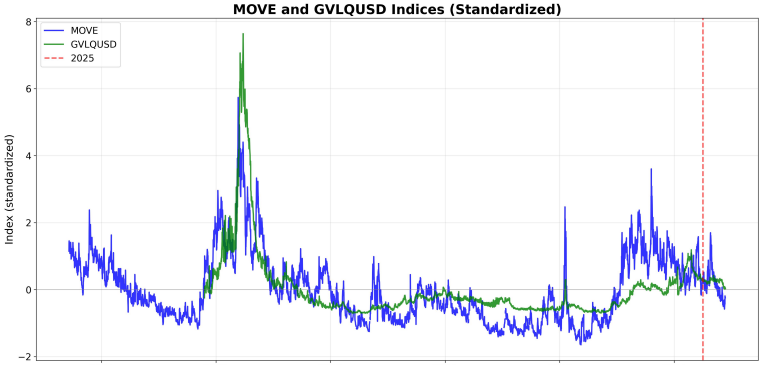
Measures of Treasury Market Stress

- Some signs of volatility / liquidity stress in April 2025, but not as large as GFC or COVID



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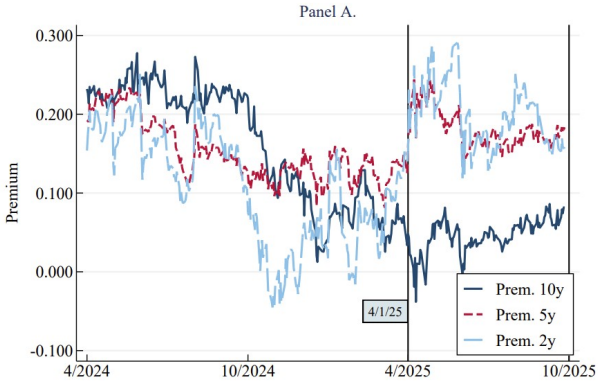
Convenience Yield on Long-term Treasuries

- Acharya and Laarits (2025): the loss in convenience of long maturity Treasuries in April 2025 reflects a loss in their hedging property



Source: Acharya and Laarits (2025). This figures plots the 10-, 5-, and 2-year TIPS-Treasury Premium, defined as the yield differential between a synthetic nominal Treasury—constructed out of Treasury Inflation Protected Security (TIPS) and inflation swaps—and a traded nominal Treasury.

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