Credit-Linked-Investment-Strategy-Back-Test

**Project Overview**

This Credit-Linked-Investment-Strategy-Back-Test is a quantitative research initiative designed to evaluate the dynamic corporate bond trading strategy over historical market data.  
The goal of this project is to identify bonds whose market prices “deviate” from the theoretical value price implied by a credit-pricing model, then construct a portfolio that goes long (buys) bonds deemed undervalued by the model and goes short (sells) bonds deemed overvalued by the model.  
Back-testing will measure how the credit-pricing driven model would have performed in terms of returns and risks.

**Credit-Linked Strategy**

*Credit-Linked*: exposure driven primarily by corporate credit risk (issuer default risk). Unlike trading based on equity movements or interest-rate bets, this trading strategy relies on instruments whose prices reflect changes in credit spreads against risk-free options.

By leveraging a model-implied fair value for each bond, the strategy seeks to profit from the convergence of the current market price to the model’s theoretical value when mispricing exists, either in undervaluation or overvaluation.

**Back-Test Methodology**

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| *Universe Selection* | Define a liquid set of corporate bonds. |
| *Signal Generation* | Recalculate model-implied fair values daily and rank bonds by their mis-pricing signal. |
| *Portfolio Construction* | * Long basket: Top 100 undervalued bonds. * Short basket: Top 100 overvalued bonds. * Apply position size ruling (equal-weight, risk -parity) |
| *Transaction Costs & Slippage* | Model bid-ask spreads, liquidity impacts, and financing costs for shorts. |
| *Rebalancing* | Periodic (monthly) updates to weights to maintain exposure to evolving signals. |

**Performance Report**

* Total Return & Annualized Return: Measures compounded gains or losses over the test period.
* Information Ratio (IR): Excess return of the strategy over a benchmark (broad corporate bond index), divided by tracking error (gauge risk-adjusted skill).
* Sharpe Ratio: Average strategy excess return divided by its volatility to assess reward per unit of total risk.
* Drawdown Analysis: Maximum peak to trough decline highlights worst-case historical losses and recovery time.

**Risk Report**

* Value at Risk (V aR): Estimate of potential loss over a given horizon at a specified confidence level.
* Stress Testing: Simulate extreme credit-spread widening scenarios (i.e. 2008 crisis levels) to assess portfolio resilience.
* Sector & Issuer Concentration: Ensure diversification by monitoring the percentage exposure to any single industry or issuer.
* Liquidity Metrics: Average daily trading volume and bid-ask spread statistics for the bonds in the portfolio, evaluating how quickly positions could be entered/exited under stress.