

Tsinghua-Invesco Research: Dynamic global asset allocation in an uncertain world

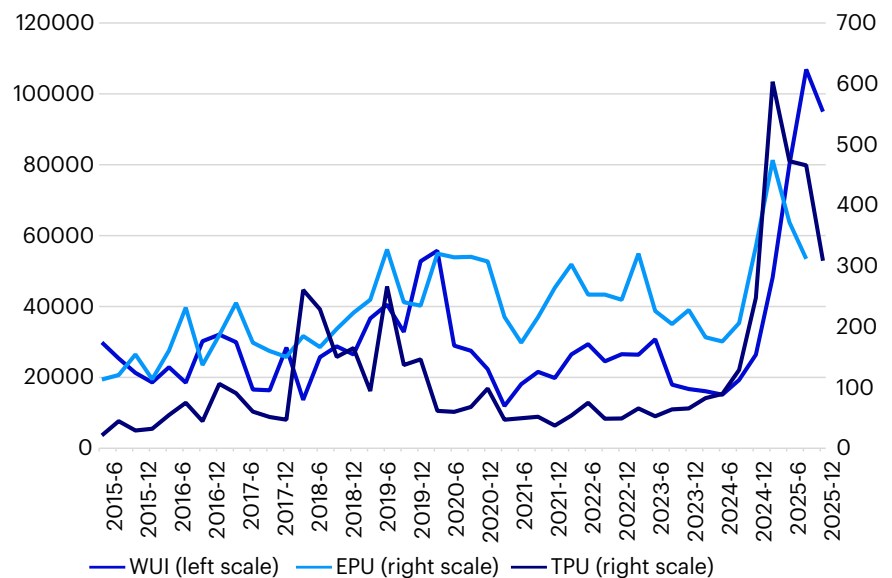
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Tsinghua's research collaboration with Invesco in 2025 focuses on enhancing asset allocation methodologies for asset owners. In a world of rising uncertainty and faster market swings, asset owners are seeing volatility spike with greater demand for dynamic asset allocation and diversification. Against this backdrop, the team examines how real time market data and regimes can be translated into portfolio decisions, so that investors can deploy a more dynamic, evidence based allocation framework that translates real time market regimes into portfolio decisions. This approach helps portfolios participate in market upswings while improving downside resilience during stress. The research shows that dynamic allocation by switching between regimes delivers higher returns, better risk-adjusted performance, and shallower drawdowns than the benchmark strategy.

Background

Rising Global Uncertainty: Over the past several years, the global markets have faced pronounced uncertainty (**Figure 1**). Geopolitical risks have meaningfully influenced pricing across equities, rates and commodities, underscoring how single-market exposures can amplify risk for investors. Global asset allocation can effectively utilize the low correlations between different markets to reduce portfolio risks, through diversified investments across markets and asset classes.

Figure 1 -- Uncertainty Indices Risen in Recent Years



Note: WUI (World Uncertainty Index), EPU (Economic Policy Uncertainty Index), TPU (Trade Policy Uncertainty)

Source: Economic Policy Uncertainty

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Need for Diversification: Interest rate normalization and policy uncertainty are driving a structural reassessment on asset class diversification. Global sovereign funds and central banks are recalibrating portfolio and asset allocation including reducing allocations to longer-maturity US government debt amid concerns on fiscal sustainability and policy volatility and strategic shifts away from US-based financial counterparties towards alternatives in other geographies such as EU¹. In China, global asset allocation is becoming a more practical and necessary tool for managing uncertainty and harvesting opportunities for Chinese investors.

Key research questions

1. How can investors better manage global portfolios in an increasingly uncertain market environment?

Static approaches struggle to capture the rapid, frequent shifts of global markets, while widely used “dynamic” frameworks like the Merrill Lynch “Investment Clock” still rely on lagged macro data and subjective judgment on market cycle (peaks and troughs between four typical economic cycles: overheat, stagflation, reflation, and recovery). In practice, such latency and subjectivity diminish effectiveness in crisis windows.

The research echoes on how global asset allocation can be redesigned to help investors navigate uncertainty, reduce vulnerability, and adapt more effectively to changing market conditions.

2. Can market-based signals help investors recognize changes in market conditions early and adjust their portfolios in a way that improves returns and reduces risk compared with traditional strategies?

Detecting market changes can provide earlier and more reliable signals of changing conditions than traditional economic indicators. More importantly, the research examines those signals through dynamic portfolio adjustments and whether they can lead to better outcomes.

The team advances a **Markov Regime-Switching (RS) model**² that brings global market states directly into the asset allocation. Instead of identifying market cycles after they have already occurred, the model estimates regime shifts continuously using real time market data. This keeps regime signals closely aligned with actual asset behavior—returns, volatility, and correlations—and allows for timelier and more stable portfolio decisions.

Key asset classes

Key asset classes span equities, bonds, and commodities to balance growth, income, and defensiveness across regimes. We use two investable universes side by side:

	USD-denominated asset pool	RMB-denominated asset pool
	Sample range: Jan 2000- Sep 2025	Sample range: Jan 2005- Sep 2025
Equities	iShares MSCI USA UCITS ETF	iShares MSCI USA UCITS ETF (RMB-converted)
	iShares MSCI Developed ex-USA UCITS ETF	iShares MSCI Developed ex-USA UCITS ETF (RMB-converted)
	iShares MSCI Emerging Markets ex-China ETF	iShares MSCI Emerging Markets ex-China ETF (RMB-converted)
	iShares MSCI China ETF	CSI 300 ETF (onshore A-share core)
Bonds	US 10-Year Treasury	China 10-Year Government Bond
Commodities (Gold)	COMEX Gold Futures	COMEX Gold Futures

1. Invesco, Global sovereign asset management study, 2025
2. Hamilton (1989), Ang and Bekaert (2002, 2004)

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On the equity side, we use four ETFs tracking MSCI ACWI indexes to cover most markets and all ETF prices are adjusted by comprising stock split and dividend income. For fixed income, we choose the most liquid and largest 10 year Government Bonds. Commodity exposure is obtained via COMEX gold futures. The sample period spans from January 2000 to September 2025. For ETFs with limited historical data due to their later inception dates, the historical series are backfilled using the total return price series of their respective underlying tracking indices.

For Chinese asset owners, this study focuses on implementable global allocation pathways under existing regulatory channels:

- Chinese investors can access offshore assets primarily via QDII and Stock/Bond Connect, with U.S.-listed and Hong Kong-listed products forming the core of implementable exposures.
- On the offshore side, we adopt MSCI index ETFs listed in the U.S. market and convert all asset returns into RMB using the CNY/USD exchange rate to fully reflect the impact of currency fluctuations on global allocation.
- On the onshore side, we use the CSI 300 Index ETF to represent China's A-share market and China 10-year government bonds to represent fixed income.

Key regimes

In the research analysis, we look at 2 regimes:

- Regime 1 ("Normal") — Growth supportive markets with low volatility and diversification benefits. Markets are broadly constructive: equity returns are typically positive, and both volatility and cross-asset correlations are lower.
- Regime 2 ("Bear") — Risk off markets with negative equity returns and elevated correlations. Risk conditions deteriorate: equity returns often turn negative, volatility and correlations rise; bonds and gold tend to be the main stabilizers.

The model uses market price behavior to identify the current market regime and the likelihood of what comes next and adjusts portfolio weights accordingly. The traditional Markowitz approach looks backward, using historical averages and assuming stable relationships, without explicitly accounting for changing market regimes.

Key research findings

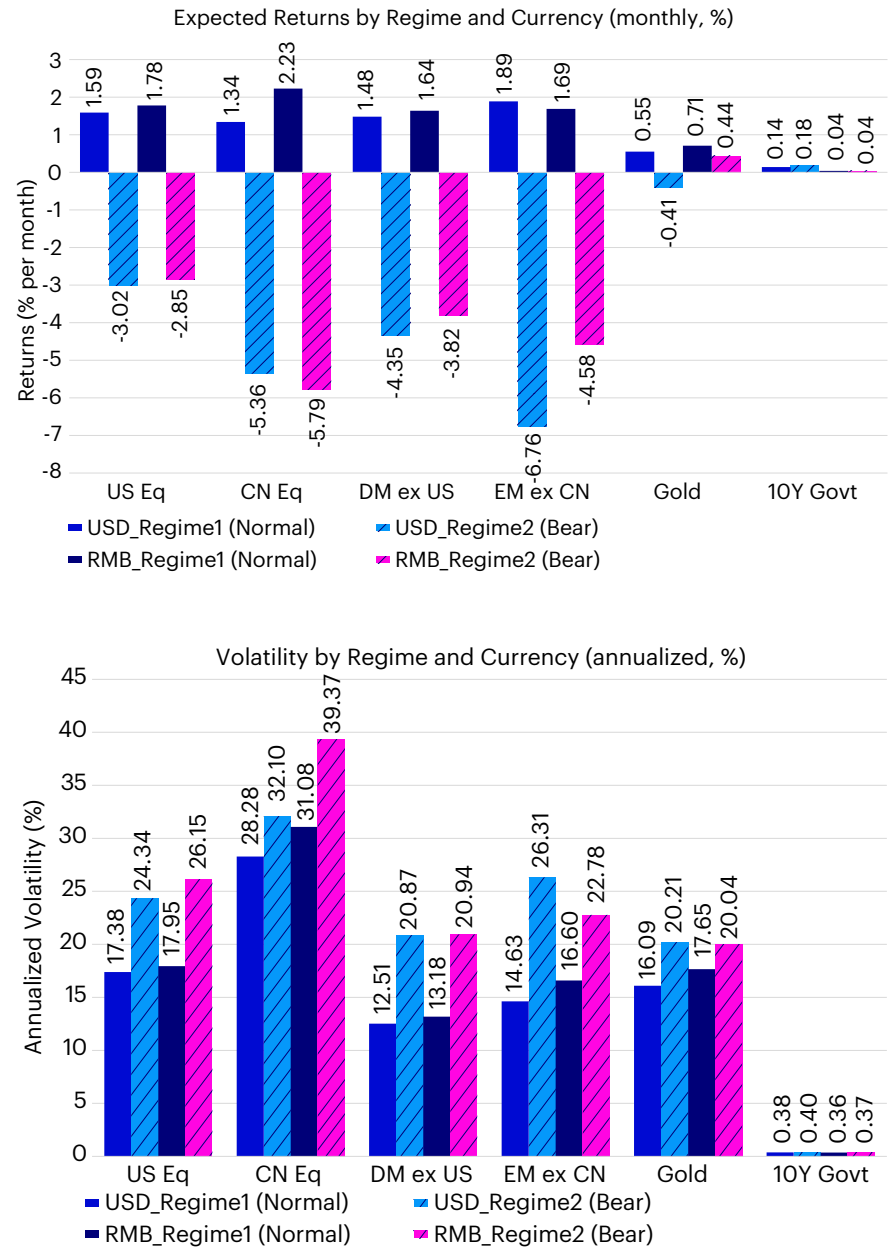
1. Dynamic global asset allocation facilitates better management of portfolios in an increasingly unstable and uncertain market environment

- **Market risk and diversification benefits change sharply across market conditions**, with equity returns turning negative, growing volatility, and cross asset correlations increasing during downturns—making static diversification unreliable exactly when protection is most needed.
 - In the USD denominated pool, Regime 1 shows clearly positive expected returns. In Regime 2, all equity returns turn negative, led by EM -6.76%, with the US relatively more resilient at -3.02%.
 - RMB denominated results tell the same story: equities are positive in Regime 1 and negative in Regime 2, while gold and bonds are comparatively stable across currencies.

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Figure 2 - Returns and volatility by regime



Source: Tsinghua-Invesco Research, Sample period: January 2000 to September 2025.
Past performance is not a guarantee of future results.

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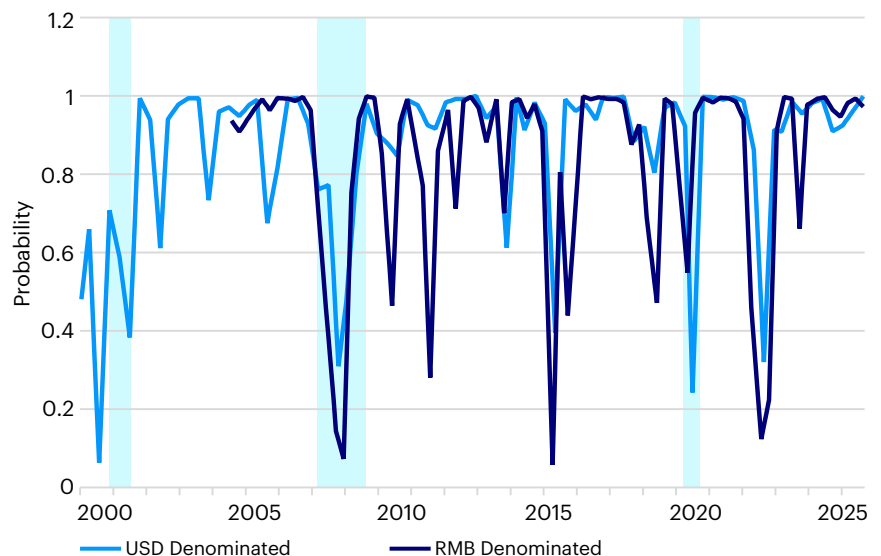
- **Dynamic asset allocation can help investors to adapt more effectively to changing market conditions and gain more:** comparing with Markowitz strategy, RS model ensured timelier rebalancing which bring higher returns.
 - RS model's annualized returns exceed 9.9% across configurations, with highest 12.4% in RMB pool with higher risk tolerance ($\gamma=2$, more aggressive).
 - Markowitz benchmark often stays below 9%, sometimes near 5%.
- **Global asset allocation remains essential,** as portfolios restricted to a single market (including China only portfolios) deliver lower returns and weaker risk adjusted performance than globally diversified portfolios in out of sample tests.
 - In the RMB cases, the RS portfolios' returns are higher than in USD (even larger excess returns versus Markowitz benchmark), and they also display superior risk control (lower volatility and shallower drawdowns).
 - For an RMB-based asset owner, globally diversified, regime-aware portfolios delivered higher out-of-sample annualized returns (11.5%-12.4% depending on γ) and higher risk-adjusted performance (Sharpe 1.47-1.60) than a China-only regime strategy (8.4%-8.7%, Sharpe 1.12-1.15).
- **Defensive assets play a structurally important role during market stress:** government bonds and, to a lesser extent, gold provide stability and downside protection in bear regimes.
 - **Low volatility:** While rotating defensively to more exposure on bonds and gold (bonds -18%, gold -35% in USD pool in Bear regime), RS keeps annualized volatility below 10% (USD) and 8.5% (RMB), lower than Markowitz. RS maximum drawdown is typically -11-17%, versus Markowitz reaching -14-25%.

2. Market based signals help investors recognize changes in market conditions early and adjust portfolios to achieve better performance and risk control

The model reads monthly asset returns and their evolving volatility/correlations from investable proxies (MSCI USA/Developed-ex-US/EM-ex-China/China (ETFs), 10-year government bonds (US/CN), etc.) to infer Normal and Bear regimes³.

These market based regime signals identified from asset price behavior align closely with major global stress events (e.g., 2008 financial crisis, 2018-2019 trade tensions, 2020 pandemic, 2022 tightening cycle), validating their ability to detect meaningful market shifts without relying on lagged macro data (Figure 3).

Figure 3 -:- Smoothed Probability of the Normal Regime



Notes: Red line: USD denominated asset pool; Blue line: RMB denominated asset pool;
Grey shaded areas: NBER recession periods

Source: Tsinghua-Invesco Research, Sample period: January 2000 to September 2025.

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3. Ang and Bekaert (2002, 2004)

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- **Dynamic portfolios that adjust exposure based on market regimes significantly outperform traditional static strategies**, delivering higher annualized returns, higher Sharpe and Calmar ratios, and materially smaller drawdowns across both USD and RMB-based portfolios.
- **For insurance and pension funds, given longer investment horizons, tighter regulatory constraints, and stricter drawdown limits, we recommend a more conservative, rules-based setup:**
 - Refine the investable universe to reflect regulatory eligibility—separate offshore, onshore, and “safe assets” buckets and define any concentration and eligibility limits.
 - Adjust the bear market trigger in the regime switching model as needed. For example, if the model shows more than a 40% chance of a bear market next month, treat it as a bear scenario and shift the portfolio into defensive positioning earlier.
 - Use higher risk aversion (γ) for conservative strategies to prioritize capital preservation.
 - Embed regulatory limits as optimization constraints (e.g., caps on offshore and risk assets), so the resulting weights are compliant by design.
- **For public mutual funds**, the framework should balance performance with tradability:
 - Tailor the investable universe to the fund’s style and liquidity profile, e.g., adjust onshore/offshore and safe asset buckets accordingly.
 - Align risk settings with the product’s goal: take more risk in active or balanced products and be more cautious in conservative ones by tightening risk controls.
 - Operationalize liquidity and cost controls as constraints: include a cash buffer, transaction cost penalty, and minimum rebalance bands to avoid excessive turnover and to meet redemption needs.

Future research directions

The Tsinghua RS framework (regime switching) demonstrates that regime shifts play a decisive role in asset pricing and allocation. Even a simple two-regime classification (Normal/Bear) can materially enhance performance. We recommend that institutions evolve from static to dynamic allocation. Asset owners can enhance their asset allocation methods using **high-frequency market data (rather than lagging macro indicators)** to prospectively determine the “regime” of the market, and then systematically enhance the forward-looking and adaptive nature of portfolio management.

Building on Tsinghua’s research framework and recommendations from industry roundtables, further directions can be considered for the future:

- **Broader asset classes and ETF wrappers:** Future work can expand to more ETFs and asset classes (e.g., REITs, digital assets, multi-asset indexes) to capture additional returns and diversification properties across regimes by:
 - **Enhancing diversification and strategic implementation:** ETFs fit naturally into Strategic Asset Allocation (SAA) and serve as core tools by which investors can apply regime-aware tilts and rebalancing. Broad-based exposure and multi-asset settings also help to reduce risk and support risk budgeting.
 - **Improving execution quality:** high liquidity and lower cost let portfolios adjust quickly when regimes change, keeping the strategy scalable and operationally clean.

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- **Rate environment changes:** With rate environment changing rapidly, future research can provide more actionable best practices for low-rate environments to help asset owners build resilient asset-allocation portfolios. The sample period features sharp rate hikes and later stabilization; subsequent cycles may include rate decline and re-steepening:
 - **When rates decline:** Duration becomes a key return driver. Longer-dated treasuries/government bonds typically benefit
 - **Investment implications:** In past low rate cycles, challenges and opportunities have coexisted: cash yields fall and reinvestment risk rises, pushing new opportunities in duration, credit, equities, and other assets. These areas warrant further exploration in model design and portfolio implementation.
- **Rising demand for cross-border investments:** We note China's ongoing enhancements to cross-border connectivity—ETF Connect, Mutual Recognition of Funds (MRF), Wealth Management Connect (WMC), and Bond Connect—which create strategic investment opportunities for asset owners in China and worldwide. Future research can be more focused on those cross-border initiatives in China:
 - China's continued institutional opening up and maturing investor base are lifting cross-border allocation.
 - Chinese asset owners investing overseas and their diversification strategies beyond U.S. concentration also reinforce the proliferating demand.
 - Cross-border investment channels (as well as FX overlays, policy framework) can be incorporated directly into the model.

Conclusion

This study shows that today's global markets are more volatile and uncertain, making traditional "set and maintain" asset allocation strategies less reliable—especially during market downturns. By using market data directly to identify when conditions are improving or deteriorating, the proposed dynamic approach helps investors respond earlier and more objectively than methods based on delayed economic indicators. The results show that portfolios adjusted based on changing market conditions consistently achieved higher returns, better risk adjusted performance, and smaller losses during market stress, across both U.S. dollar and renminbi portfolios. Overall, the findings suggest that asset owners can improve long term outcomes by moving away from static allocation and adopting a more flexible, market responsive approach to portfolio management.

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