Regulatory VaR Backtesting Engine - Portfolio Summary

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GitHub: https://github.com/bhosalesiddharth30/regulatory-var-es-backtesting-engine

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1. Project Overview

This project implements a simplified Basel-style risk backtesting engine for 1-day Value-at-Risk (VaR).
It demonstrates core skills required in **Risk Analytics, Model Development, Traded Risk, Market Risk, and Compliance Analytics**.

The engine includes:

- Historical Simulation VaR (99%)
- Rolling window forecasting
- Exception identification
- Kupiec Proportion-of-Failures Test
- Basel Traffic-Light Model Evaluation
- Automated markdown risk report generation

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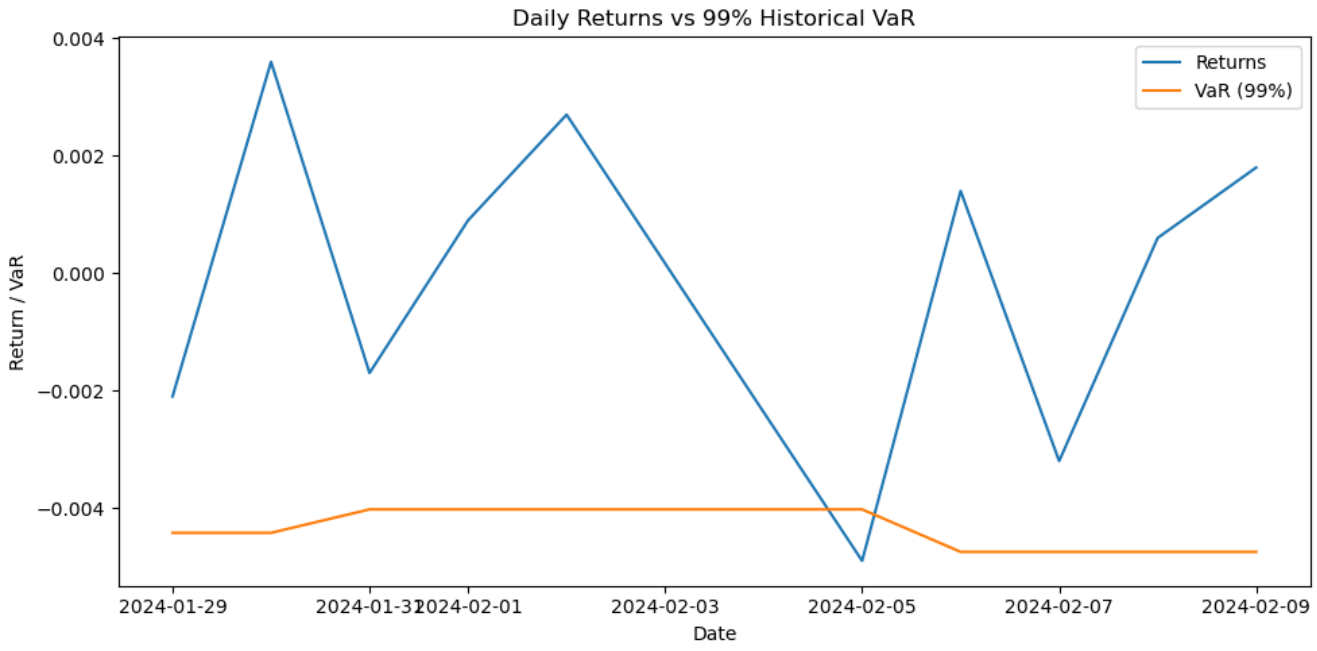
2. Daily Returns vs 99% Historical VaR



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3. Basel Backtesting Report

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# Basel Backtesting Report - Historical VaR (99%)

**Confidence Level:** 99.00%
**Number of Exceptions:** 1
**Kupiec LR Statistic:** 2.8896
**Basel Traffic-Light Category:** **Green**
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4. Key Concepts

What is Value-at-Risk (VaR)?

VaR estimates the **maximum expected loss** over 1 day at a given confidence level (e.g., 99%). A VaR of −2.5% at 99% means:

"There is only a 1% chance the loss will exceed 2.5% tomorrow."

What is the Kupiec POF Test?

Kupiec test checks whether the **observed exceptions** match the **expected exception rate**.

- Expected exceptions at 99% = 1%
- If exceptions are too many → model may underreport risk
- If too few → model is overly conservative

What is the Basel Traffic-Light System?

Basel Committee categorizes VaR model quality into:

- **Green zone** (0–4 exceptions): acceptable
- **Yellow zone** (5–9 exceptions): needs monitoring
- **Red zone** (10+ exceptions): model underestimates risk

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5. Repository Structure

Includes clean modular Python code for models, backtesting, reporting, documentation.

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6. Contact

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