PROBLEM STATEMENT

Organizations exposed to foreign exchange risk such as importers, exporters, banks, and treasury desks are primarily concerned with **how volatile the USD/INR exchange rate will be**, rather than predicting its exact future value. Accurate volatility forecasts are essential for setting hedge ratios, pricing FX derivatives, allocating risk capital, and managing uncertainty.

In practice, many commonly used volatility models are either:

- **Too simplistic**, failing to capture the persistent and multi-horizon nature of FX volatility, or
- **Too complex**, relying on non-linear methods that are difficult to interpret, tune, and deploy in real-world systems.

The challenge, therefore, is to design a volatility forecasting model that balances **predictive power, interpretability, and implementation simplicity**.

Project Objective

The objective of this project is to build a **practical and interpretable USD/INR volatility forecasting system** using:

- Publicly available market data
- Standard linear econometric techniques
  A transparent and reproducible Python-based workflow

The model should outperform naïve linear approaches while remaining easy to understand and implement.

Proposed Solution Approach

This project addresses the problem by:

- Measuring volatility using **realized volatility estimators** instead of returns
- Capturing volatility persistence across **multiple time horizons**
- Incorporating **macro-financial volatility spillovers**
- Avoiding black-box or opaque modeling techniques

The solution is implemented using the **HAR-RV-X framework**, which is linear, well-established in financial literature, and suitable for real-world deployment