SQIG Report

Macro Foundations: Linking Rates, Volatility, and Credit Risk

Understanding macro indicators is key before using predictive models. The VIX serves as a proxy for volatility, reflecting investor sentiment and market uncertainty.

Treasury yields - particularly the 13-week T-Bill and 10-year yield - capture expectations around monetary policy, inflation, and growth. Sharp rate hikes signal tightening conditions, often widening credit spreads, and raising volatility. A stable curve typically supports risk-on sentiment.

Yield curve slope changes often precede recessions and are associated with rising VIX levels and credit stress. This macro backdrop frames our machine learning approach to forecasting credit market risk.

Summary of Expected Relationships

Guided by macro theory and historical intuition, the following relationships were anticipated and evaluated in the modelling process:

- **↑ 13-week Treasury Yield → ↑ VIX** (tightening conditions)

- **↑ 10-year Yield → ↑ or ↓ VIX**, depending on inflation vs. growth expectations.

- **Flattened/Inverted Yield Curve → ↑ VIX and ↑ Credit Stress** (recession signals)

These insights informed feature design and macro selection in the credit spread forecasting pipeline.

The Approach

A machine learning framework was built to forecast credit spreads using macro variables, VIX, and yield curve dynamics. Key steps included:

- **Data Preparation**: Aligned weekly US Treasury yields, VIX, and credit spreads.

- **Feature Selection**: Random Forest and XGBoost highlighted lagged and rolling yield data as key predictors (see Figure 1).

- **Modelling**: Compared linear regression, Random Forest, and XGBoost.

- **Regime Classification**: Identified "High" vs. "Low Risk" regimes based on predicted spreads and volatility.

- **ETF Strategy**: Developed a rotation system between defensive and growth ETFs using regime and spread signals.

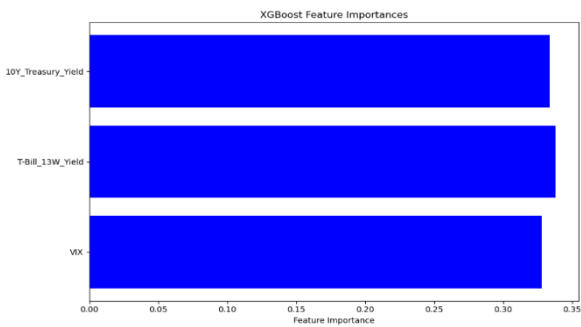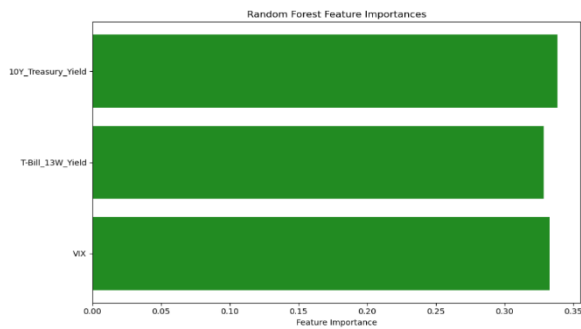- **Evaluation**: Measured performance via RMSE, MAE, cross-validation, and directional accuracy.

Figure 1

(Feature importance from RF vs. XGBoost

models)

Figure 2

(Table summarising ETF strategy)

Results

- **XGBoost outperformed** simpler models, achieving low RMSE variance and ~50% directional accuracy.

- **Long and short-term yields** were the strongest drivers of spread predictions.

- The **ETF strategy** shifted allocations weekly, favouring defensive assets in High-Risk regimes and rotating to growth assets when conditions improved (see Figure 2).

- Tactical "Widening"/ "Tightening" signals provided early insight for risk management and positioning.

Key Takeaways

- Forward-looking spread forecasts offer a timing edge over traditional indicators.

- Regime-based strategies enhance portfolio adaptability.

- Machine learning improves dynamic credit risk assessment using macro inputs.

Use Cases for a Credit Trading Desk

Trading desks can apply this framework as:

- A **quantitative overlay** for risk-on/off credit positioning.

- A **regime detector** to guide hedge adjustments or sector rotations.

- A **lead indicator** of stress to optimise trade timing.

- A **foundation** for more advanced, portfolio-specific macro models.