



Assessment of Performance of Mutual Funds Listed in Dhaka Stock Exchange, Bangladesh

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ABSTRACT

This paper aims to investigate the Mutual Fund industry's performance in Bangladesh, considering the close-end mutual funds of 32 listed funds in the Dhaka Stock Exchange, Bangladesh. The study employed unbalanced panel data analysis throughout 2014 to 2019. By using an error-corrected panel data regression model with an attempt to investigate the performance of mutual funds considering several fundamental factors such as Return on Assets, Earning per unit, Fund Size, Fund Age, Dividend payout ratio, Net Asset Growth and Management Fees, etc. After correcting autoregressive disturbance, the RE GLS regression model is selected to describe this panel data analysis. It demonstrates a significant positive connection between earning per unit and return on assets. The study identifies a significant negative relationship with fund age and asset growth in response to the change of return on assets. It also concludes there is no significant predictive power among the fund size, dividend payout ratio, management fees with return on assets while defining mutual fund performance. The study fills the gap by investigating the significant relationship of these following variables with the fundamental performance indicator. Findings of the empirical analysis suggest that the investors should pay close attention to earnings, fund age and assets growth while selecting mutual funds for investment. It is noticed that the company generally tends to pay lower dividend when the performance and profitability starts decrease. Policy makers should also pay attention to defining the downward characteristics of asset growth and dividend payout compared to the basic profitability ratios.

Keywords: Mutual Funds, Close End Mutual Funds, Performance Analysis, Dhaka Stock Exchange, Bangladesh.

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INTRODUCTION

Mutual fund is an investment tool that pools money from many investors through investing money in stocks, bonds, short-term money-market instruments, other securities, or assets. It is a diversified portfolio investment tool that the small investors generally prefer who don't have much expertise and time in handling portfolio while investing in the capital market (Kumar, 2019, Hussain, 2017). Investing in the mutual fund market is less risky and safer than investing directly in the stock market (Nicolescu et al., 2020). Mutual fund industry has been operating its activities in Bangladesh's capital market since the last three decades.

Bangladesh Securities and Exchange Commission (BSEC) currently regulate the mutual fund industry in Bangladesh under the Securities and Exchange Commission act 2001. In 1980, Investment Corporation of Bangladesh (ICB) as an Asset Management Company first introduced a mutual fund in Bangladesh's capital market, namely "First ICB Mutual Fund." The total open-ended net asset value of the worldwide mutual fund industry indicates EUR 52.7 trillion during the fourth quarter of 2019. As of 30th June 2018, the total size of the mutual fund industry in Bangladesh was 114090.3 million BDT. During the financial year of 2018-2019, the total net asset value (NAV) of 37 closed-end

mutual funds listed in the Dhaka Stock Exchange (DSE) and Chittagong Stock Exchange (CSE) was BDT 6087.23 crore, which were 65.23 crores less than the previous year. That means the net asset value was decreased by 1.06% than the year 2017-2018.

Several researches concluded that the size of a mutual fund largely depends on the maturity of the capital market, highly structured investment under strict regulation, demographic factors as well as a country's overall economic development (ICB Asset Management Company Limited, 2018; Kabir Biplob, 2017). Most of the empirical studies identified the risk-adjusted performance of the Bangladeshi mutual fund industry using popularly used ratios of Sharpe, Treynor, Jensen's alpha as well as the CAPM model. (Anjom, 2020; Rahman et al. 2012; Chowdhury et al. 2018; Qamruzzaman, 2014; Dewri & Islam, 2016; Kabir Biplob, 2017; Hassan & Akhter, 2011; Das, 2016). However, the present study identifies a significant gap in explaining the performance through the basic factors that significantly impact the following research problem. Therefore, this study aims to conduct an in-depth analysis of the factor, namely, Earnings Per Unit, Dividend Payout Ratio, Fund Age, Fund Size, Assets Growth, Management Fees, and Return on Assets, etc.

This paper is organized under different sections. Firstly, it identified the current position of the mutual fund industry in Bangladesh. Secondly, it reviewed early research studies on worldwide mutual fund and its performance evaluation. Thirdly, it described the research design and conducted the empirical model to solve the respective research problem. Finally, the study evaluates the overall performance based on the variable used and recommends some policy implications that should be considered for the development of the mutual fund industry.

OVERVIEW OF MUTUAL FUNDS IN BANGLADESH

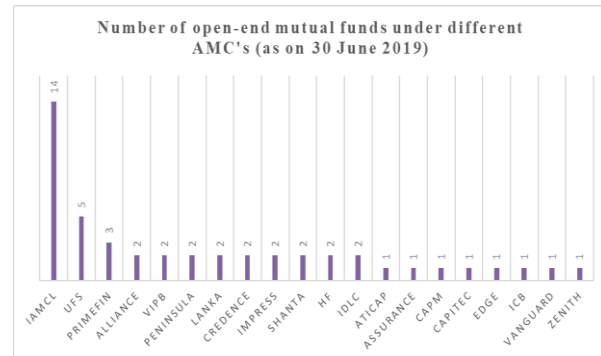
In accordance with the U.S Securities and Exchange Commission, A mutual fund is an institution that collects money from investors and invests it in bonds, stocks, and other assets. Mutual funds maintain a portfolio in their investment by investing in different securities like stocks, bonds, money market instruments, and other assets. Every investor in the funds has a part of ownership in investments. Currently there are two types of mutual fund in Bangladesh:

- Open-Ended Mutual Fund:** An Open-end mutual fund is an investment scheme where unit of funds can be issued or redeemed at any time at the net asset value of that day. Most of the open-ended mutual funds are selling units to the investor on every business day, where units are priced at their net asset value.
- Close-Ended Mutual Fund:** A close-end mutual fund is an investment scheme where a fixed number of units are issued which cannot be redeemed from the fund. In case of close-ended mutual fund, if any Investors don't want to continue their investment in the fund, they cannot sell units back to the fund (which is possible in open-ended mutual funds). However, they have an alternative that they can sell their units to the other investors at market price, which is normally different from net asset value (NAV).

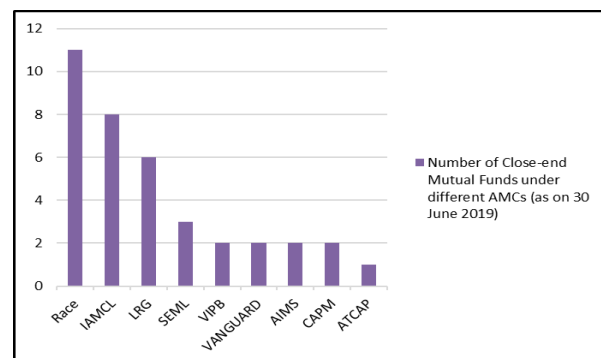
In Bangladesh, the Mutual fund industry is more than three decades old. In April 1980 Investment Corporation of Bangladesh (ICB) as an asset management company first introduced a mutual fund, namely "First ICB Mutual Fund," in the capital market of Bangladesh. This industry experienced slow growth in the first two decades. There were only 10 mutual funds listed on Dhaka Stock Exchange (DSE) till the year 2000, but after 2000 this industry was mentionable flourishing in Bangladesh's capital market. On 29 August 1999, the Government opened the doors for private limited companies. To control unwanted activities, a comprehensive regulatory framework was developed under Bangladesh Securities Exchange and Commissions as a Securities and Exchange Commission act 2001. At present, 23 public and private asset management companies are doing business under the Securities and Exchange Commission act 2001 in this sector.

At the end of the financial year 2018-19 (Financial year in Bangladesh is June to July); the total net asset value (NAV) of 37 close-end mutual funds listed in the Dhaka Stock

Exchange (DSE) and Chittagong Stock Exchange (CSE) was BDT 6087.23 crore. It was 6152.46 crore at the end of the financial year 2017-2018, which means 1.06% less than that of 2017-2018. As of the end of June 2019, there was BDT 7944.65 crore of the total net asset of 48 open-end mutual funds of Bangladesh, and the size of the total assets of the country's mutual fund at the end of June 2019 was BDT 11487.85 crore that was 0.62% of the country's GDP.



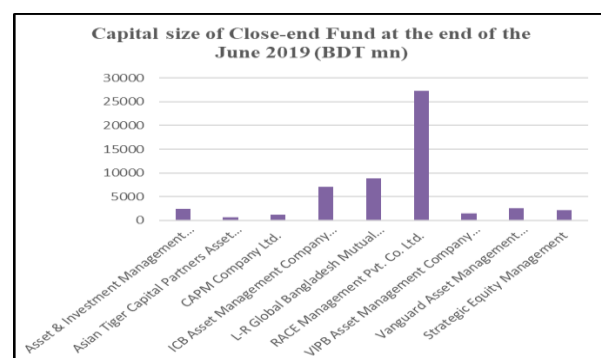
Source: ICB AMCL Close End Mutual Funds Annual Report 2018-19.



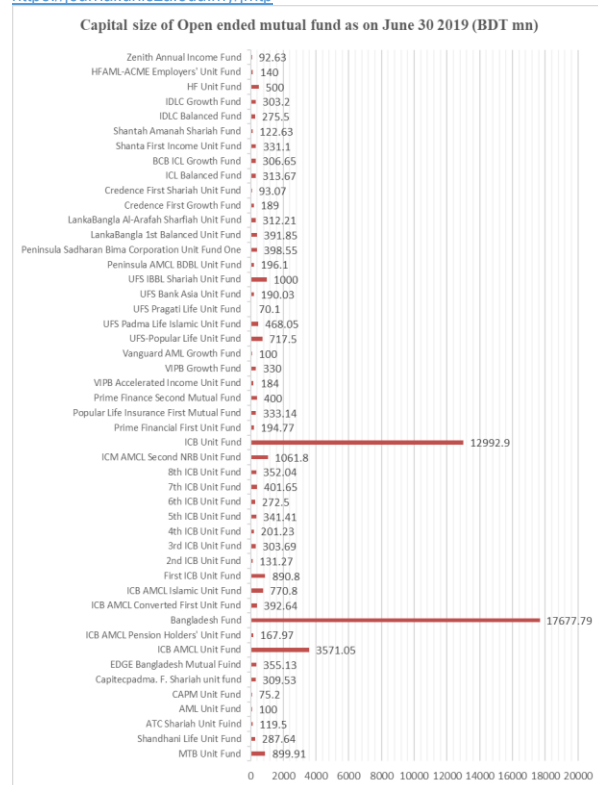
Source: ICB AMCL Close End Mutual Funds Annual Report 2018-19.

Asset Management Companies (AMCs):

At present, 37 close-end and 48 open-end mutual funds are listed on the stock exchange. Among the 37 close-end listed mutual funds, 09 funds are managed by the Investment Corporation of Bangladesh (ICB) Asset Management Company, and out of 48 open-end mutual funds in Bangladesh Investment Corporation of Bangladesh (ICB) manage 14 funds.



Source: ICB AMCL Close End Mutual Funds Annual Report 2018-19.



Source: ICB AMCL Close End Mutual Funds Annual Report 2018-19.

LITERATURE REVIEW

THEORETICAL EVIDENCE:

Return on assets (ROA)

Among the many researchers (Hult et al., 2008) clearly explained the concept of performance evaluation. The performance evaluation was divided into three types: first one is financial performance second one is operational performance, and the third is overall effectiveness. Financial performance includes- return on equity, return on investment, return on sales, profit margin, return on assets, earning per share, stock price, and sales growth. Operational performance contains- efficiency, market share, and innovation. Overall effectiveness includes- survival, aim achievement reputation, and perceived overall performance. In this study, ROA is used as a proxy of fund performance.

Earning per unit

According to the Signal Theory, Any type of good information for investors is better for its performance. Usually, management reveals information that is related to the investor's welfare. This information can be any type like company earnings increase, cost decrease, better share price, asset growth, more excellent earning per unit (EPU), etc. In accordance with signal theory, (Yuliza, 2018) examined the impact of EPS on stock price and found a significant impact of EPS on share price because a positive signal attracts investors to invest in the particular company.

Dividend payout

In Modigliani and Miller's (MM) dividend irrelevance theory, the dividend has no influence on firm stock price and cost of capital. In accordance with this theory, Foong et al., (2007) analyzed using multiple regressions on firm performance and dividend-related factors: the case of Malaysia with the sought

to determine the relationship between dividend payout and firm's performance where data were collected from Malaysian Trading/Services and Plantation firms for the years 1992 to 2000. The authors found a weak or insignificant relationship between dividend payout and firm performance in Malaysian Trading/services and plantation firms.

Fund age

Under organismic life cycle analogy, an organization is like people or plants, which means there is a time to flourish. After passing that time, the productivity and profitability of the organization may decrease. So, it could be stated that there is a negatively significant relationship between firm age and profitability. Although many researchers don't want to agree with this analogy because they think the organizational life cycle is uncertain, which can't be predetermined.

Fund size

According to the Santarelli (2006) Gibrat hypothesis, there is a significantly negative relationship between firm size and firm performance. When the firm size is an increasing rate, then firm performance will be a decreasing rate. (Ilaboya & Ohiocha, 2016) studied on Firm Age, Size and Profitability Dynamics: A Test of Learning by Doing and Structural Inertia Hypotheses to evaluate the relationship between firm size, firm age, and firm performance. The research found that firm size and firm performance have a significant negative relationship, although data analysis and interpretation could be more conformity to ensure research validity.

Assets growth

According to Nobel laureate James Tobin's Q theory, company financial conditions depend on the manager's willingness or investment expenditure by minimizing the cost of capital. Asset growth is not more significant, if the manager cannot use those assets efficiently. In similar to the Q theory, (Titman et al., 2003) applied regression analysis on 40 countries including the USA. The authors found that 13 countries had positively significant relationships and 26 countries had negatively significant relationships with asset growth and firm performance. The authors concluded that asset growth impact depends on the country's condition, as in the case of developed countries impact of asset growth is more visible than developing or underdeveloped countries.

Management fees

According to economic efficiency principles, skilled and experienced management should be remunerated for their effective and efficient management, which has more return in long run although higher cost in short run than other organizations (Grossman, Sanford J.;Stiglitz, 1980). If a smart manager doesn't have any remuneration, their management effort and valuable services may disappear. So, highly effective fund managers should take remuneration fees from investors to back them in a large return. Empirically it can be said that there is both positive and negative relationship between management fees and returns.

EMPIRICAL STUDY:

Return on Assets (ROA)

Return on Assets (ROA), used as a standard indicator to measure firm operating and financial performance (Klapper & Love, 2002) Higher ROA indicates that the firm was utilized its assets more effectively for better output, which has direct advantages to shareholders. On the other side, lower ROA means the firm failed to use its assets properly, which negatively impacted shareholder value (Haniffa & Hudaib, 2006; Ibrahim et al., 2010). Many researches used ROA as an important indicator to measure firm performance some of them are (Uwuigbe & Olusanmi, 2012; Karaca & Eksi, 2012; Rouf, 2011; Shumway, 2001; Khatib et al., 2011; Ivashkovskaya & Zinkevich, 2009; Jackling & Juhl, 2009; Bauwhede, 2009; Singh & Gaur, 2009).

Variables	Significant Positive Relationship	Significant Negative Relationship	Insignificant Relationship
Relationship between EPU and fund performance	(Majanga, 2015; Hemadiviya & Devi, 2013; Taani, Khalaf; Hamed Banykhaled, 2011; Shehzad & Ismail, 2014; Wmss, 2019; Nabi 2014)	N. Vijayakumar, S. Muruganandan and Rao, K., (2012)	Umar, Muhammad Sani; Musa, (2013)
Relationship between dividend payout and fund performance.	Arnott & Asness, 2003; Al-Kuwari, 2009; Howatt et al., 2009; Ping & Ruland, 2006)	(Renneboog & Trojanowski, 2007; Gugler & Yurtoglu, 2003; Al-Najjar & Kilincarslan, 2016; Mancinelli & Ozkan, 2006; Ting et al., 2017)	(DeAngelo et al., 2006; Farsio et al., 2004; Nissim & Ziv, 2001; Stulz, 2010; Foong et al., 2007)
Relationship between fund age and fund performance.	(Coad et al., 2013; Grazi & Moschella, 2018; Pellegrino, 2017)	(Adams et al., 2005; Cheng, 2008; Colombelli et al., 2016; Helwege et al., 2007; Holderness et al., 1999; Loderer & Waelchli, 2010; Hannan & Freeman, 1984)	(Low, Soo-Wah. 2010; Boyson, 2008; Colombelli et al., 2008)
Relationship between fund size and fund performance.	(Bojnec & Latruffe, 2013; Pervan, Maja; Višić, 2012; Kuncová et al., 2016; Lee, 2009; Agiomirgianakis et al., 2006; Oyelade, 2019)	(Low, Soo-Wah. 2010; Robert, T. Kleiman and Anandi P. Sahu, 1988; Vaughan, 2001)	(Radipere & Dhlwayo, 2014; Goddard, John; Molyneux, Phil; Wilson, 2004; Jónsson, 2007)
Relationship between asset growth and fund performance.	(Maggina et al., 2012; Michael J. Cooper, Huseyin Gulen, 2008)	(Bettman et al., 2011; Lipson et al., 2011; Xing, 2008)	(Nasser Saki, Ali Esmailzadeh Maghari, Mahtab Arab, 2018)
Relationship between management fees and fund performance.	Díaz-Mendoza et al., 2014; Berkowitz & Kotowitz, 2002)	(Babalos, Kostakis & Philipas, 2009; Carhart, 1997; Miguel A Ferreira, 2013; Roger Otten, 2002)	(Kaur, 2018)

In this research, we are different from others because a few researches have been found where used earning per unit (EPU), dividend payout, fund age, fund size, asset growth, and management fees to measure the performance of closed-end mutual funds in Bangladesh. There have been a few researches in the research world on the mutual fund that used these variables together. So, we think our research will

contribute to literature to expand the research area on mutual funds both for Bangladesh and the world.

HYPOTHESIS DEVELOPMENT

According to (Maggina et al., 2012; Akinyomi, 2013), firm performance can be measured by different indicators, but the main indicator is ROA. In this study, ROA is used as a proxy of fund performance.

EPU and Fund performance

EPU is the sum of net income or loss for the definite period per unit outstanding amid the detailing period (Sharif et al., 2020). (Wmss, 2019) applied Panel data regression analysis on dividend policy impact on firm performance evidence from listed companies in Colombo stock exchange. The research revealed that there is a significant relationship between EPU and firm performance. That means if the funds EPU is high, then the fund's performance is also high, which signals for better performance in the future. So the hypothesis is

H1: There is a significant relationship between EPU and fund performance

Fund Age

Firm Age can be defined in two ways: firstly, counting from the company's incorporation day (Ilaboya & Ohiokha, 2016; Pickering, 1968), secondly counting from the listing days in the stock exchange (Shumway, 2001). Our research defined the mutual fund's age from the listing days in the Dhaka stock exchange. Evaluating the relationship between firm age and firm performance on Indian firms, (Majumdar, 1997) found that older firms are more productive and less profitable and younger firms are less productive but more profitable. Thus, the hypothesis is:

H2: There is a significant relationship between fund age and fund performance.

Fund size

Fund size can be defined in many ways, but we defined fund size as a proxy of total assets in this research. (Keswan, 2011) conducted a study on Effect of fund size on the performance of Balanced mutual fund in Indian funds. The study found that standard deviation of funds was significantly low that means fund size had an insignificant relationship with fund performance. So the hypothesis is:

H3: There is a significant relationship between fund size and fund performance.

Dividend payout

Dividend is the reward of investors against their investment. Dividend payout refers to the percentage of a company's earnings, which is paid to its shareholders. (Foong et al., 2007) applied multiple regressions on firm performance and dividend-related factors: Malaysia's case to determine the relationship between dividend payout and firm performance. The authors found that there is a weak or insignificant relationship between dividend payout and firm performance in Malaysian Trading/services and plantation firms. So, our hypothesis is:

H4: There is a significant relationship between dividend payout and fund performance.

Assets growth

Asset growth refers to the degree at which a company's assets increase over the years. (Yao et al., 2011) analyzed panel regression on Asset growth and stock returns on the Asian financial markets. The study found that that homogeneity of asset growth and its components may alleviate the anomaly effect in case of stock returns that means asset growth and firm stock returns have a negative relationship. So, the fifth hypothesis is:

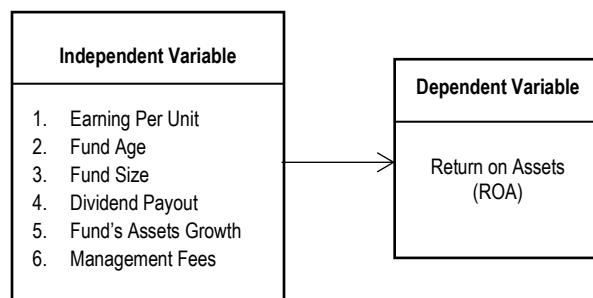
H5: There is a significant relationship between assets growth and fund performance.

Management fees

Management fees are the term by which we can say that it's the rewards of management as a manager for better utilization of funds to make a company's higher returns. (Golec, 1996) analyzed regression analysis on the effects of mutual fund managers' characteristics on their portfolio performance, risk, and fees. Research found that the fund which has a low management fee is more capable in returns than higher fees of management. Thus, the final hypothesis is:

H6: There is a significant relationship between management fees and fund performance.

CONCEPTUAL FRAMEWORK



METHODOLOGY

Data collection

In this study, secondary data is used to conduct research. In case of organizational research, secondary data are absolutely necessary getting more acceptable findings. The secondary data is quite likely internal and external data of the organization. Such data can be collected from internet or other publishing documents. This research used ROA as a dependent variable and Earning Per Unit, Fund Age, Fund Size, Dividend Pay Out Ratio, Fund's Assets Growth and Management Fees as independent variables from Bangladeshi close-end mutual fund. Data were collected from the financial statements of concerned Asset Management Companies.

Sample selection

This research is conducted to assess the performance and prospects of mutual funds listed in Dhaka Stock Exchange (DSE), Bangladesh. As an availability of data, this study is selected close-end mutual fund of Dhaka Stock Exchange. At present there are 37 close-end mutual funds listed in DSE, among 37 some funds some are newly listed in stock exchange so their data are unavailable for the research period as a result this research exclude them. This study is selected 32 close-end mutual fund based on the information

availability with the relevant financial data spanning the period 2014 to 2018.

Sl.	Mutual Fund Name	Fund Symbol in DSE	Listing year	Category
1	AB Bank First Mutual Fund	ABB1STMF	2012	A
2	AIBL 1st Islamic Mutual Fund	AIBL1STMF	2011	A
3	DBH First Mutual Fund	DBH1STMF	2010	A
4	EBL First Mutual Fund	EBL1STMF	2009	A
5	EBL NRB Mutual Fund	EBLNRBMF	2011	A
6	EXIM Bank 1st Mutual Fund	EXIM1STMF	2013	A
7	Green Delta Mutual Fund	GREENDELMF	2010	A
8	IFIC Bank 1st Mutual Fund	IFIC1STMF	2010	A
9	First Janata Bank Mutual Fund	1JANATAMF	2010	A
10	LR Global Bangladesh Mutual Fund One	LRGLOBEMF1	2011	A
11	MBL 1st Mutual Fund	MBL1STMF	2011	A
12	NCCBL Mutual Fund-1	NCCBLMF1	2012	A
13	NLI First Mutual Fund	NLI1STMF	2012	A
14	PHP First Mutual Fund	PPHMF1	2010	A
15	Popular Life First Mutual Fund	POPULAR1MF	2010	A
16	Reliance One the first scheme of Reliance Insurance Mutual Fund	RELIANCE1	2011	A
17	Southeast Bank 1st Mutual Fund	SEBL1STMF	2011	A
18	Trust Bank 1st Mutual Fund	TRUSTB1MF	2010	A
19	Vanguard AML Rupali Bank Balanced Fund	VAMLRBBF	2016	A
20	SEML Lecture Equity Management Fund	SEMCLECMF	2016	A
21	SEML IBBL Shariah Fund	SEMLIBBLSF	2017	A
22	Prime Finance First Mutual Fund	1STPRIMEFMF	2009	A
23	ICB AMCL Second Mutual Fund	ICBAMCL2ND	2009	A
24	ICB Employees Provident MF 1: Scheme 1	ICBPMF1S1	2009	A
25	Prime Bank 1st ICB AMCL Mutual Fund	PRIME1ICBA	2010	A
26	Phoenix Finance 1st Mutual Fund	PF1STMF	2010	A
27	ICB AMCL Third NRB Mutual Fund	ICB3RDNRB	2010	A
28	IFIL Islamic Mutual Fund-1	IFILISLMF1	2010	A
29	ICB AMCL Sonali Bank Limited 1st Mutual Fund	ICBSONALI1	2013	A
30	ICB AMCL First Agrani Bank Mutual Fund	ICBAGRANI1	2017	A
31	Vanguard AML BD Finance Mutual Fund One	VAMLBDMF1	2016	A
32	SEML FBLSL Growth Fund	SEMLFBLSLGF	2019	A

Source: Dhaka Stock Exchange, Bangladesh

Number of Sample data

Year	No of Mutual Funds
2014	24
2015	24
2016	28
2017	29
2018	29
2019	30
Total	164

In this study, Table 01 shows Dependent variable and Independent variables where ratios of every independent variable representing its own variable. Dependent variable is affected by every ratio of independent variables. For example, the change in Earning Per Unit will change the Return on Asset. Therefore, all of the independent variables will be analyzing to evaluate their impact on mutual fund performance listed in Dhaka Stock Exchange.

Table 01: Summary of the Operationalization of the Variables

Variable	Acronym	Operationalization
Dependent Variable:		
Return on Assets	ROA	The ratio of Income to total assets of mutual funds.
Independent Variables:		
Earning Per Unit	EPU	The ratio of Earning to mutual funds per unit.
Fund Age	AGE	Counting from the listing days in the stock exchange.
Fund Size	SIZE	The natural Logarithm of total assets of mutual funds.
Dividend Pay Out Ratio	DIV	The percentage of a fund's earnings, which is paid to its unit holders.
Fund's Assets Growth	GROWTH	The degree at which a fund's assets increase or decrease over the years.
Management Fees	MFEES	The natural Logarithm of management fees of mutual funds.

Statistical methods:

To evaluate the impact of Earning Per Unit, Fund Age, Fund Size, Dividend Pay Out Ratio, Fund's Assets Growth and Management Fees on close-end mutual fund listed in Dhaka Stock Exchange (DSE), this study used error corrected panel data regression model and after correcting autoregressive disturbance, RE GLS regression model is selected to describe this unbalanced panel data analysis. To test the objectives, this study is used the following model:

Regression Model:

$$ROA_{it} = \beta_0 + \beta_1 EPU_{it} + \beta_2 AGE_{it} + \beta_3 SIZE_{it} + \beta_4 DIV_{it} + \beta_5 GROWTH_{it} + \beta_6 MFEES_{it} + \varepsilon_{it}$$

Where,

β_0 = Intercept
 $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ = Variables' Coefficients
 ε = Error Term
Subscript i = Mutual Funds
Subscript t = Year

ANALYSIS AND DISCUSSION

Table 1: Descriptive Statistics

Variable	Obs	Mean	Std. Div.	Min	Max
ROA	164	6.2078	3.1307	-3.8395	14.7937
EPU	164	0.7413	0.3736	-0.42	1.71
AGE	164	5.6585	2.2523	1	10
SIZE	164	9.1281	0.2357	8.5390	9.5775
DIV	164	0.0715	0.0341	0	0.14
GROWTH	164	0.0321	0.0597	-0.14	0.19
MFEES	164	7.1991	0.2303	6.5764	7.7051

Findings of the descriptive statistics in table-1 shows the mean, standard deviation, minimum and maximum statistics of 164- cross-sectional time series observation of the following variables 'Return on Asset', 'Earning Per Unit', 'Fund Age', 'Fund Size', 'Dividend payout Ratio', and 'Management fees' over the study period. Following the descriptive statistics, the dependent variable ROA indicates the highest value of standard deviation with a range from a minimum value of -3.83 to a maximum value of 14.79.

Table 2: Test of Normality

Skewness / Kurtosis tests for Normality					
----- joint -----					
Variables	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	Prob>chi2
ROA	164	0.2792	0.0455	5.16	0.0757
EPU	164	0.2898	0.1046	3.81	0.1489
AGE	164	0.5269	0.0023	8.68	0.0130
SIZE	164	0.4606	0.7851	0.63	0.7312
DIV	164	0.5497	0.2123	1.94	0.3790
GROWTH	164	0.0604	0.2300	4.99	0.0823
MFEES	164	0.0242	0.3438	5.81	0.0547

Before conducting any empirical regression model, the prerequisite condition is that the respective variables should follow the normal distribution (Saeidi & Okhli, 2012); Subat et al., (2020) stated that sample size significantly affects the normality of data. However, table 2, which indicate the test of normality of the following variables. The joint probability of adjusted chi square value depicts that the variable 'Return on Equity', 'Earning per unit', 'Fund Size', 'Dividend payout ratio', 'Fund Growth' and 'Management Fees' rejected the null hypothesis. It means that the following variables are normally distributed. As per the conclusion of Bai & Ng, (2005) the probability value of skewness is more predictive than kurtosis in case of normality. In line with this concept the

probability value of skewness for the variable 'Fund Age' (0.5269) concludes rejecting null hypothesis and the variable 'Fund Age' is more or less normal in nature.

Table 3: Correlation Analysis

	ROA	EPU	AGE	SIZE	DIV	GROWTH	MFEES
ROA	1.00						
EPU	0.95	1.00					
AGE	-0.14	-0.06	1.00				
SIZE	0.12	0.01	0.13	1.00			
DIV	0.75	0.80	-0.02	0.06	1.00		
GROWTH	0.42	0.44	-0.24	0.15	0.38	1.00	
MFEES	0.19	0.06	0.06	0.93	0.10	0.14	1.00

The correlation coefficient is used to determine the random relation between two random variables used in a study. (Benesty, J., Chen, J., Huang, Y., Cohen, 2009) states that the Pearson correlation coefficient is used as an optimization criterion. Though (Zou, Kelly H., Tuncali, Kemal; Silverman, 2003) concluded that correlation and regression analyses do not infer causality, that's why more analyses are required to build a causal inference. However, table 3 shows the relationship between each dependent and independent variable -ROA, Earning per unit, Fund age, Fund Size, Dividend payout ratio, Fund asset growth, and Management Fees. The table shows that Earning per unit has the highest and significant positive relationship (.95) with ROA and Dividend payout. Ratio (.75) is the second most significantly related variable compared to the dependent variable. On the other hand, the Fund Age has the lowest and significant negative relationship (-0.14) with the dependent variable. Similarly, Fund Size (.12), Fund Asset growth (.42), and Management Fees (.19) have a comparatively less significant relationship with the dependent variable.

Table 4: Pooled OLS Regression Analysis (Dependent Variable – ROA)

Variables	Coefficients	Std. Err	t-Statistics	P > t	Hypothesis	Status
EPU	8.30261	0.30650	27.09	0.000***	H-1	Supported
AGE	-0.1493	0.03081	-4.85	0.000***	H-2	Supported
SIZE	0.34353	0.82544	0.42	0.678	H-3	Not Supported
DIV	-3.9285	3.22523	-1.22	0.225	H-4	Not Supported
GROWTH	-2.3908	1.28421	-1.86	0.065*	H-5	Supported
MFEES	1.6332	0.83112	1.97	0.051*	H-6	Supported
CONS	-13.638	2.78101	-4.90	0.000***		
R-squared	0.9334					
Adj R-squared	0.9309					
F-Stat	366.87					
Prob. > F	0.000					
Root MSE	0.8230					

Notes: *, **, *** indicate level of significance at 10%, 5% and 1% respectively.

Pooled OLS regression is one of the basic panel data models used in a study when there is no cross-sectional or time series effect belonging to the selective data (Hun, 2011). It means that the Individual effect is highly ignored in the pooled OLS regression model. It can be further clarified that the respective data should be homoscedastic and free from disturbance (error term) if the pooled OLS regression model is applied (Greene, 2008). In order to check the error term, Root Mean Square Error can be compared to the correlation coefficient value of table 3. When the individual correlation coefficient value between the dependent and independent variables is equal to 1, then Root Mean Square Error will be equal to 0 (Statistics how to, n.d.). That means there is no error in the model, and all points lie on the regression line

accordingly. The following table 4 shows that the Root MSE value is 0.823 (>0), which can best be described that a significant number of disturbances belong in the data, and the data is not free from error term. It can be further clarified that several significant variables were not captured as regressors in the following regression model. Though the diagnostic test of table 9 describes that data is homoscedastic and Adjusted R-squared value defines an overall 93% variability of the selected regressors. Finally, it can be concluded that the following pooled OLS model does not follow all the core assumptions OLS method mentioned by (Greene, 2008; Kennedy, 2003).

Table 5: Variance Inflation Factor (VIF)

Variable	VIF	1/VIF
SIZE	9.11	0.019733
MFEES	8.82	0.113368
EPU	3.16	0.316883
DIV	2.92	0.342572
GROWTH	1.42	0.705719
AGE	1.16	0.863085
Mean VIF	4.43	

Curto & Pinto,(2011) stated that if the OLS estimator concludes the regressor is strongly and not perfectly correlated with all the explanatory variables, then it can be decided that numerical instability exists among the regression coefficients. It means multicollinearity or near-multicollinearity exists among the regressors. Multicollinearity is a significant ill-conditioning factor that is the most commonly encountered in the linear regression model while defining explanatory variables (Belsley, 2006). Therefore, the Variance Inflation Factor (VIF) test statistics are used to know the multicollinearity issue of the selected explanatory variables. The standard value of the VIF test is <10. (Al-Malkawi et al., 2018; Curto & Pinto, 2011; Belsley, 2006). The above concept VIF test is applied for calculating the effect of multicollinearity in the selected regressors. Finding shows analysis from Table 5 concludes that there is no significant multicollinearity problem in the selected variables as all the VIF value is less than 10.

Table 6: Regression Analysis (Dependent Variable – ROA)

Fixed Effects Regression Model				Random Effects Regression Model			
Variables	Coefficient	t-Statistics	P > t	Coefficients	Z-Statistics	P > Z	
EPU	8.5381	28.49	0.000***	8.4121	29.49	0.000***	
AGE	-0.1305	-2.16	0.033**	-0.1572	-4.94	0.000***	
SIZE	-1.6241	-0.52	0.601	0.6727	0.78	0.438	
DIV	-2.1014	-0.66	0.510	-3.1387	-1.04	0.299	
GROWTH	-2.6255	-1.90	0.059*	-2.7891	-2.34	0.019**	
MFEES	1.0441	1.10	0.272	1.2300	1.48	0.139	
CONS_	8.1589	0.30	0.767	-13.837	-3.77	0.000***	
R-squared	0.8990			R-squared	0.9332		
F-Stat	352.52			Wald chi2	2400.05		
Prob. > F	0.0000			Prob. > chi2	0.0000		
rho	0.5389			rho	0.2074		

Notes: *, **, *** indicate level of significance at 10%, 5% and 1% respectively.

Findings of Table 4 concluded that the presence of error term in the pooled OLS regression model and the absence of exogeneity, which has a significant problem of biasness as the decision mentioned by (Greene, 2008; Kennedy, 2003). These problems can be solved by the fixed effect and random effect model, which is conducted in the following table 6.

A common default problem in the statistical software STATA is that it automatically calculates the F-statistics for

examining the applicability of the fixed-effect model with the wrong assumptions (Hun, 2011). Therefore though F-statistics of the following table 6 found significant (0.00<0.05), we don't count it as a standard measure. Consequently, it is further concluded in table 7

However, in table 6, the fixed effect regression model depicts 89.9 % Variability of selected variables. The variable Earning Per Unit, Fund age, Fund Growth is significant at 1%, 5%, and 10% level of significance. But the decision to select the fixed effect model would be made after conducting the F test.

On the other hand, the random effect model is classified when the estimate has a significant error term and homogeneity in the OLS method. Wald chi2 test is the basic test to describe the random effect method. In the following table 6, the Wald chi2 test was found as significant at a 5% level of significance. Therefore, after considering the Wald chi2 test result, the Random effect method's decision is applicable for this study. Finally, it is decided that the Random effect is the standard method to compensate for the problem found in the Pooled OLS method.

R squared value of the Random effect model is found 0.933, which means that 93% variability can be defined by the random effect method. The variable Earning per unit, Fund age are highly significant at a 1% level of significance. And Fund Growth is significant at a 5% level of significance. On the other hand, Fund size, Dividend payout ratio, and Management fees were found insignificant at 1%, 5%, and 10% level of significance.

Table 7: F-Test

F test	F (5, 152) =	1.45	Prob > F = 0.2095
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Generally fixed effect model is classified when it includes a dummy variable; the regressors have a constant slope and constant error variance across the group. The F test generally justifies the applicability decision of the fixed-effect model. When the probability of F-Value is insignificant, then the fixed effect model cannot apply (Hun, 2011). Therefore, the corrected F test value is showed in table 7. It is found that the probability of the F test is insignificant at a 5 % level of significance. Therefore, the F test doesn't support the fixed effect model.

Table 8: Result of LM Test

	Var	sd = sqrt [var]
roa	9.801554	3.130743
e	0.5192645	0.7206001
u	0.1359228	0.3686771

Breusch and Pagan Lagrangian Multiplier Test for RandomEffects

$$roa [id,t] = xb + u[id] + e[id,t]$$

Estimated results:

Test:	Var [u] = 0
Chibar2 (01)	= 16.14
prob > chibar2	= 0.0000

The test of the random effect model's existence is popularly examined by the Breusch-Pagan LM test (Breusch & Pagan, 1980). However, the Breusch-Pagan LM test is the best

measure that is identified by (Hun, 2011). Also, the random effect is preferred over the method Pooled OLS when the null hypothesis is rejected.

In the following table 8, LM test probability statistics (0.00<0.05) are found as significant. Wald test also found as significant at a 5% level of significance. Therefore, after Considering the Breusch-Pagan LM test and Wald chi2 test result, the random effect method's decision is applicable for this study.

Table 9: Hausman Test Statistics

	----- Coefficients -----			sqrt (diag (V _b -V _B) S. E.
	(b) fe	(B) re	(b - B) Difference	
EPU	8.53893	8.412131	0.1267997	0.0920171
AGE	-0.130536	-0.1572317	0.0266957	0.0513677
SIZE	-1.624132	0.6727573	-2.296891	2.969957
DIV	-2.101476	-3.138733	1.037257	1.001014
GROWTH	-2.625538	-2.789127	0.1635889	0.6938036
FEES	1.044186	1.230021	-0.1858352	0.4526044

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic
chi2 (6) = (b-B) * [(V_b - V_B) ^ (-1)] (b - B) = 11.11
Prob > chi2 = 0.0849

Hausman test is generally examined to compare the Fixed and Random effect method regression, especially when the probability of fixed and random effect models is significant or not. Also, it is used to clarify time and individual effect in a fixed and random effect method.

Table 4 Pooled OLS model already notified the presence of error term among the regressors, which concludes that the pooled OLS method is not significant in drawing the decision. Therefore, if Hausman Test statistics' null hypothesis is rejected, then the Fixed effected model will be best suited for concluding the variability of regressors. In line with the concept built by (Hun 2011), Probability of coefficients by means of the Hausman test can be concluded as insignificant (0.0849>0.05) at a 5% level of significance. Hence the null hypothesis is accepted; it supports the random effect method of regression.

Model Selection:

Model	Pooled OLS	Fixed Effect	Random Effect
Hausman Test	--	☒	✓
B-P LM Test	☒	--	✓

Finally, we have found that both the Hausman test and the Breusch-Pagan LM test support the Random effect model from the above analyses and discussion. Because the Hausman test value was found insignificant value and the Breusch-Pagan LM was found significant value that suggests the Random Effect Method is best suited to define the selected explanatory variables.

Table 10: Result of Diagnostic Test

Test	Dependent Variable – ROA		
	Hypothesis	Test Statistic	Probability
Heteroskedasticity; Breusch-Pagan Cook-Weisberg	H0: Constant Variance	$\chi^2 = 0.53$	0.4670
Serial Correlation; Wooldridge's Serial Correlation	H0: No first order serial correlation	F (1, 28) = 36.059	0.0000***

In empirical cross sectional time series and time series models, heteroskedasticity is one of the key problems noticed by several researchers. Therefore, it is important to detect heteroskedasticity (M. J. Harrison & B. P. M. McCabe, 1979). Heteroskedasticity may occur when the OLS analysis notices the significant error term can be caused by increasing value of regressors compared to the dependent variable. Moreover, it can lead to biased and misleading perimeter estimates in OLS regression (Williams, 2020).

The Breusch-Pagan or Cook-Weisberg test for heteroskedasticity is used to detect the error variance of any linear form of heteroskedasticity. When the value probability of a chi-square value is large, a significant amount of heteroskedasticity is present with the OLS regression. (Williams, 2020).The above concept probability value of the Chi-square (0.4670) in table 10 indicates insignificantly and indicates that heteroskedasticity is not a major problem in this study. The selected regressors are more or less homoscedastic in nature.

Generally, in a panel-data model, the idiosyncratic error term can cause serial correlation. Therefore, it is important to detect model biases and standard error by means of finding serial correlation (Drukker, 2003). Wooldridge (2002) discovered a model for measuring the selected error of time series data, which is very popular among a number of methods discovered by different scientists. Following the p-value of Wooldridge's Serial Correlation (0.00<0.05) in following table 10 concludes that there is a first-order serial correlation as the null hypothesis is accepted.

Table 11: RE GLS Regression (Correcting Auto correlated Disturbance)

Variables	Coefficients	Std. Err	Z-Statistics	P > Z	Hypo thesis	Status
EPU	8.6495	.27281	31.71	0.000***	H-1	Supported
AGE	-0.1677	.03674	-4.56	0.000***	H-2	Supported
SIZE	0.9394	.89947	1.04	0.296	H-3	Not Supported
DIV	-3.4134	3.0155	-1.13	0.258	H-4	Not Supported
GROWTH	-3.4165	1.1135	-3.07	0.002***	H-5	Supported
MFEES	0.9656	.84216	1.15	0.252	H-6	Not Supported
CONS	-14.432	4.1011	-3.52	0.000***		
R-squared	0.9329					
Wald chi2	2654.58					
Prob. > chi2	0.0000					
rho	0.2829					

In a random effect of cross sectional time series model, inserting regression for all the time-varying effect, the individual effect of the explanatory variable, and explain unobserved heterogeneity is widely discussed by several econometricians. In that case, the Generalized least square method is one of the most efficient models suggested (Benfratello, 2014; Berkey et al., 1998).

According to Benfratello (2014), The Random Effect GLS Regression, a special case of multilevel models and the opposite of the fixed effect regression model, can be conducted to measure the regression model concerning the problem serial autocorrelation.

Therefore, in line with the above concept, Table 11 depicts the RE GLS regression for this cross sectional time-series data. The table shows the coefficient of the following variables 'Earning per unit,' 'Fund Age' and 'Fund Growth' have been highly significant at a 1% level of significance.

Moreover, the dependent variable also found as significant at the following confidence interval. R squared value concludes that the model successfully defines 93.29% variability of the dependent and independent variables. The probability of the Wald Chi2 value also found highly significant at a 1% level of significance.

SUMMARY OF FINDINGS

Table 12: Hypothesis Decision Rule

	Hypothesis	Decision Rule	Relationship
H ₁	There is a significant relationship between EPU and fund performance	Supported	Positive
H ₂	There is a significant relationship between fund age and fund performance	Supported	Negative
H ₃	There is a significant relationship between fund size and fund performance	Not Supported	Positive
H ₄	There is a significant relationship between dividend payout ratio and fund performance	Not Supported	Negative
H ₅	There is a significant relationship between asset growth and fund performance.	Supported	Negative
H ₆	There is a significant relationship between management fees and fund performance.	Not Supported	Positive

Table 11 concluded that the Random Effect GLS regression is the best-suited model to describe this research study. Therefore, in table 12, the decision to support and do not support the null hypothesis is constructed in light of the findings showed in table 11. The hypothesis decision of table 12 describes a significant positive relationship between EPU and fund performance, which leads to accepting alternate hypothesis H1. It means that Mutual fund performance tends to increase when earning per unit increases. Secondly, it is found that there is a significant relationship between fund age and fund performance. Though, it was expected to have a positive relationship with the dependent variable. Thirdly, no significant change noticed in the fund performance when the growth of fund size happens. But most of the investors generally prefer larger funds while investing in the mutual fund market as it if found positive correlation. Fourthly, from the analysis we found insignificant relationship between the dividend payout ratio and fund performance. Moreover, it is also found that negative correlation between dividend payout and fund performance. Fifthly, the asset growth concludes significant negative relationship compared to the fund performance. Though, it was expected to have positive co-movement with the change of fund performance. Finally, management fees disclose positive but insignificant relationship with the change of funds' performance. It can best describe that management fees tend to increases when the performance increases though there are several factors that highly impact on increasing management fees which was not included in this study. Therefore, the following hypothesis H6 is rejected.

CONCLUSION & RECOMMENDATIONS

Stock market in Bangladesh is a very volatile market and it has experienced significantly declining performance in the last decade. Management inefficiency, inadequate number of mutual funds, lack of fundamentally strong company, lack of effective portfolio managers and asset managers as well as less investment literacy by the investors in the mutual fund industry are the most dominant reason for the declining performance. It is also observed that most of the investors prefer direct investment strategy and short-term speculation rather than long term investment and investment in mutual funds in the capital market.

However, the performance of mutual fund in Bangladesh is frequently researched in the recent times. Most of the researches were constructed using risk adjusted ratio analysis. This study provides an overview of the performance of 32 close-end mutual funds indexed in the DSE considering the basic profitability ratios in response to change in fund size, age, asset growth, earning per unit, dividend per unit and management fees etc. The study found a significant positive relation between earning per unit and return on assets. The study identifies a significant negative relationship with fund age and asset growth in response to the change of return on assets. It also concludes there is no significant predictive power among the fund size, dividend payout ratio, management fees with return on assets while defining mutual fund performance. This study also noticed several limitations which are as follows: the study was limited with short study period and as cross sectional time series model is used to predict the performance, insufficient data could probably mislead the result of hypothesis. Also, there are several factors i.e. tax advantages, net asset value, exchange rate, inflation rate, interest rate, P/E ratio, portfolio efficiency and stock market performance that are significantly affects the fund performance which should be included for effective performance evaluation.

Finally, this study suggests following policy recommendations for resolving these identified problems. Larger mutual funds achieve higher performance but its insignificant association may less likely explain the economics of scale in the mutual fund industry. This is inconsistent with the findings of (Dewri & Islam, 2016). Therefore, policy maker should pay close attention to the given recommendations constructed from our research which are as follows:

- Aged mutual funds achieve lower performance and its significant association suggests investors not to rely heavily on comparatively old funds while selecting mutual funds to invest. It reflects the inefficiency of asset managers as well as negative market scenarios etc. which are the significant concerns.
- This study also reveals that fund asset's growth has strong significant and negative impact on fund performance. Despite the significance, growth of assets does not always portray the high potential of getting more return from investment in Bangladesh market scenario. So, investors should consider other related components simultaneously.

Therefore, the study also suggests investors to notice long term performance rather than short term speculation while investing in the mutual funds market.

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