



## TOPICS:

Market risk, Technology

## SOURCE

Bank for International Settlements

## BIS: Harnessing Artificial Intelligence for Monitoring Financial Markets

- This BIS paper presents a novel framework that integrates **recurrent neural networks (RNNs)** with **large language models (LLMs)** to enhance the monitoring and forecasting of financial market stress. Motivated by the limitations of traditional early warning systems - namely their high false positives and inability to handle nonlinear, high-dimensional data - the authors propose an AI-based approach focused on detecting deviations from **triangular arbitrage parity (TAP)** in the Euro-Yen currency pair, a well-established proxy for market dysfunction.
- The **RNN model**, enhanced with **dynamic variable weighting**, forecasts TAP deviations up to 60 business days in advance. These variable-specific weights serve two purposes: (1) they identify which market indicators are driving the forecasted stress, and (2) they direct the LLM to search for relevant narrative context in textual financial data. This hybrid system aims to provide interpretable, data-driven explanations for forecasted dislocations.
- The methodology demonstrates strong out-of-sample performance

- over the 2021–2024 period, notably capturing signals ahead of events such as the **March 2023 banking turmoil**. While the RNN does not consistently outperform autoregressive benchmarks in terms of raw error, it provides **statistically relevant forecasts** and exhibits smoother predictions more suited for identifying emerging risks. The model's internal weighting mechanism further enhances transparency, allowing regulators to trace which variables signal stress and how those signals evolve over time.
- Additionally, the study illustrates how **LLMs**, when guided by the RNN's weights, can be used to extract focused insights from large corpora of financial news. A case study from July 2023 successfully identifies precursors to the **October 2023 U.S. Treasury market volatility** ("Treasury Tantrum"), underscoring the practical utility of the approach.

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