

W

U

T

I

S



Global Markets Division

Market Regime Model

Examining US market regimes and capitalizing on findings through VIX Term Structure

Growth Target: 51%

Investment Horizon: 1 month

Luka Bartyenyev, Flora Lokos, Matvii Polishchuk, Jacopo Mei, Maša Lazarević

Vienna, December 5th, 2025

Team Overview

Global Markets



**Luka
Bartyenyev**

Team Lead

- Regime Identification
- Storyline



BSc. WU BBE –
5th semester



**Flora
Lokos**

Associate

- Economic Sentiment



BSc. WU BBE –
3rd semester



**Matvii
Polishchuk**

Analyst

- Surprise and Uncertainty



BSc. WU Economics –
3rd semester



Jacopo Mei

Fellow Analyst

- Hedgedness Model



MSc. WU QFIN –
3rd semester



**Maša
Lazarević**

Fellow Analyst

- Fiscal & Monetary Overview



BSc. WU BBE –
5th semester

1	Macroeconomic conditions in the USA	3
2	Market regime identification model	8
3	Interpretation of latent regimes	10
4	Quantification of market hedgedness	13
5	Trade structure	15
6	Appendix	16



Macroeconomic Sentiment



Recovery Strengthens, Though Expanding Labor Supply Pushes Jobless Rates Higher

Shutdown Rebound

V-shaped recovery

Government shutdown

The **V-shaped** recovery from 43 days long shutdown, as 137k furloughed workers temporarily **slowed consumption** of irrecoverable services. Resulting **decrease in CPI**, will **rebound** quickly once they return to work.

Performance

Private investment
2.6% growth

GDP
1.9% growth

Businesses are cautious, pulling back on capital expenditures, while **tariffs halt exports.**

Labor Market Developments

Recent developments

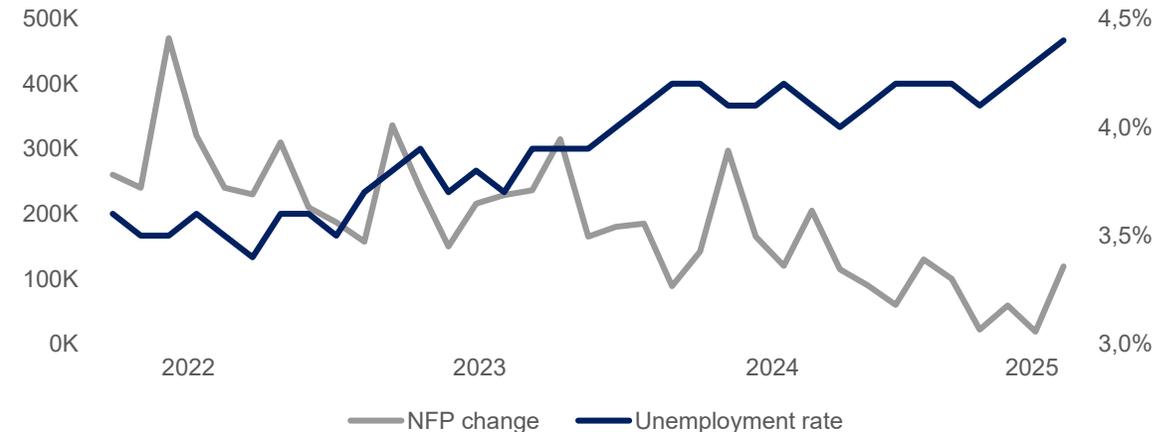
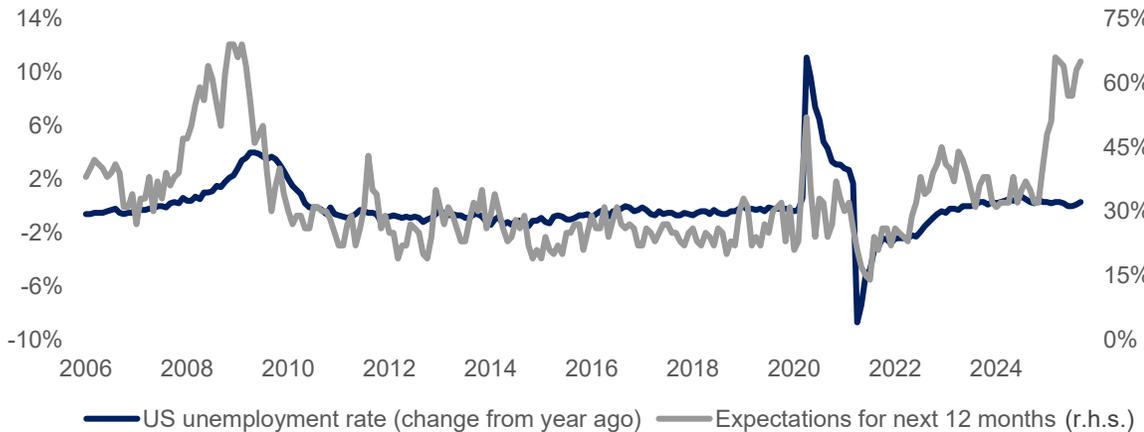
Unemployment
Driven by **new entrants** in the market (+1M active job seekers), plus AI-job losses.

Nonfarm-payrolls
Decrease in **professional business** services, government, transportation and utilities.

Participation rate
The labor force **increased** by 2.5M since last year, and so did the **unemployment rate (4.4%)**.

Conclusion
The rise in unemployment is not layoff-driven supply of workers entering labor force.

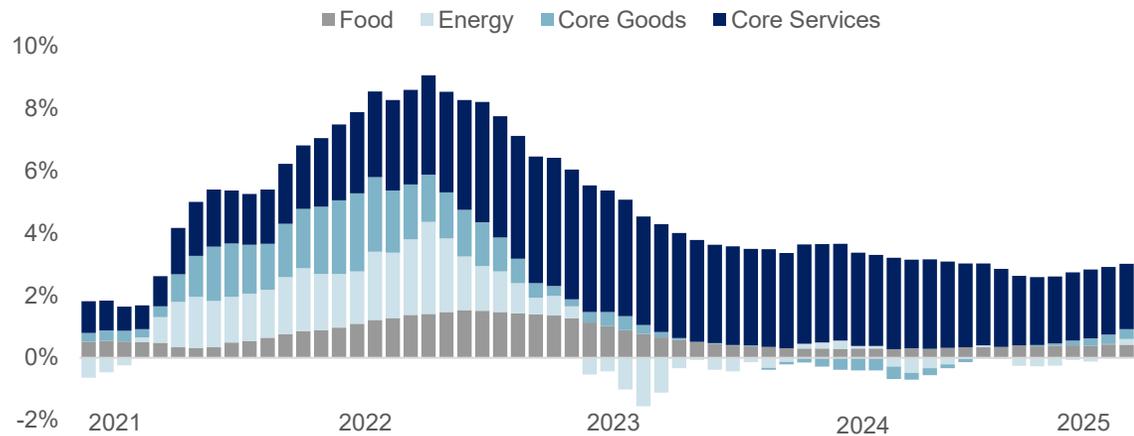
Expectations Uptick



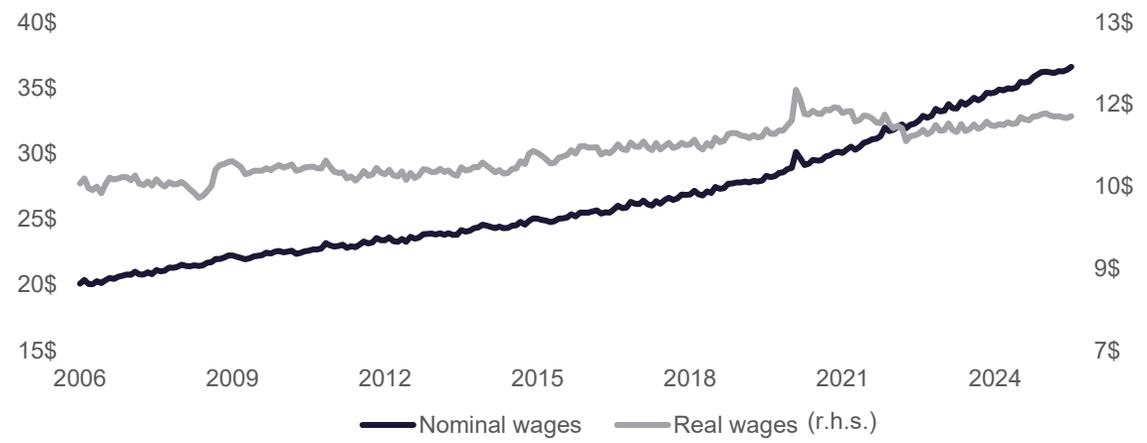
Economic Sentiment II.

Consumers Stay Active, But Stagnating Real Incomes Drive Higher Credit Usage

Sticky Services Inflation



Real Wages Trend

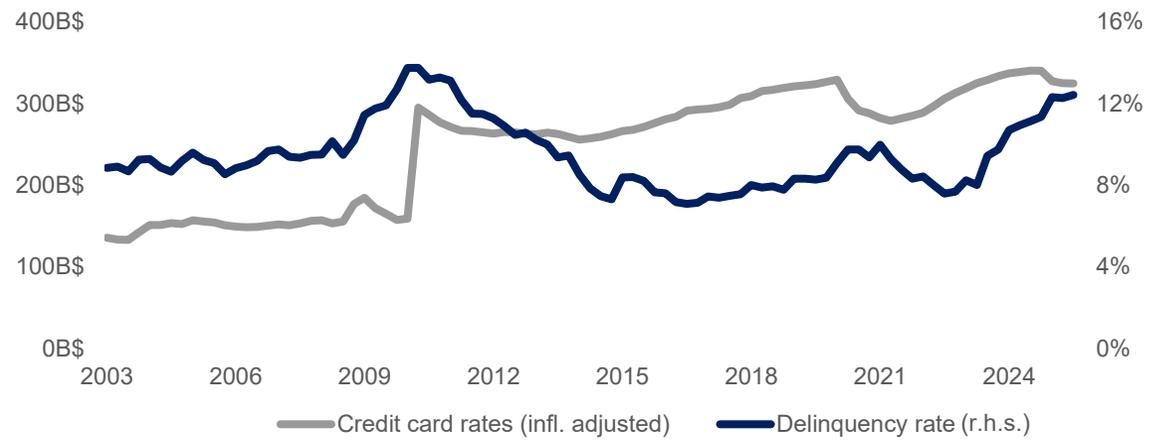


Household Credit Stress

- Short-term** consumer demand (2.8%) **remains strong**, despite long-term consumer sentiment deteriorating (down 17%).
- Households** strongly consume core services, but **mostly on credit**.
- Shelter costs cannot fall because >60% of **homeowners are locked into sub-4% mortgages**.

With real wages still lagging, households feel squeezed and increasingly rely on credit & actively seeking for jobs.

Credit Sustains an Elevated Inflation



U.S. Fiscal Environment

Structural US Spending and Tax Policy Setting the Stage for Persistent, Elevated Deficits

Government Spending Trends



Driven by Social Security, Medicare/Medicaid, due to the aging population.



Interest costs explode, now ~\$1 trillion.



Defense spending rises about 13% and border security jumps 65% in FY2026.



Cuts hit education, student loans, Medicaid, nutrition aid, and green programs.

FY2025 deficit improved slightly (-2%) only because **revenues jumped +6%**, not because spending slowed.

Tax and Tariff Balance



2025 revenues **boosted short-term** by wage growth, temporary TCJA expirations, and massive tariff intake.



Permanent TCJA extension + new H.R.1 **tax cuts** remove 4-5T\$ of future revenue, creating a **structural long-run decline**.

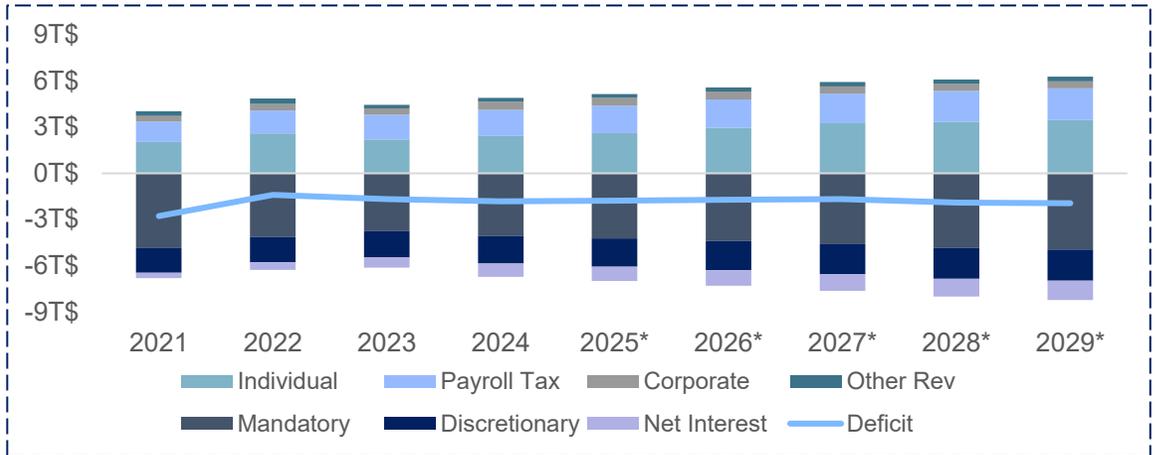


Tariffs surged (+150-300%) and brought in ~200B\$/year → helpful but will **not be enough** to offset tax losses.

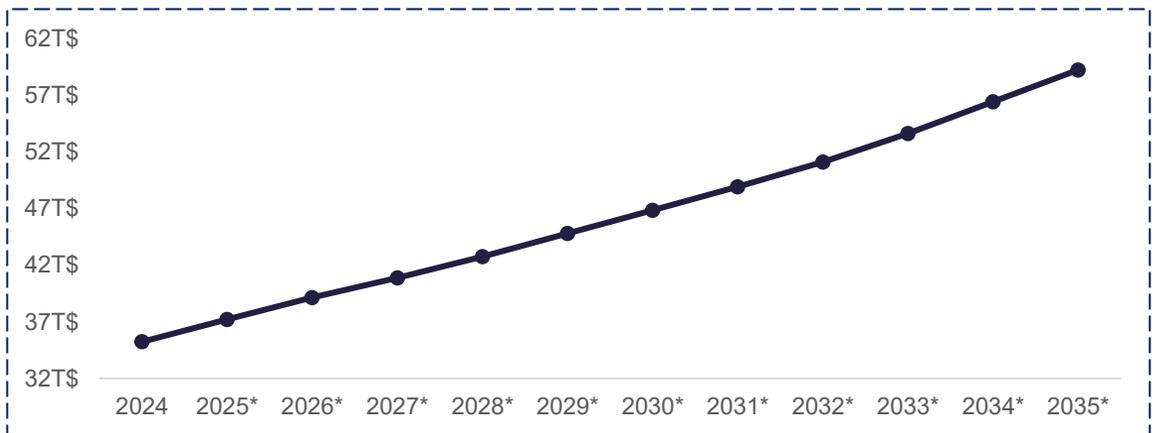


Corporate taxes **fell sharply** because businesses got expanded deductions under H.R.1.

U.S. Budget Composition & Deficit Dynamics



Projected US Federal Debt



Federal Reserve Balance Sheet & Liquidity

QT Paused as Tightening Liquidity Forces the Fed Toward Balance-Sheet Support

The QT Halt: Causes and Next Steps



Reserves approached scarcity: SOFR persistently above IORB, repo funding stress, increased SRF usage, and signs of dollar funding **tightness**.



QT was halted pre-emptively to avoid a repeat of the 2019 liquidity squeeze, consistent with the Fed's **"ample reserves"** operating framework.



The Fed signals potential **balance-sheet stabilization** followed by reserve rebuilding, likely via T-bill purchases ("**technical QE**").



Market **uncertainty** remains about the December **decision**, the **timing** of rate cuts, and how far Fed will go with balance-sheet **expansion**.

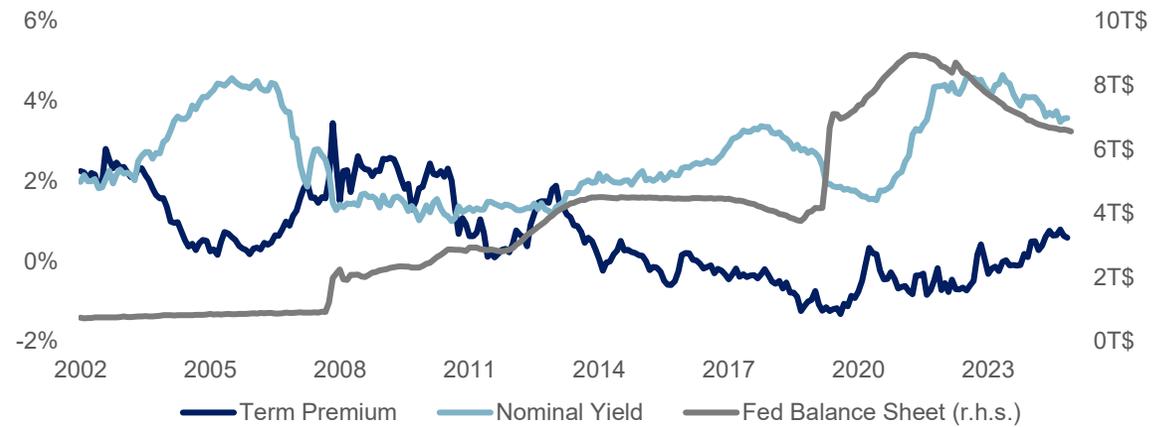


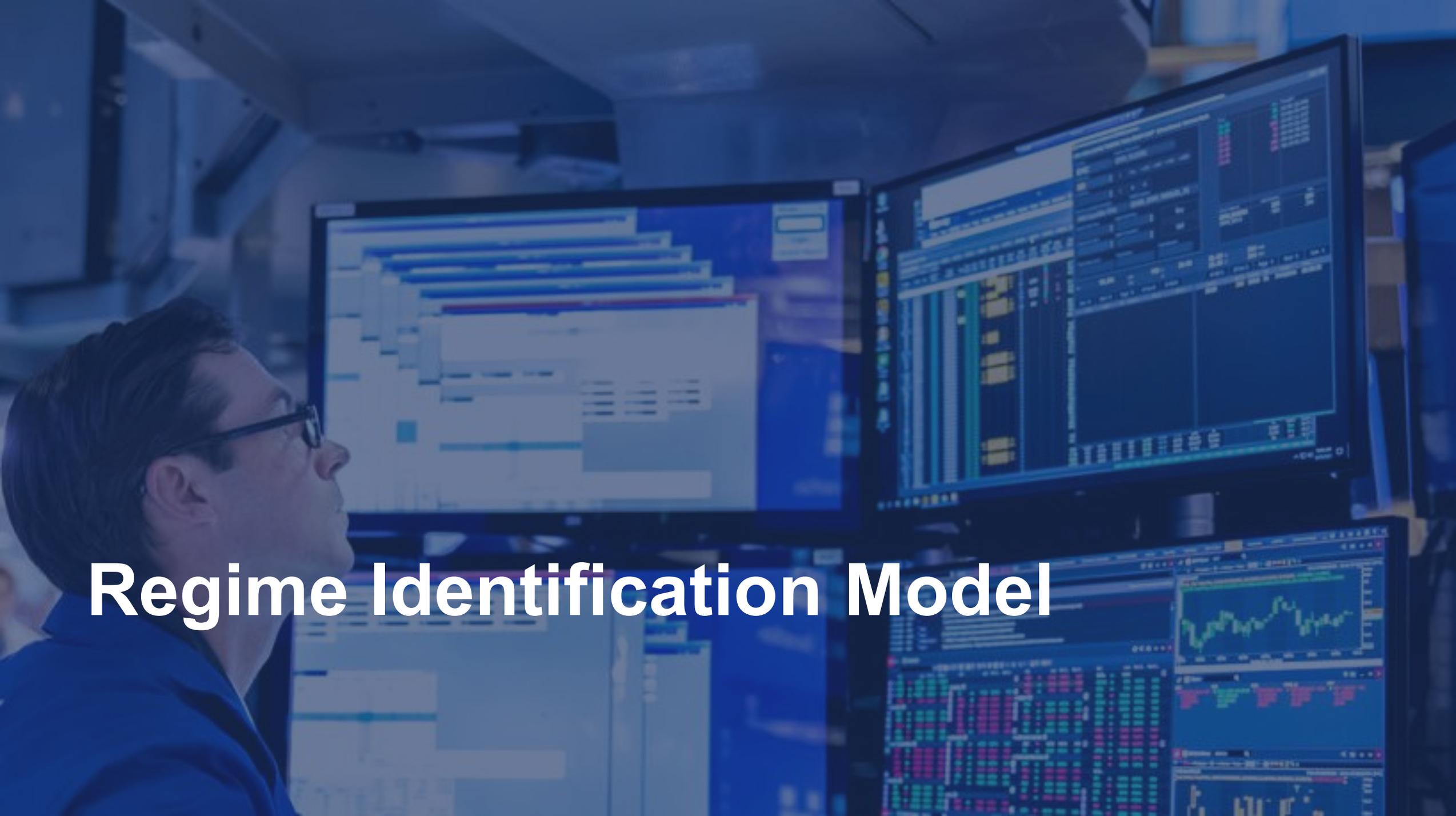
With QT paused and no Fed support for long-term bonds, private buyers must absorb heavy Treasury supply, **driving up the term premium** amid fiscal uncertainty.

Liquidity Conditions and Short-Term Rates



Balance Sheet Path and Term-Premium Implications



A man with glasses and a blue shirt is shown in profile, looking intently at a multi-monitor workstation. The room is dimly lit with a blue tint. The monitors display various data visualizations, including line graphs, bar charts, and tables. The text 'Regime Identification Model' is overlaid in white on the lower part of the image.

Regime Identification Model

Decomposition of the Market Regimes

Deriving Historical Market States with the Help Of Hidden Markov Model (HMM)

Hidden Markov Model



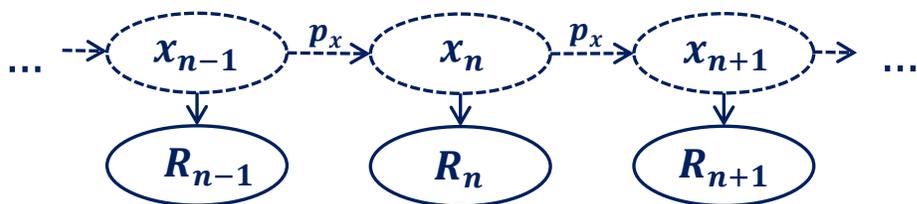
Non-stationary markets
Returns, while random, change distributions across time.



Measures shift and cluster
Volatility and correlations move violently during crises.

Goal is to identify and classify different regimes and the time of their switch.

$$P(R_n \in A | X_1 = x_1, \dots, X_n = x_n) = P(R_n \in A | X_n = x_n)$$



$$R' = (r_{SPX}, r_{Gold}, r_{WTI}, \Delta 10y)'$$

The model is fitted on daily returns of SPX, Gold, WTI, and changes in the 10-year U.S. Treasury yield.



The model estimates **daily regime probabilities** based on the fitted Hidden Markov structure.

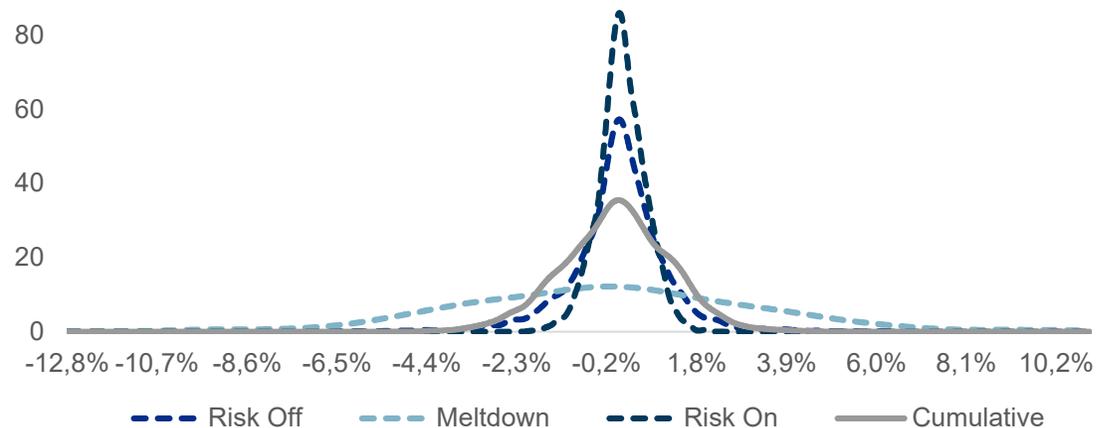
$$R_n | (X_n = x_n) \sim N(\mu_{x_n}, \Sigma_{x_n})$$

Each regime is characterized by the mean return vector and **variance-covariance matrix**.



Model identifies **high- and low-vol regimes** and correlations.

State-Conditional Distributions



Classifying the States



Market meltdown

Rarest regime that **dies off quickly** and transits into and from **Risk off**.

Volatility peaks, with $\sigma_{ann}^{SPX} = 52.8\%$.

Correlations show a **flight to safety**.



Risk off

General **state of market cautiousness**.

Volatility subdued, mean returns **without any direction**.

Moderate correlations between risk & safety.



Risk on

Euphoric macro and markets sentiment.

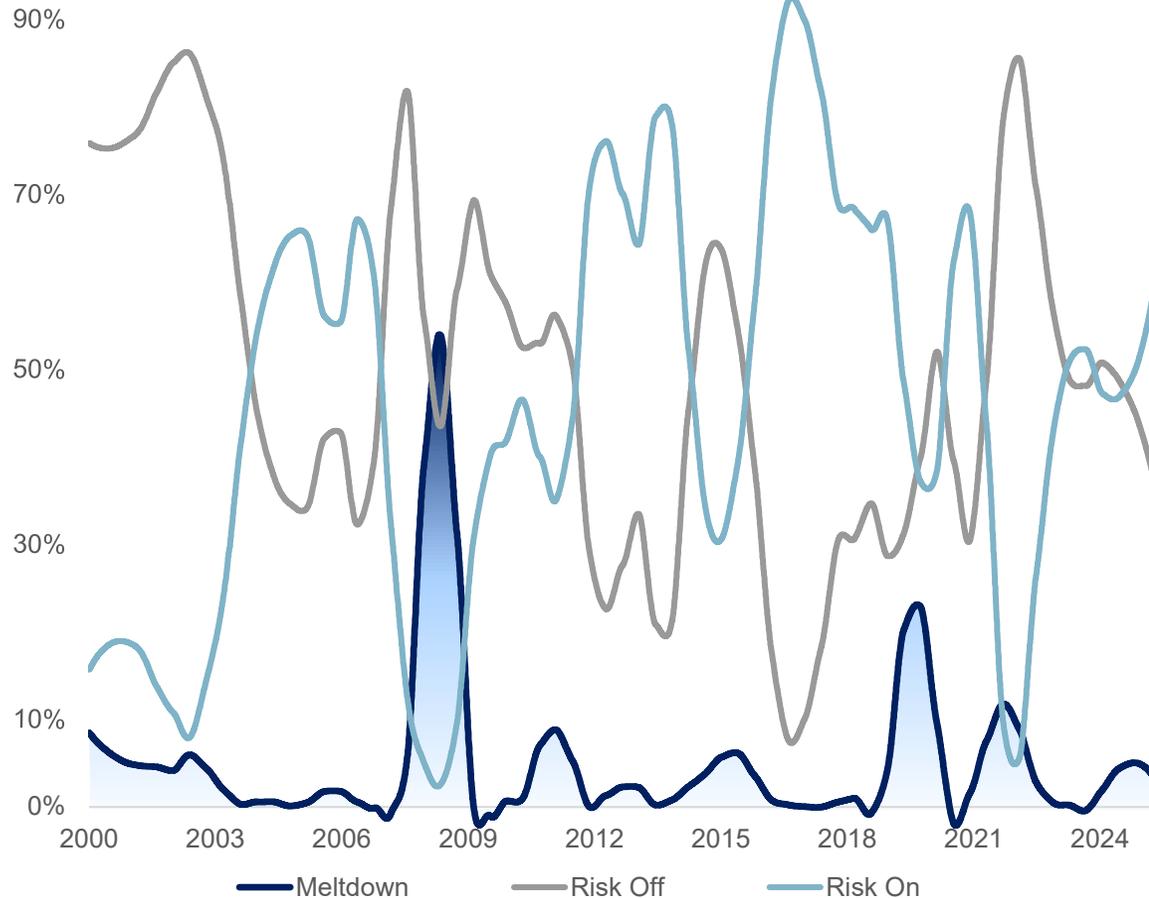
Compressed volatility, with $\sigma_{ann}^{SPX} = 1.7\%$.

Yields edge higher, Gold-SPX correlation turns positive.

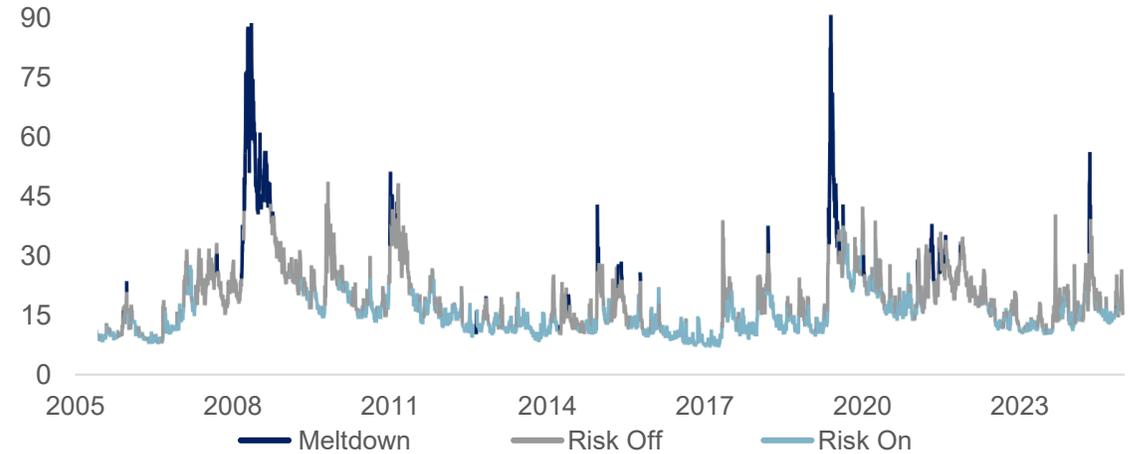
Reflection of Regimes in Markets

Translating Market Regimes into Asset Classes outside of Model's Scope

State Probabilities



VIX within Regimes



Model Results Across Markets

<p>Rates and Fixed Income</p> <p>Treasuries curve steepens within Risk On regime and flattens in Risk Off.</p>	<p>Credit</p> <p>Clear state and HY-spreads correlation, with widening in Meltdown/Risk Off.</p>
<p>Safe-heavens demonstrate state-dependency in Meltdown, strengthening significantly.</p>	<p>Strong explanatory power for vol-clustering. Closest linked to level of VIX.</p>
<p>Currencies</p>	<p>Volatility</p>



Economic Surprise and Uncertainty Indicators

Unfolding Divergence Between Concerns and Low Economic Shocks

Measuring Economic Surprise and Uncertainty

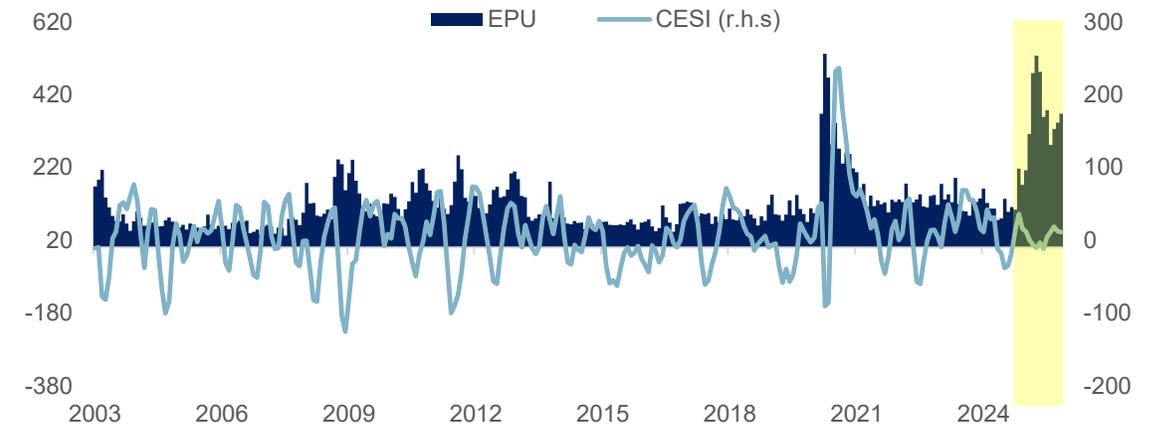
Citi Economic Surprise Index (CESI)
Reading – Bloomberg Exp.
 σ_{Surprise}
 Adjusted for the 3-month rolling average.

FRED Economic Policy Uncertainty (EPU)
 Normalized index of **volume of news articles** containing the terms 'uncertainty', 'economy', 'federal reserve'.

?

Uncertainty is among the highest while readings surprise is moderate.

Quantitative Visualization



Revelation of the New Structural Trend

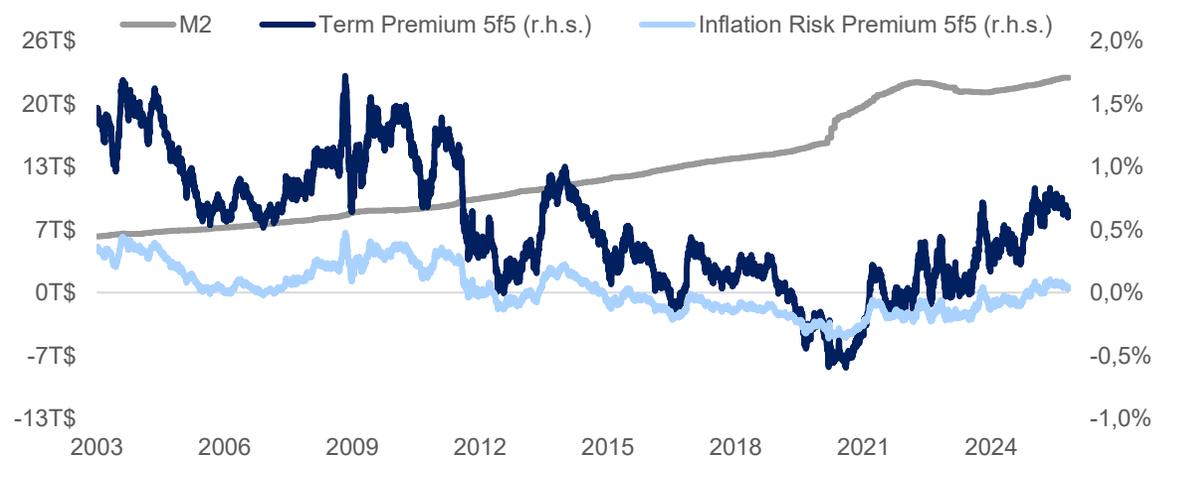
↻ The inherent liquidity injection drives **self-reinforcing market force**.

∞ Markets' systematic dependence on liquidity injection causes **structural issues**.

📈 Resulting structural issues are reflected in **elevated real yields and term premium**.

⚠️

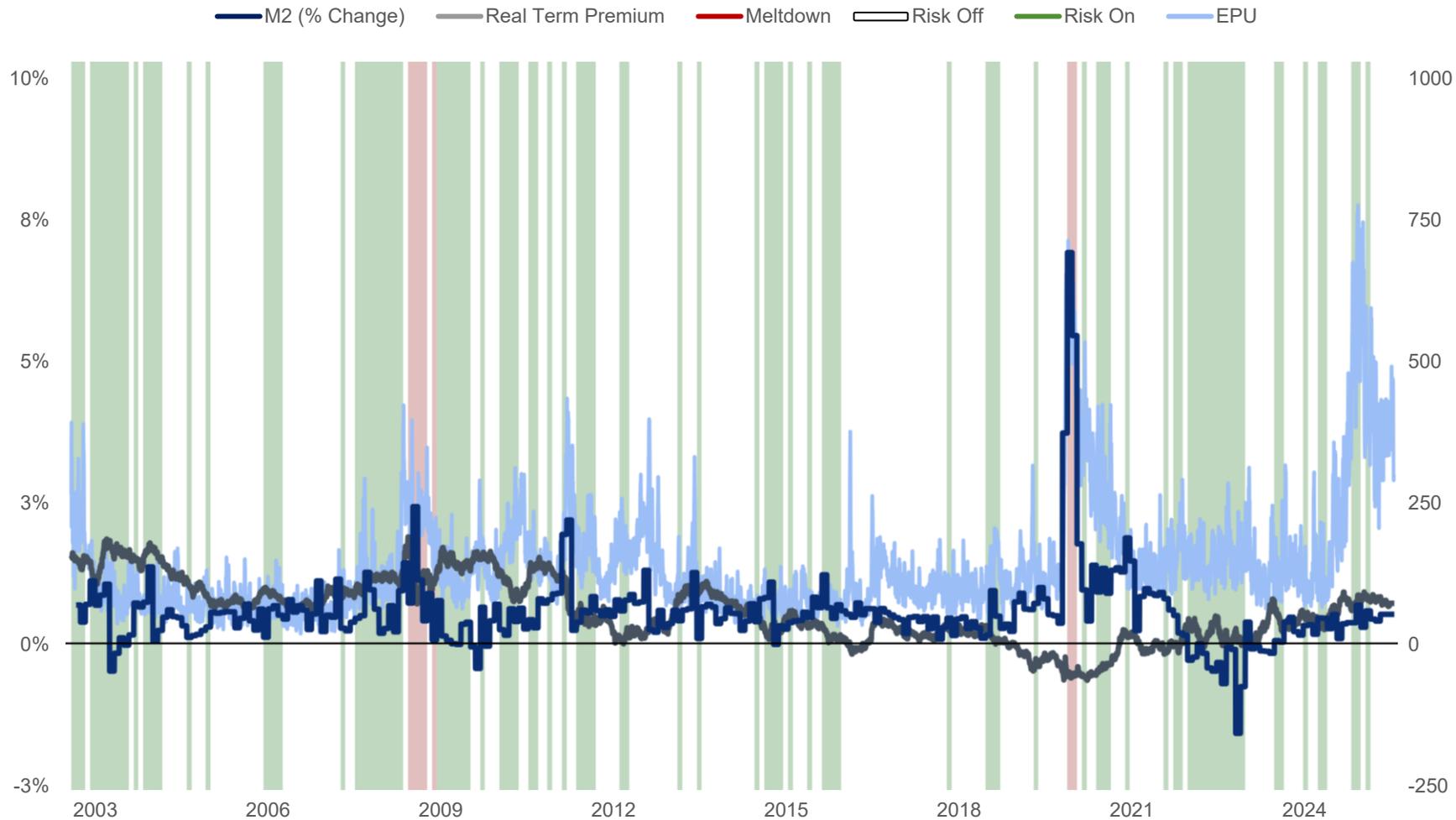
Pattern of rising uncertainty despite low economic surprise is set to persist.



Compressed Risks & High Compensations

Identification of Market Sensitivity Inflection Points

Liquidity and Uncertainty in Different Market Regimes



Structural Implications

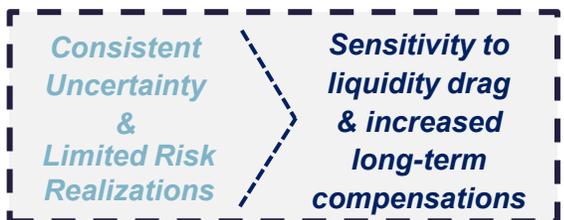
EPU as regime forecaster

- Strong EPU displacements can be associated with switch to risk-off / meltdown regime.
- **Recent uncertainty was ATH and remains elevated**, explaining risk off market distribution.

Yields and M2 Change

- Persistent monetary mass growth increases long-term concerns and duration risk compensation.
- A widening money supply associated with risk-on regimes leads to **broad volatility compression**.

What does it mean for markets?



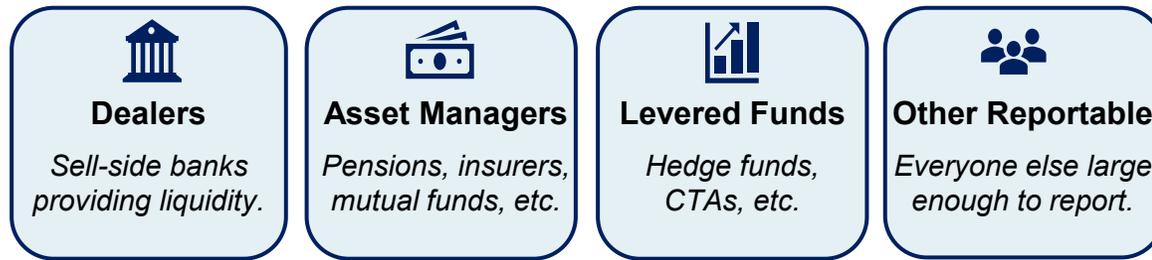
A person in a dark suit is seen from behind, looking at a computer monitor. The monitor displays a financial candlestick chart with a red line and a blue line. The background is dark and filled with other computer monitors, suggesting a trading floor or data center. The overall lighting is dim and blue-toned.

Trade Structure

Market Hedgedness Index

Defining Metrics Analyzed and Constructing the Random Forest Model

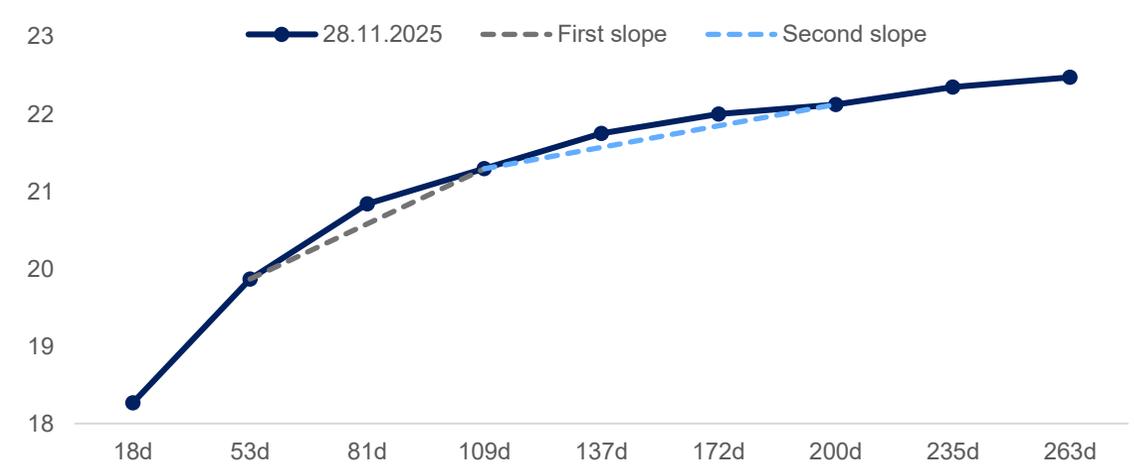
Index on Commitment of Traders Report



$$CoT_t = \frac{l_t - s_t}{\frac{1}{4} \sum_{i=0}^3 l_{t-i} + s_{t-i}}$$

The index captures **category-specific** relative risk pressure and produces a **direction + magnitude** signal about **abnormal positioning**.

VIX Term Structure



Random Forest and Hedgedness Index

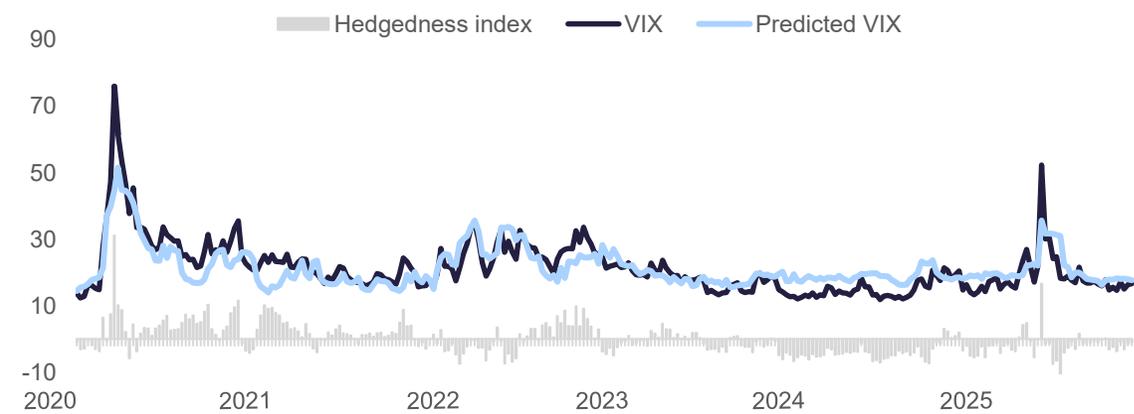
Model

$$HI_t = VIX_t - \widehat{VIX}_{F,t}$$

- $HI_t > 0$: VIX is **overpriced** (recent panic is fresh).
- $HI_t < 0$: VIX is **underpriced** (volatility is oversupplied).

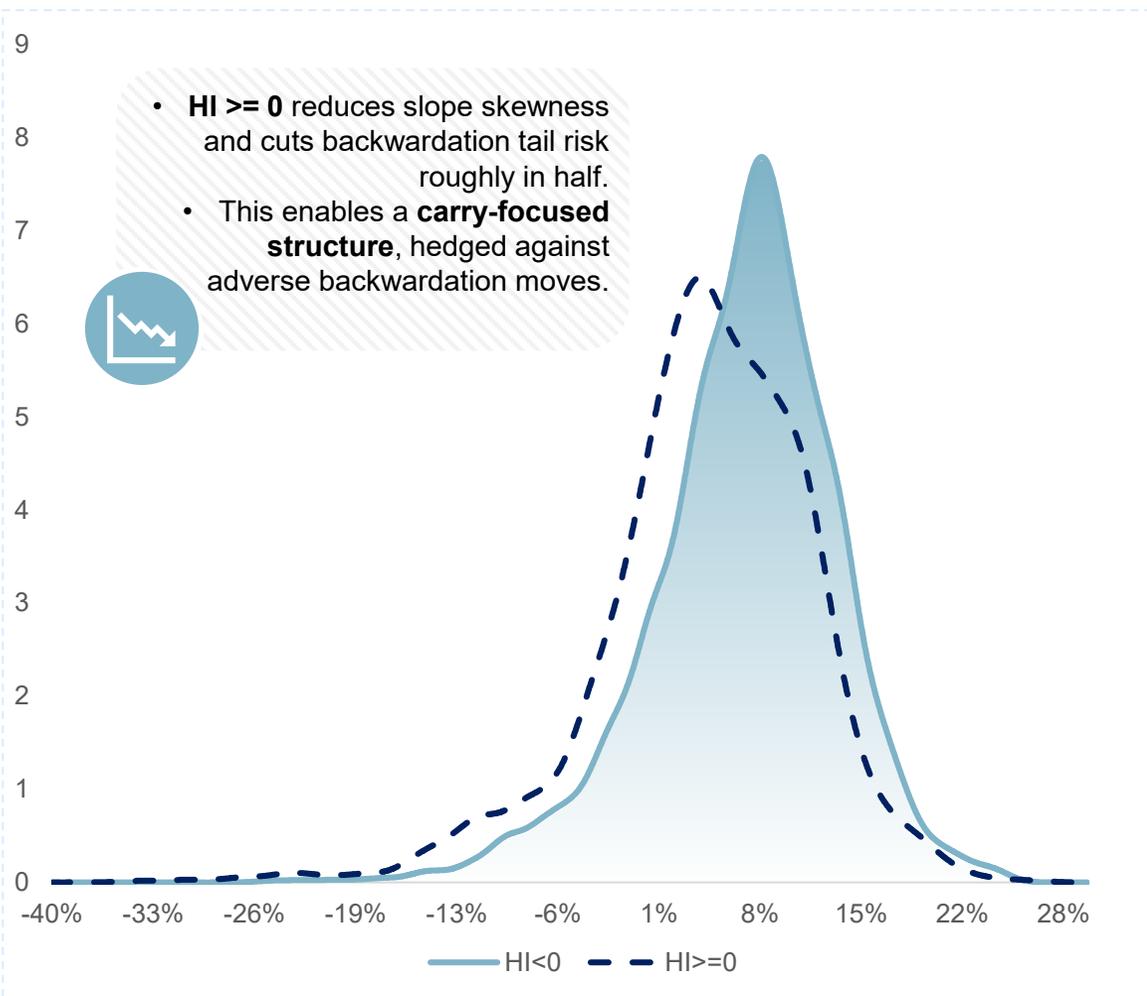
Data inputs

- Market Regime** weekly average.
- Realized Volatility** annualised 25 day window.
- CoT Indices** positionings for the 4 agents.

$$\widehat{VIX}_{F,t} = f(X_t, \sigma_t, CoT'_t)$$


Interpretation of Hedgedness Index & Trade Implementation

HI-Dependant Slope



Trade Structure

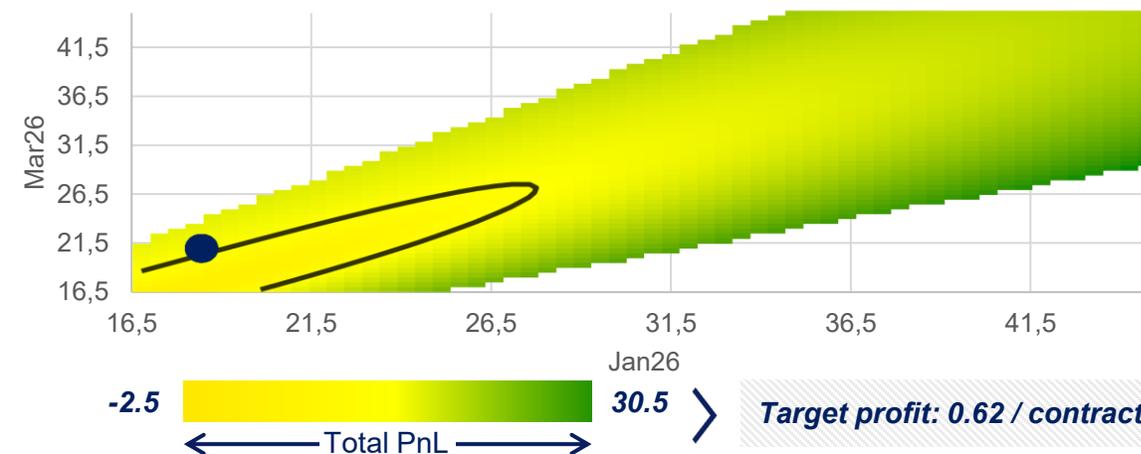
Futures calendar spread – simultaneously sell and buy futures on the same underlying but with different expirations.

As of close 28.11.2025:

Position	Expiry	Fut.Price /Strike	CF now
SELL Jan26 VIX Future	21 January 2026	19.8	-
BUY Mar26 VIX Future	18 March 2026	21.25	-
BUY Jan26 VIX Call	21 January 2026	35	-0.44

Trade captures **carry premium from VIX curve**, being hedged from backwardation.

P&L Mapping





Appendix

This document is being made available by WUTIS Trading and Investment Society, acting through its society ("WUTIS"), for information purposes only and for the sole and exclusive use of the addressee in connection with the matter or possible transaction to which this document relates. This document is incomplete without reference to, and should be assessed solely in conjunction with, the oral briefing provided by WUTIS.

This document is strictly confidential and remains the property of WUTIS. You agree that you shall only use this document for the purpose of evaluating and considering the matter or possible transaction to which this document relates. This document may not be distributed, published, reproduced, or disclosed, in whole or in part, to any other person, nor relied upon by you or any other person, nor used for any other purpose at any time, in each case without the prior written consent of WUTIS.

This document does not constitute nor does it form part of an offer to sell or purchase, or the solicitation of an offer to sell or purchase, any securities or any of the businesses or assets described herein or an offer or recommendation to enter into any transaction described herein nor does this document constitute an offer or commitment to provide, arrange or underwrite any financing. You are responsible for making your own independent investigation and appraisal of the risks, benefits, appropriateness and suitability of any transaction or matter contemplated by this document and WUTIS is not making any recommendation (personal or otherwise) or giving any investment advice and will have no liability with respect thereto. The decision to proceed with any transaction or action contemplated by this document must be made by you in the light of your own commercial assessments and WUTIS will not be responsible for such assessments.

Neither WUTIS nor any of its subsidiaries or affiliates, nor any of their respective officers, directors, employees or agents (WUTIS together with such persons being the "WUTIS Group") accepts any liability whatsoever for any direct, indirect or consequential losses (in contract, tort or otherwise) arising from the use of this document or its contents or any reliance on the information contained herein. WUTIS Group is not responsible for any specialist advice, including legal, regulatory, accounting, model accounting, tax, actuarial or other advice.

This document was prepared on the basis of information and data, obtained from publicly available sources and, where applicable, from you and/or any other entity that may be involved in any transaction or matter contemplated by this document (and/or any of your or the aforementioned entities' affiliates), in each case prior to or on the date hereof. The information in this document has not been independently verified by WUTIS. WUTIS has relied on any information provided by you or from third party or public sources as complete, true, fair, accurate and not misleading. With respect to any financial or operating forecasts and analyses provided to it, WUTIS has assumed that they are achievable and have been reasonably and properly prepared on bases reflecting the best currently available information, estimates and judgments as to the future financial performance of the entity(ies) to which they relate and that such forecasts or analyses would be realised in the amounts and time periods contemplated thereby. No member of the WUTIS Group, makes any warranty or representation, express or implied, as to the accuracy, completeness or reasonableness of the information (including projections and assumptions) contained in this document whether obtained from or based upon third party or public sources or otherwise.

This document is given as at the date hereof, may not be final, is based on information available to WUTIS as at the date hereof, is subject to any assumptions set out therein and is subject to change without notice. Accordingly, this document may be based on (a) data and information that may no longer be current and (b) estimates that may involve highly subjective assessments. It should be understood that subsequent developments may affect this document and the WUTIS Group does not undertake any obligation to provide any additional information or to update any of the information or the conclusions contained herein or to correct any inaccuracies which may become apparent. Any data or information regarding, or based on, past performance is no indication of future performance.

Members of the WUTIS Group are involved in a wide range of commercial banking, investment banking and other activities out of which conflicting interests or duties may arise. In the ordinary course of its business, the WUTIS Group may provide services to any other entity or person whether or not a member of the same group as you (a "Third Party"), engage in any transaction (whether on its own account, on behalf of any Third Party or otherwise, and including any transaction or matter contemplated by this document), notwithstanding that such services, transactions or actions may be adverse to you or any member of your group, and the WUTIS Group may retain for its own benefit any related remuneration or profit. The WUTIS Group operates in accordance with a conflicts of interest policy which identifies conflicts of interest it faces in the ordinary course of its business, and establishes organisational and procedural measures to manage those conflicts where it is reasonably able to do so. Neither WUTIS nor any other part of the WUTIS Group shall have any duty to disclose to you or utilise for your benefit any non-public information acquired in the course of providing services to any other person, engaging in any transaction (on its own account or otherwise) or otherwise carrying on its business. WUTIS' research analysts and research departments are independent and are subject to certain regulations and internal policies. WUTIS research analysts may hold opinions and make statements or investment recommendations and/or publish research reports with respect to any company referred to herein, the transactions contemplated herein or any person or entity involved therein or related thereto that differ from or are inconsistent with the views or advice communicated by WUTIS.

Sources

Source Name	Link	Date of Retrieval	Used for
Bloomberg	-	29/11/2025	Economic Sentiment I&II
FRED - Delinquency Rate on Credit Card Loans, All Commercial Banks	https://fred.stlouisfed.org/series/DRCCLA CBS	29/11/2025	Economic Sentiment II
FRED - Consumer Price Index for All Urban Consumers: All Items (CPI)	https://fred.stlouisfed.org/series/CPIAUCS L	29/11/2025	Economic Sentiment II
FRED - Unemployment Rate (US, headline)	https://fred.stlouisfed.org/series/UNRATE	29/11/2025	Economic Sentiment I
FRED - Large Bank Consumer Credit Card Balances: 90 or More Days Past Due Rates: Balances Based (credit-card delinquency)	https://fred.stlouisfed.org/series/RCCCBB ALDPD90P	29/11/2025	Economic Sentiment II
PolicyUncertainty.com	https://www.policyuncertainty.com	25/11/2025	Economic Policy Uncertainty
Bloomberg	-	20/11/2025	Citi Economic Surprise Index
BPC	https://bipartisanpolicy.org/report/deficit-tracker/#data-toc-id-0	17/11/2025	U.S. Fiscal Environment

Sources

Source Name	Link	Date of Retrieval	Used for
CBO	https://www.cbo.gov/data/budget-economic-data	17/11/2025	U.S. Fiscal Environment
Statista	https://www.statista.com/statistics/216998/forecast-of-the-federal-debt-of-the-united-states/	25/11/2025	U.S. Fiscal Environment
Tax Foundation	https://taxfoundation.org/research/all/federal/big-beautiful-bill-senate-gop-tax-plan/	17/11/2025	U.S. Fiscal Environment
Tax Foundation	https://taxfoundation.org/research/all/federal/trump-tax-cuts-2025-budget-reconciliation/#:~:text=Lawmakers%20have%20passed%20legislation%20called,law%20on%20July%204%2C%202025.	17/11/2025	U.S. Fiscal Environment
The Budget Lab at Yale	https://budgetlab.yale.edu/research/state-us-tariffs-october-30-2025	25/11/2025	U.S. Fiscal Environment
White House	https://www.whitehouse.gov/wp-content/uploads/2025/05/President-Trumps-Fiscal-Year-2026-Discretionary-Funding-Request-Overview.pdf	17/11/2025	U.S. Fiscal Environment
BNP Paribas	https://economic-research.bnpparibas.com/html/en-US/United-States-Will-sufficiently-cautious-stops-QT-11/5/2025,52968	17/11/2025	Federal Reserve Balance Sheet & Liquidity

Sources

Source Name	Link	Date of Retrieval	Used for
FRED – Total Assets	https://fred.stlouisfed.org/series/WALCL	25/11/2025	Federal Reserve Balance Sheet & Liquidity
FRED – M2	https://fred.stlouisfed.org/series/M2SL	25/11/2025	Federal Reserve Balance Sheet & Liquidity
MFS	The Fed Ends QT: What it Means for Markets	17/11/2025	Federal Reserve Balance Sheet & Liquidity
New York Fed	Treasury Term Premia - FEDERAL RESERVE BANK of NEW YORK	25/11/2025	Federal Reserve Balance Sheet & Liquidity
Money Supply M2	https://fred.stlouisfed.org/series/M2SL	25/11/25	Surprise and Uncertainty & Fed Money Supply