

RESEARCH INSIGHT

Too Big to Fail Became Too Complex to Fail

05 October 2026

Issue 009

LB Research
www.lb-research.com



Executive summary



Laura Brennan

Independent Researcher

Laura Brennan is an independent researcher specialising in market structure, systemic risk and cross-market transmission

Systemic importance is not one ranking.

Key findings

- HY OAS ranks 9th in structural strength but 3rd in robust bridge importance.
- HYG is the **strongest shock transmitter**.
- VIX ranks far higher on **downside consequence** than on transmission.

Key metrics

Structural strength rank	HY OAS: 9
Robust bridge importance rank	HY OAS: 3
HYG transmission rank	1
VIX downside consequence rank	2

Why it matters

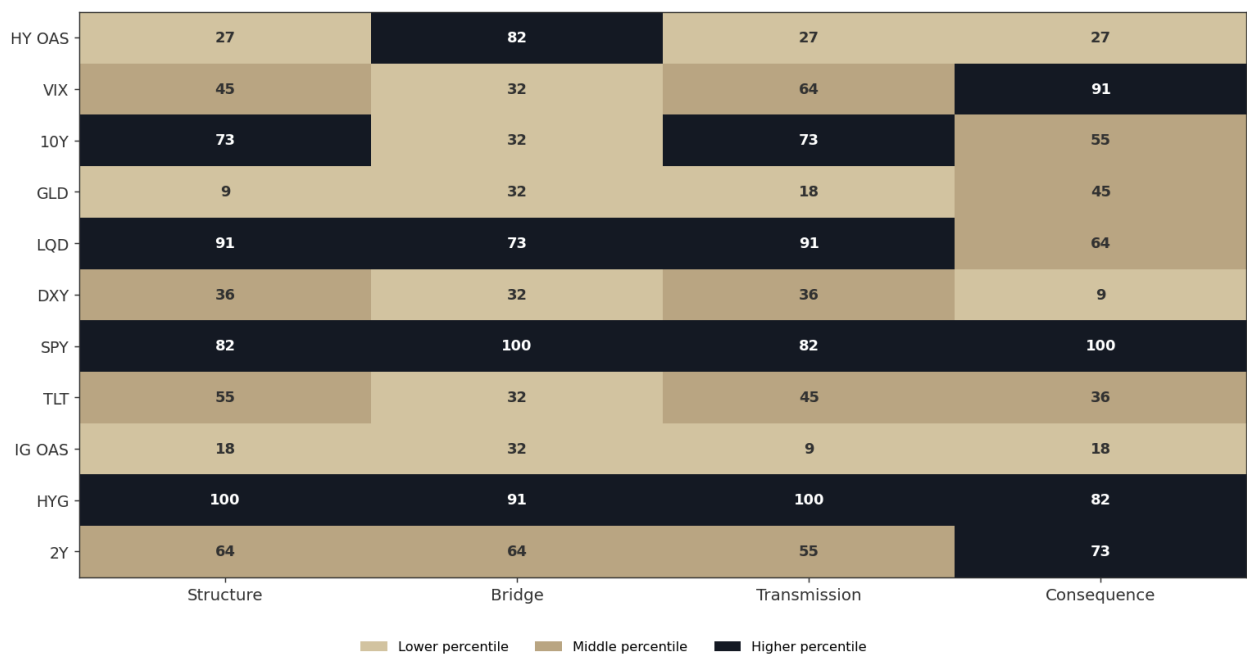
A node can be important because it connects markets, bridges clusters, transmits shocks or responds most strongly to stress.

Those roles do not always belong to the same asset.

Systemic importance has more than one dimension

Systemic importance has more than one dimension

Structural connectedness, bridge position, shock transmission and downside consequence identify different roles within the same market system



LB

Source: Yahoo Finance via yfinance; FRED. Author analysis — Laura Brennan

Figure 1. Systemic importance across structure, bridge position, transmission and downside consequence.

The same assets do not dominate every dimension of systemic importance. HYG ranks highly on structure and transmission, while SPY combines strong bridge importance with high downside consequence.

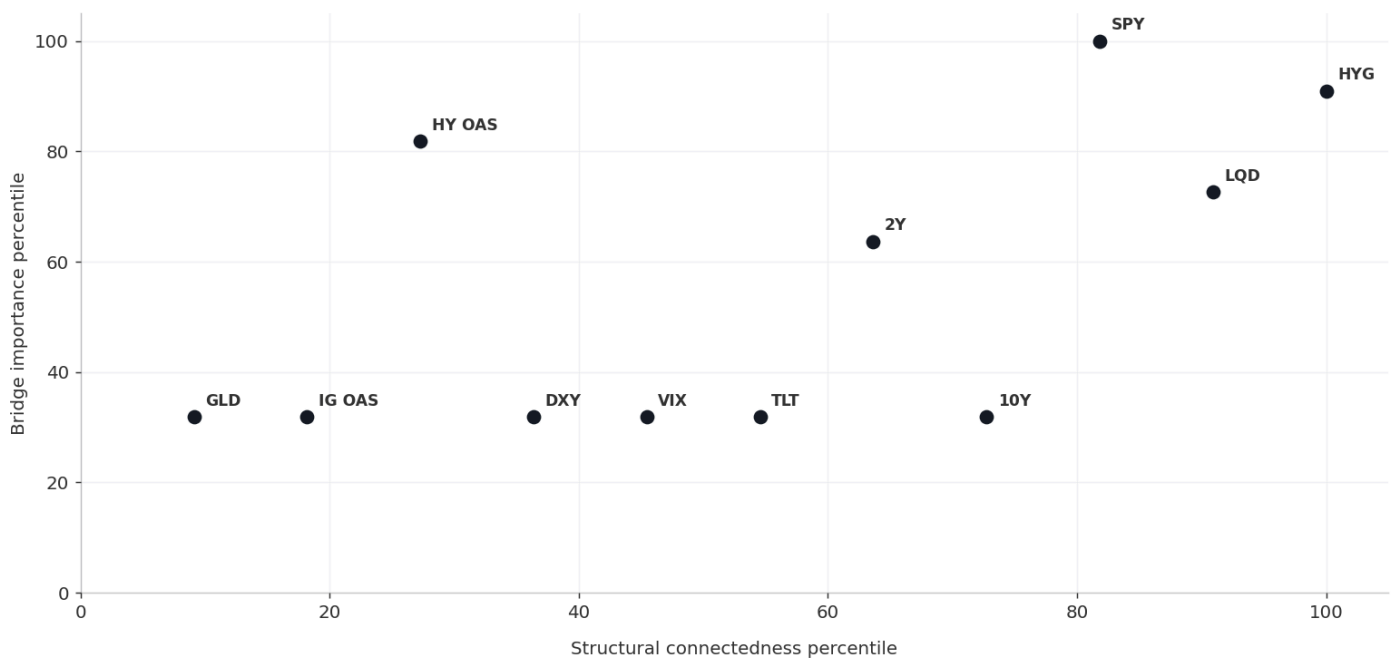
Percentiles are calculated cross-sectionally across the 11-instrument universe for each dimension.

HY OAS shows the clearest divergence. Its structural importance is relatively low, yet its bridge importance is high. The result suggests that systemic importance is better understood as a set of distinct roles than as a single ranking.

Being connected and being a bridge are different roles

Being connected and being a bridge are different roles

HY OAS ranks relatively low on ordinary connectedness but remains important as a bridge between otherwise distinct parts of the system



Source: Yahoo Finance via yfinance; FRED. Author analysis — Laura Brennan

Figure 2. Structural connectedness versus bridge importance across the cross-market network.

Most highly connected assets also rank relatively high in bridge importance.

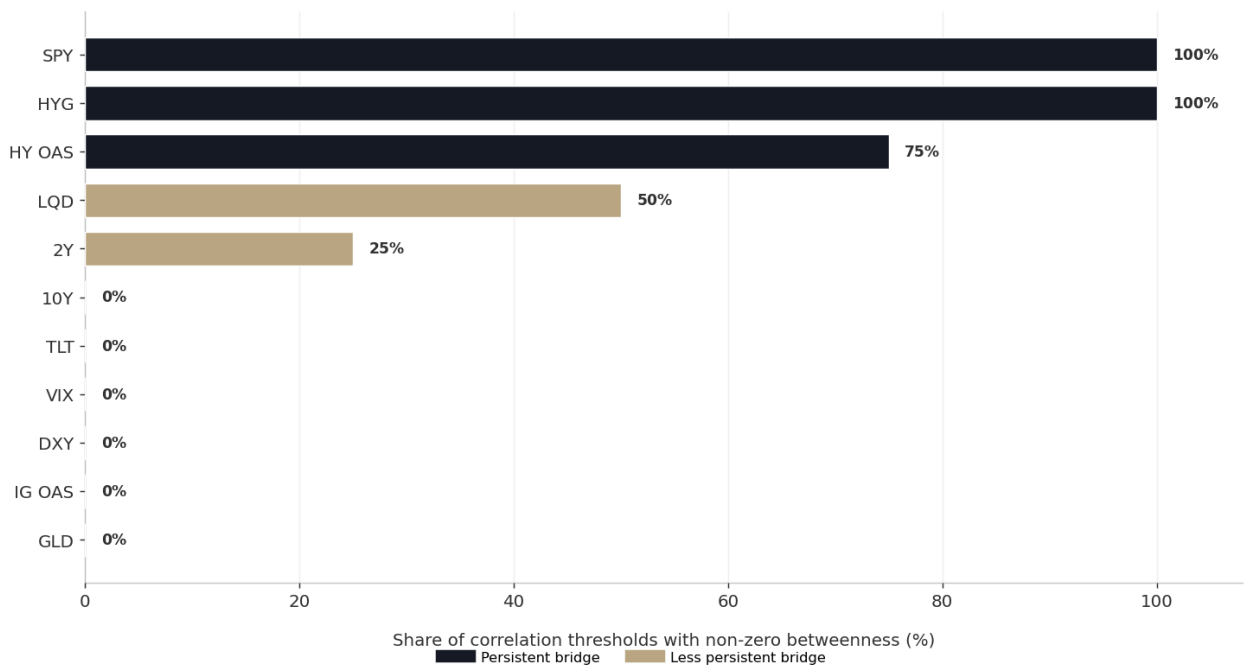
HY OAS is the exception. It sits much lower on structural connectedness but remains one of the most important bridges in the system.

A node can matter because of where it sits, not just how many strong links it has.

Some bridge positions survive the network definition

Some bridge positions survive the network definition

SPY and HYG remain bridges across every tested threshold, while HY OAS retains a bridge role across three of four network definitions



Source: Yahoo Finance via yfinance; FRED. Author analysis — Laura Brennan

Figure 3. Persistence of bridge importance across alternative correlation thresholds.

SPY and HYG remain bridges across every threshold tested.

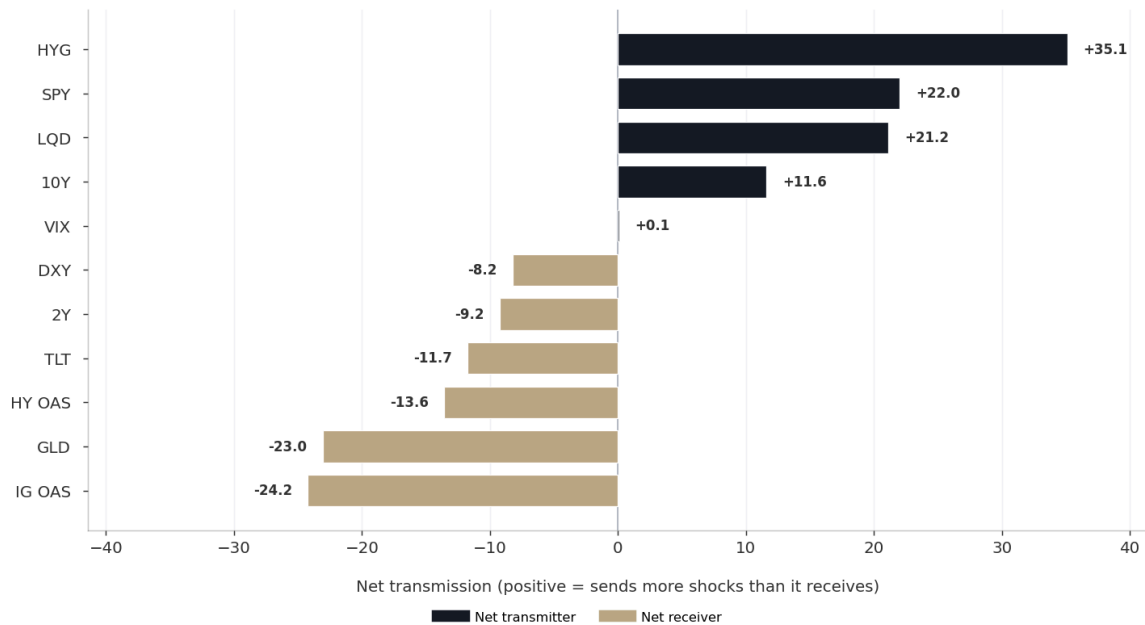
HY OAS retains a bridge role across **three of four** network definitions, despite ranking much lower on ordinary structural strength.

A bridge is more convincing when its importance survives changes in network specification.

Bridge position does not imply shock transmission

Bridge position does not imply shock transmission

HYG is the strongest current net transmitter, while HY OAS is a structural bridge but currently receives more transmission than it sends



LB

Source: Yahoo Finance via yfinance; FRED. Author analysis — Laura Brennan

Figure 4. Current net shock transmission across the cross-market system.

HYG is the strongest current net transmitter, followed by SPY and LQD.

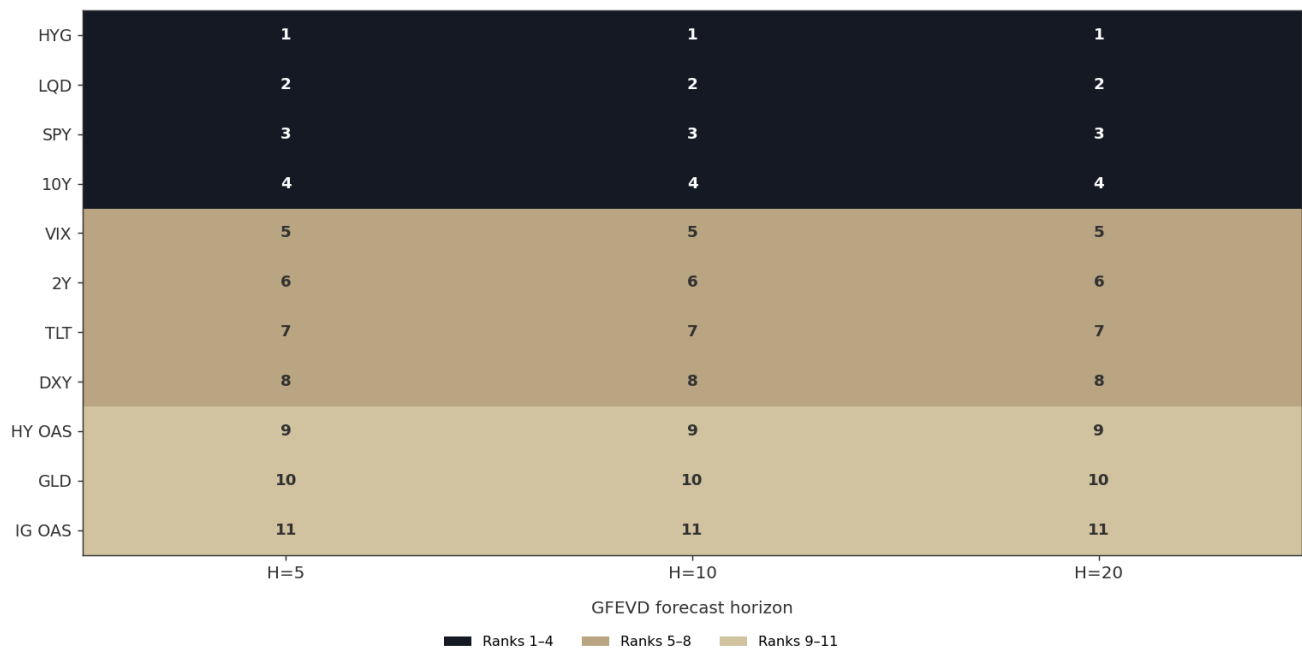
HY OAS is different. Despite its importance as a structural bridge, it currently receives more transmission than it sends.

Structural position and directional transmission capture different forms of systemic importance.

The transmission hierarchy survives the forecast horizon

The transmission hierarchy survives the forecast horizon

HYG, LQD, SPY and the 10-year yield retain the same leading transmission ranks across 5-, 10- and 20-step GFEVD horizons



Source: Yahoo Finance via yfinance; FRED. Author analysis — Laura Brennan

Figure 5. Shock-transmission ranks across 5-, 10- and 20-step GFEVD horizons.

The transmission ordering is unchanged across all three forecast horizons.

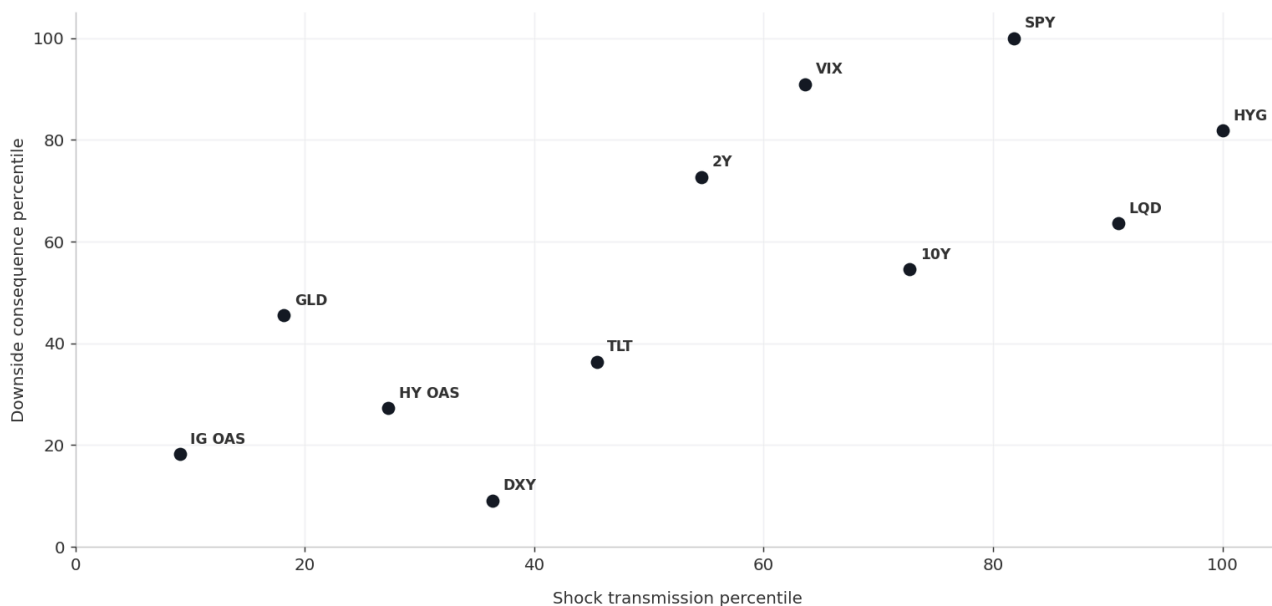
HYG remains first, followed by LQD, SPY and the 10-year yield.

The directional ranking is not sensitive to the forecast horizon used.

Transmission and downside consequence identify different nodes

Transmission and downside consequence identify different nodes

VIX ranks far higher on downside consequence than on shock transmission, while other nodes occupy very different positions across the two dimensions



Source: Yahoo Finance via yfinance; FRED. Author analysis — Laura Brennan

Figure 6. Shock transmission versus downside consequence across the cross-market system.

High transmission does not automatically imply high downside consequence.

Percentiles are calculated cross-sectionally across the 11-instrument universe for each dimension.

VIX ranks much higher on downside consequence than on transmission, while HYG remains prominent across both dimensions.

How a node spreads stress and how it responds to stress are different systemic roles.

Methodology

Data

Sample period

19 September 2023–16 September 2026

Universe

11 cross-market instruments spanning equities, credit, rates, volatility, gold and the U.S. dollar.

DXY, GLD, HYG, LQD, SPY, TLT and VIX are sourced from Yahoo Finance.

HY OAS, IG OAS, the 2-year Treasury yield and the 10-year Treasury yield are sourced from FRED.

Data source

Yahoo Finance, accessed through yfinance.

Federal Reserve Economic Data (FRED).

Transformations

Market prices and indices are converted to daily log returns.

Credit spreads and Treasury yields are converted to daily changes.

Network structure

Rolling **120-observation** correlation networks are estimated using absolute correlations.

Structural importance is measured using connection strength and betweenness centrality.

Bridge robustness is tested at correlation thresholds of **0.35, 0.40, 0.45 and 0.50**.

A persistent bridge is defined as having non-zero betweenness at three or more of the four tested thresholds.

Shock transmission

Directional connectedness is estimated using a **VAR(1)** and row-normalised **generalised FEVD**. The baseline forecast horizon is **10 steps**, with robustness checks at **5 and 20 steps**.

Downside consequence

Stress days are defined using the lower tail of SPY returns. Asset responses are standardised so downside consequence can be compared across different market variables.

Robustness is tested at the **10th, 15th and 20th percentiles** of SPY returns.

Interpretation

Structural connectedness, bridge position, shock transmission and downside consequence are treated as distinct dimensions of systemic importance.

For cross-dimensional comparison, each measure is converted to a **cross-sectional percentile rank across the 11-instrument universe**.

Research workflow

Step	Description
Data	Daily market data for 11 cross-market instruments
Transformations	Log returns for market prices and indices; daily changes for spreads and yields
Rolling window	120 observations
Structural network	Absolute-correlation network
Network threshold	Baseline $ \rho \geq 0.40$
Structural importance	Connection strength and betweenness centrality
Threshold robustness	Repeated at 0.35, 0.40, 0.45 and 0.50
Transmission model	VAR(1), no deterministic trend
Shock decomposition	Row-normalised generalised FEVD
Forecast horizon	Baseline $H = 10$
Horizon robustness	$H = 5, 10$ and 20
Downside state	Lower tail of SPY returns
Consequence measure	Standardised asset response on downside days
Stress robustness	10th, 15th and 20th percentiles
Synthesis	Structure, bridge position, transmission and downside consequence treated as separate systemic roles

Research implications

The evidence in this report shows that systemic importance cannot be reduced to one ranking.

Key observations

- Structural connectedness, bridge position, shock transmission and downside consequence identify different roles.
- HY OAS ranks relatively low on structural strength but remains an important bridge.
- HYG is the strongest current shock transmitter.
- VIX ranks far higher on downside consequence than on transmission.
- Bridge importance persists for some assets across alternative network thresholds.
- Transmission rankings remain stable across 5-, 10- and 20-step GFEVD horizons.

Together, these results suggest that systemic importance is **role-dependent**.

A node may matter because it connects many parts of the system, because it links otherwise distinct clusters, because it transmits shocks, or because it responds most strongly when stress arrives.

Those roles do not always belong to the same asset.

Monitoring several dimensions together therefore gives a more complete view of systemic structure than relying on a single centrality or transmission ranking.

References

Data

Yahoo Finance, accessed through yfinance.

Federal Reserve Economic Data (FRED), Federal Reserve Bank of St. Louis.

Cross-market universe comprising DXY, GLD, HYG, LQD, SPY, TLT, VIX, HY OAS, IG OAS, the 2-year Treasury yield and the 10-year Treasury yield.

Data through **16 September 2026**.

Methodology

Diebold, F. X. and Yilmaz, K. (2014). "On the network topology of variance decompositions: Measuring the connectedness of financial firms." *Journal of Econometrics*, 182(1), 119–134.

Pesaran, H. H. and Shin, Y. (1998). "Generalized impulse response analysis in linear multivariate models." *Economics Letters*, 58(1), 17–29.

Freeman, L. C. (1977). "A set of measures of centrality based on betweenness." *Sociometry*, 40(1), 35–41.

Kou, G., Chao, X., Peng, Y., Alsaadi, F. E. and Herrera-Viedma, E. (2019). "Machine learning methods for systemic risk analysis in financial sectors." *Technological and Economic Development of Economy*, 25(5), 716–742.

Software

Python, pandas, NumPy, statsmodels, NetworkX, matplotlib, fredapi and yfinance.

Disclaimer

This publication has been prepared by LB Research for informational and educational purposes only. It does not constitute investment advice, investment research as defined under applicable regulation, a recommendation, or an offer to buy or sell any financial instrument.

The analysis is based on publicly available market data and the methodologies described within this publication. While reasonable care has been taken in preparing this report, no representation or warranty is made regarding the accuracy, completeness or timeliness of the information presented.

Any opinions expressed reflect the author's judgement at the publication date and may change without notice. Past performance is not indicative of future results.

Readers remain solely responsible for their own investment decisions.

© 2026 LB Research. All rights reserved.

Questions or feedback: contact@lb-research.com

LB

— RESEARCH —

