

Concept Paper

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A Financial Tool - VaR - for Informed Decision-Making - Indian Banking Companies

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Abstract: This report provides a comprehensive analysis of portfolio risk management using Value at Risk (VaR) for a banking sector investment portfolio. We evaluate a portfolio composed of SBI, HDFC, Axis Bank, and ICICI Bank, using historical data from July 1, 2023, to June 30, 2024. The report covers the calculation of VaR, portfolio variance, and standard deviation, highlighting the impact of different weightage adjustments on the portfolio's risk profile. Two scenarios—one with increased weightage in SBI and another with increased weightage in HDFC—demonstrate how changes in asset allocation affect potential losses. The findings emphasize the importance of strategic asset allocation for both speculators and hedgers. Speculators are advised to focus on high volatility and market trends, while hedgers should prioritize stability and risk management. This analysis aids investors in making informed decisions to balance risk and return in their banking sector investments.

Keywords: portfolio risk management; value at risk (VaR); banking sector investment; asset allocation; financial risk analysis

JEL Classification: G11, G12

Introduction

Value at Risk (VaR) is a critical risk management tool used to quantify the potential loss in value of a portfolio over a specified period, given a certain confidence level. In this blog, we analyze the VaR of a portfolio consisting of stocks from major Indian banks—SBI, HDFC, Axis Bank, and ICICI Bank—under different weightage scenarios. We will explore the financial implications of varying these weightages and how they impact the overall risk profile of the portfolio. When selecting a banking company for investment, several critical factors come into play. These include -

1. **Financial Health and Stability** - Investors typically assess a bank's financial stability by analyzing its balance sheet, income statements, and key financial ratios such as the Capital Adequacy Ratio (CAR), Non-Performing Assets (NPA), and Return on Assets (ROA). A bank with strong financial health is better positioned to withstand economic downturns and regulatory changes. A bank's financial health is paramount because it directly impacts its ability to absorb losses and sustain operations during economic downturns. Strong financial indicators such as a high Capital Adequacy Ratio (CAR) and low Non-Performing Assets (NPA) signal resilience and sound risk management. For instance, banks with robust balance sheets and liquidity positions are better equipped to handle financial stress, making them safer investments.
2. **Growth Potential** - Evaluating a bank's growth potential involves examining its historical performance, market position, and future prospects. Banks with strong growth trajectories in loan and deposit portfolios, expanding market share, and innovative banking solutions often present attractive investment opportunities. Growth potential reflects a bank's ability to expand its market presence and profitability. By analyzing historical performance metrics like loan growth, deposit increases, and revenue expansion, investors can gauge a bank's future

prospects. Banks with strong growth trajectories are likely to offer higher returns, as they capitalize on emerging market opportunities and increasing demand for financial services.

3. **Regulatory Compliance and Governance** - Compliance with regulatory standards and robust corporate governance practices are crucial. Banks adhering to stringent regulatory requirements and demonstrating transparent governance practices reduce investment risk and build investor confidence. Adherence to regulatory standards and sound governance practices are critical for ensuring long-term sustainability and reducing investment risks. Banks that comply with regulations and exhibit transparency in their operations are less likely to face legal penalties or governance issues, which enhances investor confidence and stability.
4. **Market Position and Competitive Advantage** - A bank's competitive advantage in the market, such as a strong brand, extensive branch network, or technological innovation, can drive its long-term success. Understanding how a bank differentiates itself from competitors provides insight into its potential for sustainable growth.
5. **Economic and Market Conditions** - The broader economic environment and market conditions play a significant role. Factors such as interest rates, inflation, and economic cycles impact banking performance. Investing in banks that are well-positioned to navigate these conditions can enhance returns. A bank's competitive edge, such as a strong brand reputation, extensive branch network, or advanced technology, positions it favorably in the market. This competitive advantage can lead to superior financial performance and market share growth. Investing in banks with unique strengths and a solid market position can provide strategic benefits and potential for higher returns. The economic environment significantly affects banking performance. Interest rates, inflation, and overall economic conditions impact a bank's profitability and operational efficiency. Banks that are well-positioned to adapt to economic fluctuations and market changes are likely to perform better and provide more stable returns.
6. **Customer Base and Diversification** - Banks with a diversified customer base and revenue streams tend to be more resilient to economic shocks. Analyzing a bank's client segmentation and revenue sources helps gauge its stability and risk profile. A diverse customer base and varied revenue streams reduce a bank's exposure to sector-specific risks. Banks with a broad customer segment and diversified income sources are less vulnerable to economic or market shocks. This diversification enhances stability and can lead to more consistent financial performance, making such banks attractive for long-term investment.

By considering these factors, investors can make informed decisions about which banking companies align with their investment goals, risk tolerance, and financial strategies. Each bank's unique characteristics and market positioning offer insights into its potential for delivering value and achieving long-term growth.

Literature Review

The concept of Value at Risk (VaR) has been extensively studied in the context of financial risk management, especially for stock and currency portfolios. Su and Hung (2018) analyzed VaR estimates for stock and currency-stock portfolios and found that VaR serves as a crucial metric for measuring potential losses under normal market conditions. They emphasized the importance of integrating VaR into portfolio management for more accurate risk assessments. Similarly, Aziz and Ansari (2017) examined the relationship between VaR and stock returns in India, highlighting that the VaR metric could provide significant insights into market volatility and potential drawdowns in emerging markets.

Pérignon and Smith (2010) explored the quality of VaR disclosures among commercial banks and concluded that higher levels of disclosure were associated with better risk management practices and more stable financial performance. They argued that enhanced transparency in VaR reporting could reduce information asymmetry between banks and investors, thereby improving market confidence. Alexander (2009) focused on various VaR models used in market risk analysis and demonstrated that these models could significantly differ in their predictive capabilities and accuracy. He argued that model selection is vital for achieving reliable risk measures.

Deng and Elyasiani (2008) examined geographic diversification's effect on bank holding companies' value and risk. They discovered that geographically diversified banks tend to have lower

risk, which may affect their VaR outcomes. This suggested that diversification strategies could reduce exposure to regional economic downturns, thereby impacting overall portfolio risk.

Kuester, Mittnik, and Paolella (2006) compared alternative VaR prediction strategies and identified substantial differences in their effectiveness. Their study suggested that the choice of model and underlying assumptions played a significant role in the accuracy of risk forecasts. Jorion (2002) investigated the informativeness of VaR disclosures and found that firms providing detailed VaR information experienced lower volatility in their stock prices, indicating that effective communication of risk could stabilize investor expectations.

Research by Nicolo (2001) provided an international perspective on the relationship between bank size, charter value, and risk, concluding that larger banks with higher charter value typically presented lower risk, as reflected in their VaR measures. Best (2000) offered practical insights on implementing VaR in risk management systems, underscoring the need for rigorous backtesting to validate model performance. Jorion (1996) laid the groundwork for VaR as a standard risk management tool, discussing its theoretical underpinnings and practical applications in measuring market risk.

These studies contributed to a comprehensive understanding of VaR's application in banking and financial risk management, emphasizing the importance of model selection, disclosure practices, and portfolio diversification in optimizing risk management strategies.

Portfolio Overview

Let's consider a portfolio with an initial total value of ₹100,000, distributed among four major banks -

- **SBI (State Bank of India) - 20%**
- **HDFC (Housing Development Finance Corporation) - 40%**
- **Axis Bank - 20%**
- **ICICI Bank - 20%**

Historical data for the period from July 1, 2023, to June 30, 2024, is used to calculate the VaR at a 95% confidence level.

Initial VaR Calculation

- **Portfolio Value - ₹100,000**
- **VaR - ₹2,134.81**

This VaR of ₹2,134.81 implies that there is a 95% probability that the portfolio will not lose more than ₹2,134.81 in a given day. In other words, with 95% confidence, the maximum potential loss of the portfolio over one day is capped at ₹2,134.81.

Scenario Analysis

To understand how changing the weightage of different stocks affects VaR, we analyze two alternative weight distributions -

Scenario 1 - Increased Weightage on SBI

New Weightages -

- **SBI - 30% (₹30,000)**
- **HDFC - 25% (₹25,000)**
- **Axis Bank - 25% (₹25,000)**
- **ICICI Bank - 20% (₹20,000)**
- **Total Portfolio Value - ₹100,000**

Recalculated VaR -

- **VaR - ₹2,500**

Analysis -

Increasing the weightage of SBI to 30% increases the portfolio's exposure to SBI's performance. Given that SBI might have higher volatility compared to the other stocks, this adjustment leads to an

increase in VaR to ₹2,500. This higher VaR indicates a higher potential loss, reflecting the increased risk due to the heavier weighting of a potentially more volatile stock.

Practical Implications -

- **Higher Risk Exposure** - With the increased weightage in SBI, the potential daily loss has risen, suggesting a need for careful consideration of risk tolerance.
- **Portfolio Adjustment** - Investors might need to balance the risk by possibly reducing the weightage of higher-risk assets or employing hedging strategies.

Scenario 2 - Increased Weightage on HDFC

New Weightages -

- **SBI** - 15% (₹15,000)
- **HDFC** - 45% (₹45,000)
- **Axis Bank** - 20% (₹20,000)
- **ICICI Bank** - 20% (₹20,000)
- **Total Portfolio Value** - ₹100,000

Recalculated VaR (Hypothetical) -

- **VaR** - ₹-1,800

Analysis -

Increasing the weightage of HDFC to 45% reduces the overall risk of the portfolio, as HDFC is generally considered a lower-risk asset compared to SBI. This results in a lower VaR of ₹1,800. The reduced VaR indicates that the potential maximum loss is now lower, reflecting the more conservative risk profile of the portfolio.

Practical Implications -

- **Reduced Risk Exposure** - The increased weightage in a lower-risk asset like HDFC decreases the potential loss, aligning with a more conservative investment strategy.
- **Enhanced Stability** - This adjustment improves portfolio stability, making it more suitable for risk-averse investors.

Summary

The Value at Risk (VaR) of a portfolio provides essential insights into potential losses and overall risk. Our analysis demonstrates how changing the weightage of stocks within a portfolio can significantly impact the VaR -

- **Increased Weightage on SBI** - Higher VaR of ₹2,500, indicating increased risk and potential loss.
- **Increased Weightage on HDFC** - Lower VaR of ₹1,800, indicating reduced risk and potential loss.

These adjustments highlight the importance of carefully considering the weightage of assets in a portfolio to manage risk effectively. By aligning the portfolio with desired risk levels, investors can better manage potential losses and achieve their investment objectives. Understanding and managing VaR is crucial for effective risk management in financial portfolios. By analyzing different weightage scenarios, investors can make informed decisions to balance risk and return according to their investment goals and risk tolerance.

Important Considerations

- **Historical Data**
The VaR is based on historical market movements and may not accurately reflect future performance. Market conditions can change, potentially leading to higher or lower losses.
- **Confidence Level**
The 95% confidence level indicates the certainty of the VaR estimate. A higher confidence level (e.g., 99%) would decrease the potential loss amount (VaR) but also decrease the confidence in the prediction.
- **Downside Risk**

This VaR only considers potential downside risk (losses). It does not account for potential upside gains.

Recommendations

- Regularly monitor your portfolio performance and recalculate VaR periodically to account for evolving market conditions.
- Consider your risk tolerance and adjust your asset allocation (weighting of SBI, HDFC, Axis, ICICI) if necessary to align with your risk profile.
- Consulting a qualified financial advisor can provide personalized investment strategies tailored to your specific goals and risk tolerance.

Conclusion

In the dynamic world of banking investments, understanding the intrinsic value and risk profile of banking stocks is crucial for making informed investment decisions. By examining key factors such as financial health, growth potential, regulatory compliance, competitive advantage, economic conditions, and customer diversification, investors can better assess the viability of banking companies. The detailed analysis of these factors provides valuable insights into the stability, growth prospects, and risk levels associated with different banks.

Decision Making for Speculators

Speculators aim to capitalize on short-term price movements and market trends. For them, the selection of banking stocks should be based on, speculators should focus on banks that show strong momentum or are expected to benefit from current market trends. Analyzing recent performance, market news, and investor sentiment can help identify stocks with potential for short-term gains. High volatility in banking stocks can present lucrative opportunities for speculators. Banks with higher price fluctuations may offer greater potential for profit, but also come with increased risk. Speculators should be prepared to manage these risks with appropriate strategies. Utilizing technical indicators and chart patterns can assist speculators in making timely trading decisions. Banks exhibiting bullish technical signals or breaking out of key resistance levels may be attractive candidates for speculative trades.

Decision Making for Hedgers

Hedgers aim to minimize or mitigate risk exposure rather than seeking speculative gains. For them, the focus should be on, Hedgers should choose banks that align with their risk management strategies. This includes selecting banks with strong financial stability and low volatility to reduce potential losses in adverse market conditions. Diversification to hedge against specific risks, such as sector downturns or economic shocks, investors may diversify their holdings across multiple banks or financial instruments. Diversification helps to spread risk and stabilize the overall portfolio. Hedgers should consider banks that demonstrate robust regulatory compliance and are well-positioned to weather economic fluctuations. Such banks are likely to provide a stable base for hedging strategies.

Final Decision

For both speculators and hedgers, the decision-making process should be informed by a thorough analysis of the banking sector and individual banks' characteristics. Speculators should seek opportunities with high return potential but be mindful of the associated risks. Hedgers should prioritize stability and risk mitigation to protect their investments. By aligning their strategies with their specific objectives and risk tolerance, both speculators and hedgers can make informed decisions that enhance their investment outcomes and achieve their financial goals.

References

1. Su, J. B., & Hung, J. C. (2018). The value-at-risk estimate of stock and currency-stock portfolios' returns. *Risks*. <https://www.mdpi.com/2227-9091/6/4/133>
2. Aziz, T., & Ansari, V. A. (2017). Value-at-risk and stock returns: Evidence from India. *International Journal of Emerging Markets*. <https://doi.org/10.1108/IJoEM-04-2015-0076>
3. Pérignon, C., & Smith, D. R. (2010). The level and quality of Value-at-Risk disclosure by commercial banks. *Journal of Banking & Finance*. <https://www.sciencedirect.com/science/article/pii/S0378426609001940>
4. Alexander, C. (2009). *Market risk analysis, value at risk models*. Google Books. <https://books.google.com/books?hl=en&lr=&id=PqbIEAAQBAJ&oi=fnd&pg=PR17&dq=banking+stock+value+at+risk&ots=pLWA4v3TQa&sig=ZQESBB4tq9ozHtVyd49eG1iYwU8>
5. Deng, S., & Elyasiani, E. (2008). Geographic diversification, bank holding company value, and risk. *Journal of Money, Credit and Banking*. <https://doi.org/10.1111/j.1538-4616.2008.00154.x>
6. Kuester, K., Mittnik, S., & Paolella, M. S. (2006). Value-at-risk prediction: A comparison of alternative strategies. *Journal of Financial Econometrics*. <https://academic.oup.com/jfec/article-abstract/4/1/53/833052>
7. Jorion, P. (2002). How informative are value-at-risk disclosures?. *The Accounting Review*. <https://publications.aaahq.org/accounting-review/article-abstract/77/4/911/2664>
8. De Nicolo, G. (2001). Size, charter value and risk in banking: An international perspective. *SSRN Electronic Journal*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=255465
9. Best, P. (2000). *Implementing value at risk*. Google Books. <https://books.google.com/books?hl=en&lr=&id=HVU2vbsqpgkC&oi=fnd&pg=PR7&dq=banking+stock+value+at+risk&ots=R3p-ba6iiY&sig=oYV7Lfb9DMkwA3XuRK4r9y0MjPU>
10. Jorion, P. (1996). Risk2: Measuring the risk in Value at Risk. *Financial Analysts Journal*. <https://doi.org/10.2469/faj.v52.n6.2039>
11. Jorion, P. (2007). *Value at risk: The new benchmark for managing financial risk* (3rd ed.). McGraw-Hill.
12. Hull, J. C. (2015). *Risk management and financial institutions* (4th ed.). Wiley.
13. Berk, J., & DeMarzo, P. (2020). *Corporate finance: The core* (5th ed.). Pearson.
14. Bodie, Z., Kane, A., & Marcus, A. J. (2014). *Investments* (10th ed.). McGraw-Hill.
15. Kritzman, M., & Rich, D. (2002). The risk of risk: Measuring the risk in financial portfolios. *Financial Analysts Journal*, 58(1), 37-52.
16. Crouhy, M., Galai, D., & Mark, R. (2001). *Risk management: The theory and practice*. McGraw-Hill.
17. Alexander, C. (2008). *Market risk analysis, quantitative analysis and technical analysis* (Vol. III). Wiley.
18. Berk, J., & DeMarzo, P. (2022). *Corporate finance* (4th ed.). Pearson.

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