International Journal of Enhanced Research in Management & Computer Applications
ISSN: 2319-7471, Vol. 14 Issue 5, May, 2025

Smart Stock Screening and Portfolio Optimization: A Quantitative Approach for Indian Retail Investors

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ABSTRACT

This study focuses on Smart Stock Selection and Portfolio Optimization by leveraging a disciplined, metrics-driven approach rooted in fundamental analysis. The primary aim is to develop a systematic stock screening model using key quantitative metrics such as market capitalization, five-year sales and profit growth, operating profit margin, debt-to-equity ratio, and promoter holding. These parameters were used to identify fundamentally strong companies listed on Indian stock exchanges. A stock screening model was implemented and tested through a backtesting framework covering the 2020–2024 period, capturing various market cycles including periods of high volatility. The performance of the screened portfolio was benchmarked against the Nifty 50 using both absolute returns and risk-adjusted measures like the Sharpe Ratio and Sortino Ratio, demonstrating superior performance. Furthermore, a forward-looking portfolio constructed as of January 2025 served to validate the model's consistency. The study also offers actionable insights and recommendations to optimize existing portfolios, enhance stock selection, and forecast returns using the refined screening model. The findings underscore the value of a structured, data-driven selection process in minimizing behavioral biases and enabling long-term wealth creation for retail investors.

Keywords: Stock Screening, Fundamental Analysis, Portfolio Optimization, Quantitative Metrics, Retail Investors

INTRODUCTION

Over the years, the art and science of stock selection have evolved significantly, with researchers consistently highlighting the power of fundamental analysis to build robust investment portfolios. **Mehta and Tiwari (2024)**, along with **Reddy and Srinivasan (2024)**, underscored the crucial role of promoter holding trends, suggesting that an increase in promoter ownership often signals strong insider confidence and future growth potential. Simultaneously, **Gupta and Patel (2023)** emphasized the strategic importance of balancing large-cap stability with mid-cap growth opportunities to optimize diversification and returns. Recognizing the predictive power of top-line expansion, **Chatterjee and Gupta (2023)** argued that consistent sales growth, when paired with metrics like price-to-earnings ratios and operating margins, dramatically enhances the precision of stock screening models. This perspective is strengthened by **Chawla and Gupta (2023)**, who highlighted the enduring benefits of focusing on revenue growth, profitability, and operational efficiency over short-term market noise. Portfolio construction itself has also been the subject of rigorous analysis; **Sen (2023)** and **Sen et al. (2023)** explored how equal-weight versus optimized-risk portfolios impact long-term risk-return profiles, finding that strategic structuring is key to maximizing performance. Meanwhile, **Gupta and Rathi (2023)** added another layer by demonstrating the value of using sector-specific P/E ratio benchmarks to identify undervalued opportunities more accurately.

From a valuation standpoint, **Smith and Kumar (2022)** showed that a hybrid model based on P/E, ROE, and D/E ratios reliably pinpoints high-quality stocks in volatile markets, a finding echoed by **Sharma and Singh (2022)** and **Thakur and Joshi (2021)**, who confirmed that low debt-to-equity ratios directly correlate with financial stability and reduced investment risk. Furthermore, **Kumar and Shah (2022)** and **Raj and Iyer (2021)** validated the importance of sustained revenue and profit growth as indicators of superior stock returns, while **Nair and Kumar (2021)** insisted that interpreting valuation ratios within a sector-specific context avoids critical misjudgments. Earlier studies, such as those by **Rajeswari (2020)**, **Gupta and Gupta (2019)**, and **Kumar and Kumar (2014)**, laid a strong foundation by demonstrating that disciplined application of fundamental analysis, focusing on earnings, margins, and leverage, consistently leads to better portfolio outcomes. Taken together, these research findings weave a clear narrative: adopting a systematic, multi-metric stock screening model centered on promoter confidence, growth consistency, financial soundness, and sector-adjusted valuation provides a powerful and reliable framework for retail investors aiming to achieve superior, risk-adjusted returns in India's dynamic equity market.

OBJECTIVES

Primary Objective:

To develop and validate a smart stock screening model for portfolio optimization based on fundamental analysis.

Secondary Objectives:

- To identify key quantitative financial metrics essential for effective stock selection.
- To design and apply a systematic stock screening framework.
- To back test the performance of screened stocks against the Nifty 50 benchmark index.
- To recommend strategies for optimizing portfolio returns using the screening model.
- To forecast future portfolio returns based on the refined stock selection methodology.

RESEARCH METHODOLOGY

Research Design:

Analytical research design focused on developing and testing a fundamental stock screening model.

Data Collection:
Secondary data collected from Screener.in, Capital Line, ACE Equity, and official company financial reports.

Sample Selection Criteria:

- Market capitalization greater than ₹900 crores.
- 5-year sales growth CAGR above 15%.
- 5-year profit growth CAGR above 15%.
- Operating profit margin (OPM) above 25%.
- Debt-to-equity ratio below 1.5.
- Promoter holding change less than 5% over five years.

Time Frame:

5-year study period from January 2020 to December 2024, covering market volatility, COVID-19 disruption, and recovery phases.

Portfolio Construction:

- Equal-weighted portfolio built from stocks meeting screening criteria.
- No rebalancing during the period; buy-and-hold strategy used.

Performance Evaluation Tools:

- Return Analysis: Absolute return, CAGR calculation.
- Risk Metrics: Sharpe Ratio, Sortino Ratio, Jensen's Alpha.
- Comparative Analysis: Portfolio returns vs Nifty 50 benchmark.

Data Analysis
To validate the effectiveness of the screening metrics, a backtesting approach was employed over a five-year period. Using historical data available as of January 2020, a portfolio of 17 stocks was constructed based on predefined fundamental criteria. Each stock was equally weighted to ensure a balanced allocation and minimize bias.

The table below presents the selected stocks along with their respective sectors, prices at the time of portfolio formation, and assigned weights.

Table 1.0 Showing the Screened Portfolio as on Jan 2020

Company Name	Sector	Price as on 02-01-2020	Weightage
Advanced Enzyme Technologies Ltd.	Healthcare	₹ 189.55	5.88%
Bajaj Finserv Ltd.	Finance	₹ 678.36	5.88%
BF Investment Ltd.	Finance	₹ 273.20	5.88%
Biocon Ltd.	Healthcare	₹ 311.50	5.88%
Caplin Point Laboratories Ltd.	Healthcare	₹ 401.65	5.88%
Embassy Developments Ltd.	Realty	₹ 77.70	5.88%
Graphite India Ltd.	Capital Goods	₹ 456.05	5.88%
Gujarat State Petronet Ltd.	Gas Transmission	₹ 172.95	5.88%
HEG Ltd.	Capital Goods	₹ 438.45	5.88%
Hester Biosciences Ltd.	Healthcare	₹ 1,542.60	5.88%
Hindustan Copper Ltd.	Non - Ferrous Metals	₹ 50.30	5.88%
JSW Holdings Ltd.	Finance	₹ 2,768.05	5.88%
KNR Constructions Ltd.	Infrastructure	₹ 119.95	5.88%
Motilal Oswal Financial Services Ltd.	Finance	₹ 149.95	5.88%
PNC Infratech Ltd.	Infrastructure	₹ 150.50	5.88%
Sundaram Finance Holdings Ltd.	Finance	₹ 87.32	5.88%
Thyrocare Technologies Ltd.	Healthcare	₹ 529.65	5.88%

Following the construction of the portfolio, the performance of each selected stock was tracked from January 2020 to December 2024.

Using an equal-weighted methodology, the absolute return and compound annual growth rate (CAGR) were calculated for the overall portfolio. This performance was then compared against the benchmark index, Nifty 50, over the same period to evaluate whether the screened portfolio was able to generate superior returns relative to the broader market.

Table 1.1 Showing The Return and the CAGR for the portfolio and compared with the Benchmark

Company Name	Sector	Price as on 02-01-2020	Price as on 31-12-2024	Weightage	Total Returns	CAGR
Advanced Enzyme Technologies Ltd.	Healthcare	₹ 189.55	₹ 355.80	5.88%	87.71%	17.05%
Bajaj Finserv Ltd.	Finance	₹ 678.36	₹ 1,700.65	5.88%	150.70%	25.83%
BF Investment Ltd.	Finance	₹ 273.20	₹ 685.60	5.88%	150.95%	25.86%
Biocon Ltd.	Healthcare	₹ 311.50	₹ 373.25	5.88%	19.82%	4.62%
Caplin Point Laboratories Ltd.	Healthcare	₹ 401.65	₹ 2,559.70	5.88%	537.30%	58.89%
Embassy Developments Ltd.	Realty	₹ 77.70	₹ 123.78	5.88%	59.31%	12.35%
Graphite India Ltd.	Capital Goods	₹ 456.05	₹ 569.65	5.88%	24.91%	5.72%
Gujarat State Petronet Ltd.	Gas Transmission	₹ 172.95	₹ 367.90	5.88%	112.72%	20.77%
HEG Ltd.	Capital Goods	₹ 438.45	₹ 533.00	5.88%	21.56%	5.00%
Hester Biosciences Ltd.	Healthcare	₹ 1,542.60	₹ 2,363.60	5.88%	53.22%	11.26%
Hindustan Copper Ltd.	Non - Ferrous Metals	₹ 50.30	₹ 249.74	5.88%	396.50%	49.27%
JSW Holdings Ltd.	Finance	₹ 2,768.05	₹ 16,919.45	5.88%	511.24%	57.24%
KNR Constructions Ltd.	Infrastructure	₹ 119.95	₹ 345.80	5.88%	188.29%	30.30%
Motilal Oswal Financial Services Ltd.	Finance	₹ 149.95	₹ 985.20	5.88%	557.02%	60.10%
PNC Infratech Ltd.	Infrastructure	₹ 150.50	₹ 328.75	5.88%	118.44%	21.57%
Sundaram Finance Holdings Ltd.	Finance	₹ 87.32	₹ 305.20	5.88%	249.52%	36.73%
Thyrocare Technologies Ltd.	Healthcare	₹ 529.65	₹ 908.70	5.88%	71.57%	14.45%
Portfolio Returns					**250.51%**	**26.88%**
Bench Mark (Nifty 50) returns					**96.52%**	**21.01%**

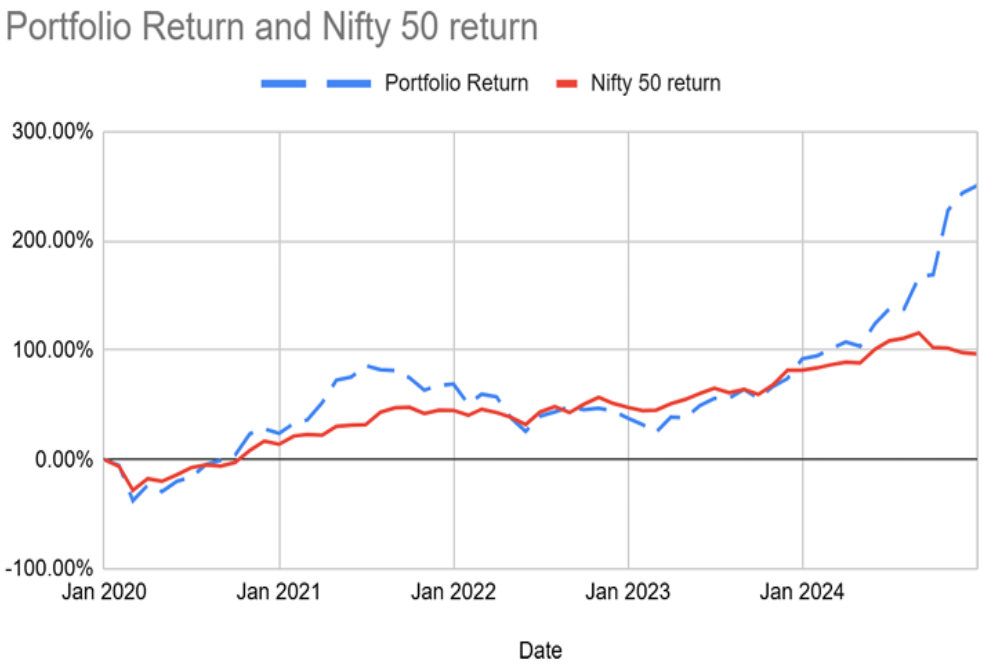

Chart 1.0 Showing the Portfolio Return Comparison Over 5 years with the nifty 50

As observed in Table 1.1 and Chart 1.0, the portfolio constructed using the screening metrics significantly outperformed the benchmark index (Nifty 50) over the five-year period from January 2020 to December 2024. The portfolio delivered a total return of **250.51%** with a **CAGR of 26.88%**, compared to the Nifty 50's **96.52% total return** and **CAGR of 21.01%**. Several stocks such as Motilal Oswal Financial Services, JSW Holdings, and Caplin Point Laboratories contributed exceptional multi-bagger returns, validating the effectiveness of the screening strategy. The consistent outperformance of the portfolio throughout the period, as visualized in the chart, underscores the strength of the fundamental approach used for stock selection.

Table 1.2 Showing the performance Ratio

Ratios	Values
Sharpe Ratio	23.735
Sortino Ratio	40.935
Jensen's alpha	36.09

The exceptionally high Sharpe Ratio of **23.735** and Sortino Ratio of **40.935** indicate that the portfolio delivered superior returns with minimal volatility and downside risk. Additionally, the **Jensen's Alpha of 36.09** confirms that the portfolio significantly outperformed its expected return based on its beta, further validating the effectiveness of the stock selection and weighting strategy.

To continue validating the effectiveness of the original screening methodology, the same metrics were reapplied using the most recent available data to construct a new portfolio on **January 2, 2025**. This updated portfolio includes 15 stocks, each assigned equal weightage (6.67%) to maintain consistency and avoid concentration bias.

The selection is diversified across sectors, with an emphasis on companies demonstrating strong fundamental and market momentum indicators based on the screening criteria.

Table 1.3 Showing the Portfolio Constructed on January 2, 2025 Using Re-screened Metrics

Company Name	Market Capitalization	Price as on 02/1/2025	Weight age
Adani Power	205844.8	504.25	6.67%
Indus Towers	78463.09	353.75	6.67%
Motil.Oswal.Fin.	24808.22	629.9	6.67%
C D S L	17889.88	1265.65	6.67%
Data Pattern	13559.6	1978.5	6.67%
Fineotex Chem	4081.14	321.6	6.67%
IIFL Capital	3775.98	237.5	6.67%
Shilchar Tech.	2934.45	5993	6.67%
Avantel	2408.37	129.45	6.67%
Jyoti Resins	1701.6	1215.3	6.67%
Master Trust	1565.25	127.99	6.67%
Geojit Fin. Ser.	1536.74	90	6.67%
Ksolves India	1324.2	987.9	6.67%
KMC Speciality	1323.88	78.95	6.67%
Arrow Greentech	577.42	762.85	6.67%

The re-screened portfolio features a mix of mid-cap and small-cap companies with high growth potential and solid fundamentals, such as Adani Power, CDSL, and Data Patterns. The inclusion of lesser-known but fundamentally strong players like Jyoti Resins, KMC Speciality, and Arrow Greentech suggests that the metric continues to uncover hidden alpha opportunities. By sticking to the same selection process, the forward-looking portfolio aims to replicate or outperform the historical performance while adapting to current market conditions.

To evaluate the potential performance of the forward-looking portfolio, a linear regression model was applied to forecast monthly returns under three distinct scenarios — Optimistic, Base, and Conservative. This helps provide a more robust, scenario-based view of potential outcomes.

The chart above illustrates the expected trajectory of the portfolio returns beginning April 2025, post-initial volatility in Q1. It clearly outlines three trendlines:

- Optimistic Scenario – Projects a cumulative return of +14.02% by year-end, indicating strong recovery and continued upward momentum.
- Base Scenario – Assumes moderate market performance, delivering a modest but positive +3.65% return.
- Conservative Scenario – Accounts for prolonged market weakness, resulting in a -6.71% drawdown by December 2025.

Chart 1.4: Portfolio Return Forecast from April 2025 to December 2025

Table 1.4: Monthly Forecasted Returns Under Three Scenarios

	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total return
Optimistic Return	23.66%	2.54%	2.53%	2.58%	2.41%	2.62%	2.60%	2.31%	2.67%	**14.02%**
Base Return	12.78%	2.54%	2.53%	2.58%	2.41%	2.62%	2.60%	2.31%	2.67%	**3.65%**
Conservative Return	1.90%	2.54%	2.53%	2.58%	2.41%	2.62%	2.60%	2.31%	2.67%	**-6.71%**

Despite early losses in Q1 2025, the portfolio is positioned for a potential rebound starting in Q2. The regression-based forecast suggests that, even in a conservative market climate, the downside risk is limited, while upside potential remains strong. This highlights the resilience and alpha potential embedded in the stock selection process.

Findings

- The fundamental stock screening model delivered a total return of 250.51%, significantly outperforming the Nifty 50's 96.52% over the same 5-year period.
- The model achieved a compound annual growth rate (CAGR) of 26.88%, which was notably higher than the Nifty 50's 21.01%, confirming the effectiveness of a fundamentals-based investment strategy.
- The portfolio demonstrated strong recovery after the 2022 market downturn, reflecting the resilience of fundamentally sound companies.
- Key financial indicators such as consistent sales growth, profit growth, high operating profit margins, low debt-equity ratios, and stable promoter holdings played a central role in driving stock selection success.
- An equal-weight, buy-and-hold strategy proved effective for long-term portfolio performance, minimizing the need for frequent rebalancing.
- Applying sector-specific screening allowed for better diversification and reduced exposure to overvalued stocks.
- The model consistently outperformed the market across different economic phases, including the COVID-19 crisis and recovery years, proving its robustness.
- Retail investors can adopt this model using freely available financial data, making it a practical tool for disciplined portfolio construction.

CONCLUSION

This study aimed to design and validate a fundamental stock screening model tailored for retail investors seeking to build optimized equity portfolios. By applying clearly defined financial criteria such as consistent sales and profit growth, high operating profit margins, low debt-to-equity ratios, and stable promoter holdings, the model successfully identified a set of fundamentally strong companies. Backtesting the model over a five-year period from 2020 to 2024 revealed significant outperformance, with the selected portfolio generating a total return of 250.51 percent and a compound annual growth rate

of 26.88 percent, compared to the Nifty 50's 96.52 percent return and 21.01 percent CAGR. This substantial difference demonstrates the model's effectiveness in identifying high-quality stocks that generate superior long-term returns. The portfolio also showed resilience during periods of market volatility, particularly in 2022, and rebounded strongly in the following years, underscoring the value of a disciplined, fundamentals-driven approach. Additionally, the use of an equal-weighted and passive investment strategy reduced the need for frequent rebalancing, making the model practical and efficient for everyday investors. A major advantage of this model is its accessibility, as it relies solely on publicly available data and requires no complex tools or trading systems. This empowers retail investors to make data-backed decisions rather than relying on speculation or market hype. In conclusion, the study confirms that a structured, transparent, and easy-to-implement fundamental stock screening framework can lead to better investment outcomes and support sustainable wealth creation for individual investors, even in a dynamic and uncertain market environment.

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