Market Volatility Analysis: Findings Report

1. Project Overview

Goal: Analyze how crypto volatility (BTC, ETH) impacts stock indices (NSE, XIC).

Period: 2022–2025

Methods: Python (Pandas, NumPy, Matplotlib, Seaborn), statistical analysis, rolling volatility, correlation analysis, log-return distributions.

2. Key Findings
2.1 Adjusted Close Price Trends

Crypto prices (BTC & ETH) are highly volatile.

Stock indices (NSE, XIC) show steady, predictable trends.

2.2 Log Returns Distribution

BTC & ETH: wide, fat-tailed distributions → high probability of extreme returns.

NSE & XIC: narrow, sharp peaks → low daily return variability.

2.3 Correlation Analysis

BTC ↔ ETH: high correlation (0.8–0.9) → crypto moves together.

BTC/ETH ↔ NSE/XIC: low correlation (0.1–0.4) → crypto is mostly independent.

NSE ↔ XIC: moderate correlation.

2.4 Rolling Volatility

Crypto volatility is spiky and unstable.

Equity indices: low, stable volatility with occasional spikes.

Price crashes coincide with volatility spikes → leverage effect / volatility clustering.

2.5 Rolling Correlation

BTC ↔ ETH correlation: consistently high.

BTC ↔ NSE/XIC: low and unstable → crypto provides diversification.

Correlation rises during major global events.

3. Implications

Crypto is riskier but can act as diversification.

Volatility spikes help identify structural market events.

Useful for portfolio risk management and anomaly detection.

4. Visuals (Screenshots of Plots)

Price trend charts

Log-return histograms

Correlation heatmaps

Rolling volatility & rolling correlation charts