

Performance of Closed-Ended Mutual Funds: A Test of Market Efficiency

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Abstract

Background: Mutual funds, known for aggregating funds from a diverse investor base, play a crucial role in managing small funds smartly. This study evaluates the performance of selected closed-ended mutual funds and examines market efficiency in Nepal.

Methods: Using a descriptive and casual-comparative research design, the study spans forty-eight months from January 15, 2018, to January 14, 2022. Monthly data from five mutual funds are analyzed, with metrics such as the Treynor ratio, Sharpe ratio, and Jensen alpha. The study variables include market returns, assets, expense ratios, fund age, liquidity, and mutual fund returns. Various statistical tests, including correlation analysis, Integrated Ranking Analysis, ANOVA test, t-test, and P-value tests, are conducted to determine the significance and statistical relevance of the study variables.

Results: The findings reveal that mutual fund performance is influenced by factors such as return, age, liquidity, asset, and expense ratio. Expense ratio and age emerge as the most impactful factors, demonstrating a statistically significant relationship with market return ($p < 0.05$). All selected mutual funds outperform the market return (NEPSE), with Sanima Equity Fund securing the top rank in all three measures.

Conclusion: The Sharpe ratio, Treynor ratio, and Jensen alpha measures for mutual funds surpass those of the market, indicating market inefficiency in its semi-strong form.

Novelty: This study uniquely evaluates closed-ended mutual funds using comprehensive performance metrics, demonstrating their significant outperformance compared to market benchmarks. It underscores their effectiveness in actively managing passive funds and challenges the efficient market hypothesis.

Keywords: Stock Market, Sharpe Ratio, Treynor Ratio, Jensen Alpha, Market Return

JEL Classification: G10, G12, G23

1. Introduction

In the ever-changing landscape of global finance, investors have increasingly turned their attention to emerging markets over the past two decades, drawn by the promise of higher returns and diversification benefits (Ratner & Leal, 2005). This phenomenon underscores the pivotal role that these markets play in the investment strategies of individuals and institutions worldwide. Among the various financial instruments facilitating this investment trend, mutual funds stand out as crucial players. These investment vehicles, characterized by pooling funds from a diverse group of investors to invest in a range of securities, offer a professionally managed portfolio to individual investors (Chau & Tam, 2020). This study embarks on an exploration of the multifaceted dynamics governing mutual funds, with a specific focus on their performance in the Nepalese context.

Mutual funds, which originated in the late 18th century, have evolved over the years, with the creation of both open and closed-ended funds. The Massachusetts Investment Trust, established in the United States in 1924, marked a pivotal moment in the history of mutual funds, introducing the concept of continuous creation and cancellation of units (Baker et al., 2015). This historical evolution highlights the global significance of mutual funds as investment vehicles that have become integral to investors' portfolios, providing a professionally managed portfolio comprising stocks, bonds, and other assets.

Post-2008 global financial crisis, the equity fund sector experienced substantial growth, reflecting a notable compound annual growth rate of 6.64% until 2018, driven by innovations, digitalization, and online trading (Carneiro et al., 2022; Karki et al., 2021; Bhandari et al., 2021). This surge in assets underscores the growing significance of mutual funds within the global financial markets. Nepal, with its embryonic mutual fund industry, has seen these financial products gradually emerge as significant players in the local market. The roots of this industry can be traced back to the establishment of the "NCM Mutual Fund in 1993" (Thapa & Rana, 2011). In Nepal, where the NEPSE (Nepal Stock Exchange) functions as the primary platform for stock market activities, mutual funds have gained prominence as investment avenues. However, the lack of comprehensive empirical studies evaluating their performance in the local context reveals a significant research gap (Pant, et al., 2022). Driven by the growing importance of mutual funds in Nepal, this research addresses a critical research gap by conducting empirical evaluations of their performance. The backdrop of a dynamic global

financial environment and the unique attributes of Nepalese mutual funds set the stage for a thorough assessment of the performance dynamics of Nepalese mutual funds.

In pursuit of the overarching goal of assessing the performance of Nepalese mutual funds, this research articulates three specific objectives that precisely recognize and address the unique features of the local market. Firstly, to analyze the returns generated by mutual funds and compare them with benchmark/market returns while considering associated risks. Secondly, to scrutinize the overall efficacy of Nepalese mutual funds. Thirdly, to determine the statistical significance of mutual funds' performance, while concurrently assessing market efficiency. These objectives, aligned with the specificities of the Nepalese market, underscore the need for a detailed exploration of mutual fund dynamics in the region. As this study focuses on these research objectives, beyond contributing to mutual fund literature, its significance lies in practical implications in Nepal's emerging mutual funds, providing actionable insights for fund managers. Through comprehensive analysis, it aims to enhance both theoretical understanding and practical considerations for investors and industry professionals.

The research remainder is structured subsequently as: Section 2 mentions a literature review with relevant prior research, offering a contextual background for the investigation. Section 3 provides a detail of the research design, specifically focusing on the empirical approach. Section 4 of the study outlines the results while Section 5 includes discussion and their consequences. Section 6 serves as the conclusion section of the study.

2. Literature Review

The mutual fund industry has experienced remarkable expansion, prompting researchers and academicians to scrutinize its performance over the past few decades. Evaluating the performance of a fund is often synonymous with assessing the competence of the fund manager. Investors and academic researchers actively engaged in anticipating securities prices and measuring the performance of various mutual fund classes, employing diverse risk-return models and asset pricing models since the 1960s (Karki, 2018).

Treynor (1965) pioneered a formal technique, introducing the reward-to-volatility ratio, which is a measure of performance that incorporates both risk and return. Sharpe (1966) later proposed an alternate approach, using the portfolio's ratio of risk premium to standard deviation of its return. Building upon this, Jensen (1968) developed a third measure, Jensen's alpha, assessing risk-adjusted excess return by considering systematic risk. Rooted in the CAPM (Capital Asset Pricing Model), these 3 methods remain to be extensively utilized in the assessment of mutual fund performance. Sharpe's reward-to-variability ratio, Treynor's reward-to-volatility ratio, and Jensen's alpha, all ex-post techniques grounded in historical averages, provide valuable insights, though they reflect past performance rather than expectations for the future.

Sharpe (1966) extended Treynor's work by introducing composite performance measures considering both return and risk. His study, which covered the developed market in the United States from 1944 to 1963, evaluating 34 open-end mutual funds, concluded that the average mutual fund performance significantly lagged behind that of the Dow Jones Industrial

Average (DJIA). [Jensen's \(1968\)](#) Risk-Adjusted Excess Return emphasized the relative returns of a mutual fund, recognizing that mutual funds are not risk-free assets. This measure, derived from the application of CAPM's theoretical results, uses alpha to assess the portfolio's additional return or loss after adjusting for systematic risk. [Elton et al. \(2004\)](#) and [Dahal et al. \(2020\)](#) highlighted the significance of incorporating certain indices and accounting measures in analyzing fund performance, as their exclusion could lead to a substantial overestimation. This research supports the utility of Jensen's measures for studying mutual fund performance. [Jensen \(1968\)](#) applied his model to assess the mutual funds' returns exceeding the market returns, finding that out of 115 mutual funds he tested, none performed up to par.

Similarly, [McDonald \(1974\)](#) used monthly data from 1960 to 1969 to perform a comprehensive analysis of 123 mutual funds. Using four metrics - reward-to-volatility ratio, non-risk-adjusted average return, Jensen's alpha, and reward-to-variability ratio - McDonald discovered that the funds' substantial performance didn't surpass market returns. This body of research collectively emphasizes the ongoing efforts to employ sophisticated measures in assessing mutual fund performance, contributing valuable insights to both investors and the broader academic community.

Many studies have been conducted and demonstrated a comprehensive overview of mutual fund performance, encompassing various geographical locations and methodologies. [Alvi et al. \(2020\)](#) delved into the potential drivers of mutual fund performance in Pakistan, examining factors such as fund risk, KSE-100 returns, lag returns, asset under management, total expense, total income, and fund age. In the context of Pakistan, [Asad and Siddiqui \(2019\)](#) explored factors influencing mutual fund returns, considering both micro and macro factors. Their study encompassed conventional and Islamic funds, revealing that risk-return coefficient, size, and fund age exhibited insignificant effects on the performance of mutual funds.

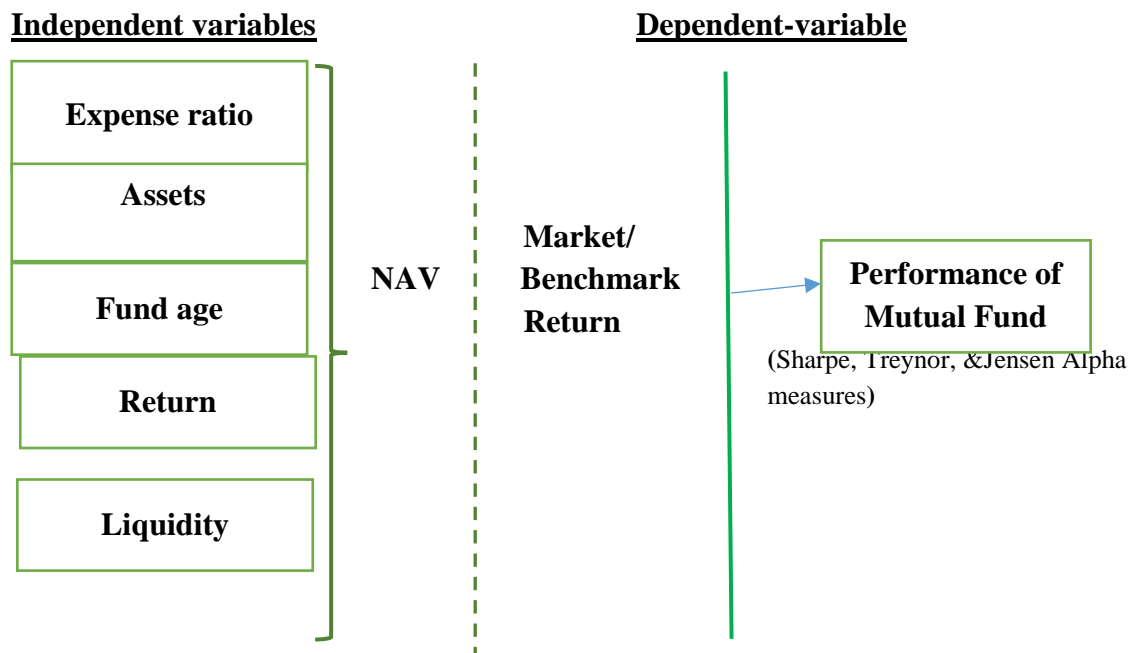
In the Indian context, [Adhikari et al. \(2020\)](#) analyzed equity-oriented mutual fund schemes, employing Sharpe, Treynor, and Jensen measures over ten years. Their findings documented that eight of 10 plans exceeded the market, emphasizing the significance of risk-adjusted returns. Similarly, [Raj et al. \(2018\)](#) conducted a relative study of HDFC and SBI mutual funds in India, using metrics such as Treynor, Sharpe, and Jensen ratios, beta, and standard deviation. The findings highlighted the HDFC mutual funds' superior rate of return compared to SBI, albeit with higher volatility. [Dhanda \(2017\)](#) analyzed the performance of sample mutual funds schemes in India, using NAV data over fourteen years. The study concluded that sector-specific growth schemes outperformed benchmark indices, emphasizing the potential for long-term growth in such funds. Similarly, [Radhika and Kanchana \(2017\)](#) evaluated HDFC mutual funds, concluding that the majority of selected schemes outperformed relevant benchmark portfolios. [Megharaja \(2017\)](#) examined the risk-return profile of equity funds in India, revealing that most schemes exhibited superior performance, attributing it to effective stock selection by portfolio managers.

Arora and Raman (2020) examined the performance of randomly chosen 30 schemes of mutual funds, highlighting variations in returns and risk among different funds. Bajracharya (2016) analyzed Nepalese mutual funds, considering monthly returns and various ratios, concluding that liquidity, lagged returns, and assets significantly influence the performance of funds. Rauniyar (2016) also focused on Nepalese mutual funds, revealing the significant influence of liquidity, assets, and lagged returns on fund performance. A global study was undertaken by Ferreira et al. (2013) to evaluate the performance factors of mutual funds across 19 countries. Their findings indicated that fund size and performance were positively correlated. Nafees et al. (2011) found that the performance of closed-end and open-end mutual funds in Pakistan lagged behind that of the market portfolio. Similarly, the performance evaluation of forty-four open-ended mutual funds in Pakistan found that asset turnover, expense ratio, and size positively impacted fund returns (Rehman & Baloch, 2015). The research gap in the existing literature is identified in terms of the need for a more in-depth analysis of factors determining mutual fund performance, particularly focusing on the skills of fund managers in security selection, an aspect not extensively explored in the Nepalese context.

The limited research on Nepal's mutual fund industry, focused mainly on risk-adjusted performance, highlights a significant gap in understanding the factors influencing fund performance. Against this backdrop, this study aims to analyze performance factors comprehensively and incorporate established risk-adjusted measures. Aligning with the objectives, this study develops a theoretical framework as shown in Figure 1.

Theoretical Framework

Figure 1: Theoretical Framework



The theoretical framework for this research incorporates key factors such as assets, expense ratio, liquidity, NAV, fund age, and return to determine mutual fund performance.

This framework provides specific research hypotheses that guide the empirical investigation of mutual fund performance in Nepal. The following are the hypotheses:

H01: *'There is no significant relationship between fund attributes (assets, expense ratio, age, liquidity, return) and mutual fund performance'.*

H02: *'There is no significant relationship between net asset value return and mutual fund performance'.*

H03: *'Mutual fund performance exceeds benchmark returns'.*

H04: *'Nepalese stock market is efficient in its weak form'.*

The formulated hypotheses provide a clear direction for empirical testing, aiming to enhance the understanding of factors influencing mutual fund performance in Nepal.

3. Research Design

This study employs a descriptive and causal-comparative research design to analyze the performance of fund managers, chosen for its fact-finding and information-gathering capabilities regarding mutual fund performance. The research design relies on secondary data analysis.

3.1 Population and Sample Size Determination

The study examines cases of five mutual fund managers, considering five funds out of 29 total schemes operational during the study period. Monthly liquidity, assets, age, expense ratio, return, Net Asset Value (NAVs), etc., were collected from respective mutual fund managers and the Nepal Stock Exchange. The analysis focused on funds operational for over four years, collecting NAV data for 48 months from January 15, 2018, to January 14, 2022.

Table 1. *Sample Mutual Fund Schemes Selected for Study*

Mutual Funds	Fund Manager	Fund size (Rs) million	Date of establishment
Laxmi Equity Fund (LEMF)	Laxmi Capital	1250	2018
Global IME Samunnat Scheme I (GIMES1)	Global IME Capital	1000	2017
Sanima Equity Fund (SAEF)	Sanima Capital	1300	2014
Nabil Equity Fund (NEF)	Nabil Investment	1250	2015
Siddhartha Equity Fund (SEF)	Siddhartha Capital	1500	2015

3.2 Data Analysis Methods

The study employs measures introduced by Sharpe-1966, Treynor-1965, and Jensen-1968 to evaluate mutual fund and fund manager performance. These models, aligned with the CAPM model, assess the linear relationship between returns and risks. The key data analysis methods include:

Net Asset Value (NAV) Return

NAV return is the difference between an organization's value of assets and its net liabilities. It serves as a performance metric for mutual funds.

NAV = value of (assets – liabilities)

Similarly, NAV per share = $\frac{\text{Value of (assets– liabilities)}}{\text{Total shares outstanding}}$

NAV Return = $\frac{\text{NAV}_2 - \text{NAV}_1}{\text{NAV}_1}$, Where, NAV₁ is NAV value at time 1 and NAV₂ is

NAV value at time 2

Sharpe Ratio

Sharpe ratio, ‘a risk-adjusted performance measure’, is frequently applied to assess portfolio performance. The Sharp ratio assesses the portfolio’s overall risk by utilizing standard deviation as opposed to solely relying on systematic risk (β). This ratio represents the return on risk premiums produced per unit of overall risk. Sharpe proposed the reward-variability ratio, which is referred to as the Sharp ratio, given as:

$$S_p = \frac{R_p - R_f}{\sigma_p} \dots\dots\dots (i)$$

‘Where, S_p is the Sharpe Ratio, R_p is the average rate of return for a fund, R_f is the average risk-free return, and σ_p is the Standard Deviation of the fund’. A higher portfolio value (S_p) relative to the market value (S_m) signifies a fund with superior performance, and vice-versa.

Treynor Ratio

Treynor ratio compares the premium for a risk to the volatility of returns, as assessed by portfolio systematic risk (β). It measures extra return per unit of systematic-risk beta. This relied on the premise that by diversifying unsystematic risk, a multi-asset portfolio eliminates all risks, leaving only systematic risk (beta). It's computed as:

$$T_p = \frac{R_p - R_f}{\beta_p} \dots\dots\dots (ii)$$

Where, ‘T_p is the Treynor Ratio, R_p is the average rate of return for a fund, R_f is the average risk-free return, and β_p is the Beta of the fund’. An increase in the portfolio's value (T_p) relative to the market's value (T_m) signifies a stronger performance of the fund and vice versa.

Jensen Alpha Measures

As defined by beta, Jensen alpha represents the discrepancy between the actual return and the anticipated or required return of a given portfolio, assuming a specific level of systematic risk. It is founded on the principles of CAPM. The equation for determining Jensen alpha is as follows:

$$\alpha_p = R_p - EAR \dots\dots\dots (iii)$$

Where, α_p is the Jensen Alpha, R_p is the fund’s average returns, and EAR_p is the equilibrium average returns. Equilibrium Average Return (EAR_p) = R_f + β_p (R_m - R_f), where R_f is the average risk-free return, β_p is the Beta of the fund, and R_m is the Market index’ return. A higher alpha signifies an enhanced performance of the fund, as it signifies a superior return.

To evaluate fund selectivity within the CAPM framework, [Jensen's \(1968\)](#) absolute metric was used. It entails a regression analysis between the fund's and markets' excess returns. Jensen Alpha (α) represents the intercept, indicating the average return when the market portfolio's return is zero. Calculated through a single beta regression (iv), a significantly positive α shows superior stock selection and performance beyond the benchmark, while a negative α signals poor stock selectivity.

$$R_{pt} - R_{ft} = \alpha_p + \beta_p (R_{mt} - R_{ft}) + E_{pt} \dots \dots \dots (iv)$$

Where, R_{pt} is the return of the portfolio at month - t, R_{mt} is the Benchmark returns at month -t, R_{ft} is the Risk-free return at month -t, α is the Jensen performance measure, β_p is the fund's systematic risk. Consequently, a significantly positive Alpha (α) value signifies the mean additional return achieved over the benchmark return, taking into account the fund's level of systematic risk. Consequently, this demonstrates the fund manager's exceptional aptitude for predicting security prices and selecting stocks. For future research, exploring an alternative approach to the cognitive-behavioral framework proposed by [Devkota et al. \(2023\)](#) and [Bhattarai et al. \(2024\)](#) could offer a more comprehensive examination, highlighting the additional factors influencing mutual fund performance.

4. Results

To better understand the performance dynamics of mutual funds, this study employed a quantitative analytical framework and a variety of statistical methods.

4.1 Performance Ranking

At first, the study evaluated and ranked five Nepalese mutual funds based on critical performance indicators, revealing insights into their respective strengths and weaknesses. The rankings are based on the increasing order of fund assets, month since establishment (age), liquidity, expense ratio, NAV, and return. The fund with the highest asset, a month from the establishment (age), liquidity, NAV, and return is ranked first, and vice versa. However, in the event of expense ratio, the fund with the lowest expense ratio is listed at the top. Table 1 presents the ranking details.

Table 2. Normal Ranking of 5 Mutual Funds by their Features

Name	Asset Rank	Age rank	Expense Ratio Rank	Liquidity Rank	Rank of Return	Rank of NAV	Overall rank
LEMF	4	3	4	2	5	5	5
GIMES1	5	1	5	5	2	2	4
SAEF	2	5	3	3	1	1	2
SEF	1	4	2	1	3	3	1
NEF	3	2	1	4	4	4	3

Siddhartha Equity Fund (SEF) emerged as the top performer, securing the highest overall rank

due to its substantial asset value, 51 months of stable operation, impressive liquidity, and strong return rates. Sanima Equity Fund (SAEF), despite being the youngest fund with only 2 months in operation, showcased remarkable performance by attaining the highest return rate of 30.02%. Nabil Equity Fund (NEF) secured the 3rd rank, displaying a balanced performance across various parameters, including a competitive asset value of 125 crore rupees (\$ 9.62 million). In contrast, Global Sannumat Scheme 1 (GIMES1) demonstrated effective expense management with the lowest expense ratio (1.26%) but lagged behind in asset value and liquidity, leading to a lower overall rank. Laxmi Equity Fund (LEMF) secured the lowest overall rank, primarily influenced by a comparatively lower asset value and modest return rates (5.29%).

4.2 Descriptive Analysis

Descriptive statistics illustrated in Table 3 offer a comprehensive overview of the mutual funds and the NEPSE index.

Table 3. *Descriptive statistics of various variables.*

Name	N	Minimum	Maximum	Mean	Std. Deviation
Asset	240	18.80	21.81	21.04	0.38
Expense ratio	240	0.16	2.86	1.15	0.65
Age	240	2.00	70.00	34.30	15.92
Liquidity	240	14.30	20.88	19.18	1.25
Nav	240	7.94	26.01	11.80	3.72
Return	240	-20.00	160.10	17.85	37.21
NEPSE index	240	-13.29	19.95	1.79	7.42

The average log of asset value was 21.04, indicating substantial investments across all funds. Efficient expense management was reflected in the average expense ratio of 1.15, with GIMES1 standing out for its low expense ratio. The average fund age was 34.30 months, with a notable standard deviation of 15.92, highlighting variations in establishment periods. Mutual funds exhibited an average return of 17.85%, showcasing considerable variability (Std. Deviation: 37.21). SEF's consistently high returns contributed significantly to the overall positive performance of the funds. The NEPSE index reflected market conditions with an average return of 1.79%, emphasizing the fluctuating nature of the market.

Table 4. *Individual Descriptive Summary of Sample MFs Compared with NEPSE*

Mutual Funds	Minimum Return	Maximum Return	NAV (Rs.)	Av. Monthly Return	Standard Deviation	t-Value	P-Value
LEMF	-17.30	61.30	10.53	5.29	26.159	1.1098	0.136
NEF	-19.70	92.80	11.16	11.63	32.8943	2.156	0.018
SEF	-3.90	79	11.96	19.62	23.7468	5.497	0.000

GIMES1	-20.60	160.10	12.27	22.69	53.79	2.7517	0.004
SAEF	-4.20	127.30	13.00	30.2	39.73	5.0595	0.000
Overall MF	-20.00	160.10	11.78	17.85	37.21		
NEPSE	-13.29	19.95	-	1.79	7.41		

Table 4 illustrating the performance analysis of the five sample mutual funds, spanning the research period from 15th January 2018 to 14th January 2022, reveals compelling insights into their returns and volatility. Sanima Equity Fund (SAEF) leads the pack with an impressive average monthly return of 30.02%, varying from a minimum of -4.20% to a maximum of 127.30%, and a standard deviation of 39.73%. Global IME Samunnat Scheme 1 (GIMES1) follows closely, boasting an average monthly return of 22.69%, with a wider range between -20.60% and 160.10% and a standard deviation of 53.79%. SEF, NEF, and LEMF exhibit competitive performances with average monthly returns of 19.62%, 11.63%, and 5.29%, respectively. The Net Asset Value (NAV) of these funds varies, with Sanima Equity Fund holding the highest NAV (Rs.13). Additionally, the average monthly return for all mutual funds during the research period was 17.85%, surpassing the NEPSE index's average return of 1.79%. This substantial outperformance underscores the effectiveness of mutual funds in generating returns for investors, positioning them as attractive investment options. Table 4 also shows the test results of the statistical significance of the mean returns of the sample funds, highlighted by their respective t-values and p-values ($P < 0.05$) of the sample mutual fund schemes in order to evaluate their robustness in performance. It is evident from the above table that except for Laxmi Equity Fund (LEMF), all schemes have succeeded in providing a statistically significant ($P < 0.05$) positive mean return to the mutual fund investors than the market index.

4.3 Inferential Analysis

In the exploration of the association between the returns of Nepalese mutual funds and market dynamics, the correlation coefficients presented in Table 5 provide detailed insights. The positive correlation coefficients, ranging from 0.226 to 0.351, indicate a consistent positive relationship between the returns of funds and the market. Although most coefficients are below 0.5, indicating a moderate relationship, it is crucial to note that the nature of these correlations contributes significantly to understanding the funds' responsiveness to market changes.

Table5. Correlation between Fund, Various Pairs and Market-Return

Name of Mutual Fund Schemes & variables	Correlation Coefficient	Sig.
Laxmi Equity Fund (LEMF)	0.351	0.136
Global IME Samunnat Scheme1 (GIMES1)	0.226**	0.004
Sanima Equity Fund (SAEF)	0.2354**	0.000
Nabil Equity Fund (NEF)	0.279	0.018

Siddhartha Equity Fund (SEF)	0.323**	0.000
Assets & Return	0.737**	0.000
Expense Ratio & Return	-0.28**	0.000
Age & Return	0.608**	0.000
Liquidity & Return	0.022	0.739

** . Correlation has a 1% level of significance.

Notably, the Laxmi Equity Fund stands out with the highest correlation coefficient of 0.3511, demonstrating a non-significant relationship with market returns. Conversely, Global IME Sammunat Scheme 1 exhibits a more modest correlation of 0.2259, signifying a relatively weaker connection with market returns among the selected funds. Exploring deeper into the statistical significance, the p-values associated with the correlation coefficients become pivotal. Four funds; SAEF, SEF, NEF, and GIMES1, display p-values lower than the 0.05 level of significance. This implies a statistically significant relationship between the returns of these funds and the market throughout the study period. While, the p-value for Laxmi Equity Fund, though exceeding the 0.05 level, highlights its uniqueness, indicating that its returns might not be significantly influenced by market dynamics.

Expanding the analysis to various pairs of variables concerning market returns, the correlation coefficients offer deeper insights. The exceptionally high coefficients of 0.737 for assets and 0.608 for age signify strong positive relationships with market returns, implying that these variables have a substantial role in inducing fund performance. Conversely, the negative correlation coefficient of -0.28 for the expense ratio suggests a notable inverse relationship with market returns. However, the correlation coefficient of 0.022 for Liquidity with market return is notably low, indicating a negligible relationship between liquidity and market returns. This is further confirmed by the p-value exceeding 0.05, implying a lack of statistically significant difference in liquidity concerning market returns.

4.4 Performance Metrics

The performance analysis results on Nepalese mutual funds reveal a striking picture of excellence, as depicted in Table 6 through key performance metrics –Sharpe, Treynor, and Jensen ratios. These metrics serve as robust indicators, comparing the funds against a benchmark to determine their risk-adjusted returns.

Table 6. Summary of Measures for Five Sample Mutual Fund Schemes

Mutual Funds	Sharpe Ratio of Fund	Sharpe Ratio of Market	Treynor Ratio of Fund	Treynor Ratio of Market	Jensen Alpha of Fund	Jensen Alpha of Market	Overall rank
LEMF	0.088	-0.1604	2.133	-1.2153	3.51	-0.0247	5
NEF	0.26326	-0.1604	7.1410	-1.2153	10.093	-0.0247	4
SEF	0.7011	-0.1604	16.439	-1.2153	17.846	-0.0247	2

GIMES1	0.3666	-0.1604	1.6047	-1.2153	21.616	-0.0247	3
SAEF	0.6808	-0.1604	21.902	-1.2153	28.5	-0.0247	1

Examining the Sharpe Ratio, all selected funds exhibited positive Sharpe indices, signifying a superior return per unit of risk compared to the market. Remarkably, Siddhartha Equity Fund leads the field with a Sharpe Ratio of 0.701, securing the top position, closely followed by Sanima Equity Fund at 0.681 and Global IME Sammunat Scheme at 0.367, securing the second and third positions, respectively. Notably, despite its last-place ranking, the Laxmi Equity Fund maintains impressive risk-adjusted returns when compared to the market benchmark. The Treynor Ratio, emphasizing the reward-to-systemic-risk ratio, highlights the funds' ability to adapt to market dynamics. In this domain, Sanima Equity Fund emerges as the top leader, with a Treynor Ratio of 21.902, demonstrating exceptional excess returns over systematic risk. Despite the robust overall performance ($T= 1.605$), the Global IME Sammunat Scheme ranks fifth in this metric, demonstrating the diversity in the strengths of these funds. Based on the Jensen Alpha, a metric of risk-adjusted performance compared to the market index, all funds outperform the NEPSE Index. Sanima Equity Fund again retains the top rank with an impressive alpha value of 28.50, highlighting its exceptional ability to generate returns beyond the expected market performance. Laxmi Equity Fund, despite ranking fifth in alpha, maintains a positive value, reinforcing its contribution to superior risk-adjusted returns.

As a result, the performance measures show that, despite the challenging market conditions reflected by the negative NEPSE Index, the selected mutual funds perform significantly. Sanima Equity Fund ranks first in terms of excellence, followed by Siddhartha Equity Fund and Global IME Sammunat Scheme. Nepalese mutual funds offer strong risk-adjusted returns, making them attractive investment options in a challenging financial market.

4.5 Analysis of Variance (ANOVA) and Post-hoc Tests

ANOVA test was carried out to identify the mean differences in the returns of various Nepalese mutual funds schemes and their divergence from market returns (NEPSE). The results, summarized in Table 7, provide an overview of the mean return differences among the selected mutual funds in the market.

Table 7. ANOVA and Post-hoc Analysis for the Mean Returns between Various Mutual Funds

ANOVA Test						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F-critical</i>
Between Groups	647.703	1	647.70	13.798	0.0059	5.3176
Within Groups	375.516	8	46.939			
Total	1023.219	9				
Post-hoc Analysis						
Scheme	Groups	Mean	Variance	t-Stat.	P (T<=) two-tail	Bonferroni correction (α)
LEMF	GIMES1 return	22.685	2893.438	-2.055	0.0439	0.005

	SAEF return	30.023	1578.538	-3.719	0.0004
	NEF return	11.633	1082.039	-1.090	0.2790
	SEF return	19.621	563.914	-2.982	0.0036
	SAEF return	30.023	1578.538	-0.760	0.4492
GIMES1	NEF return	11.633	1082.039	1.214	0.2282
	SEF return	19.621	563.914	0.361	0.7192
	NEF return	11.633	1082.039	2.470	0.0154
SAEF	SEF return	19.621	563.914	1.557	0.1236
NEF	SEF return	19.621	563.914	-1.364	0.1761

The post-hoc analysis, supported by a Bonferroni correction ($\alpha = 0.05/10 = 0.005$), carefully examined pairwise mean differences. Surprisingly, the t-values related to the returns of LEMF in comparison to SAEF and SEF are statistically significant ($P < 0.005$). LEMF's mean returns differ from those of SAEF and SEF, with p-values of 0.0004 and 0.0036, respectively, both falling far below the benchmark criterion of 0.005, indicating a clear difference. These significant differences highlight the complex dynamics at work within these specific groups of mutual funds. Conversely, the examination of other mutual fund groupings indicates t-values with statistical p-values more than 0.005 ($P > 0.005$). This result confirms the lack of statistically significant differences among these other groups.

5. Discussion

The analysis of the Nepalese mutual fund industry and selected schemes offers comprehensive insights into performance. Descriptive statistics highlight monthly returns that outperform the NEPSE index, with correlation analysis revealing positive yet moderate associations between funds and market returns. Notably, the Laxmi Equity Fund displays no significant relationship with the market return, contrasting with findings from [Wermers \(2000\)](#) and indicating a context-specific nature. Correlation coefficients reveal positively significant relationships between assets and market return, age, and market return, while the negative relationship between expense ratio and market return implies potential impacts on fund performance. The statistical significance of these relationships ($P < 0.05$) contradicts the proposed hypotheses; H_{01} and H_{02} , which posit a substantial relationship between fund attributes and their performances. This study aligns with [Wermers \(2000\)](#) and contradicts studies by [Otten and Bams \(2002\)](#), emphasizing the complex nature of these associations.

ANOVA results reveal significant differences in mean returns among selected funds. Post-hoc analysis with Bonferroni correction emphasizes Laxmi Equity Fund's distinct standing with significant differences from other funds. Correlation analysis exposes substantial relations and notable variations, with Siddhartha Equity Fund (SEF) exhibiting the statistically

significant highest coefficient (0.323), aligning with [Alvi et al. \(2020\)](#) and [Bajracharya \(2016\)](#). Examining relationships between independent variables and market return elucidates mean differences. Positive mean differences between assets and market return suggest a slight impact, while negative mean differences between expense ratio and market return highlight the negative relationship, resonating with [Philpot et al. \(1992\)](#) and [Jan and Hung \(2003\)](#). Positive mean differences between fund age and market return align with [Ferreira et al. \(2013\)](#), emphasizing a positive relationship. Insignificant positive impacts of liquidity on return, consistent with [Asad and Siddiqui \(2019\)](#), highlight the minor influence of liquidity on fund return.

Moving beyond correlations, risk-adjusted performance metrics such as the Treynor ratios, Sharpe ratios, and Jensen Alpha highlight positive performance narratives. Siddhartha Equity Fund, Sanima Equity Fund, and Global IME Sammunat Scheme 1 lead in the Sharpe ratio, validating the third hypothesis (H_{03}) and highlighting their capacity to yield superior returns per unit of risk. Notably, Laxmi Equity Fund lags, indicating a potential mismatch between risk and return. The Treynor ratio reinforces outperformance, with Sanima Equity Fund leading in efficiency. Jensen Alpha further emphasizes funds' outperformance, with Sanima Equity Fund ranking at the top, consistent with previous studies. ANOVA table emphasizes overall significance, with post-hoc analysis identifying intra-group specific differences. Laxmi Equity Fund stands out with significant differences from others, reinforcing factors influencing fund performance. In terms of ranking, Sanima Equity Fund, Siddhartha Equity Fund, and Nabil Equity Fund emerge as top performers across various criteria. Conversely, Laxmi Equity Fund and Global Sammunat Scheme 1 secured lower rankings. The result reveals the outperformance of mutual funds against the market benchmark, indicating market inefficiency in the semi-strong, aligning with [Karki's \(2020\)](#) findings. This contradicts the fourth hypothesis (H_{04}) that the Nepali equity market is efficient in its weak form.

6. Conclusion

This research analyzes the performance dynamics of the closed-ended mutual fund industry in Nepal, providing investors, fund administrators, and policymakers with valuable insights. The results illuminate the efficacy of selected schemes by assigning them rankings according to multiple criteria and employing a variety of analytical tools. The top performers, namely, Sanima Equity Fund (SAEF) and Siddhartha Equity Fund (SEF), demonstrate their capabilities in terms of assets, expense ratio, age, liquidity, NAV, and rate of return. On the contrary, the evaluations for the Laxmi Equity Fund (LEMF) and Global Sammunat Scheme 1 (GIMES1) Fund are comparatively lower. The performance measures, including the Jensen Alpha, Sharpe, and Treynor ratios consistently highlight the funds' outperformance against the market index. Despite challenges such as a lack of understanding among investors, poor financial literacy, and an underdeveloped capital market, mutual funds are vital in mobilizing savings and providing investment opportunities. Recommendations include a focus on innovative schemes, awareness programs, effective portfolio strategies, and regulatory enhancements to foster trust and interest among investors. The study's revelation of mutual funds'

outperformance against market benchmarks indicates market inefficiency in the semi-strong form suggesting avenues for future research into additional performance factors.

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