# Stock Return Prediction with Volume Signals (AAPL Case Study)

## Objective:

Evaluate whether trading volume predicts AAPL returns; quantify uncertainty using Gaussian vs Bootstrap CIs.

## Methodology:

- Data: AAPL daily (1980–2022)
- Features: lagged returns, rolling averages, momentum, z-scores
- Models: Linear Regression, Logistic Regression
- Risk: Gaussian vs Bootstrap intervals

## Key Results:

- Linear Regression: $R^2 \approx 0$
- Classification: Accuracy ≈ 47% (recall up=10%, down=88%)
- Gaussian CI: too narrow
- Bootstrap CI: wider, realistic

## Insights:

- Volume signals alone insufficient
- Gaussian assumptions underestimate risk
- Bootstrap better captures fat tails
- Future: richer features, non-linear models, strategy-level evaluation