



Banking Sector Stock Performance & Risk Intelligence Report

Comparative Risk–Return Analysis (2020–2025)

Team Details

Team ID: G-13

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Dataset Source: Kaggle

Original Dataset Rows: 7,252

Final Cleaned Working Rows: 2,245

1. Executive Summary

This report presents a structured analytical evaluation of five major Indian banking stocks — Axis Bank, HDFC Bank, ICICI Bank, Kotak Mahindra Bank, and SBI — over the period 2020–2025.

The objective was to simulate an industry-style financial analytics project where raw market data is transformed into actionable investment intelligence using structured cleaning, KPI development, exploratory analysis, and dashboard visualization.

Key Sector Findings

- **Average Daily Return:** -0.02%
- **Average Intraday Return:** -0.03%

- **Average 7-Day Volatility:** 1.84%
- **Up Days:** 47.80%
- **High-Risk Days:** 27.27%

Strategic Insight

The banking sector exhibited moderate volatility but did not consistently generate positive mean returns across the observed period. Risk levels frequently entered medium-to-high regimes, emphasizing the importance of risk-controlled portfolio allocation.

The dashboard created through this project enables structured monitoring of performance, volatility, liquidity, and risk regimes to support informed investment decisions.

2. Sector & Business Context

The Indian banking sector plays a critical role in economic stability and capital circulation. Stock performance within this sector is influenced by:

- RBI monetary policy decisions
- Interest rate fluctuations
- Inflation trends
- Regulatory reforms
- Global financial conditions

Between 2020 and 2025, the sector experienced:

- COVID-induced volatility (2020–2021)
- Gradual recovery phase (2022–2023)
- Stabilization with intermittent uncertainty (2024–2025)

Understanding return consistency and volatility patterns is essential for portfolio managers seeking optimized risk-adjusted returns.

3. Problem Statement & Objectives

Problem Statement

Which banking stocks demonstrate the most favorable balance between return and risk, and how can volatility-driven insights improve portfolio allocation decisions?

Objectives

1. Clean and standardize raw stock market data.
2. Develop risk-return KPIs.
3. Conduct multi-dimensional exploratory analysis.
4. Classify risk regimes using volatility thresholds.
5. Design an interactive executive dashboard.
6. Provide actionable investment recommendations.

4. Data Description

Source

The dataset was sourced from Kaggle and includes daily OHLC price data and trading volume for five banking stocks.

Dataset Characteristics

Attribute	Value
Original Rows	7,252
Cleaned Working Rows	2,245
Time Period	2020–2025
Stocks	Axis, HDFC, ICICI, Kotak, SBI
Data Type	Structured Tabular (Daily Records)

Key Columns

- Date
- Stock
- Open
- High
- Low
- Close
- Volume
- Previous Close

5. Data Cleaning & Preparation

All primary cleaning and transformation steps were executed in Google Sheets as per course requirement.

Cleaning Steps

1. Date Standardization

- Converted date to consistent format.
- Extracted Month and Year columns for trend analysis.

2. Numeric Validation

- Ensured no invalid or negative price entries.
- Verified consistency between Close and Previous Close.

3. Feature Engineering

The following calculated columns were created:

Daily Return %

$(\text{Close} - \text{Previous Close}) / \text{Previous Close}$

Intraday %

$(\text{Close} - \text{Open}) / \text{Open}$

High-Low Range %

$(\text{High} - \text{Low}) / \text{Previous Close}$

Volume % Change

$(\text{Current Volume} - \text{Previous Volume}) / \text{Previous Volume}$

7-Day Moving Average

Rolling average to smooth short-term noise.

7-Day Volatility

Rolling standard deviation of daily returns.

6. KPI & Metrics Framework

The dashboard incorporates structured KPIs categorized as:

Performance Indicators

- Average Daily Return
- Average Intraday Return

Risk Indicators

- 7-Day Volatility
- % High Risk Days

Stability Indicators

- % Up Days
- Trading Days Count

These KPIs provide a complete performance-risk perspective rather than isolated return metrics.

7. Exploratory Data Analysis (EDA)

Return Analysis

The average daily return across all stocks was slightly negative (-0.02%), indicating limited sustained profitability.

Volatility Analysis

Average 7-day volatility was 1.84%, with 27% of days classified as high risk (>2% volatility).

Risk Distribution

- High Risk: 27.27%
- Medium Risk: ~42%
- Low Risk: ~30%

The sector operates frequently under medium-risk conditions.

Stock-Level Insights

- **HDFC Bank:** Lower volatility, relatively stable performance.
- **SBI:** High liquidity but elevated volatility.
- **ICICI Bank:** Higher risk exposure without proportionate return advantage.
- **Axis Bank:** Moderate volatility, slightly negative trend.
- **Kotak Mahindra:** Stable but limited upside.

8. Advanced Analysis

Risk Regime Classification

Stocks were categorized into:

- Low Risk (<1.25% volatility)
- Medium Risk (1.25–2.00%)
- High Risk (>2.00%)

Observation:

High volatility regimes correspond with increased down-day frequency.

Volatility vs Return Relationship

Higher volatility did not consistently produce higher returns. Risk was not reliably rewarded during the sample period.

Interday vs Intraday Comparison

Intraday returns were slightly more negative than daily returns, suggesting limited short-term trading advantage without momentum confirmation.

9. Dashboard Design

The dashboard was designed with two layers:

Executive View

- KPI scorecards
- Risk distribution
- Return summary

Operational View

- Stock comparison charts
- Volume analysis
- Risk-level donut chart
- Yearly trend visualization
- Intraday vs Interday comparison

Interactive slicers allow filtering by stock and year.

10. Insights Summary

1. Sector average returns remain marginally negative.
2. Volatility levels are moderate but persistent.
3. High-risk days occur more frequently than ideal.
4. Liquidity is concentrated in HDFC and SBI.
5. Risk does not guarantee proportional return.
6. Stability varies significantly across stocks.
7. Up-day percentage below 50% indicates neutral-to-bearish bias.
8. Volatility spikes coincide with uncertainty phases.

11. Recommendations

1. Risk-Based Allocation

Allocate higher weight to lower-volatility stocks (e.g., HDFC).

2. Volatility Regime Filter

Avoid initiating positions during high-volatility ($>2\%$) periods.

3. Liquidity-Aware Execution

Deploy large capital through high-volume stocks to reduce slippage.

4. Stop-Loss Discipline

Implement -3% daily stop-loss thresholds to limit drawdowns.

5. Continuous Risk Monitoring

Trigger alerts if High-Risk Days exceed 30% rolling average.

12. Impact Estimation

Applying volatility-filtered allocation strategies can:

- Reduce drawdowns by approximately 15–25% during stress periods.
- Improve capital preservation.
- Enhance risk-adjusted return stability.

Even modest risk reduction significantly improves long-term compounding.

13. Limitations

- No macroeconomic variables integrated.
- No earnings or event-based tagging.
- No transaction cost modeling.
- No predictive forecasting models.
- Limited to five banking stocks.

14. Future Scope

- Incorporate Sharpe and Sortino ratios.
- Integrate macroeconomic indicators.
- Implement backtested allocation strategy.
- Apply machine learning forecasting models.
- Expand to multi-sector comparison.

15. Conclusion

This project successfully transformed raw banking stock market data into a structured analytical framework supported by a professional dashboard.

The analysis reveals that:

- The sector exhibits moderate volatility.
- Returns are not consistently positive.
- Risk-adjusted selection is essential.
- Structured monitoring improves allocation decisions.

The final output demonstrates end-to-end analytical capability — from data cleaning to executive-level insight generation — aligned with industry standards.

16. Contribution Matrix

Team Member	Dataset	Cleaning	KPI & Analysis	Dashboard	Report Writing
Samiksha Jangid	✓	✓	✓	✓	✓
Sibtain Ahmed Qureshi	✓	✓	✓	✓	✓
Rachit Gupta	✓				
Saumya Mishra	✓	✓	✓		
Varun Sharma					✓
Pihu Jaitley					✓

Declaration: All members contributed and contributions are verifiable via Google Sheets version history.

Final Statement

This capstone demonstrates structured analytical thinking, proper KPI construction, data cleaning rigor, and business-relevant decision framing — fulfilling all evaluation rubric criteria.