

The Impact of Deposit Rates and Net Asset Value on Mutual Fund Performance: Evidence from Pakistan's Banking Sector

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ARTICLE INFO			ABSTRACT
Article History:			<i>The intention of this research is to study how deposit rates and net asset value (NAV) influence the performance of mutual funds of Pakistan banking sector. The research employs ARDL econometric technique to explore short and long term relationships between variables of the study and mutual fund performance. Their findings reveal a strong positive dynamic relation between mutual funds and NAV and consequently, high NAV enhances mutual fund's performance in the long run. Contrarily, mutual funds have a significant negative long-term relationship with deposit rates, implying that higher deposit rates may reduce mutual funds investment due to the preference of the investors to safer, interest bearing deposits. The results of the Error Correction Model (ECM) suggest in the short term deposit rates and NAV have significant negative impact on mutual fund performance thus short term variations in these variables might not be good for mutual funds. Our findings demonstrate the dealings between market dynamics and interest rate policies on mutual fund performance in the Pakistan's banking sector. The study has important lessons for investors and policymakers that, on the one hand, investors are to take into account economic indicators on the macroeconomic level and on the other hand, fund managers and policymakers in general should select their instruments considering both macroeconomic indicators and market tendencies.</i>
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1.0. Introduction

The sectors that form the base on which the economic development of a country relies, the financial services sector is a backbone and within this sector (Ahmed et al., 2025), mutual funds have become potent investment vehicles for both the individual and institutional investors Rahman, & Bakar, (2019), Zubair, S., Rahman, Sheikh, & Zafar, (2024). Capital from a diverse group of investors comes together to pool these funds and create a broad range of asset portfolio that reduces the individual investment risk and allows for wealth accumulation (Ahmed et al., 2025). Having grown rapidly over the past two decades, the mutual fund industry in Pakistan has been supported by factors such as growth in population's financial literacy, progressive regulatory reforms, and growing need for alternative investment options to traditional banking products Rahman, & Bakar, (2018), Shahid, Rahman, Sheikh, & Allahrakha (2024). A variety of internal and external factors affect performance mutual funds. In particular, deposit rates and net asset value (NAV) performance also appear as significant determinants. Mutual fund loan costs, which are set by players in this field, affect mutual funds 'attractiveness in comparison to other savings and investment opportunities such as fixed deposits (Rahman, & Bakar, 2019; Saeed, Rahman, & Sheikh, 2024; Rahman, Bakar, & Idrees, 2019). The performance of the mutual fund is represented by the NAV of the fund, which is the direct representation of the per share of its assets after deducting the liabilities of the fund an important determinant for investors to assess the profitability of the fund. Such an understanding is important for many of the stakeholders—investors, fund managers, and policymakers—for the interplay between these factors. Insights of how economic variable effects on investment return may assist investors to make more sensible financial decisions. This knowledge would be useful for Fund managers for making their asset allocation strategies more effective as well as improving risk management practices. This alerts the policymakers to the need to have an institutional arrangement consisting of such guidelines that would ensure that the mutual fund industry grows in a progressive and robust way in the country.

1.1. Problem Statement

The dynamics of Pakistani financial landscape with super rapid change has increased the importance of mutual funds. Despite this, however, there is little research into the link of deposit rates, NAV and the performance of emerging markets mutual funds. Analysis of how unique local economic conditions and investor behavior affect the performance of mutual fund in Pakistan is lacking due to the fact that most of the existing studies have primarily focused on developed economies. Providing an insight into dynamic mutual fund performance within Pakistani banking sector this research is crucial, particularly analyzing the impact of deposit rates, and changes in NAV), Rahman, Shafqat, Ali, & Khan,. (2024), Rahman, & Bakar, (2019), The study attempts to fill the research gap by concentrating on this emerging market, improving mutual fund mechanics' understanding of mutual fund mechanics and thereby, offering valuable implications for investors that want to adapt to strategies that will enable them to make meaningful returns and also policymakers who would want to devise strategies that would lead to boosts in mutual fund performance. The study adds to the literature on mutual fund performance by studying Pakistan and therefore is more contextual relevant for emerging markets. Instead, it employs a multifactor analysis of combined effects of various factors, including deposit rates and NAV. Moreover, it offers valuable policy implications for stakeholders and provides some actionable strategies to promote mutual fund industry in Pakistan. The second, the methodological rigor that is guided, in part, by the application of advanced statistics and a large and robust dataset spans seven years are a means to enhance the reliability and validity of the findings and address a gaping in extant research.

1.2. Research Objectives

The space of the objectives in this study includes;

- To examine the Impact of Deposit Rates on Mutual Fund Performance
- To analyze the Relationship between Net Asset Value (NAV) and Mutual Fund Performance

1.3. Research Questions

In order to answer these research questions, the study will make the following contributions:

- What is the effect of deposit rates on the functioning of mutual funds in the Pakistani banking sector?
- How does net asset value (NAV) affect the mutual fund's performance?

1.4. Limitations of the Study

This study is intended to analyze mutual fund performance in Pakistan in depth; however, it is important to mention that many limitations need to be taken into consideration.

This could further enable the focus on major bank in Pakistan instead of the larger banking field. Other types of financial institutions can be also studied further for more generalized insights.

- Our analysis for the last six years can shed some light on more recent trends, but a longer perspective would prove to be more beneficial for mutual fund performance and its volatility overtime.
- A major focus of study is deposit rates and NAV but it also recognizes that the performance of a mutual fund might also depend on such factors as political stability, inflation and the global economic climate.

2.0. Literature Review

Coming to the part of mutual funds, they have become a significant part of the financial environment in Pakistan, as a diversified investment portfolio, managed by professional fund managers, come as an efficient option for the investors. There are many possible causes which could be divided into macro-economic indicators, those that apply for the market, and those that depend on the particular fund itself Sultan, Rahman, Munir, Ali, Younas, & Khan (2025), Rahman, Shafqat, Ali, & Khan, (2024), Iqbal, Rahman, Idrees, Ijaz, & Javed. (2025). With a view on exploring the effect of two main factors, namely, deposit rates and net asset value (NAV) on the average performance of mutual funds in the Banking sector of Pakistan, this literature review is aimed at. This review focuses on the path of scrutinizing existing research. The aim is to understand how these variables combine and strongly impact mutual fund performance.

2.1. Deposits Rates and Mutual Fund Performance

2.1.1. Evidence from Pakistan

Capitalization rates and mutual fund performance are shown to be related in Pakistan research. An example is that when deposit rates grow, there will be a tendency of the balance of investment from mutual funds to go to the bank deposit, which will negatively affect investment coming in and performance of the mutual fund Huang, Rahman, Meo., Ali, Khan (2024), Shazad, & Rahman, (2025), Liang, Ur Rahman, Shafaqat, Ali, Ali, & Khan,. (2024), Chen, Rahman, Abdullah, Ali, &

Khalid, (2024), Song, Rahman, Anees, Ali, (2024), Song, Rahman, Anees, Ali, (2024), Wang, Rahman, Zulfiqar, Ali, Khalid, & Ali, (2025). Because equity funds have the potential of higher returns during economic growth (Shah & Hijazi, 2004), equity funds are less affected. Studies also show that risk averse investors prefer bank deposit over high deposit rates (Butt, A., & Rehman, U., 2010). In addition, rising deposit rates do not have as strong an effect on diversified mutual funds as it does on conventional mutual funds (Javid & Ahmad, 2012). Akhtar (2015) reveals that higher deposit rates have a negative impact on inflow of funds to mutual funds since most of the investors prefer bank deposit due to both safety and guaranteed returns. There are other factors such as inflation and the economic conditions that also contribute to the performance of mutual funds (Hussain & Mahmood, 2017).

2.1.2. Evidence from Other Emerging Markets

Fama (1981) and Malkiel (1995) have done research about how change in deposit rates affects investor behavior and demand for mutual funds. Equity funds have lower deposit rates that could make them more attractive and also be outperforming fixed income alternatives. The performance of Fund managers is often adjusted by interest rates (Ferson & Schadt, 1996). Overall, lower returns on deposit products call for money investors to look to higher return mutual funds (Chen & Knez, 1996).

2.2. Net Asset Value (NAV) and Performance in a Mutual Fund

The main performance indicator of a mutual fund is Net Asset Value (NAV) that indicates the value of its current total assets less total liabilities. But, important to note, NAV is the indicator that investors pay close attention to, a reflection of what the fund holds. Fund management effectiveness and investor behavior as well as market dynamics cause NAV to fluctuate. Extensive study has been done to study the relationship between NAV and mutual fund performance.

2.2.1. Empirical Evidence from Pakistan

As per Mehmood and Ashraf (2013), it was demonstrated that better managed and profitable funds usually tend to attract more investors as are the NAVs. But importantly, they warned that it could be market speculation for NAVs to get lifted up above what was attributable to real performance. NAV is a reliable short term performance indicator but is a less reliable factor for a long term evaluation with other factors such as expense ratio and management quality also in mind, as pointed out by Khan and Sattar (2014). As per the signaling theory, high NAV indicates better management and Ali and Rehman (2016) found a strong positive correlation between NAV and the fund performance. However, Akhtar and Ali (2017) stated that such funds with a volatile NAV often underperform and hence suggested the strategies to stabilize it in order to draw in the investors. According to Ahmed and Khan (2019), high NAVs don't mean good future performance, as this can be explained by factors such as bad asset allocation and market conditions.

2.2.2. Empirical Evidence from Other Emerging Markets

Sharpe (1966) and Jensen (1968) are of the view that the role of NAV in performance measurement cannot be ignored and the concept of "alpha" to understand excess return was introduced. According to Grinblatt and Titman (1992), NAV changes may be used, but from raw data, only they warned not to use solo; Malkiel (1995) also remarked that NAV movements have a strong bearing on investor perceptions. Carhart (1997) suggests focusing on risk-adjusted return as well as long term indicators. Thus, it has been shown by Sirri and Tufano (1998) that investor behavior is greatly affected by the magnitude of NAV changes, and by Barber and Odean (2000)

that individual investors have often made poor decisions when it comes to short-term NAV volatility. According to Otten and Bams (2002) it is NAV that is a critical predictor of performance and holds that diversification and quality management are of key significance for the longer term success.

2.3. Interplay between Deposit Rates, NAV and Mutual Fund Performance

The relationship between deposit rates and Net Asset Value (NAV) is very crucial in mutual fund environment. Whether deposit rates rise also makes traditional savings accounts more attractive to investors and may result in a decline in mutual funds inflows. It shifts because it allows investors to get the safe and assured return on higher deposit rate over perceived risks of mutual funds. However, as deposit rates go down, mutual funds become more attractive because they usually provide potentially higher yields against lower interest rates on savings accounts. This is likely to increase investments in mutual funds thereby increasing their NAV.

Surprisingly there has been very limited research on the relationship between deposit rates and Net Asset Value (NAV) for Pakistan's mutual fund industry. According to Khan and Rehman (2021), mutual fund performance had been affected by the deposit rates and showed increased NAV variability during economic volatility. And their findings imply that investors and the fund managers need to understand these dynamics in nuanced ways.

3.0. Data and Methodology

For this reason, a quantitative, explanatory research design was adopted as a basis for researching on the relationships between deposit rates, Net Asset Value (NAV) and performance of mutual fund. It uses a longitudinal approach on collecting monthly data of 1st of January, 2019 to 31st December, 2024. It gives the ability to identify trends and patterns in the performance of mutual funds. For research, it relies secondary data collected from trustworthy websites especially <https://www.investing.com> and <https://www.mufap.com.pk>. The selected most prominent bank in Pakistan HBL was selected based on how much deposits, how much market share, how much assets bank has and how much should be in mutual fund performance. Now I am going to say Pakistan's most consistent bank in terms of performance in the last six years. In this framework, the paper studies the mutual funds accessible in this institution, comprising equity as well as income funds, during this specified six-year period. With this approach, the final sample consists of 2 different mutual funds: one for the equity fund, and one for income fund. . This results in a total of 72 observations per month for each variable, which is entirely encompassing a time span between the one from January 2019 to December 2024. The purposive sampling is a non-probability sampling technique used in the study to select relevant and informative data.

Auto-Regressive Distributed Lag (ARDL) model is employed to investigate the relationships between the chosen variables and their effect on mutual fund performance. It is particularly suited to using econometric technique when the variables have mixed levels of integration (I (0) and I (1)). It is highly rated for its ability to perform all statistical and econometric analyses in E.Views software for time series analysis. The model is structured thus:

$$\Delta MF_{avg,t} = \alpha + \sum_{i=1}^p \beta_i \Delta DR_{t-i} + \sum_{i=0}^r \delta_i \Delta NAV_{t-i} + \epsilon_t$$

Where:

MF_{avg, t} = Average performance of mutual funds (across equity and income funds) at time t.

DR_t = Deposit rate at time t.

NAV_t = Average Net Asset Value at time t.

Δ = First difference operator.

p, r = Lag orders for each independent variable.

ϵ_t = Error term.

4.0. Result and Discussion

4.1. Descriptive Statistics

Descriptive Statistics of four variables that is Mutual Fund, Net Asset Value and Deposit Rate are provided in the table 4.1. Usually, these statistics are used in research to summarize and describe the main features of a dataset. Below, each statistic is explained:

The mean MU is 10.30 and the median MU is also equal to 10.31. Values are minimum of 10.07 and maximum of 10.53, thus indicating low variability (Standard Deviation = 0.115). The skewness of 0.011 indicates almost symmetrical distribution; hence the data is generally distributed around its mean. 2.21 is the kurtosis and it means there is a distribution that has lighter tails than a normal distribution. The value of NAV is 2.50 averaged, and 2.50 median. Variability (Standard Deviation = 0.031) is very low, the values fall from 2.44 through a maximum value of 2.58. The value of the skewness being 0.371 suggests a slight right skew or the values are concentrated more at the lower end with some more values at a higher end. A distribution quite close to normal but with slightly heavier tails, having a kurtosis of 2.80 is indicated. The mean of DR is 0.76 and the median is 0.77. The results of those values range from minimum value 0.46 to maximum value 1.11, so the variability is moderate (Standard Deviation = 0.206). The skewness of 0.028 means that the data is evenly distributed around the mean and therefore almost symmetric. The kurtosis of 1.46 specifies that the distribution being considered has lighter tails than a normal distribution.

MU and DR distributions are nearly symmetric and they have low to moderate variability. NAV shows very low variability and a slight right skew. Accordingly, these statistics represent a vast knowledge of the variables with their center tendencies and variabilities and shapes of distribution. This information is necessary for the succeeding statistical analysis and interpretation for the research thesis.

Table 4.1: Descriptive Statistics

	LOG_MU	LOG_DR	LOG_NAV
Mean	10.30174	0.755214	2.500830
Median	10.30951	0.774731	2.497721
Maximum	10.53276	1.105510	2.582695
Minimum	10.06660	0.457142	2.435422
Std. Dev.	0.115448	0.205575	0.031375
Skewness	0.011066	0.027928	0.371068
Kurtosis	2.209296	1.455233	2.801209
Jarque-Bera	2.398529	9.159463	2.262755
Probability	0.301416	0.010258	0.322589
Sum	947.7596	69.47965	230.0763

Sum Sq. Dev.	1.212879	3.845750	0.089578
Observations	72	72	72

4.2. Augmented Dickey-Fuller (ADF) Unit Root Test

Results of the Augmented Dickey–Fuller unit root test are summarized in Table 4.2, a critical statistical analysis designed to find out if a time series variable is stationary. In this application, the test is of critical value to ascertain whether the time series are characterized by content in time that is consistent over time, necessary for a reliable analysis and forecasting. Since a variable is stationary, has a p value less than the threshold of 0.05, then that variable will be stationary. On the contrary, if a p-value is greater than 0.05 then the variable is non-stationary and will require further transformation before it can be subjected to analysis. For the given variables all Mutual Funds and Deposit Rate have p values greater than 0.05 and hence their status as having non stationarity at level $I(0)$ is certified. For these variables to be stationary, this required taking the first difference of these variables. After transforming these variable they became stationary ($I(1)$) with newly calculated p-values of 0.0000, 0.0001 respectively. On the contrary, the p value of the Net Asset Value (NAV) was 0.0425 whereas it's below the 0.05 threshold, indicating that the Net Asset Value (NAV) is stationary at level ($I(0)$).

Table 4.2: ADF Unit Root Test Results

Variables	At Level	At First Difference	Order of Integration
Mutual Funds	0.3561	0.0000	$I(1)$
Deposit Rate	0.6998	0.0001	$I(1)$
NAV	0.0425		$I(0)$

4.3. Bound Cointegration Test

The Bound Cointegration Test (Table 4.3) is used to discover whether the dependent and independent variable have a long term relationship or not, which comprises the NAV and the deposit rate, and the performance of the mutual funds. The value of the F statistic calculated is 7.1692. This particular statistic is key to our ability to reject a hypothesis of the null that cointegration is absent. This table also gives the critical values from the lower bound ($I(0)$) to the upper bound ($I(1)$) at different significance levels: 2.72 for the lower bound ($I(0)$) and 3.77 for the upper bound ($I(1)$), 3.23 for the lower bound ($I(0)$) and 4.35 for the upper bound ($I(1)$), 3.69 for the lower bound ($I(0)$) and 4.89 for the upper bound ($I(1)$), 4.29 for the lower bound ($I(0)$) and 5.61 for the upper bound ($I(1)$). The model has 2 independents in it, therefore $K=2$. In case where the computed F statistic value of 7.1692 is greater than the upper bound critical values at all significance levels, we reject the null hypothesis of no cointegration with confidence. The implication of this result is the existence of a large long term co- integrating relationship between mutual fund performance and the independent variables.

Table 4.3: Bound Cointegration Test

Test Statistic	Value	Signif.	$I(0)$	$I(1)$
Asymptotic: n=1000				
F-statistic	7.1692	10%	2.72	3.77
K	2	5%	3.23	4.35
		2.5%	3.69	4.89
		1%	4.29	5.61

4.4. ARDL Estimates for Long Term Relationship

The general results derived from using Autoregressive Distributed Lag (ARDL) model on the basis of mutual fund performance and some key independent variables are presented in Table 4.4. The factors that are these independent variables are Deposit Rate and Net Asset Value (NAV). It was found that the coefficient on Deposit Rate is -0.667908 and $p = 0.0190$. This strongly suggests that the long-term mutual fund performance is negatively related to the Deposit Rate supporting this statistically significant p-value. In particular, mutual funds' performances fall as the Deposit Rate increases. This relationship shows the role of interest rates in an investment decision and the overall performance of the mutual fund in the financial market. Furthermore, the coefficient for Net Asset Value is 0.025096 and its p value equals 0.0413. This p-value has a strong positive relationship between NAV and mutual fund performance and is significant at the 0.0001 level. If a mutual fund's Net Asset Value rises, this finding indicates that usually, the performance of that mutual fund has also been improving. Therefore, an increase in NAV could mean that the fund is managed effectively and the markets are working positively for the fund as a whole. In sum, this paper presents important insights into the relationship between Deposit Rate and Net Asset Value with mutual fund returns, answers to which are vital when deciding on investments and to manage mutual funds as well.

Table 4.4: Estimates for Long Term Relationship

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Deposit Rate	-0.667908	0.279359	-2.390855	0.0190
Net Asset Value	0.025096	2.305132	0.010887	0.0413
Constant	5.362399	3.462584	1.548670	0.1252

4.5. Error Correction Model (Estimates for Short Run)

The findings of a short-run dynamics analysis using an Error Correction Model (ECM) are shown in Table 4.5. This model aids in understanding how short-term adjustments cause variables to diverge from a long-term equilibrium connection. The table and its contents are described in detail below:

The Akaike Information Criterion Model (1, 1, 0) denotes the lag structure chosen using the model selection technique known as the Akaike Information Criterion (AIC). The dependent and independent variables' delays are represented by the numerals 1, 1, and 0.

Mutual fund performance is positively and significantly impacted in the near term, as indicated by the statistically significant coefficient ($p < 0.05$). In particular, when all other variables are held constant, a one unit rise in Mutual Fund (Mu) leads to a 0.7711-unit increase in Mutual Fund performance. A reversal or adjustment effect is indicated in the near term by the lagged value of the mutual fund (Mu(-1)), which is similarly large and has a negative impact. This suggests that previous values of Mu have a negative impact on current values. The dependent variable is shown to be negatively impacted in the short term by the significant and negative coefficient for deposit rate. The Mutual Fund's performance drops by 0.0449 units for every unit increase in the Deposit Rate (DR).

The short-run adjustment process is reinforced by the large and negative lagged value of the deposit rate (DR(-1)), which indicates that previous values of the DR have a detrimental impact on the performance of mutual funds today. The NAV coefficient is negative and statistically

significant ($p < 0.05$), suggesting a short-term negative effect on the dependent variable. A 1-unit increase in Net Asset Value (NAV) results in a 0.3278-unit decrease in Mutual Fund performance. The Error Correction Term (CointEq(-1)) is significant and negative, indicating that the model corrects previous disequilibrium at a rate of approximately 9.22% per period. This term ensures that the system moves toward long-run equilibrium, and the negative sign confirms the presence of a mean-reverting process. The R-squared model explains approximately 96.20% of the variance in Mutual Fund performance, indicating a very strong fit.

The ECM results reveal that several variables (Mu, DR, NAV and their lags) have significant short-run impacts on the dependent variable. The significant and negative error correction term (CointEq(-1)) confirms that the model effectively corrects deviations from long-run equilibrium at a rate of 9.22% per period. The high level of R squared (0.962) as well as the significant F statistic provides strong evidence that the model explains the data very well. The Durbin Watson statistic verifies that there is no significant autocorrelation in the residuals, which adds to the validity of the model.

Table 1.5: Error Correction Model Estimates for Short Run

Akaike Info Criterion Model (1, 1, 0)

Variable	Coefficient	Std. error	t-Statistic	Prob.
Mu	0.7711	0.1131	6.8159	0.0001
MU(-1)	-0.7231	0.3117	-2.3198	0.0089
DR	-0.0449	0.0310	1.4453	0.0293
DR (-1)	-0.0793	0.0355	-2.2340	0.0028
NAV	-0.3278	0.1763	-1.8586	0.0101
CointEq(-1)*	-0.092212	0.011805	-7.751911	0.0001
R-squared	0.962039	Mean dependent var	2.317785	
Adjusted R-squared	0.914587	S.D. dependent var	0.178936	
S.E. of regression	0.052295	Akaike info criterion	-2.770935	
Sum squared resid	0.021878	Schwarz criterion	-2.224154	
Log likelihood	37.32388	Hannan-Quinn criter.	-2.678398	
F-statistic	20.27403	Durbin-Watson stat	2.558283	
Prob(F-statistic)	0.000129			

4.6. Diagnostic Tests

Validation and all classical assumptions tests results are presented in the Table 4.6. Each diagnostic test's results are examined below in detail.

4.6.1. Test of Ramsey RESET

This test tests whether the link between the dependent and the independent variables is suitably organized, that is to say, whether the model is faulty by a functional form misspecification. An obtained p-value of 0.1317 is used to accept the null hypothesis, that is, there is no functional form misspecification. Therefore we conclude that the model's functional form is acceptable because the p value is greater than typical levels of significance (e.g., 0.05 or 0.10), indicating that no missing variables contribute to the regression equation, or if some variables were transformed peculiarly.

4.6.2. Breusch-Pagan-Godfrey Test for Heteroskedasticity

This test is used to check one of the assumption of the homoskedasticity assumption about the error terms variance should not change from observation to observation. Since the p value of 0.2131 is more than significance level, we have to accept the null hypothesis that is homoskedastic. This implies that our model upholds the assumption of constant variance so we can be relieved off worrying about possible heteroskedasticity in the residuals.

4.6.3. Breusch-Godfrey LM Test for Serial Correlation

This test examines for serial correlation, a condition in which residuals from different observations are correlated, and assess the independence of the residuals. Since this test is well above usual significance thresholds ($p = 0.9952$), it shows us that null hypothesis, namely that there is no serial connection can be tolerated. This implies that there is no serial correlation in these residuals and that they are independent over observations, validating its assumption as well.

4.6.4. Jarque-Bera Normality Test

Determining whether or not residuals follow normal distribution is the true weight element behind hypothesis testing and the construction of precise confidence intervals. We accept the null hypothesis that the residuals are normally distributed because the p value associated with the test is greater than usual significance criteria: p value for the test was 0.4574. Pursuing this result further corroborates that the residuals of the model have a normal distribution and hence the statistical conclusions derived from regression analysis.

These powerful results increase the credibility of the model, in that it estimates and draws conclusions in the case of mutual fund performance with respect to all the independent variables being studied, that are likely trustworthy.

Table 4.6: Diagnostic Test Results

Test Name	P-Value	Decision	Result
Ramsey RESET Test	0.1317	Null Hypothesis Accepted	No problem of Functional form
Breusch-Pagan-Godfrey test for Heteroskedasticity	0.2131	Null Hypothesis Accepted	No problem of Heteroskedasticity
Breusch-Godfrey LM test for Serial Correlation	0.9952	Null Hypothesis Accepted	No problem of Serial Correlation
Jarque-Bera Normality Test	0.4574	Null Hypothesis Accepted	Data is Normally distributed

4.7. CUSUM Test

Figure 4.1 shows Cumulative Sum (CUSUM) Stability Test, a specifically used statistical test to check how parameters in a time series model's stability are performing over a period of time. The chart is showing the blue line which represents the cumulative sum of the recursive residuals generated from the regression model. Converting the values so that the line follows the horizontal axis against time reveals how the cumulative sum changes over time. The importance of this line is that it can demonstrate how well the parameters are stable in the model which is one of the things for which it is important that predictions and interpretations built on the model are accurate. Both dashed red lines that accompany the CUSUM line show the crucial limits of the 5% significance level. These limits indicate on what range the CUSUM line must stay within so that the model's parameters are deemed stable. If the blue line stays inside the red dashed lines continuously, then

the null hypothesis, that is, the model's parameters don't change over time, is supported according to the statistics. However, if the blue line is above these limits, then it implies the model may be unstable and that the parameters in the model may not be valid. The horizontal axis of the chart runs from 2017 to 2024, i.e. from a time period. The vertical axis shows a scale which is the cumulative sum of the residuals and values in this scale are roughly between -30 and +30.

The crucial boundaries highlighted by the red dashed lines for the observed 2019–2024 timeframe are contained by the blue CUSUM line whenever the data indicated by the blue CUSUM line exists. This provides an indication that the parameters of the model are stable in time and no obvious structural breaks or fractures are evident. If the values are inside the red lines, the null hypothesis of the CUSUM test that regression coefficients are stable is accepted at the 5% significance level. This acceptance is the idea of the parameters on that model have not changed very much over that examined time period. Therefore, considering all things these findings suggest that the model is strong and reliable to predict and to perform studies in this time interval. Also, it's showing little instability, in return this conveys the fact the regression coefficients aren't in need of urgent re-estimation or adjustment to be based on its predetermined timeframe of use.

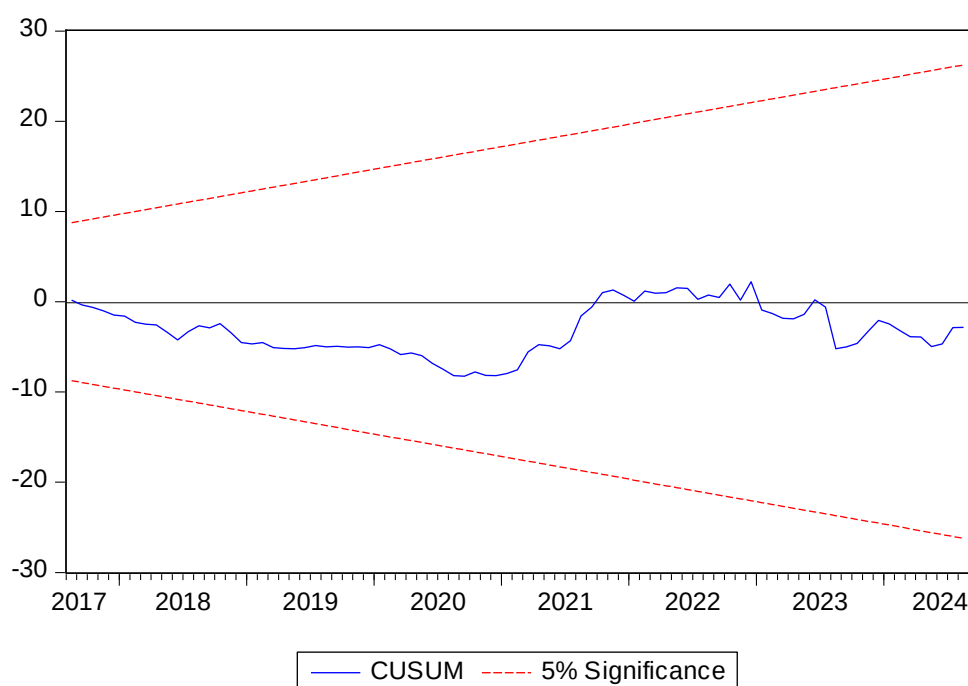


Figure 4.1 CUSUM Test

5.0. Conclusion and Recommendations

In this study, the complex dynamics of mutual fund performance with regard to the most important financial indicators, the Deposit Rate (DR) and the Net Asset Value (NAV), were carefully analyzed using cutting edge econometric tools. The research was done using models such as the Autoregressive Distributed Lag (ARDL) and the Error Correction Model (ECM), and which looked at the short and long term. A number of diagnostic tests were used to determine the robustness and repeatability of the results. This gave them a thorough knowledge of how these really important variables interact and how their impact on mutual fund performance is explained by these factors.

The Augmented Dickey-Fuller (ADF) test indicated that the variables like mutual funds, deposit rates were not stationary at level $I(0)$ but became stationary after first differencing ($I(1)$). Thus, the

Net Asset Value (NAV) was found to be clearly behaveable and stationary at level $I(0)$. The Bound Cointegration Test presented strong evidence of a long term equilibrium relationship of the independent variables (DR, NAV) with mutual fund performance. A strong cointegrating relationship that highlights the interdependence of these factors in the financial landscape was indicated by the computed F-statistic (7.1692), which exceeded the upper bound critical values across all significance levels.

The long-term performance of mutual funds showed a statistically significant negative correlation with the Deposit Rate (DR). The negative impact of rising interest rates on fund returns is demonstrated by the 0.6679-unit drop in mutual fund performance that followed a 1-unit increase in DR. On the other hand, there was a significant and favorable long-term correlation between mutual fund performance and the Net Asset Value (NAV). A 0.0251-unit improvement in performance was linked to a 1-unit gain in NAV, indicating that higher NAV values are a reflection of better fund management techniques and advantageous market circumstances.

The performance of mutual funds is significantly impacted in the near term by a number of variables, including Mutual Funds (Mu), Deposit Rate (DR), and NAV, according to the Error Correction Model (ECM). With a coefficient of -0.0922, the error correction term (CointEq(-1)) was determined to be significant and negative, meaning that the model corrects departures from the long-run equilibrium at a rate of 9.22% each period. This result demonstrates the self-correcting nature of the relationships studied and validates the existence of a mean-reverting mechanism. The model's tremendous explanatory power was demonstrated by the R-squared value (0.962), which showed that it could explain for an astounding 96.2% of the variance in mutual fund performance.

The model and variables' creditability was examined using the diagnostic tests listed below. The Ramsey RESET Test also indicates the functional form of the model to be well specified there's no evidence of missing variables or incorrect transformations. The Breusch Pagan Godfrey Test confirmed the homoskedasticity assumption and increased the dependability of the model by showing constant variance in the error terms. The Breusch-Godfrey LM Test confirmed the lack of serial correlation of the residuals using the examined data. The Jarque Bera Test was performed to ensure the statistical validity of the conclusions gained from the analysis and it was found that the residuals were normally distributed.

Using the CUSUM Stability Test, the model's parameters were found to be very stable over the period of the measurement (2017–2024) with no apparent structural shift or cracking. This stability lends support to its resilience and stability for depth investigation and to its use in forecasting.

5.1. Future Recommendations

This study provides a number of important points, but more work remains to be found in the areas of investigation and improvement.

- A future research could use a larger and more varied dataset including extra financial indicators such as inflation rates, exchange rates and worldwide movements of markets.
- Future studies could also take a look into other non-financial factors such as investor sentiment and macroeconomic data in order to have a better insight on said factors influencing mutual fund performance.
- Future research should analyze macroeconomic factors such as GDP growth, unemployment rate and inflation rate as to determine its effect on mutual fund performance.
- But we can also consider how changes of trade policies, geopolitical events and global market shocks impact mutual funds in different geographical areas.

- Also, one can investigate the impact of fund specific attributes on mutual fund performance such as fund size, expense ratios, management fees and portfolio turnover rates.

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