Evaluation of Portfolio Performance of the Investment Corporation of Bangladesh's Mutual Funds

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Abstract

The number of mutual funds that were professionally managed is on the rise. Consequently, the importance of evaluating the performance of mutual funds has also increased. Investors prefer investing in such stocks that have performed better compared to other alternatives since investors always like to choose fund managers on a comparative basis. This study has endeavoured to address this issue by measuring the performance of mutual funds managed by ICB (Investment Corporation of Bangladesh) through Treynor Index, Sharpe Index, Jensen Alpha, and Fama Decomposition. This study has found that the performance of ICB mutual funds is satisfactory in the context of mutual funds sector of Bangladesh. However, there remain several shortcomings in managing the portfolios by the portfolio managers of ICB. Much of the underperformance of ICB mutual funds is attributable to the bureaucratic systems and structural rigidity of ICB.

Index terms— ICB mutual funds, portfolio performance, tryenor index, sharpe index, jensen alpha, fama decomposition, net selectivity.

1 Introduction

ver the last few decades the debate on the ability of mutual funds to outperform the market remains unsettled. Many early researchers on the performance of mutual fund outlined the difficulty of outperforming the market rather mutual funds frequently perform inferior to the market (Angelidis, Giamouridis, and Tessaromatis, 2014;Fama, 1965;Sharpe, 1966;Jensen, 1968). Some later studies have reported favouring mutual funds, but most of the average funds still fail to exhibit above-normal performance (Treynor and Black, 1973;Blake and Timmermann, 1998;Haslem, 2003). However, the debate on the ability of mutual funds to outperform the market has further steered by the introduction of the methodology of measuring and comparing the performance of mutual funds for better investment decisions. In Bangladesh, the mutual funds sector is subtle compared to the capital market of the country. In many countries, mutual fund assets constitute close to 50% of market capitalisation, but mutual funds asset is less than 3% of total capital market in Bangladesh **??**ICB, 2016).The investors of Bangladesh are being offered with small O

2 Literature Review

The CAPM model has got popular attraction because it offered a simple framework which predicts In financial market, measurement of portfolio performance is crucial. Portfolio performance measurement helps an investor to make better investment decisions and lower its investment risk. However, measurement of portfolio performance is not a new phenomenon rather it has begun in the early 1950s. At that time, investors measured portfolio performance based on the returns of individual securities without considering the risk associated with the individual securities (Khedmatgozar, Kazemi, and Hanafizadeh, 2013). After the introduction of "Modern Portfolio Theory" by Markowitz in 1952 investors and portfolio managers are benefitted by the framework provided by **??**arkowitz (1952). The framework proposed by **??**arkowitz (1952) entails that investors should be compensated for taking additional risk. Later in 1959, Markowitz also developed the Capital Asset Pricing Model (CAPM) which provided a risk-inclusive portfolio evaluation process (Francis and Archer, 1979;Prigent,

2007;Zhao, 2014). the risk of a portfolio and measures the relationship between risk and expected return (Brown and Wu, 2016). The empirical literature on portfolio management particularly focused on measurement of portfolio performance. Many researchers have developed several measurement techniques and models. Treynor and Black (1973) developed an index which measures the risk-adjusted performance of a portfolio. Treynor's Index is a useful measurement technique to measure the excess return of a portfolio per unit of risk. Beta measures the risk; the higher the beta score goes, the higher the excess return per unit of risk generated by the portfolio. Sharpe (1966) developed a ratio to measure the risk-adjusted return of a portfolio. The Sharpe Index later became the industry standard for measuring the riskadjusted return from a portfolio. The index is the average return earned more than the risk-free rate per unit of volatility. The performance of a portfolio associated with the risk-taking activities can be isolated when mean return subtracts the risk-free rate (Webster, 2014). The calculation of Sharpe ratio for such a portfolio containing zero risks is very simple as the ratio will be exactly equal to zero. The higher the Sharpe ratio, the more attractive the risk-adjusted return from the portfolio.

Further development of portfolio performance measurement techniques has resulted in Jensen's Alpha, which is another risk-adjusted performance measure. Jensen's Alpha represents the average return on a portfolio over and above that predicted by the CAPM given the portfolio's beta and the average market return. However, these measurement techniques have been widely used to measure the performance of portfolios. Empirical studies also considered studying these measurement techniques and their effectiveness in measuring mutual fund performance. For example, the study performed by Tykvová (2006) entails that average mutual funds had no ability to identify and select undervalued stocks and a negative ability to time the market while a few mutual funds exhibit consistency in identifying and selecting undervalued stocks. The study has utilised the Jensen's Alpha measurement to measure the financial performance of mutual funds.

The factor that controls returns can be monitored in the study of Brown and Wu (2014) and has found that these factors explain the persistence in portfolio performance of mutual funds. This study has utilised the Sharpe Index and Jensen Alpha to measure mutual fund performance. However, the study of Brown and Wu (2014) failed to explain the persistence prevailing in the significant underperformance of the worst mutual funds. Treynor's Index has used in the study performed by Haque (2014) where the survivorship bias in mutual funds has demonstrated. The study concluded that mutual funds performed significantly worse compared to the market at an aggregate level. However, the study carried out by Wu and Brown (2014), and Arora (2015) have also demonstrated that mutual funds failed to perform well compared to the market and also fails to exhibit abovenormal performance.

However, the debate on the ability of mutual funds to outperform the market has further steered by the introduction of the methodology of measuring and comparing the performance of mutual funds for better investment decisions. Angelidis, Giamouridis, and Tessaromatis (2014) have examined the effectiveness of benchmarks to weight small mutual funds. The study concluded with a cautious note concerning the use of benchmark because it tracks the calculation of Jensen's Alpha by weighing small mutual funds. The study of Kuhle (2012) further suggested that calculations and measurements that are unique to the period or type of fund or choice of benchmark should not be used to make generalised conclusion concerning the performance of mutual funds.

MacIsaac (2014) has measured the mutual funds' performance considering the Jensen Alpha measurement. The study has concluded that mutual funds performed comparatively better than other industries. However, the study conducted by Khedmatgozar, Kazemi, and Hanafizadeh (2013) found that selection of benchmark, composition of mutual fund portfolio, survivability, and non-CAPM return-generating factors may stress the performance measurement procedure. However, the measurement techniques i.e. Sharpe Ratio, Treynor Index, Jensen Alpha, and so forth are not free from criticisms. Although the measurement techniques, used in this study, have some limitations, these techniques have been investigated by many notable researchers and this study has also considered these techniques to evaluate the mutual funds' performance of ICB.

3 III.

4 Methodology

This study aimed at applying theoretical knowledge of finance and applying the data and information obtained from ICB and related sources to evaluate the performance of ICB's Mutual Funds. ICB is the pioneer in the mutual funds industry of Bangladesh and one of the best performing investment banks. For these reasons ICB mutual funds have been selected for this study. However, to make the analysis and to conduct this study, all necessary data have been collected from both primary and secondary data sources. Primary data have been gathered from the official database and authorised personnel of ICB. Conversely, secondary data have been collected from annual reports of ICB mutual funds, Planning and Research Division of ICB, online journals, books, and the internet.

This study has used time series data on ICB mutual funds. The performance measurement used in this study is based on the162-monthly closing price of ICB mutual funds of DSE from July 2001 to December 2014. DGEN has been used as the benchmark index for the period concerned of this study. This study has considered the

364-days Treasury bill rate as the riskfree rate for the concerned period. The risk-free rate (Tbill rate) that has been used in this study is 5.5%.

Necessary trading data on ICB mutual funds, DGEN, and T-bill rates have been collected from DSE Data Library. All the data were analysed quantitatively; composite portfolio measure and composition analysis have been carried out to gauge the performance of ICB mutual funds. This study particularly focused on risk and return analysis of the mutual funds. The risk and return analysis was aided by beta coefficients measurement, rsquared measurement, and standard deviations of returns of mutual funds. Based on these risk and return analysis this study considered composite portfolio performance measurement analysis. The composite portfolio performance measurement has been carried out by using Treynor's Index, Sharpe Ratio, and Jensen Alpha. This study has further considered Fama's Decomposition analysis to identify the portfolio performance of ICB mutual funds. This study has also examined portfolio composition analysis. The portfolio composition analysis has been performed based on the most dominating portion of stocks (at least 50% of the portfolio) of the respective mutual funds of ICB.

IV.

5 Empirical Analysis and Findings a) Analysis of Return

Both portfolio managers and analysts start their analysis of stocks or portfolios with the calculation of return. More specifically, the arithmetic mean is the frequently used measurement tool to calculate portfolio return. However, the arithmetic mean, in this case, means simply the average annual return of the mutual fund. Arithmetic mean tells how well a stock performs over aperiod. However, Table **??** provides the monthly and annualised returns of ICB mutual funds, DGEN, and DSE20. Analysis of returns of ICB mutual funds clearly exhibits its outperformance compared to the market return. ICB mutual funds outperformed the market as they have higher monthly and annualised return than the return of the market.

6 Table 1 : Monthly and Annualized Returns of ICB Mutual Funds, DGEN, and DSE20 b) Analysis of Risk

Investment means it will certainly have some risk although the degree of risk may differ. However, the term 'risk' refers to the possibility of losing principal and any earning or failure to make money from an investment. However, risk can be measured by several means, but this study has considered standard deviation, beta coefficients, and R-squared to gauge the risk of ICB mutual funds. These measurement techniques have been used historically to measure risk and are major components of modern portfolio theory. However, Table 2 exhibits the standard deviation of eight mutual funds of ICB along with DGEN and DSE20. Standard deviation is used to measure the dispersion of data from its mean. This study has applied standard deviation on the annualised return to measure volatility or risk. In the case of mutual funds, standard deviation tells how much return deviates from expected return from the stock. Where, ??????(??,??) indicates covariance between individual mutual fund's return and market return while ???????? indicates variance of market return. The beta coefficients of ICB mutual funds have been presented in Table 3. From this table, it could be observed that the beta coefficients of ICB mutual funds are well below to the market. This means the calculated betas of considered mutual funds have low biasness to the market. R-squared is another measurement that has been used in this study to represent the percentage of a fund portfolio's movements that have been explained by movements in a benchmark index. DGEN has been regarded as the benchmark index for ICB mutual funds. The values of R-squared usually range between 0 and 100 while a value between 85 and 100 for a mutual fund indicates a performance record that isclosely correlated to the benchmark index. However, R-squared has been measured using following formula (Bacon, 2008):

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? = ???(?, ?) ??? ? ? 2 = [?(? ? ? ? ? ????)(? ? ? ? ? ????) (? ? 1)? ? ? ?] 2

The results of R-squared have presented in Table **??**. The table indicates that the movement of returns of ICB mutual funds could not be explained by the returns from the benchmark index. In such cases, it is recommended that the investors of mutual funds avoid actively managed funds with high R-squared values.

8 Table 4 : R-squared of ICB Mutual Funds c) Composite Portfolio Performance Measures

The composite portfolio performance measurement has been carried out by using Treynor's Index, Sharpe Ratio, and Jensen Alpha. This study further considered Fama's Decomposition analysis to identify the portfolio performance of ICB mutual funds. This study has also examined portfolio composition analysis. The portfolio composition analysis has been performed based on the most dominating portion of stocks (at least 50% of the portfolio) of the respective mutual funds of ICB.

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9 . Treynor Measures

Treynor measure has been the first measurement of composite portfolio performance that includes risk. The objective of Treynor's measure is to find a performance measure that could be applied to all investors regardless of their personal risk preference. According to Treynor's measure, there are two components of risk; risk arising from the fluctuations in the market and the risk produced by the fluctuations of individual securities. However, the Treynor's measure or the reward-to-volatility ratio of this study is defined by (Christopherson, Carinõ, and Ferson, 2009):

Where, refers to the average rate of return for portfolio iduring specified period; ??????refers to the average rate of return on a risk-free investment during the specified time period; and ???? refers to the slope of the fund's characteristics line during that time period. The numerator of Treynor's measure identifies the risk premium while the denominator corresponds with the risk of the portfolio. Table 5 presents the Treynor's measure of ICB mutual funds along with DGEN. From the above table, it can be said that the Treynor's measure of all the ICB mutual funds has outperformed the market as each of the mutual funds had a value higher than the market. 7thICB mutual fund exhibits highest Treynor's measure.

10 ii. Sharpe Ratio (Index)

The Sharpe Index is known as there ward-tovariability ratio which is used to measure the excess return (i.e. risk premium) per unit of total risk in an investment asset. The Sharpe Index is similar to the Treynor's measure, but it considers standard deviation of the portfolio rather than the slope of the fund's characteristics line (i.e. systematic risk). However, the Sharpe Index or the reward-to-variability ratio of this study is defined by (Connor, Goldberg, and Korajczyk, 2010): The output of Sharpe Index has been presented in Table 6. According to the figures reported in this table the Sharpe Index clearly indicates that neither of the ICB mutual funds exhibits superior risk-adjusted return compared to the market. That is, neither of the ICB mutual funds has outperformed the market.

11 iii. Jensen Measure

The Jensen measure is another measurement technique used to measure the excess return that a portfolio generates over its expected return. Jensen measure is alternatively known as Jensen Alpha. However, the Jensen measure or the reward-to-volatility ratio of this study is defined by:? ? = ? ? ???? ? [??? ?????? + ? ? (? ? ???? ? ??? ??????)]

Where, refers to the average rate of return for portfolio during specified time period; ??????refers to the average rate of return on a risk-free investment during specified time period; ???? refers to the slope of the fund's characteristics line during that time period; and ????? ? ? ? refers to the expected return on market portfolio of risky assets. The output of Jensen measure has been presented in Table 7. From this table, it can be observed that all the ICB mutual funds have managed to generate positive excess return adjusted for market risk. Among the eight mutual funds 6th ICB mutual fund exhibits the highest value of Jensen Alpha. "Therefore, it may be said that 6th ICB mutual fund is the best performing mutual fund while 1st ICB mutual fund is the least performing." iv. Fama Decomposition Fama's Decomposition is used to finely breakdown the portfolio performance. The overall performance of a portfolio has measured by Fama's Decomposition i.e. excess return from a portfolio. Alternatively, overall performance will be equivalent to the total of portfolio risk and selectivity. Here, the selectivity component represents the portion of the portfolio's actual return beyond that available to an unmanaged portfolio with same systematic risk.

v. Fama's Decomposition of Risk Fama's Decomposition of Risk of this study is defined by: Where, ????????????? refers to the portion of portfolio's excess return due to risk taking; ???? refers to systematic risk of the portfolio; ???? refers to the expected return on market portfolio of risky assets; and ?????? refers to the average rate of return on a risk-free investment during the time period.

However, Fama's Decomposition of Risk is presented in Table 8. From this table, it can be observed that 6th ICB mutual fund exhibits highest excess return due to risk taking.

12 vi. Fama's Decomposition of Selectivity

The portion of excess return that cannot explain the portfolio beta and market risk premium refers to selectivity. However, Fama's Decomposition of Selectivity of this study is defined by: Where, ?????????????????????????? refers to the portion of portfolio's excess return due to superior security selection; ??????????????refers to total excess return the of the portfolio; and ????, ????, and ?????? are as same as they were in Fama's Decomposition of Risk.

However, Fama's Decomposition of Selectivity is presented in Table 9. From this table, it can be seen that 6th ICB mutual fund exhibits the highest selectivity due to superior security selection. ?? ??????????? = ?? ????? ? ? ? (? ? ? ???) vii. Fama's Decomposition of Diversification Fama's Decomposition of Diversification measures the difference between the return that should be earned according to the CML and the return that should be earned according to the SML. However, Fama's Decomposition of Diversification of this study is defined by:?? ???????ð ??"???????? = (? ? ? ???) (? ? ? ? ? ? ? ?)

Where, ????, ????, and ?????? are as same as they were in Fama's Decomposition of Risk; ???? refers to the standard deviation of the specific mutual fund; and ???? refers to the standard deviation of the market.

However, Fama's Decomposition of Diversification is presented in Table 10. From this table, it could be observed that 6th ICB mutual fund exhibits the highest diversification. From this table, it can be observed that all the mutual funds of ICB have negative Net Selectivity. From this finding, it can be inferred that the portfolio managers of ICB fail to diversify away the unsystematic risk properly through their portfolio selection ability.

V.

13 Conclusion

In light of these analysis above, this study has endeavoured to understand the operations and management of Investment Corporation of Bangladesh. Investment Corporation of Bangladesh (ICB) has come up to create new investment opportunities by issuing mutual funds in the capital market. As a state-owned investment bank, ICB played a critical role in accelerating the pace of industrialization and developing a capital vibrant market. ICB helped organizations and individuals to support their equity needs through its mutual funds. Although there remains much debate concerning the performance measurement of mutual funds, this study endeavoured to address this issue by measuring the performance of mutual funds managed by ICB through Treynor Index, Sharpe Index, Jensen Alpha, and Fama Decomposition. The findings reported in this study clearly indicate that there remain several shortcomings in managing the portfolios by the portfolio managers of ICB. Although there are some shortcomings but the area of operations and scope of activities have been narrowed down with the creation of Capital Market Development Program (CMDP). [1] [2]

Figure 1: C

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					2016 Year
1st ICB 2nd	:	0.95100%	1.19795%	11.41196%	14.37540% Volume XVI
ICB Name	:	Monthly Return		Annualized Return	Issue VI
					Version I
3rd ICB 4th	:	1.13450%	1.13341%	13.61401%	13.60096% ( ) Manage-
ICB 5th ICB		1.32519%	1.47064%	15.90226%	17.64768% ment and Busi-
6th ICB 7th		1.13344%	1.15732%	13.60126%	13.88784% ness Research
ICB 8th ICB		1.18275%	0.22430%	14.19297%	2.69162%
DGEN DSE20					

Figure 2: C

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Figure 3: Table 2 :

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Figure 4: Table 3 :

Name	Standard deviation
1st ICB	20.69204%
2nd ICB	23.98384%
3rd ICB	22.70051%
4th ICB	22.60077%
5th ICB	22.82556%
6th ICB	33.31826%
7th ICB	23.31629%
8th ICB	24.45745%
DGEN	7.94533%
DSE20	9.95535%
Name	Beta
1 st ICB	0.290333469
2 nd ICB	0.353755095
3 rd ICB	0.257675094
4 th ICB	0.336138189
5 th ICB	0.415684339
6 th ICB	0.529488738
7 th ICB	0.254526598
8 th ICB	0.464035555
DGEN	1

Figure 5: C

5

Figure 6: Table 5 :

Name	R-squared
1st ICB	8.633849%
2nd ICB	5.927977%
3rd ICB	4.785532%
4th ICB	8.295044%
5th ICB	7.956083%
6th ICB	2.463026%
7th ICB	2.188619%
8th ICB	9.476383%

? = ? ? ??? ? ??? ?????? ? ?

? ? ???

??????

Name	Yearly Return	Risk-free Return	Beta	Treynor Measure
1st ICB	11.4%	5.5%	0.29	0.20
2nd ICB	14.4%	5.5%	0.35	0.25
3rd ICB	13.6%	5.5%	0.26	0.32
4th ICB	13.6%	5.5%	0.34	0.24
5th ICB	15.9%	5.5%	0.42	0.25
6th ICB	17.6%	5.5%	0.53	0.23
7th ICB	13.6%	5.5%	0.25	0.32
8th ICB	13.9%	5.5%	0.46	0.18
DGEN	14.2%	5.5%	1	0.09

Figure 7: C

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Figure 8: Table 6 :

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Name	DGEN	Yearly Return	Rf	?	Jensen Alpha
1st ICB	14.19%	11.41%	5.5%	.29	0.0340
2nd ICB	14.19%	14.38%	5.5%	.35	0.0581
3rd ICB	14.19%	13.61%	5.5%	.26	0.0588
4th ICB	14.19%	13.60%	5.5%	.34	0.0519
5th ICB	14.19%	15.90%	5.5%	.42	0.0679
6th ICB	14.19%	17.65%	5.5%	.53	0.0755
7th ICB	14.19%	13.60%	5.5%	.25	0.0590
8th ICB	14.19%	13.89%	5.5%	.46	0.0436

Figure 9: Table 7 :

8

Figure 10: Table 8 :

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Name	Rp	Rf	RPRisk	RPTotal	RPSelectivity
1st ICB	11.4%	5.5%	2.5%	5.9%	3.4%
2nd ICB	14.4%	5.5%	3.1%	8.9%	5.8%
3rd ICB	13.6%	5.5%	2.2%	8.1%	5.9%
4th ICB	13.6%	5.5%	2.9%	8.1%	5.2%
5th ICB	15.9%	5.5%	3.6%	10.4%	6.8%
6th ICB	17.6%	5.5%	4.6%	12.2%	7.5%
7th ICB	13.6%	5.5%	2.2%	8.1%	5.9%
8th ICB	13.9%	5.5%	4.0%	8.4%	4.4%

Figure 11: Table 9 :

10

36

Figure 12: Table 10 :

Name	Rm	Rf	?p	? ?	? ?	RPDiversification
1st ICB	14.19%	5.49%	29.03%	20.69%	7.95%	20.14%
2nd ICB	14.19%	5.49%	35.38%	23.98%	7.95%	23.19%
3rd ICB	14.19%	5.49%	25.77%	22.70%	7.95%	22.62%
4th ICB	14.19%	5.49%	33.61%	22.60%	7.95%	21.83%
5th ICB	14.19%	5.49%	41.57%	22.83%	7.95%	21.38%
6th ICB	14.19%	5.49%	52.95%	33.32%	7.95%	31.89%
7th ICB	14.19%	5.49%	25.45%	23.32%	7.95%	23.32%
8th ICB	14.19%	5.49%	46.40%	24.46%	7.95%	22.75%

viii. Fama's Decomposition of Net Selectivity

Fama's

Figure 13: C

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Name	RPSelectivity	RPDiversification	Net Selectivity
1st ICB	3.40%	20.14%	-16.74%
2nd ICB	5.81%	23.19%	-17.39%
3rd ICB	5.88%	22.62%	-16.74%
4th ICB	5.19%	21.83%	-16.64%
5th ICB	6.79%	21.38%	-14.59%
6th ICB	7.55%	31.89%	-24.34%
7th ICB	5.90%	23.32%	-17.43%
8th ICB	4.36%	22.75%	-18.39%

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