

# Title: Market Trends and Portfolio Diversification: A Sector-Based Analysis

**Author:** Rohith Koushik D C

**Affiliation:** CMS Business School, JAIN (Deemed-to-be University), Bengaluru

**Email:** rohithkaushik01@gmail.com

## Abstract

This study examines the usefulness of sector-based portfolio diversification in the Indian stock market, focusing on five important sectors: Information Technology (IT), Fast Moving Consumer Goods (FMCG), Banking, Automobiles, and Pharmaceuticals. The analysis compares the sectoral indices of these five sectors to the NIFTY 100 index from 2005 to 2024, using monthly closing prices. Furthermore, five leading companies from each sector (25 in total) were chosen, and their individual performances were compared to the NIFTY 100. Using quantitative financial metrics such as Descriptive Statistics, CAGR, Beta, Sharpe Ratio, Value at Risk (VaR), Correlation heat maps, and ARIMA forecasting, the study finds that FMCG and Pharma are low-volatile, they are considered as defensive investment options, whereas Banking and Automobiles are more volatile, but have high-growth potential. TCS, HDFC Bank, Sun Pharma, ITC and Maruti Suzuki emerged as consistently strong performers within their respective sectors. The findings emphasize the value of comparing both sectoral and company-level performance with broader market indices, using historical monthly price data, to inform strategic portfolio allocation and risk mitigation for institutional and retail investors.

**Keywords:** Portfolio diversification, risk-return analysis, sectoral trends, regression, forecasting, investment strategies.

## 1. Introduction

Investment strategies in emerging markets such as India are progressively shifting away from traditional asset allocation and towards sector-based diversification due to differences in cyclical behavior and risk-return profiles across sectors. With changing market dynamics and macroeconomic events, a strategic understanding of sectoral behavior is critical for portfolio optimization. This paper compares key sectors and their constituent companies to the NIFTY 100 benchmark to evaluate the efficiency of sectoral diversification in risk management and return enhancement.

## 2. Literature Review

Several studies have investigated the effect of sectoral diversification on portfolio performance. Fama and French (1992) emphasized the importance of industry characteristics in predicting stock returns, whereas Sharpe (1966) pioneered risk-adjusted performance measures such as the Sharpe ratio. Recent research has shown the value of machine learning algorithms in anticipating stock patterns (Gupta et al., 2021). However, few studies have combined basic, technological, and statistical approaches to completely measure sectoral performance. This research closes the gap by combining several analytical methodologies.

## 3. Research Objectives

- To assess the risk-return profile of five major Indian sectors.
- To compare sectoral index performance with NIFTY 100.
- To evaluate individual stock performance within each sector.

## 4. Research Methodology

### 4.1 Data Collection

- Time Frame: 2005-2024
- Data Source: NSE historical stock data and Yahoo Finance
- Sectors & Stocks Analyzed and compared to NIFTY-100

IT: TCS, Infosys, Wipro, HCL Tech, Tech Mahindra.

FMCG: HUL, ITC, Nestle, Britannia, Dabur.

Banking: HDFC Bank, ICICI, Kotak Bank, SBI, Axis Bank.

Automobile: Maruti, Tata Motors, M&M, Bajaj Auto, Hero MotoCorp.

Pharma: Sun Pharma, Cipla, Dr. Reddy's, Divi's Lab, Lupin.

- Tools Used: Python, MS-Excel

## 4.2 Analytical Techniques

- Descriptive Statistics: Mean, Standard Deviation, CAGR.
- Risk-Return Analysis: Beta, Sharpe Ratio, Value at Risk (VaR).
- Regression Analysis: To examine sectoral dependency on NIFTY 100.
- Correlation Heat Maps: To assess sectoral relationships.
- Time-Series Forecasting: ARIMA model for predicting future trends.

## 5. Data Analysis & Findings

- Sectoral Indices Compared to NIFTY 100

### 5.1 Descriptive Statistics & Risk-Return Analysis

Index	Mean	Std. Dev	Median	Max	CAGR (%)	Beta	Sharpe Ratio	VaR (95%)
NIFTY 100	0.0119	0.0614	0.0102	0.2991	12.85	1.000	1.117	-8.94%
NIFTY IT	0.0129	0.0695	0.0137	0.2380	13.54	0.673	1.085	-10.18%
NIFTY AUTO	0.0148	0.0744	0.0193	0.3058	15.59	1.013	1.289	-10.79%
NIFTY BANK	0.0146	0.0863	0.0084	0.4453	14.11	1.234	0.940	-12.77%
NIFTY FMCG	0.0131	0.0507	0.0129	0.1880	15.41	0.529	1.856	-7.05%
NIFTY PHARMA	0.0115	0.0605	0.0122	0.2997	12.42	0.587	1.061	-8.83%

### Interpretation

- Among all indices, NIFTY AUTO has the greatest average monthly return (Mean = 0.0148) and a strong CAGR of 15.59%, indicating a high development potential. However, it is associated with somewhat high volatility (Std. Dev = 0.0744) and increased downside risk (VaR = -10.79%).
- NIFTY BANK has the highest volatility (Std. Dev = 0.0863), the highest recorded return (Max = 0.4453), and a high Beta (1.234), indicating substantial market sensitivity. Despite the higher risk, it had a strong CAGR of 14.11%, making it interesting to aggressive investors.
- On the defensive side, NIFTY FMCG has the greatest Sharpe Ratio (1.856), implying the best risk-adjusted return. It also has the lowest VaR (-7.05%) and Beta (0.529), indicating that it is relatively stable and suitable for conservative investors.

- NIFTY PHARMA and NIFTY IT have balanced profiles that include moderate returns, reasonable volatility, and favorable Sharpe Ratios, making them appropriate for diversified portfolios.

### 5.2 Sectoral Wise Correlation with NIFTY 100

Sector	Correlation with NIFTY 100
IT	0.68
Automobiles	0.82
Banking	0.91
FMCG	0.54
Pharmaceuticals	0.60

#### Interpretation

- Banking & Automobiles are the most correlated sectors (0.91 & 0.82, respectively) with NIFTY 100, meaning their performance is highly dependent on overall market conditions.
- FMCG (0.54) and Pharmaceuticals (0.60) show lower correlation, making them ideal for diversification.
- IT sector correlation (0.68) indicates moderate sensitivity to the market, making it a balanced investment choice.

### 5.3 Regression Analysis

#### Sectoral Regression Analysis with NIFTY 100

Metric	NIFTY IT	NIFTY AUTO	NIFTY BANK	NIFTY FMCG	NIFTY PHARMA
R-squared	0.351	0.694	0.764	0.408	0.352
Adjusted R-squared	0.348	0.692	0.763	0.405	0.349
F-statistic	130.3	545.7	781.0	165.9	130.9
Prob (F-statistic)	2.08e-24	7.54e-64	1.46e-77	3.07e-29	1.70e-24
Intercept (const)	0.0049	0.0028	-0.00003	0.0069	0.0045
NIFTY 100 Coefficient	0.6706	1.0089	1.2286	0.5272	0.5844
Standard Error	0.059	0.043	0.044	0.041	0.051
t-statistic	11.414	23.360	27.946	12.882	11.441
p-value	0.000	0.000	0.000	0.000	0.000

Durbin-Watson	1.931	1.894	2.123	2.025	2.064
---------------	-------	-------	-------	-------	-------

### Interpretation

- **Model Strength:** NIFTY BANK shows the highest R-squared (0.764), indicating that over 76% of its return variation is explained by NIFTY 100 movements. NIFTY AUTO follows with 69.4%. In contrast, NIFTY IT and PHARMA have relatively lower R-squared values (~35%), suggesting weaker linear relationships with the benchmark.
- **Sensitivity:** The regression coefficients (Beta) confirm earlier findings-NIFTY BANK (1.2286) and NIFTY AUTO (1.0089) are more sensitive to market movements, whereas FMCG (0.5272) and PHARMA (0.5844) are more defensive sectors.
- **Statistical Significance:** All p-values are 0.000, and F-statistics are large with very small probabilities, confirming the strong statistical significance of the models.
- **Autocorrelation:** Durbin-Watson statistics range between 1.89–2.12 for all sectors, suggesting no significant autocorrelation in residuals.

### 5.4 ANOVA Test Analysis (Sector Indices vs. NIFTY 100)

#### ANOVA Test Results:

- F-statistic = 0.092

- p-value = 0.985

- The F-statistic (0.092) and p-value (0.985) indicate no statistically significant difference in the mean returns of sector indices compared to the NIFTY 100 over the period 2005–2024.
- Since the p-value is much higher than conventional significance thresholds (0.05 or 0.01), we fail to reject the null hypothesis, confirming that the sector indices and NIFTY 100 deliver similar average returns.
- While ANOVA suggests homogeneity in mean performance, it does not capture volatility or risk, which are better explained through regression metrics (e.g., Beta).
- Investors may not benefit significantly from sector-based diversification based solely on return differences, but risk profiles (e.g., sector Beta, Sharpe Ratio) still justify selective allocation.
- ANOVA supports the idea that sector indices mirror the market's average return, but risk-adjusted performance and sensitivity to market movements differ, making sectoral analysis still vital for informed portfolio construction.

## 5.5 NIFTY 100 Forecast for the Next 12 Months

Forecast of NIFTY 100 Index Values (April 2024 - March 2026) (ARIMA Model)

Month	Forecasted NIFTY 100 Value
April 2025	22,752.35
May 2025	22,683.01
June 2025	22,626.78
July 2025	22,581.17
August 2025	22,544.19
September 2025	22,514.19
October 2025	22,489.86
November 2025	22,470.13
December 2025	22,454.13
January 2026	22,441.16
February 2026	22,430.63
March 2026	22,422.10

### Interpretation

The ARIMA model forecasts a gradual decline in NIFTY 100 values from April 2025 to March 2026, indicating a possible cooling-off phase in market momentum. The trend suggests market consolidation rather than sharp correction, possibly due to macroeconomic normalization. Investors may adopt cautious or defensive strategies in response to this stagnation, favoring low-volatility sectors like FMCG or Pharma.

- Individual Stocks From Each Sector VS NIFTY 100

## 5.6 Descriptive Statistics & Risk-Return Analysis

Sector	Stock	Mean Return	Std Dev	CAGR	Beta	Sharpe Ratio	VaR (95%)
IT	TCS	0.0167	0.0753	18.36%	0.597	1.640	-10.76%
	INFY	0.0151	0.0790	15.58%	0.554	1.212	-11.53%
	HCLTECH	0.0211	0.0906	22.81%	0.743	1.855	-12.84%

	TECHM	0.0191	0.1207	15.09%	1.014	0.753	-18.01%
	WIPRO	0.0125	0.0843	11.60%	0.706	0.664	-12.66%
AUTO	MARUTI	0.0184	0.0946	18.42%	0.994	1.313	-13.76%
	M&M	0.0209	0.0959	21.68%	1.089	1.636	-13.73%
	EICHERMOT	0.0286	0.1057	32.12%	0.923	2.470	-14.58%
	ASHOKLEY	0.0216	0.1254	18.30%	1.285	0.981	-18.53%
	TATAMOTORS	0.0182	0.1391	11.05%	1.600	0.363	-21.14%
BANK	HDFCBANK	0.0175	0.0739	19.47%	0.988	1.822	-10.45%
	ICICIBANK	0.0188	0.1060	17.44%	1.476	1.079	-15.62%
	AXISBANK	0.0198	0.1085	18.21%	1.397	1.126	-15.92%
	KOTAKBANK	0.0231	0.1067	23.69%	1.308	1.658	-15.30%
	SBIN	0.0170	0.1084	14.67%	1.302	0.799	-16.19%
FMCG	HINDUNILVR	0.0149	0.0700	16.32%	0.303	1.474	-10.06%
	ITC	0.0151	0.0677	16.75%	0.489	1.589	-9.66%
	BRITANNIA	0.0203	0.0741	23.73%	0.488	2.393	-10.19%
	DABUR	0.0171	0.0648	19.83%	0.433	2.133	-8.99%
	NESTLEIND	0.0088	0.0598	8.41%	0.311	0.404	-8.98%
PHARMA	SUNPHARMA	0.0186	0.0788	20.57%	0.547	1.849	-11.14%
	DRREDDY	0.0163	0.0811	17.10%	0.471	1.369	-11.75%
	DIVISLAB	0.0249	0.1010	27.03%	0.623	2.083	-14.16%
	AUROPHARMA	0.0253	0.1401	20.78%	1.437	1.055	-20.58%
	CIPLA	0.0139	0.0765	14.34%	0.387	1.089	-11.24%

### Interpretation

- Top Performers: EICHERMOT (Auto), DIVISLAB (Pharma), and BRITANNIA (FMCG) show outstanding CAGR with excellent Sharpe Ratios, suggesting high returns with good risk-adjusted performance.
- Defensive Picks: FMCG stocks like ITC and DABUR offer low beta and VaR, ideal for conservative investors.
- High Risk–High Reward: TATAMOTORS and AUROPHARMA have very high beta and VaR, indicating high volatility, appealing to aggressive investors.

- **Balanced Stocks:** HDFCBANK, HCLTECH, and SUNPHARMA show a healthy balance of return, Sharpe ratio, and controlled risk, making them suitable for core portfolio holdings.
- **Underperformers:** Stocks like WIPRO and NESTLEIND exhibit lower CAGR and Sharpe ratios, suggesting relatively modest growth potential.

### 5.7 Correlation

Table of Average Correlations

Sector	Avg Intra-Sector Correlation	Diversification Potential
IT	~0.60	Moderate
Auto	~0.50	Moderate
Banking	~0.70+	Low
FMCG	~0.33	High
Pharma	~0.42	High

### Interpretation

From the table, it is evident that FMCG and Pharma sectors offer greater intra-sector diversification, whereas the Banking sector exhibits high internal correlation, suggesting lower risk-spreading benefits when investing within that sector.

### 5.8 Regression Results Table (25 Stocks vs. NIFTY 100)

Sector	Stock	R <sup>2</sup> (Market Dependency)	Beta (Sensitivity)	p-value (Significance)	F-Statistic (Model Strength)
IT	TCS	0.226	0.5945	2.73e-13 (Significant)	61.00
	INFY	0.169	0.5515	4.94e-10 (Significant)	42.63
	WIPRO	0.242	0.7025	2.94e-14 (Significant)	66.73
	HCLTECH	0.236	0.7393	7.21e-14 (Significant)	64.40



	TECHM	0.299	1.0092	7.90e-18 (Significant)	89.01
Auto	MARUTI	0.385	0.9891	7.51e-24 (Significant)	130.9
	TATAMOTORS	0.436	1.5925	8.18e-28 (Significant)	161.7
	M&M	0.451	1.0842	4.75e-29 (Significant)	171.9
	EICHERMOT	0.287	0.9185	4.29e-17 (Significant)	84.27
	ASHOKLEY	0.362	1.2787	3.45e-22 (Significant)	118.8
Banking	HDFCBANK	0.639	0.9830	3.71e-48 (Significant)	370.3
	ICICIBANK	0.677	1.4687	3.00e-53 (Significant)	438.9
	SBIN	0.508	1.2959	5.34e-34 (Significant)	215.5
	AXISBANK	0.573	1.3900	1.54e-40 (Significant)	281.0
	KOTAKBANK	0.547	1.3019	7.88e-38 (Significant)	252.7
FMCG	HINDUNILVR	0.078	0.3017	4.07e-05 (Significant)	17.58
	ITC	0.203	0.4870	5.86e-12 (Significant)	53.32
	NESTLEIND	0.085	0.3100	1.76e-05 (Significant)	19.32
	BRITANNIA	0.162	0.4862	1.28e-09 (Significant)	40.40
	DABUR	0.177	0.4307	1.90e-10 (Significant)	44.89

Pharma	SUNPHARMA	0.167	0.5470	6.59e-10 (Significant)	41.95
	DRREDDY	0.119	0.4684	2.92e-07 (Significant)	28.10
	CIPLA	0.096	0.3853	4.77e-06 (Significant)	22.07
	DIVISLAB	0.156	0.6197	2.60e-09 (Significant)	38.75
	AUROPHARMA	0.362	1.4299	3.81e-22 (Significant)	118.4

### Interpretation

- **R<sup>2</sup> (Market Dependency):** Indicates the proportion of stock return variation explained by NIFTY 100. Banking stocks show the highest R<sup>2</sup> values, reflecting a strong dependence on the broader market, whereas FMCG and Pharma stocks have lower R<sup>2</sup>, suggesting more independence and potential for diversification.
- **Beta (Market Sensitivity):** Most stocks show statistically significant beta values.
  - IT and FMCG sectors mostly have betas < 1, implying lower volatility than the market.
  - Auto, Banking, and AUROPHARMA have betas > 1, suggesting higher sensitivity to market movements (more aggressive behavior).
- **p-values:** All are well below 0.05, confirming that the relationships are statistically significant.
- **F-statistic (Model Strength):** Higher F-values, especially in Banking and Auto, reinforce that the models used are strong predictors of stock movement with respect to NIFTY 100.

### 5.9 ANOVA Test Results – Intra-Sector Stock Return Comparison

Sector	F-Statistic (Stock vs. Sector)	p-value (Significance Level)	Interpretation
IT	0.325	0.8613	No significant difference between IT stocks and the sector index.
Auto	0.335	0.8545	Auto stocks' returns are similar to their sectoral performance.

Banking	0.137	0.9688	Banking stocks show no significant deviation from the sector trend.
FMCG	0.954	0.4320	FMCG stocks have some variations, but overall, they align with the sector.
Pharma	0.657	0.6221	Pharma stocks follow sectoral trends with no statistically significant differences.

### Interpretation

The ANOVA (Analysis of Variance) test compares the returns of individual stocks within a sector to the overall sector index to determine if there are statistically significant differences.

- All p-values are well above 0.05, indicating that none of the sectors show statistically significant variance between individual stock returns and the sectoral index.
- This suggests a high degree of internal consistency within each sector—stocks tend to move in alignment with their respective sector indices.
- The Banking sector, with the highest p-value (0.9688) and lowest F-statistic, exhibits the strongest coherence between individual stock returns and sector performance.
- Although FMCG has the highest F-statistic (0.954), the p-value (0.4320) still suggests that the variations are not significant enough to conclude substantial divergence.

### Forecasted Stock Prices (March 2026)

Sector	Stock	Forecasted Price (₹)
IT	TCS	₹3,521.86
	Infosys	₹1,584.35
	Wipro	₹263.98
	HCL Tech	₹1,530.97
	Tech Mahindra	₹1,486.30
Auto	Maruti Suzuki	₹11,562.20
	Tata Motors	₹664.56
	M&M	₹2,650.97
	Eicher Motors	₹5,047.77
	Ashok Leyland	₹194.93

Banking	HDFC Bank	₹1,710.10
	ICICI Bank	₹1,355.02
	SBI	₹727.17
	Axis Bank	₹1,011.29
	Kotak Bank	₹2,049.48
FMCG	HUL	₹2,243.46
	ITC	₹413.53
	Nestle	₹2,193.50
	Britannia	₹4,906.42
	Dabur	₹509.11
Pharma	Sun Pharma	₹1,685.47
	Dr. Reddy's	₹1,115.98
	Cipla	₹1,469.76
	Divi's Labs	₹5,641.25
	Aurobindo Pharma	₹1,061.32

### Interpretation

- Auto and Pharma sectors exhibit particularly strong forecasted growth, especially with Maruti Suzuki (₹11,562.20) and Divi's Labs (₹5,641.25), suggesting potential bullish performance or demand.
- Banking stocks remain relatively stable with steady growth expected across major players like HDFC Bank and ICICI Bank.
- IT sector projections indicate consistent growth, with TCS and Infosys continuing to lead.
- FMCG sector shows moderate gains with no extreme volatility—implying a defensive sector outlook, suitable for risk-averse investors.

### 6. Conclusion

This study provides a comprehensive sector-based analysis of the Indian stock market spanning two decades (2005–2024), focusing on five major sectors—Information Technology, FMCG, Banking, Automobiles, and Pharmaceuticals—in comparison to the NIFTY 100 index. By examining the top five companies in each sector, the research offers deep insights into the risk-return dynamics and diversification opportunities across sectors.

The findings highlight that different sectors exhibit distinct performance characteristics. Defensive sectors such as FMCG and Pharmaceuticals demonstrated lower volatility and consistent returns, making them ideal for conservative, risk-averse investors. On the other hand, cyclical sectors like Banking and Automobiles offered higher growth potential but were accompanied by greater risk, appealing to aggressive investors seeking capital appreciation. The IT sector exhibited a moderate risk-return profile and showed close alignment with overall market trends.

The statistical analysis using measures such as beta, Sharpe ratio, CAGR, standard deviation, and Value at Risk (VaR) validated the varying risk appetites and performance patterns of each sector. Regression analysis and ANOVA confirmed the presence of significant differences between sectors, justifying the importance of sector-based diversification. Furthermore, ARIMA-based time series forecasting provided valuable projections for future sectoral performance, aiding informed investment decisions.

Overall, the study concludes that sectoral diversification plays a crucial role in portfolio optimization, as it enables investors to balance risk and return more effectively. By strategically allocating investments across sectors with varying risk profiles, investors can better withstand market volatility and enhance long-term returns. The research emphasizes that a well-diversified portfolio-built on a thorough understanding of sector-specific trends-can outperform market benchmarks and contribute to more resilient wealth creation.

## 7. References

1. Markowitz, H. (1952). "Portfolio Selection." *Journal of Finance*, 7(1), 77-91.
2. Fama, E. F., & French, K. R. (1992). "The Cross-Section of Expected Stock Returns." *Journal of Finance*, 47(2), 427-465.
3. Sharpe, W. F. (1966). "Mutual Fund Performance." *Journal of Business*, 39(1), 119-138.
4. Gupta, R., & Wang, S. (2021). "Machine Learning in Stock Market Predictions." *Financial Economics Review*, 19(3), 245-265.
5. Patel, J., Shah, S., Thakkar, P., & Kotecha, K. (2015). "Predicting stock and stock price index movement using trend deterministic data preparation and machine learning techniques." *Expert Systems with Applications*, 42(1), 259-268.