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Exploring Safer Investment Opportunities: A Comparative Analysis of Risk-Adjusted Performance in Defensive and Cyclical Sectors

Muhammad Zahid Iqbal and Dr Muhammad Mahmood Shah Khan[*]

ABSTRACT

Sector rotation theory suggests that the performance of different sectors relative to the overall market varies across economic cycles. To enhance risk-adjusted returns, investors reallocate capital between cyclical and defensive sectors during different phases of the business cycle. The unique behaviour and diversification characteristics of sectoral movements help investors achieve their risk diversification objectives. The objective of this study is to determine which sectoral category offers better risk-adjusted returns. The study was conducted in three stages. First, sectoral equity indices were constructed using a float-adjusted market capitalisation-weighted index methodology. Second, sectors were classified as defensive or cyclical based on the sensitivity of their returns to changes in the market portfolio, using evidence derived from the constructed sectoral indices. Third, risk-adjusted performance measures, including the Sharpe ratio, Sortino ratio, Treynor ratio, M-squared (M2) and Jensen's alpha, were calculated and compared. The study covered the period from 1 January 2009 to 31 December 2023. Twenty sectoral indices were constructed, of which seven were classified as defensive and 13 as cyclical. The findings indicate that defensive sectors outperform cyclical sectors on a risk-adjusted basis. Furthermore, defensive sectors appear less exposed to market volatility, making them relatively safer and more stable investment options. In contrast, cyclical sectors offer the potential for higher returns but are accompanied by greater risk. These results remain consistent across all risk-adjusted measures employed in the study. The findings provide valuable insights for investors, policymakers and regulators seeking to make informed investment decisions.

Keywords: Defensive Sectors, Cyclical Sectors, Risk-Adjusted Performance, Sector Rotation, Sharpe Ratio, Treynor Ratio, Sortino Ratio, Jensen's Alpha

JEL Classification Codes: G11, G12, E32, C43, G18

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1. INTRODUCTION

In the last three decades, major economic events such as the Asian financial crisis (1997), the dot-com bubble (1995–2000), the Global Financial Crisis (GFC) (2008), the European sovereign debt crisis (2010–12) and the Covid-19 pandemic (2020) have severely affected economies around the globe and changed the dynamics of financial markets. Further, the Russia-Ukraine conflict and US-China trade war intensified the economic uncertainty not only for developed but also for emerging economies (Syed and Bouri 2022). Such events significantly influence investor behaviour and portfolio allocation decisions as investors attempt to manage risk and maintain stable returns under changing economic conditions.

In portfolio investment, diversification plays a crucial role in reducing the overall risk of a portfolio. Sectors act differently, are heterogeneous in nature and react distinctly to market changes (Azam et al., 2022). Traditional diversification across asset classes is increasingly complemented by sectoral diversification, where investors allocate funds among different industries depending on their expected performance under varying economic conditions. Equity sectors differ considerably in their sensitivity to economic fluctuations and market movements. Some sectors tend to remain relatively stable during economic downturns, while others are more sensitive to changes in economic activity. This heterogeneity in sectoral behaviour creates opportunities for investors to enhance portfolio performance through informed sector allocation strategies.

Financial literature commonly distinguishes between defensive sectors and cyclical sectors based on their responsiveness to economic cycles. Defensive sectors are characterised by stable performance and lower sensitivity to changes in the market. They therefore attract investors seeking to avoid volatility. These sectors are related to businesses that provide essential goods and services, with low beta and inelastic demand across economic cycles (Novy-Marx 2014), and are considered relatively safe during crisis periods. In contrast, cyclical sectors are more closely tied to economic expansion and contraction. Their performance tends to rise during periods of economic growth but decline during economic slowdowns, resulting in higher return volatility and stronger market sensitivity.

Despite the growing interest in sector-based investment strategies, empirical evidence regarding the comparative risk-adjusted performance of defensive and cyclical sectors remains limited, particularly in emerging markets. Most prior studies have focused on developed markets, while relatively few studies examine sector-level investment strategies within emerging economies where macroeconomic volatility, policy uncertainty, and structural economic challenges may significantly influence sectoral performance. Pakistan provides an interesting context for such analysis due to its evolving financial markets, expanding investor participation, and periodic economic fluctuations.

The present study aims to examine whether defensive or cyclical sectors offer superior risk-adjusted returns in the context of the Pakistan Stock Exchange (PSX). To achieve this objective, sectoral equity indices were first constructed using a float-adjusted market

capitalisation-weighted methodology. Subsequently, sectors were categorised as defensive or cyclical based on their estimated beta values derived from the market model, where sectors with beta values below unity are classified as defensive while those with beta values above unity are considered cyclical. Finally, the performance of these sector categories was evaluated using multiple risk-adjusted performance measures including the Sharpe ratio, Treynor ratio, Sortino ratio, Jensen's alpha and M-squared. By comparing the risk-adjusted performance of defensive and cyclical sectors over the period from 2009 to 2023, this study provides empirical evidence that can assist investors, portfolio managers, and policymakers in understanding sectoral investment dynamics within an emerging market environment.

This study contributes to the literature on sectoral investment strategies in several ways. First, it constructs sectoral equity indices for the PSX using a float-adjusted market capitalisation weighting methodology, providing a more precise representation of sector performance in an emerging market context. Second, sectors are systematically classified as defensive or cyclical based on estimated beta values obtained from the market model (see Table 2), allowing an objective identification of sector sensitivity to market movements. Third, the study evaluates sector performance using multiple risk-adjusted performance measures, including the Sharpe ratio, Sortino ratio, Treynor ratio, M-squared and Jensen's alpha. The empirical results indicate that defensive sectors consistently outperform cyclical sectors in risk-adjusted terms, as reflected in higher average Sharpe and Sortino ratios and a positive Jensen's alpha for defensive sectors (Table 5). These findings provide useful insights for investors and portfolio managers regarding sector allocation strategies in emerging equity markets.

2. LITERATURE REVIEW

This section briefly covers the related prior literature on the subject. Risk and return characteristics of an asset, sector, security or market are considered important factors by investors in making informed investment decisions. Specifically, investing in equities is associated with a high degree of uncertainty, which creates risk that investors must bear in order to earn returns. Markowitz (1952) presented the idea of portfolio selection through Modern Portfolio Theory (MPT), which takes into account the investor's beliefs about the future performance of securities when selecting a portfolio. Investors are risk averse and make rational investment decisions by choosing securities with higher returns at a given level of risk or securities with lower risk at a given level of returns. Thus, the selection of an investor's optimal portfolio relies primarily on risk and return characteristics of assets. Understanding the relationship between returns and risk is crucial, as analysing risk and return helps investors make smarter, more informed decisions. In the world of investment, risk and return are closely connected. Generally, investments with lower risk carry lower returns and vice versa (Asthana and Ahmed 2023).

Coudert and Gex (2008) asserted that a period of risk aversion coincides with the financial crises, which reflect the flight of capital to relatively safer asset classes. In order to avoid

downside risk, investors focus on asset fundamentals especially at the time of economic slowdown (Nofsinger and Varma 2014; Lins et al., 2017). Investment strategies focused on defensive or environmental, social and governance (ESG)-oriented assets tend to outperform the broader market during crises such as COVID-19, owing to their relatively safer and more resilient nature. In crises, investors even shift their attention to corporate fundamentals, causing capital reallocation from defensive to ESG stocks (Singh 2020). Gupta (2020) studied the stability of beta (a systematic risk measure) of 11 sectors in the Indian stock market, using upside and downside betas of sectors. The study found an asymmetry, with a significant difference between the upside and downside betas of sectors. Ole-Meiludie et al. (2014) provided evidence related to the non-cyclical nature of defensive sectors during market turmoil. They recommended switching investment to defensive sectors during periods of economic uncertainty. Sectoral sensitivity to market risk may also vary with macroeconomic conditions, as inflation shocks can significantly influence beta dynamics across industries (Valadkhani 2025).

Prior literature stresses that the defensive or cyclical characteristics of an investment cannot be ignored in portfolio management. Novy-Marx (2014) studied defensive and cyclical stocks from the perspective of volatility and noted the prominence of defensive equity strategies which underweight high-beta (cyclical) and overweight low-beta (defensive) stocks. The strategy relies on the empirical findings of Blitz and van Vliet (2007), who studied US, Japanese and European markets, and concluded that stocks with lower volatility attain higher risk-adjusted returns. They suggested that in the strategic asset allocation process low-risk stocks should be included in the portfolio as a separate asset class. Baker and Haugen (2012) presented evidence from 33 international markets between 1990 and 2011 showing that low-volatility stocks consistently outperform high-risk stocks, both in returns and risk-adjusted performance. Frazzini and Pedersen (2014) presented interesting findings by introducing an investment model based on beta in which shorting higher-beta stocks to lever up lower-beta stocks produces significant positive risk-adjusted returns.

Goetzmann et al. (2024) show that stocks more sensitive to business cycle expectations (procyclical stocks) earn higher returns due to greater macroeconomic risk exposure. This evidence reinforces the importance of sectoral behaviour, supporting the present study's comparison of defensive and cyclical sectors in explaining risk-adjusted performance differences. Recent empirical evidence also suggests that systematic sector rotation strategies can generate superior risk-adjusted returns relative to passive investment strategies (Salotra and Pinsky 2026).

3. METHODOLOGY

3.1. Data

This study covers the period from 1 January 2009 to 31 December 2023; the period was selected on the basis of data availability. The data consist of daily stock prices, free-float

(FF) numbers of shares and corporate announcements (related to cash dividends, bonus issues, rights issues, mergers and acquisitions, listing, delisting, etc.) and were collected from the PSX. Data for three-month T-bill rates were obtained from the website of the State Bank of Pakistan (SBP). Data on the consumer price index (CPI) were extracted from the website of the Pakistan Bureau of Statistics (PBS).

3.2. Index Formation

Following the index mathematics methodology of S&P Dow Jones Indices (S&P DJI, n.d.), the sectoral equity indices were formed using a float-adjusted, market-capitalisation-weighted index methodology. The index divisor was set at the inception of the index with reference to a base value of 1,000 points. In order to avoid fluctuations in index value, the divisor was adjusted for any events that change the market capitalisation of companies or stocks in the index, so that the index is a continuous measure. In short, the divisor requires adjustment for the following events:

a) Security adding to or deleting from the index

b) Merger or acquisition of security or by security in the index

c) Corporate announcements/actions that change the value of the stock in the index

d) Non-market events

The following eligibility screening criteria were employed to identify and exclude stocks that lack liquidity and investability by not meeting the requirements given below:

a) Minimum 5% free-float number of shares of the total number of shares outstanding
b) Companies having TVR equal to 10% or higher
c) Must trade for at least 70% of the total trading days available in a review period
d) Fewer than 20 days of continuous non-trading since last review date

The stocks were reviewed on a quarterly basis for their eligibility and stocks that failed any of the above criteria were not eligible to be part of the index.

After the criteria were met, equity indices for 20 sectors were formed. There were 3,716 daily observations for each sector. Sector classification broadly follows the industrial categorisation framework adopted by the PSX.

Table 1: List of Sector Indices

Code	Sector Name	Code	Sector Name	Code	Sector Name
801	Automobile Assembler	809	Fertilizer	823	Pharmaceuticals
802	Automobile Parts & Accessories	810	Food & Personal Care Products	824	Power Generation & Distribution
803	Cable & Electrical Goods	812	Insurance	825	Refinery
804	Cement	813	Inv. Banks / Inv. Cos. / Securities Cos.	827	Synthetic & Rayon
805	Chemical	820	Oil & Gas Exploration Companies	828	Technology & Communication
807	Commercial Banks	821	Oil & Gas Marketing Companies	829	Textile Composite
808	Engineering	822	Paper & Board		

Source: Authors' own.

Stock returns are an established measure used by the majority of scholars in economics and finance. The returns of each sector index were measured as the change in consecutive log closing prices (Azam et al., 2022).

$$R_{i,t} = ln(P_{i,t}/P_{i,t-1}) * 100 \quad (1)$$

where $R_{i,t}$ represents a return of sector *i* at day *t*, and $P_{i,t}$ shows closing index value of sector *i* at day *t.*

To check the stationarity of the return series of all sectors, the Augmented Dickey-Fuller (ADF) test (Dickey and Fuller 1981) was employed, which suggests that all series are stationary at level.

Risk-Adjusted Return Measures

Considering the defensive and cyclical categories, this study applies five measures in order to compare them. These are the Sharpe ratio, Treynor ratio, Sortino ratio, M-squared (M^2) and Jensen's alpha.

The Sharpe ratio, developed by Sharpe (1966), was measured as the ratio of the sector's risk premium to its total risk.

$$Sharpe\ Ratio_i = \frac{E[R_i - R_f]}{\sigma_i} \quad (2)$$

Where R_i represents the return of sector *i,* R_f denotes the risk-free rate proxied by the three-month Treasury bill rate and σ_i represents the standard deviation of sector *i* returns which shows the total volatility of the sector.

Sortino and van der Meer (1991) presented the Sortino ratio, which was measured as the ratio of the sector's risk premium to downside risk.

$$Sortino\ Ratio_i = \frac{E[R_i - R_f]}{\sigma_D} \tag{3}$$

Where R_i represents the return of sector *i,* R_f denotes the risk-free rate and σ_D represents downside variations of sector *i* capturing the volatility associated with negative returns.

Treynor (1965) developed the Treynor ratio, which was calculated using the systematic risk of the sectors instead of total risk.

$$Treynor\ Ratio_i = \frac{E[R_i - R_f]}{\beta_i} \tag{4}$$

Where R_i represents the return of sector *i,* R_f denotes the risk-free rate and β_i represents the systematic risk (beta) of sector i, measuring the sensitivity of sector returns to movements in the market portfolio.

The M² measure developed by Modigliani and Modigliani (1997) transforms the Sharpe ratio into absolute return units by scaling portfolio risk to match the market portfolio, thereby enhancing interpretability.

$$M^2 = (R_i - R_f)\frac{\sigma_m}{\sigma_i} - (R_m - R_f) \tag{5}$$

Jensen (1968) established a measure, namely Jensen's alpha, which was used to measure sector performance relative to the market. It is taken as the difference between actual sector returns and calculated risk-adjusted returns.

$$\alpha_i = R_i - [R_f + \beta_i(R_m^{real} - R_f)] \tag{6}$$

Where α_i represents Jensen's alpha of sector *i*. R_i shows the realised return of sector *i,* R_f denotes the risk-free rate, β_i represents the systematic risk of sector *i* and R_m^{real} denotes the real return of the market portfolio proxied by the Karachi Stock Exchange 100 (KSE-100) index. In order to avoid bias arising from inflationary effects, the market return was converted into real terms using CPI-based adjustment, while portfolio returns were retained in nominal form. This ensures that Jensen's alpha reflects abnormal performance relative to an inflation-adjusted benchmark.

3.3. Categorisation of Sectors

The standard practice to measure beta is by regressing stock returns on the returns of the market portfolio. Varied return frequencies (such as daily, weekly, and monthly) along with

the varying length of the period (in general ranging from 5 to 30 years) may bring differences in estimated beta values. This may challenge the usefulness of beta, so, to validate the results, the sectoral defensive and cyclical categories are compared with the Morgan Stanley Capital International (MSCI) defensive and cyclical indices (MSCI 2022). The MSCI defensive sector category includes Energy, Healthcare, Utilities and Consumer Staples, and the MSCI cyclical category includes Financials, Communication Services, Consumer Discretionary, Information Technology, Industrials, Materials and Real Estate.

In order to categorise sectors as either defensive or cyclical, the following criterion was applied (Jensen et al., 1972; Asinas 2018):

$$\text{Defensive if } \beta_i < 1$$

$$\text{Cyclical if } \beta_i > 1$$

Following Ahmad et al. (2023), the value ofβ_i was obtained using the market model by regressing daily excess returns of each sector on daily market (KSE-100) returns.

$$r_{i,t} = \alpha_i + \beta_i r_{m,\tau} + \epsilon_{i,\tau} \quad (7)$$

The excess return framework incorporates the risk-free rate proxied by the three-month Treasury bill rate obtained from the SBP. This adjustment ensures that sector and market returns are measured relative to the prevailing risk-free return, thereby accounting for the effects of inflation and interest rate conditions in the estimation of Capital Asset Pricing Model (CAPM)-based measures.

Table 2: Sector Classifications

Code	Sector Name	β_i	p	SE	R-sq	Classification
801	Auto Assembler	0.787	0.000	0.016	0.350	Defensive
802	Auto Parts	0.932	0.000	0.020	0.324	Defensive
803	Cable & Elec	1.102	0.000	0.028	0.268	Cyclical
804	Cement	1.316	0.000	0.016	0.610	Cyclical
805	Chemical	1.072	0.000	0.016	0.494	Cyclical
807	Comm. Bank	1.129	0.000	0.011	0.700	Cyclical
808	Engineering	1.090	0.000	0.022	0.362	Cyclical
809	Fertilizer	0.925	0.000	0.011	0.614	Defensive
810	Food & PC	0.967	0.000	0.027	0.229	Defensive
812	Insurance	1.119	0.000	0.022	0.367	Cyclical
813	Inv. Banks/ Sec.	1.275	0.000	0.023	0.402	Cyclical
820	O&G Exploration	1.112	0.000	0.012	0.652	Cyclical
821	O&G Marketing	1.174	0.000	0.013	0.658	Cyclical
822	Paper	0.967	0.000	0.022	0.315	Defensive
823	Pharma	0.900	0.000	0.020	0.310	Defensive
824	Power Gen & Dist	0.838	0.000	0.015	0.421	Defensive
825	Refinery	1.291	0.000	0.023	0.416	Cyclical
827	Synth & RYN	1.298	0.000	0.038	0.207	Cyclical
828	Tech & Com.	1.288	0.000	0.019	0.510	Cyclical
829	Textile Comp	1.280	0.000	0.018	0.545	Cyclical

Source: Authors' own

Table 2 summarises each sector's beta, significance value, standard error and category. The category of each sector is determined by the value β_i which shows that seven sectors are defensive whereas 13 are cyclical. The defensive sectors are less volatile than cyclical sectors, with lower systematic risk, as their values of β are less than 1. The p-values of β_i of all sectors are below 0.05, which shows that the coefficient estimates are significant and reliable. SE, the standard error, measures uncertainty around the coefficient estimates, here the lower value of SE reflects higher precision of all sectors' estimates. A higher R-squared value (0.700) shows that the commercial banks sector depends more on the market, whereas the lowest value (0.207) shows that the Synthetic & Rayon sector depends mostly on idiosyncratic factors.

3.4. Descriptive Statistics

Table 3a: Descriptive Statistics (Defensive)

Defensive	*d801*	*d802*	*d809*	*d810*	*d822*	*d823*	*d824*
Mean	0.101	0.100	0.086	0.078	0.068	0.091	0.091
Std Err	0.024	0.030	0.021	0.034	0.032	0.031	0.024
SD	1.478	1.821	1.307	2.049	1.930	1.876	1.434
Kurtosis	2.402	1.082	2.895	0.901	7.171	2.183	3.492
Skewness	0.065	-0.026	-0.010	-0.154	-0.182	0.103	0.161
Minimum	-7.981	-8.004	-7.739	-9.108	-22.314	-10.842	-8.231
Maximum	8.906	7.232	7.303	8.004	17.185	9.932	7.208
Count	3716	3716	3716	3716	3716	3716	3716

Table 3b: Descriptive Statistics (Cyclical)

Cyclic-al	*c803*	*c804*	*c805*	*c807*	*c808*	*c812*	*c813*	*c820*	*c821*	*c825*	*c827*	*c828*	*c829*
Mean	0.037	0.078	0.076	0.066	0.049	0.026	-0.004	0.064	0.049	0.042	0.042	0.063	0.065
Std Err	0.043	0.031	0.028	0.024	0.034	0.034	0.037	0.025	0.028	0.039	0.057	0.035	0.032
SD	2.567	1.911	1.724	1.466	2.091	2.095	2.279	1.495	1.679	2.381	3.452	2.132	1.948
Kurtos-is	3.953	1.542	3.530	2.760	1.969	3.026	1.421	2.611	1.757	1.291	1.953	1.152	1.114
Skew-ness	0.496	0.106	0.049	0.005	-0.023	0.013	-0.162	0.127	-0.06	0.129	0.286	-0.066	-0.10
Mini-mum	-11.75	-8.28	-10.14	-7.90	-13.09	-12.99	-10.94	-7.87	-8.03	-10.07	-15.57	-11.51	-8.10
Maxi-mum	21.305	9.038	14.108	7.004	10.606	13.027	9.916	7.453	7.270	10.178	14.173	8.196	7.186
Count	3716	3716	3716	3716	3716	3716	3716	3716	3716	3716	3716	3716	3716

Source: Authors' own

Table 3 (a & b) presents a summary of key characteristics of return series for both defensive and cyclical categories of sectors. The table facilitates the evaluation of the distribution, risk and behaviour of returns across sectors. In the summary statistics for defensive sectors,

consistently positive mean returns reflect resilience and stability. The generally lower standard deviations indicate lower volatility in defensive sectors. The skewness value around 0 highlights generally symmetrical returns with no strong bias towards either gains or losses. The minimum and maximum values reveal the extreme data points in each series; compared with cyclical sectors, defensive sectors generally have smaller swings. Summary statistics of cyclical sectors offer valuable insights. Mean returns are generally lower than those of defensive sectors. Standard deviations are generally higher, which points to higher volatility in cyclical sectors. The wider range indicates the potential to generate relatively higher gains or losses.

3.5. Validation of Empirical Results

To ensure the reliability of the empirical findings, several steps were taken to validate the results. First, sector classifications into defensive and cyclical categories were derived using beta coefficients estimated through the market model (see Equation 7 and Table 2). The statistical significance of the estimated coefficients confirms the robustness of the classification. Second, sector performance was evaluated using multiple risk-adjusted performance measures, including the Sharpe ratio, Sortino ratio, Treynor ratio and Jensen's alpha. Since these measures capture different dimensions of risk, such as total volatility, downside risk and systematic risk, the consistency of results across all indicators strengthens the reliability of the findings. Finally, the resulting sector classifications were compared with commonly used defensive and cyclical classifications reported in prior literature and index methodologies, which further supports the validity of the empirical approach adopted in this study.

4. RESULTS

Table 4: Sector-wise Risk-Adjusted Performance

Sector	Sharpe	Sortino	Treynor	M-Squared	Jensen's alpha
d801	0.0487	0.0723	0.0914	0.0258	0.0647
d802	0.0387	0.0567	0.0756	0.0189	0.0618
d809	0.0432	0.0637	0.0610	0.0170	0.0479
d810	0.0240	0.0340	0.0508	0.0049	0.0402
d822	0.0200	0.0290	0.0399	-0.0004	0.0297
d823	0.0328	0.0489	0.0665	0.0122	0.0515
d824	0.0430	0.0644	0.0735	0.0189	0.0539
c803	0.0032	0.0047	0.0061	-0.0153	-0.0034
c804	0.0252	0.0373	0.0367	0.0052	0.0361
c805	0.0274	0.0395	0.0440	0.0057	0.0373
c807	0.0249	0.0363	0.0323	-0.0003	0.0260
c808	0.0094	0.0135	0.0180	-0.0106	0.0096
c812	-0.0017	-0.0024	-0.0031	-0.0227	-0.0138
c813	-0.0148	-0.0204	-0.0265	-0.0357	-0.0455
c820	0.0230	0.0340	0.0309	-0.0019	0.0241
c821	0.0117	0.0168	0.0168	-0.0118	0.0088
c825	0.0053	0.0077	0.0097	-0.0133	0.0006
c827	0.0036	0.0053	0.0095	-0.0110	0.0004
c828	0.0160	0.0229	0.0265	-0.0031	0.0223
c829	0.0184	0.0262	0.0280	-0.0020	0.0240

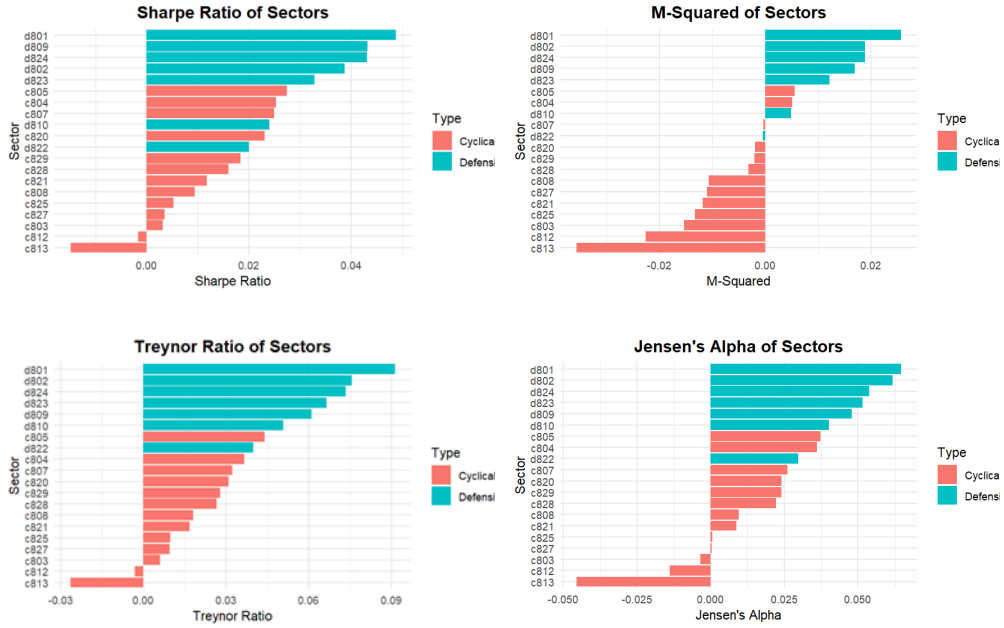
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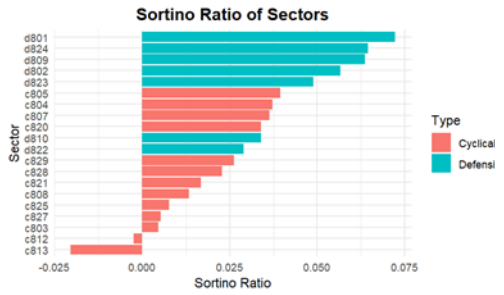
Table 4 presents sector-level performance evaluated through Sharpe, Sortino and Treynor ratios, Jensen's alpha and the M-squared (M^2) measure. Each indicator captures a distinct aspect of risk-adjusted returns: Sharpe reflects total risk, Sortino isolates downside risk, Treynor accounts for systematic risk, while Jensen's alpha measures excess returns relative to the CAPM benchmark. The M^2 measure complements these by translating risk-adjusted performance into return-equivalent terms. The sector codes with the prefix 'd' represent defensive sectors, whereas those with the prefix 'c' represent cyclical sectors.

The results reinforce the superior performance of defensive sectors across all measures, including M^2 and Jensen's alpha. For instance, the Automobile Assembler sector (d801) not only records the highest Sharpe, Sortino, and Treynor ratios but also exhibits a strong positive M^2 value, indicating that when its risk is scaled to match the market portfolio, it

delivers higher excess returns. More importantly, it records a notably positive Jensen's alpha, indicating that the sector generates returns above those justified by its exposure to market risk. Its positive magnitude suggests that the sector's returns are not solely compensation for risk but reflect genuine outperformance. This strengthens the conclusion that its outperformance is not merely statistical but also economically meaningful. Other defensive sectors, such as Fertilizer (d809), Pharmaceutical (d823) and Power Generation & Distribution (d824), also exhibit relatively strong risk-adjusted performance with consistently positive ratios across the applied measures. Their consistently positive Jensen's alpha values reinforce the presence of excess returns, while relatively higher Sortino ratios indicate effective downside risk management. The M^2 values for these sectors are also positive, confirming that their superior Sharpe ratios translate into economically meaningful gains when expressed in return terms. This can be interpreted as the existence of a consistent pattern in favour of defensive sectors.

Figure 1: Sectoral Rankings Based on Risk-Adjusted Performance Measures





Source: Authors' own.

In contrast, the performance of cyclical sectors appears comparatively weaker. Several cyclical sectors display very low or even negative risk-adjusted performance indicators. For instance, the Insurance sector (c812) and Investment Banks / Securities sector (c813) record negative values for Sharpe ratio, Sortino ratio, Treynor ratio, and M^2, indicating that the returns generated by these sectors are insufficient to compensate investors for the level of risk undertaken. More importantly, their negative Jensen's alpha indicates that returns fall short of CAPM expectations, implying underperformance even after accounting for market risk. This implies that their underperformance is not only relative to risk but also in absolute return terms when standardised for comparison.

Figure 1 presents the comparative ranking of sectors based on five risk-adjusted performance indicators, namely the Sharpe ratio, Sortino ratio, Treynor ratio, Jensen's alpha, and M-squared (M^2). Unlike the numerical presentation in Table 4, the figure highlights the relative positioning and consistency of sectors across different indicators. A noticeable pattern is the clustering of defensive sectors in the upper portion of the rankings across all measures, whereas cyclical sectors are predominantly concentrated in the lower range. This visual separation indicates that defensive sectors deliver more consistent performance irrespective of the risk metric applied. The rankings also show that defensive sectors maintain stability not only in terms of total and downside risk but also in generating returns relative to systematic market exposure.

Another important observation is the wider dispersion among cyclical sectors. While a few cyclical industries achieve moderate positive performance, several others record near-zero or negative values, particularly under Jensen's alpha and M^2 measures. This suggests greater variability and inconsistency in the ability of cyclical sectors to convert risk exposure into sustainable returns.

Table 5: Category-wise Risk-Adjusted Performance

Sector	Sharpe	Sortino	Treynor	M-Squared	Jensen
Defensive	0.0357	0.0527	0.0655	0.0139	0.0499
Cyclical	0.0116	0.0170	0.0176	-0.0090	0.0097

Source: Authors' own.

The aggregated results in Table 5 reinforce the distinction between defensive and cyclical sectors. Defensive sectors exhibit higher average Sharpe (0.0357), Sortino (0.0527), and Treynor ratios, indicating better compensation for total, downside, and systematic risk.

More importantly, the average Jensen's alpha for defensive sectors is positive, demonstrating that, on average, these sectors outperform the returns predicted by their market risk exposure. In contrast, cyclical sectors show a weaker average alpha, suggesting an inability to consistently generate excess returns. The M^2 results are consistent with these findings. Defensive sectors report positive values, indicating that their performance remains superior even when risk is normalised to the market level. Cyclical sectors, on the other hand, display negative M^2 values, reinforcing the conclusion that their higher risk does not translate into proportional returns. Importantly, these M^2 results corroborate, rather than replace, the conclusions drawn from Jensen's alpha.

The empirical results of this study are broadly consistent with prior research emphasising the advantages of low-volatility or defensive investment strategies. Blitz and van Vliet (2007) document that low-risk stocks tend to generate higher risk-adjusted returns compared with high-risk stocks in several developed markets. Similarly, Novy-Marx (2014) highlights the importance of defensive equity strategies that overweight lower-beta assets. The results of the present study extend this evidence to the context of the Pakistan Stock Exchange, suggesting that defensive sector strategies may also be effective within emerging market environments characterised by greater economic uncertainty and market volatility.

Overall, the findings indicate that defensive sectors exhibit relatively stable return behaviour and provide superior risk-adjusted performance compared with cyclical sectors. These results support the notion that sector allocation strategies based on defensive characteristics may enhance portfolio stability, particularly during periods of heightened market uncertainty.

5. CONCLUSION

Based on the above discussion, it can be concluded that defensive sectors perform better than cyclical sectors, attracting risk-averse investors and being ideal for conservative or long-term portfolios. Defensive sectors offer lower but steadier returns with reduced tail risk. Cyclical sectors reflect volatile behaviour with the potential to generate extreme returns and a higher probability of losses. Due to higher volatility and inconsistent risk-

adjusted returns, market timing or hedging is an important consideration. Given the high volatility of cyclical sectors and their ability to generate extreme returns, aggressive investors may find them consistent with their investment strategy. The findings of this study are in line with Blitz and van Vliet (2007), who suggested an association between low-volatility stocks and higher risk-adjusted returns. From the perspective of the investor, the strategy of investing in a specific category of sector would depend on the market conditions. In periods of market turmoil, the optimal investment strategy is to invest in defensive sectors. On the other hand, when the market is booming, investing in cyclical sectors could outperform the market with extreme positive returns.

Future research may explore time-varying sector sensitivity using dynamic beta models or regime-switching approaches to capture changing market conditions. In addition, comparative studies across multiple emerging markets could provide broader evidence on the effectiveness of sector rotation strategies in different economic environments.

6. RECOMMENDATIONS

The findings of this study offer meaningful insights for investors, portfolio managers, and financial regulators operating in emerging equity markets. The empirical evidence indicates that defensive sectors provide comparatively stronger and more stable risk-adjusted performance than cyclical sectors across all evaluation measures. Higher Sharpe and Sortino ratios, together with positive Jensen's alpha values, suggest that defensive sectors are more effective in generating consistent returns while maintaining relatively lower exposure to market risk.

From an investment perspective, these findings suggest that allocating a larger portion of portfolios towards defensive sectors may improve risk-adjusted performance, particularly during periods of heightened market uncertainty. Since defensive sectors demonstrate relatively lower sensitivity to market fluctuations, they may provide investors with a more stable return profile and reduce overall portfolio volatility. For institutional investors such as pension funds, insurance companies, and long-term investment funds, sector allocation strategies that emphasise defensive sectors may contribute to more stable portfolio outcomes. Such strategies may be particularly relevant in emerging markets where macroeconomic volatility and policy uncertainty can significantly influence equity market performance.

From a regulatory and market development perspective, the findings highlight the importance of strengthening sector-based investment products, such as sector-specific exchange-traded funds (ETFs), which may facilitate diversification across industries. Additionally, greater transparency in sectoral performance reporting and risk disclosures may assist investors in making more informed allocation decisions. Overall, a better understanding of sectoral risk-return characteristics can contribute to improved portfolio management practices and more efficient capital allocation within the equity market.

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