

Effect of Macroeconomic Variables on the Performance of Mutual Funds: Evidence from Bangladesh Financial Market

Abstract

Using multiple regression analysis in this research paper, this is examined that these macroeconomic variables (Money Supply-M2, Inflation Rates and Exchange Rates) have significant relationships with the performance of mutual funds (represented by monthly return based on NAV) in Bangladesh. According to this project paper, money supply M2 has a negative relationship with the performance of mutual funds in the financial market of Bangladesh. Because, a higher level of money supply in the market weakens the monetary value of taka which makes the market more vulnerable. And this vulnerable market leads to a negative impact on the whole financial market as well as the mutual fund industry. Interest rates have a positive relationship with the performance of mutual funds in the financial market of Bangladesh because a higher level of interest rate increases the tendency of savings in the ultimate consumers and they try to consume less and save more. This savings is going to be invested in the capital market as well as in the mutual fund industry which leads the market to a better position for the fund managers. Inflation rates have a negative relationship with the performance of mutual funds in the financial market of Bangladesh as the higher level of inflation makes the price of commodities higher and the monetary price of the taka lower. This tendency of making the less value of money, most of the investors want to withdraw their investment from the market which leads to a downturn in the financial market as well as in the mutual fund industry. At the end, exchange rates have a positive relationship with the performance of mutual funds as the higher level of exchange rate makes the Bangladesh taka more powerful in the international market.

Keywords: Exchange Rates; Inflation Rates; Interest Rates; Money Supply; Mutual Funds; NAV;

Introduction:

Mutual fund is an important instrument in the financial market of Bangladesh which is professionally managed fund collected from a variety of investors in the market. Different mutual funds have different level of performance over the year and some mutual funds are doing above standard and some are doing below average (Investopedia, 2019). Different economic factors have different level effects on the performance of these mutual funds available in the financial market of Bangladesh. Macroeconomic variables have large effects on the economy as well as on the financial markets. As the mutual funds are the major components of the financial market of Bangladesh, the macroeconomic variables may have higher or lower level effects on these mutual funds (Kazanjian, 1999). Islam & Mollah (2021) analyzes the dynamic relationship between macroeconomic variables and risk-adjusted returns of different types of mutual funds in Bangladesh.

Current status of mutual funds in Bangladesh:

In the financial market of Bangladesh, two principal types of mutual funds are available which are

1. Open-End Mutual Funds
2. Closed-End Mutual Funds

To deal with open-end mutual funds share, the funds are willing to buy back their share from the investors at the net asset value. This buy back is possible to be done at the end of each business day (Moshi and Kilindo 1999). Closed-end mutual funds are the listed funds in the share market. We have only 37 close end mutual funds listed in DSE in Bangladesh. These close-end mutual funds introduce their shares in the market through the initial public offering (IPO). Investors need to sell their shares in the market if they want not to hold the shares any longer and mutual funds are not bound to buy back their shares from the investors (Rowland 1996). The price of the shares will be determined according to the market movement which can vary from the net asset value (Fuchita and Litan, 2008).

Investment Corporation of Bangladesh (ICB) is a government institution first introduced the mutual funds in 1980 in Bangladesh. Now, only 1% of the total market capitalisation is occupied by Listed Mutual funds. Different banks and non-banks are getting involved in the mutual fund industry in Bangladesh. Now, according to the macroeconomic variables mutual funds need to be monitored. In the financial market of Bangladesh, there are 37 close-end mutual funds listed in DSE upto December 2018. The close-end mutual funds with their asset managers are given below:

Table-1: Asset Managers and Their Occupied Number of Close End Mutual Funds in DSE

Sl.No.	Manager to the Issue	No. Of Funds
1	ICB	3
2	ICBAMCL	10
3	LRGlobal	6
4	ATCPAMCL	1
5	RACE	10
6	AIMS	2
7	SEML	2
8	VAML	1
9	VIPB	2

	TotalClose EndMutualFund	37
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UNDER PEER REVIEW

Literature Review:

Lots of research work is done in the history to explain the relationship among macroeconomic variables like inflation, interest rates, exchange rates, money supply etc. with the performance of mutual funds in different countries. In this research paper, different analysis will be

explained below to display the effects of these macroeconomic variables on the performance of mutual funds in Bangladesh.

The reader of the thesis paper will understand the effects of various macroeconomic variables on the performance of mutual funds in Bangladesh and the investors will get the recommendations about when to buy and when to sell the investments of mutual funds according to the different macroeconomic factors.

Mohammad Raza Monjazebe and Esmaeel Ramazanpour (2013) had done a research to find the effects of macroeconomic variables on the performance of mutual funds and they found that the exchange rate as a macroeconomic variable has a positive effect on the performance of mutual funds. In that research paper, they also found that the inflation also has a positive effect on the return of mutual funds.

Kariuki (2014) researched on the effects of macroeconomic variables on the performance of mutual funds in Kenya. That research paper shows that different macroeconomic factors like inflation, exchange rate, interest rate, money supply and GDP have large effects on the performance of the mutual funds in Kenya. Some factors had positive effects and some factors have negative effects on the performance of mutual funds in the economy of Kenya. Kariuki (2014) researched through the regression model that the factors which had positive effects were GDP, Money supply, interest rate and inflation. And the factors which had negative effects were exchange rates of the country.

Another research was conducted by Dahlquist et al (2000) on the performance of mutual funds based on Swedish economy. Researcher explained the effects of different factors like past performances, revenue flows of mutual funds, overall turnover in the year, total size of the firm, proxy expenses and management cost. The effects of these factors on the performance of mutual funds in Swedish economy were explained throughout the research paper. At the end of the research paper, the researchers found that different fees and costs were reliable to decrease the excess returns of the mutual funds and the firms which had been professionally managed performed better in the market.

In another research paper, Ottem and Bam (2003) explained the effect of a location of a manager on the performance of mutual funds based on UK and USA. The researcher used the UK local to the USA investment and followed regression analysis on USA market. That research paper showed that there were no significant relationships between the location of a fund manager and the performance of mutual funds in USA.

Another research was conducted by Elton and Gruber (1988) according to Arbitrage Pricing Theory (APT) based on Japan. Elton and Gruber (1988) studied the effects of macroeconomic variables such as crude oil prices, industrial production and money supply on the equity returns in Japan. After doing the research, the author explained that the equity returns have a positive relationship with macroeconomic variable - short term interest rates.

Smirlock and Yawitz (1985) conducted a study to see the effect of macroeconomic variable-interest rates on equity prices. Throughout the research paper, the authors analysed the relationship among interest rates and equity prices according to monetary policy. The study revealed that the interest rates have an inverse relationship with equity prices.

The major objective of the study is to understand the performances of mutual fund industry & relationship with the macroeconomic variables which will help to understand the market behaviour of mutual funds according to the macroeconomic variables in Bangladesh.

Data and Methodology:

In this research paper, the deductive approach is followed where researchers thoroughly review some existing literature on the research topic and make some new hypothesis based on the topic and existing literature. After doing the research analysis with different data analysis tools, the research paper may support or not the research hypotheses. This research paper is going to deal with lots of numerical variables like NAV data of mutual funds, interest rates, inflation rates, money supply M2 and exchange rates of Bangladesh for last five years. As all the variables of this research paper are quantitative in nature, the quantitative research methods will be followed in this research paper to get the best output from the research paper (Scott, Rabanal and Kannan, 2009). As this study will explain the relationship among macroeconomic variables and the performance of mutual funds in the financial market of Bangladesh, this study is an explanatory study in nature. Again, this research will explore the performance of mutual funds in Bangladesh and the recent macroeconomic situations in Bangladesh. So, this research paper is also an exploratory study in nature.

In DSE, the total number of listed close-end mutual funds is 37 and 7 mutual funds are selected randomly to conduct the research paper. The data is collected for five years from January 2014 to December 2018. Mutual funds to conduct the research paper are given below:

Table-2: List of Mutual Fund

DSE Code	Names	Redemption Year	Fund Manager
1JANATAMF	First Janata Bank Mutual Fund	2020	RACE
IFIC1STMF	IFIC Bank 1st Mutual Fund	2019	RACE
PHPMF1	PHP First Mutual Fund	2020	RACE
EBL1STMF	EBL First Mutual Fund	2019	RACE
MBL1STMF	MBL 1st Mutual Fund	2020	LR Global
1STPRIMFMF	Prime Finance First Mutual Fund	2019	ICBAMCL
ICBEPMF1S1	ICB Employees Provident MF	2019	ICBAMCL

To achieve the objectives of this research paper, I have collected all the dependent and independent variables data from various sources available in Bangladesh. All the macroeconomic variables from the perspective of Bangladesh are:

- a. Money supply M2
- b. Interest rates
- c. Inflation rates
- d. Exchange rates

These macroeconomic variable data are collected from the World Bank data archive site where these macroeconomic variables are available according to different country and other indexes. The dependent variable data which is the return based on NAV has been collected from the DSE market and other secondary sources.

Different tools will be used to measure the performance of selected mutual funds in the financial market of Bangladesh. Those commonly used tools are Sharpe index, Treynor index, Jensen's alpha, Information ratio, regression data analysis in EViews (Black and Szado 2015). To find out the relationship among macroeconomic variables and the performance of mutual funds, the EViews is used to run following tests like: Unit Root Test, Stationary Test, Regression, Fixed Effect Regression, Random Effect Regression and Hausman Test.

Analysis and Discussion:

For each mutual fund scheme under study, the total returns are computed as:

$$R = \frac{(NAV1 - NAV0)}{NAV0}$$

Where,

R = Rate of Return of the mutual fund,

NAV1 = Net Asset Value of the mutual fund for year 1,

NAV0 = Net Asset Value of the mutual fund for year 0.

Table-3: Mean, Standard deviation and beta of mutual funds by using NAV

<i>Mutual Funds</i>	<i>Mean return from NAV</i>	<i>STD NAV</i>	<i>Beta</i>
IJANATAMF	0.00733	0.03368	0.32954
IFIC1STMF	0.00531	0.03285	0.44382
PHPMF1	0.00660	0.03574	0.40611
EBL1STMF	0.00782	0.03689	0.43236
MBL1STMF	0.00666	0.03609	0.41905
1STPRIMFMF	0.00952	0.06699	0.93567
ICBEPMF1S1	0.01437	0.05436	0.72273
DSEX	0.00516	0.04754	0.97297

Source: Own Calculation in excel

First of all, here, no mutual fund has negative mean return during the test period. The ICBEmployeesProvidentMutualFund has performed best during the test period and they are holding market leadership in the mutual fund industry in Bangladesh.

Treynor Measure:

Treynor (1965) stated the relationship between the return on the portfolio, above the risk-free rate, and its systematic risk (Hubner, 2003).

The ratio uses beta as a measure of risk: $TR = \frac{R_p - R_f}{\beta_p}$ where TR = denotes the Treynor Ratio,

R_p =denotestheaveragereturn, R_f =denotestheaveragereturnonrisk-freeassets, β_p =denotestheBeta. All the selected mutual funds among close end mutual funds of Bangladesh outperformed the according to NAV data. Among these seven mutual funds ICB Employees performed best IFIC 1STMF performed worst.

Table-4: Treynor Measure

Treynor Ratio (Reward to Volatility)			
Name of Funds	By NAV	Rank	Comments
1JANATAMF	0.0126398	2	Outperformed
IFIC1STMF	0.0048519	7	Outperformed
PHPMF1	0.0084617	4	Outperformed
EBL1STMF	0.0107826	3	Outperformed
MBL1STMF	0.0083505	5	Outperformed
1STPRIMFMF	0.0067957	6	Outperformed
ICBEPMF1S1	0.0155088	1	Outperformed
DSEX	0.0020511		

Source: Own Calculation in excel

Sharpe Measure:

Sharpe (1966) stated the relationship among the returns and variability. Sharpe ratio relates the excess return of a portfolio with the standard deviation of the portfolio. This ratio is calculated based by dividing average excess return by the standard deviation of the portfolio. The Sharpe ratio for this research paper is given below: $SR = \frac{R_p - R_f}{\sigma_p}$ where SR = denotes the Sharpe Ratio, R_p = denotes the average return, R_f = denotes the average return on risk-free assets, σ_p = denotes the standard deviation.

Table-5: Calculation of Sharpe Ratio

Sharpe Ratio (Reward to variability)			
Name of Funds	By NAV	Rank	Comments
1JANATAMF	0.123673	3	Outperformed
IFIC1STMF	0.065543	7	Outperformed
PHPMF1	0.096154	5	Outperformed
EBL1STMF	0.126382	2	Outperformed
MBL1STMF	0.096957	4	Outperformed
1STPRIMFMF	0.094913	6	Outperformed
ICBEPMF1S1	0.206177	1	Outperformed
DSEX	0.041973		

Source: Own Calculation in excel

In the calculation of Sharpe ratio with the NAV data ICB Employees fund belonged in the top position and IFIC first performed worst according to NAV data. These measures are also suitable for evaluating the performance of a portfolio that represents an individual's total investment. The main criticism of the Sharpe ratio is that it considers total risk/standard deviation as a relevant measure of risk.

Jensen's Alpha Measure:

Jensen (1968) founded the measure which compare the excess return of market with the excess return of portfolio in the basket. This is an arithmetic difference between the market excess return and portfolio excess return for a specific period in the financial market.

Jensen's alpha measure is calculated by:

Differential Return = Portfolio Return - CAPM Return or $(R_p - R_f) = \alpha + \beta (R_m - R_f)$ where α = Excess return, R_p = denotes the average return of the portfolio, R_f = denotes the average return on risk-free assets, β = denotes the Beta.

Table-6: Calculation of Jensen Alpha

Jensen Alpha			
Name of Funds	By NAV	Rank	Comments
1JANATAMF	0.0035	4	Outperformed
IFIC1STMF	0.0013	7	Outperformed
PHPMF1	0.0026	6	Outperformed
EBL1STMF	0.0038	3	Outperformed
MBL1STMF	0.0027	5	Outperformed
1STPRIMFMF	0.0045	2	Outperformed
ICBEPMF1S1	0.0098	1	Outperformed
DSEX	0.000053936		

Source: Own Calculation in excel

Here, the Jensen Alpha is positive for all of the mutual funds which indicate that the mutual funds in Bangladesh can outperform in the financial market. The ICBEmployee Performs mutual fund has the highest Jensen Alpha and IFIC first mutual fund has lowest Jensen Alpha.

Information Ratio:

I used this formula for calculating information ratio for NAV data. Information ratio delineates how much information a mutual fund can own and up to which extent it can apply those information and data for achieving higher return. This formula is $IR = E(R_p - R_m) / \sigma$.

Table-7: Information Ratio for NAV

Information Ratio			
Name of Funds	By NAV	Rank	Comments
1JANATAMF	0.0503	4	Outperformed
IFIC1STMF	0.0044	7	Outperformed
PHPMF1	0.0355	6	Outperformed
EBL1STMF	0.0664	3	Outperformed
MBL1STMF	0.0374	5	Outperformed
1STPRIMFMF	0.0890	2	Outperformed
ICBEPMF1S1	0.2138	1	Outperformed

Source: Own Calculation in excel

Herethistables showsusthatthroughtheNAVdataICB Employeeshasmuchhigher informationratiothanothermutualfundhas.Allofthemutualfundscanaddvaluefrominformation.IFIC haspoorperformanceincalculationwithNAV data.

Correlation:

The correlation analysis basically shows if there any relationship exists among the variables. Therelationshipscan beamongdependentvariablesonlyorindependentvariablesonlyorboth.

Table-8:CorrelationAnalysis

Variables	Moneys upplyM2	Interest rate	Inflation rate	Exchange rate	Return basedonN AV
Moneysupply	1	0.9404	0.9139	0.8659	0.0919
Interestrates	0.9404	1	0.9811	0.6663	0.0429
Inflationrate	0.9139	0.9812	1	0.6097	0.0158
Exchangerates	0.8659	0.6662	0.6097	1	0.1395
Returnbased onNAV	0.0919	0.0429	0.0158	0.1395	1

Source:OwnCalculationinexcel

UnitRootTest:

InthisresearchpaperthemostcommonlyusedtestsaredonewhichareADF(AugmentedDickeyFullertest)andPPTest whichisPhillips-PerronTesttodotheunitroottestofthedata(Dickey& Fuller, 1979). Thus, the unit root test based on ADF and PP is done to check whether the datais stationary or not and also to check the order of the variables. The result of unit root test isdisplayed here where it can be said that all variables are stationary except exchange rate at theirlevel.

Table-9:UnitRootTest

UnitRoottest	ADFTest	PPTest
Variables	Level	Level
MoneysupplyM2	0	0
Interestrates	0	0
Inflationrate	0	0
Exchangerates	1	1
ReturnbasedonNAV	0	0

Source:OwnCalculationinexcel

In both ADF and PP test, it can be seen that the value of the test for money supply, inflation rate,interest rate and return based on NAV is zero (0) and the value of unit root test is one (1) forexchange rate. So, here, we can reject the null hypothesis for four variables as they are stationaryand not for one variable (exchange rate) as this is not stationary at level. Thus, the first differenceneedstobedoneonlyforexchangerate.

Stationary Test:

The stationary test shows the first differences of unit root test in this research paper.

Table-10: Stationary Test

Unit Root test	ADF Test	PP Test
Variables	1st Difference	1st Difference
MoneysupplyM2	0	0
Interstrate	0	0
Inflationrate	0	0
Exchangerate	0	0
ReturnbasedonNAV	0	0

Source: Own Calculation in excel

In the above given chart, it is seen that all of the variables are stationary as there 1st differences which provided the value zero (0). Thus, we can also reject the null hypothesis for exchange rate at 1st differences as the exchange also proven as stationary here.

Equality of Variances Test:

Here is the equality of variance tests result which is providing the scenarios of differences among the variables over the periods. The total numbers of observations of each variable are 420 for these five variables.

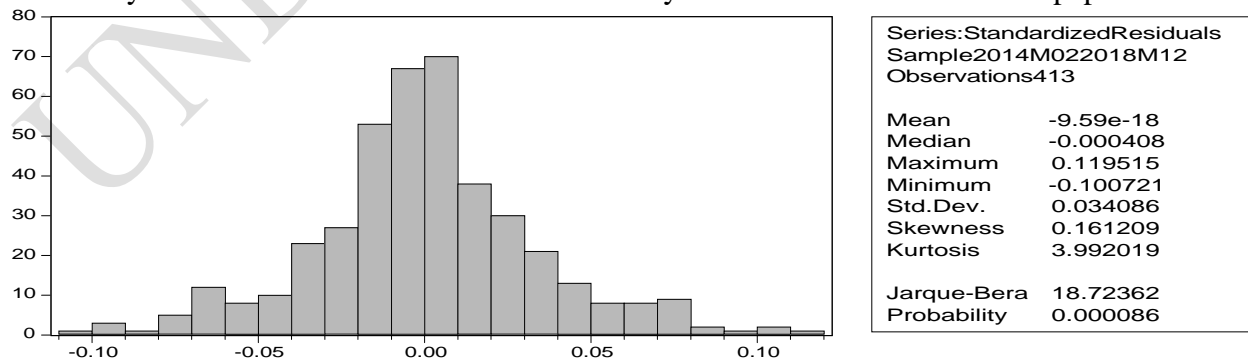
Table-11: Equality of Variances Test

Variable	Count	Std.Dev.	Mean Abs. Mean Diff.	Mean Abs. Median Diff.
ReturnbasedonNAV	420	0.036504	0.026715	0.026653
MoneysupplyM2	420	0.167867	0.147931	0.147931
Interstrate	420	0.011257	0.010056	0.009672
Inflationrate	420	0.006975	0.005867	0.005675
Exchangerate	420	2.166931	1.854144	1.613002
All	2100	30.89351	0.408943	0.360586

Source: Own Calculation in excel

Normality test:

Normality test shows whether the variables are normally distributed or not in the research paper.



Graph-1: Normality test

Here, from the above given graph it can be said that the variables of this research paper are normally distributed. The median value of the data set is -.000408, the maximum value is .1195, the minimum value of the data set is -.100721, the standard deviation is .034086, Skewness is .161.

Regression Analysis:

To find out the effects of macroeconomic variables like money supply M2, interest rate, inflation rate and exchange rate on the performance of mutual funds in the financial market of Bangladesh, a multiple regression analysis has been conducted using EViews software. EViews is commonly used software to analyse different variables according to different tests. The multiple regressions will be more suitable to use fixed effects and random effect regression. Here, multiple regression model is conducted to find out the result of this paper and this regression analysis has been conducted by using “Panel Least Squares” method in EViews. And the summary of the regression is shown in the box:

Table-12: Regression Analysis

Variable	Coefficient	t-Statistic	Prob.
C	1.465847	3.425025	0.0007
Money supply M2	-0.09556	-3.22688	0.0014
Interest rate	0.635592	0.673639	0.5009
Inflation rate	-3.2026	-2.53759	0.0115
D(Exchange rate)	0.018689	2.435854	0.0153

Source: Own Calculation in excel

The overall regression equation is

$$\text{Return based on NAV} = 1.465847 - 0.09556(\text{M2}) + 0.635592(\text{Int.}) - 3.2026(\text{Inf.}) + 0.018689(\text{Ex})$$

This regression equation is showing the relationship among independent variables and dependent variables with a constant intercept. From the equation it can be said that if we hold all other variables constant, the return based on NAV will be increased by 1.465847 unit each month. This 1.465847 units is constant which will not be effected any other variables. Here, the dependent variable is return based on NAV of mutual funds and the independent variables are money supply M2, interest rate, inflation rate and exchange rate. In the output box of the regression analysis, it is seen that the value of R square is only 0.057385 which is very low that means the independent variable can explain the dependent variable at only 5.74%. Thus macroeconomic variables mentioned here can explain the performance of mutual funds in the financial market of Bangladesh at only 5.74% level. Now, the adjusted R square needs to be focused to find out the proper explanation because the adjusted R square is unbiased about the total number of the observations and the adjusted R square consider the degree of freedom. In the regression analysis the adjusted R square is 0.048144 and this is also so much lower to explain the dependent variable. The independent variables can explain the dependent variable on at 4.8% according to adjusted R square. Here, the model as whole is significant because the P value is 0.000074 which is lower than 5% in the regression analysis.

Fixed Effect Analysis:

To produce the best results from the regression analysis, we need to consider the unique characteristics of variables incorporated in the research paper. One individual variable can affect another which may mislead the result of the regression analysis. So, a fixed effect regression analysis is done to control the invariant characteristics of variables. Here are the summary results of the regression analysis under fixed effect:

Table-13: Summary of Fixed Effect Analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.46585	0.429127	3.415884	0.0007
MoneysupplyM2	-0.09556	0.029693	-3.21826	0.0014
Interstrate	0.63559	0.946045	0.671841	0.5021
Inflationrate	-3.2026	1.26544	-2.53082	0.0118
D(Exchangerate)	0.01869	0.007693	2.429352	0.0156

Source: Own Calculation in excel

Here, the new equation according to the fixed effect analysis is:

$$\text{Return based on NAV} = 1.465847 - 0.095561(M2) + 0.635592(\text{Int.}) - 3.202596(\text{Inf.}) + 0.018689(\text{Ex})$$

Random Effect Analysis:

According to the output of the random effect analysis, different determiners have different tendency to have the parameter at their ease which have differences in the panel data. These differences in panel data happens randomly which may mislead the results of the regression analysis. To remove the variant characteristics of the variables, a random effect analysis has been conducted with the Panel EGLS (Cross-section random effects) method in multiple regressions.

Table-14: Summary of the Random Effect Analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.465847	0.42913	3.415884	0.0007
MoneysupplyM2	-0.09556	0.02969	-3.21826	0.0014
Interstrate	0.635592	0.94605	0.671841	0.5021
Inflationrate	-3.2026	1.26544	-2.53082	0.0118
D(Exchangerate)	0.018689	0.00769	2.429352	0.0156

Source: Own Calculation in excel

The random effect model is significant because the value of P (F-statistic) is 0.001918 which is less than 5%. After conducting the random effect analysis with Panel EGLS (Cross-section random effects) the new equation is like:

$$\text{Return based on NAV} = 1.465847 - 0.09556(M2) + 0.635592(\text{Int.}) - 3.2026(\text{Inf.}) + 0.018689(\text{Ex})$$

Housman Test:

The fixed effect analysis has some unique features and the random effect analysis also has some unique characteristics. The fixed effect and the random effect analysis may have some dissimilarity in the outcome of the analysis which may affect or mislead the result. The summary of the Housman test is provided here like:

Table-15: Summary of Housman Test

Variable	Fixed	Random	Var(Diff.)
MoneysupplyM2	-0.09556	-0.09556	0.000
Interestrates	0.635592	0.635592	0.000
Inflationrate	-3.2026	-3.2026	0.000
D(Exchangerate)	0.018689	0.018689	0.000

Source: Own Calculation in excel

To check either the fixed effect or random effect is appropriate, the Housman test is done in this research paper. Housman test will show if there is any dissimilarity between fixed effect and random effect analysis to get the proper outcome from the research. Both the fixed effect analysis and random effect analysis can be applicable for this research paper. From the above given chart it is clear that there are no differences among the coefficients of independent variables according to the fixed effect analysis and random effect analysis in the Housman test.

Relationship among dependent variable and independent variables:

Table-16: Comment on Regression

Variables	Co-eff. (λ)	P-value	Comments
MoneysupplyM2	-0.09556	0.0014	The coefficient of money supply M2 is -0.09556 which is showing negative sign. This coefficient states that the relationship between money supply M2 and the return based on NAV of mutual funds is negative. As the P value is 0.0014 which is less than 5%, the relationship is significant.
Interest rate	+0.635592	0.5009	The coefficient of interest rate is +0.635592 and that is positive in nature. So, the relationship between interest rates and the return based on NAV is positive. But, the test result is not significant as the P value is 0.5009 which is more than 5%.
Inflation rate	-3.2026	0.0115	The coefficient of inflation rate is -3.2026 and this is negative value. And the test result is significant as the P value is 0.0115 which is less than 5%. So, the inflation rate is negatively related to the return based on NAV.
Exchange rate	0.018689	0.0153	The coefficient of Exchange rate is 0.018689 and this is positive value. And the test result is significant as the P value is 0.0153 which is less than 5%. So, the inflation rate is positively related to the return based on NAV.

Source:Own calculation inExcel(Regression)

UNDER PEER REVIEW

Findings and Conclusions:

In the research paper, the major objective was to find out the effects of macroeconomic variables on the performance of mutual funds in the financial market of Bangladesh. At first, to see the effect of macroeconomic variables like money supply-M2, inflation rate, interest rate and exchange rate a quantitative research technique was used in the study. To analyse the performance of mutual funds in Bangladesh, some ratios were shown in the study based on last five-year data for seven (randomly selected) mutual funds. To examine the relationship of macroeconomic variables with the performance of mutual funds, regression was conducted with EViews software.

From the regression analysis, money supply-M2 has a significant relationship with the performance of mutual funds. This relationship between money supply-M2 and the performance of mutual funds is negative where one-unit increase of money supply causes decrease in the performance of mutual funds by 0.09556 unit. Interest rate has a positive relationship with performance of mutual funds but this relationship is not significant according to the p value. Inflation rate has a significant relationship with the performance based on NAV of mutual funds in Bangladesh. But, this relationship is negative in nature and one-unit increase in the inflation decreases 3.2026 unit in the return of mutual funds in Bangladesh. The exchange rate has a positive relationship with the performance of mutual funds in Bangladesh. The exchange rate has a significant relationship with the performance of mutual funds in Bangladesh where one unit increase of exchange rate increases 0.018689 unit of return based on NAV of mutual funds in the financial market of Bangladesh.

So the policymakers should control the money supply-M2 more efficiently as higher money supply causes higher losses in the mutual fund industry. Inflation should be in controlled level because inflation has highest level of negative relationship with the performance of mutual funds in the financial market of Bangladesh. Lower level of inflation may provide the better environment for the mutual fund industry. Exchange rate should be higher as the exchange rate has the positive relationship with the performance of mutual funds in the financial market of Bangladesh.

COMPETING INTERESTS

Authors have declared that they have no known competing financial interests OR non-financial interests OR personal relationships that could have appeared to influence the work reported in this paper.

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UNDER PEER REVIEW

Appendices:

Table A1: Regression Output in EViews

Dependent Variable: RETURN_BASED_ON_NAV				
Method: Panel Least Squares				
Date: 08/29/19 Time: 17:52				
Sample (adjusted): 2014M02				
2018M12 Periods included: 59				
Cross-sections included: 7				
Total panel (balanced) observations: 413				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.465847	0.427981	3.425025	0.0007
MONEY_SUPPLY_M2	-0.095561	0.029614	-3.226875	0.0014
INTEREST_RATE	0.635592	0.943520	0.673639	0.5009
INFLATION_RATE	-3.202596	1.262062	-2.537589	0.0115
D(EXCHANGE_RATE)	0.018689	0.007672	2.435854	0.0153
R-squared	0.057385	Mean dependent var		0.000544
Adjusted R-squared	0.048144	S.D. dependent var		0.035108
S.E. of regression	0.034253	Akaike info criterion		-3.898080
Sums of squared resid	0.478680	Schwarz criterion		-3.849370
Log likelihood	809.9534	Hannan-Quinn criter.		-3.878814
F-statistic	6.209589	Durbin-Watson stat		2.001072
Prob(F-statistic)	0.000074			

Table A2: Pairwise Granger Causality Tests

Null Hypothesis:	Observation	F-Statistic	Prob.
Money supply M2 does not Granger Cause Return based on NAV	406	1.15408	0.3164
Return based on NAV does not Granger Cause Money supply M2		6.17183	0.0023
Interest rate does not Granger Cause Return based on NAV	406	1.32181	0.2678
Return based on NAV does not Granger Cause Interest rate		0.27036	0.7632
Inflation rate does not Granger Cause Return based on NAV	406	8.24666	0.0003
Return based on NAV does not Granger Cause Inflation rate		2.47571	0.0854
Exchange rate does not Granger Cause Return based on NAV	406	4.67288	0.0099
Return based on NAV does not Granger Cause Exchange rate		1.42060	0.2428
Interest rate does not Granger Cause Money supply M2	406	1.54493	0.2146
Money supply M2 does not Granger Cause Interest rate		3.03409	0.0492
Inflation rate does not Granger Cause Money supply M2	406	3.02621	0.0496
Money supply M2 does not Granger Cause Inflation rate		2.68184	0.0697
Exchange rate does not Granger Cause Money supply M2	406	2.04365	0.1309
Money supply M2 does not Granger Cause Exchange rate		32.9187	6.00E-14
Inflation rate does not Granger Cause Interest rate	406	31.7789	2.00E-13
Interest rate does not Granger Cause Inflation rate		1.74926	0.1752
Exchange rate does not Granger Cause Interest rate	406	10.7795	3.00E-05
Interest rate does not Granger Cause Exchange rate		19.6198	7.00E-09
Exchange rate does not Granger Cause Inflation rate	406	6.86595	0.0012
Inflation rate does not Granger Cause Exchange rate		24.0964	1.00E-10