Re-engineering Mutual Funds Performance in Sub-Saharan Africa: Evidence from the Ghana Stock Exchange

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ABSTRACT

The study presents an examination of mutual funds average returns relative to the benchmark in Ghana using Sharpe and Treynor’s index for a sample of ten Ghanaian Mutual Funds selected on the basis of consecutive data availability during the period of 1st January 2010 to 31st December, 2014. The results revealed that 80% of the Mutual Funds recorded high raw returns with a strong correlation coefficient of +0.6089 between the raw returns and total risk. It was also found that the average Sharpe index for all the Mutual Funds was 1.351 outperforming the benchmark index of 0.300 and more so the average Treynor index for all the Mutual Funds was 12.68 beating the benchmark index of 9.59. Moreover 80% of the Mutual Funds were highly diversified with an average adjusted R-square of 59.88%. The analysis concluded that, the money market funds had a superior performance than the balanced and equity funds under all the three performance evaluation techniques.

Keywords: Mutual Fund, Performance, Ghana, Sharpe and Treynor’s index

INTRODUCTION

The assets of Mutual Fund industry globally, have upsurge more than sevenfold for the past two decades with enormous growth in the emerging economies, driven by the ever expanding middle class, domestic and international diversification, rising per capita income and the change in the pension schemes which allow participants to indirectly invest for economic and financial gains (Investment Company institute, 2014). The Morningstar database listed only nine diversified Emerging Market mutual Funds in 1991 but the figure surged to 200 in the early 2006 because of the impressive returns of the Emerging Market Funds (Gottesman and Morey, 2007). Arugaslan et al (2007) applied Modigliani and Modigliani to evaluate the risk-adjusted performance of the 20 largest US-based Mutual Funds during 1995-2004. They concluded that funds with the highest raw returns are outperformed by their benchmarks when their performance are evaluated on risk-adjusted basis whiles some funds with low raw returns outperformed their benchmarks on risk-adjusted basis. These conclusions indicate the sharp contrast between raw returns and risk adjusted returns for performance evaluation of Mutual Funds. This study therefore seeks to examine mutual fund average returns of ten selected Mutual Funds in Ghana with the methods of Sharpe index and Treynor index relative to the GSE-CI benchmark to ascertain whether the Mutual Funds provide reward for volatility and variability for the study period 2010-2014.

RELATED WORKS

Mutual Funds are financial intermediaries, which pools the savings of several investors of common financial goals and then invest the proceeds in a well-diversified portfolio of securities with the underlying composition of debenture, equity shares of joint stock...
companies, money market instruments, etc (Arora, 2015). The significance of Mutual Funds has claimed global attention since 1980s, triggering extensive research in this field especially in the study area of Mutual Funds performance.

2.1 Background of Mutual Fund Industry in Ghana

The Mutual Funds industry in Ghana commenced in 1993 with the promulgation of the Security Industry Law (SIL) 1993 (PNDC Law 333) section 141-Regulation which was substituted by the Security Industry (amendment) Act, 2000 (Act 590) section 11. SIL established the Security and Exchange Commission (SEC) as a regulatory body to provide integrity to the financial markets, to protect consumers, the national interest and also the integrity of the economy.

The Databank Asset Management Services Limited was the first asset management company to launch Mutual Funds called, the Databank Epack investment funds (Epack), which commenced operations in October 1996 and was credited for demystifying and democratizing the stock market investment in Ghana. This fund is considered to be relatively risky as it can invest up to 20% of its Net Asset Value in fixed income securities for a short period. The Mutual Fund industry has seen a steady increase in asset under management since its inception. The capital market has assumed increasing importance in the financial markets in Ghana.

Since it started operating in the country, capital market has witnessed various developments. Currently, the market is one of the highly regarded performing markets in Africa.

Yeboah (2009) claimed that the Mutual Fund industry in Ghana has made significant impact in the capital market for the past two decades and is now a significant financial intermediary. Becker and Vaughan (2003) attributed the immense impact of Mutual Funds as a financial intermediary to the ever increasing funds mobilization, rising number of schemes and investors in the industry.

To improve the capitalization, the government extended the stock market tax holiday for another five years. In addition, the exemption from capital gain tax has been extended for further five years to promote investment and deepen activities on the stock market. Mutual funds and unit trust funds that invest in stocks on the stock market are also exempted from VAT on financial services (GNA, 2012).

2.3 Implications of Sharpe & Treynor’s Index

Historical returns are the main criteria for evaluating the performance of mutual funds and the top performing funds in any category are ranked in descending order on the specific time period and not considering the risk exposure of the funds. Bhardwaj (2013) argued that funds that are in the same category do have varied risk profile as in the case of two equity diversified funds with the same 3 year historical return of 15%. The first fund evenly spread its risk across several sectors while the second fund has most of its funds in the banking sector. Comparatively, the latter has stronger risk profile than the former which could be affected by unique risks such as inflation and interest rate.

It is, therefore imperative to take into consideration, the risk exposure of funds when analyzing historical returns of mutual funds. Treynor and Sharpe indices are the two quantitative methods, which come handy for analyzing risk adjusted performance of mutual funds. Mutual funds are exposed to, basically two type of risks, namely systematic and unsystematic risks. Unsystematic risk also called diversifiable risk, can be eliminated, reduced or diversifiable by investing in other securities. Systematic risk also called market risk or non-diversifiable risk, can be eliminated or diversifiable in nature. Standard deviation is the measure of the portfolio’s total risk while Beta measures the market risk. Sharpe and Treynor indices have the same numerator i.e. the excess return but differ with denominator for the risk adjustment. Sharpe uses standard deviation as its denominator whiles Treynor uses Beta.

The Sharpe ratio measures the excess return generated relative to the total risk exposure to the fund. Whiles the Treynor ratio measures the excess return generated relative to the market risk exposure to the fund. Basically, the higher the ratio, the more superior the fund’s risk-adjusted performance i.e. investors are compensated for taking more risk. Marte (2012) reiterated Blanchett’s argument that Sharpe ratio is a useful tool for making comparison with funds of similar portfolio strategies whiles other advisers confirmed that it could be used with other tools to help investors develop strategy that match their return needs and risk tolerance.

Padgette (1995) argued that although historical data gives indication of investment’s future outlook it would be inappropriate to attempt to assume that future risk forecast is totally accurate especially in the short term. Historical data in the long term depicts a better picture of the potential future risks. Treynor ratio uses beta to measure how sensitive a portfolio of investment is to the market movement. Thus beta attempt to measure the variance of return relative to the market’s movement.
According to Morningstar (2012) a low beta would indicate that the portfolio has been less volatile relative to the market and has taken on less risk with lower potential return. Likewise, a high beta would imply that the portfolio has high-risk than the market and also has greater potential return.

2.4 Limitations of the Sharpe & Treynor’s Index

The Sharpe ratio is just a raw number and only meaningful when compared with ratios for other investments over the same time period; and with similar objectives. Sharpe ratio doesn’t recognize non-quantifiable factors that can affect performance, such as prevailing economic and market conditions or a change in fund managers (Wealth Management System Inc. 2016).

In addition, when comparing investments with negative returns, the calculation can produce a ratio that is counterintuitive -- that is, a fund with a higher standard deviation may have a higher Sharpe ratio than another fund with a lower standard deviation. In such cases, other risk assessments need to be considered. In addition, relying on Sharpe ratios based on readily available fund data may not give a sufficiently long-term view of a fund's risk-adjusted performance. In cases where standard deviation is provided only for a fund's most recent three-year period, additional research is required in order to calculate the ratio for longer periods.

While the Sharpe ratio has limitations, it is regarded as a valid statistic for comparing funds and other investment assets. Used as a screening tool, it provides an objective measure of an investment’s risk-adjusted past performance. Used in conjunction with well-defined selection criteria and monitoring policies, it can help plan sponsors create and maintain a suitable array of investment choices for the benefit of plan participants (Wealth Management System Inc. 2016).

Treynor ratio subject to generic weaknesses of CAPM. It assumes that an existing portfolio is fully diversified; hence, systematic risk is taken into account only. It is applicable to mean-variance world (Dzikevičius, 2004).

2.5 Significance of Benchmark in Performance Evaluation

Benchmarks are useful in the determination of the relative performance of portfolio and securities over a period. This is necessary when evaluating the performance of mutual fund and the fund manager. Dor et al (2008) argued that a typical benchmark must be a broad based index with a fair representation of the investment style of the fund. Benchmark is appropriate for a narrow asset class style investment mandate but not appropriate for flexible investment style mandate across multiple asset class categories for reason that the index may not highlight the large variation across the asset classes of the same style category.

The commonest Benchmark for measuring US stock return are Wilshire 5000 for Broad market, S&P 500 for large Capitalization stock, Russell 2000 for Small Capitalization stock and Morgan Stanley’s EAFE for the Global stocks. In Ghana, the GSE Composite and GSE Financial Stock Indices are used to measure the performance of the market. The GSE-CI is the total market capitalization of all ordinary stocks listed on the Ghana Stock Exchange with the exception of stocks listed on other markets and the GSE-FI captures only the total market capitalization of the financial stocks listed on the exchange (GSE, 2011).

According to Hewlett (2015) benchmark must be unambiguous, investable, measurable, specified in advance and appropriate and consistent with the manager’s investment style. He further argued that for benchmarking, many observations are needed for significant results and shifting of parameters during active management, complicate performance valuation.

Lehman and Modest (1985) conducted performance evaluation of 130 mutual funds over the period of January 1968 to December 1982 using Capital Asset Pricing Model (CAPM) and a variety of Arbitrage Pricing Theory (APT) benchmarks to ascertain the extent of sensitivity of funds normal performance to the benchmark chosen and also whether absolute and relative rankings of funds are dependent on benchmark chosen. The results obtained suggest that the rankings of funds are sensitive to the method used to construct the APT benchmark but there are difference between rankings obtained from alternative benchmarks showing the significance of the appropriate model used for computing for risk and expected return. It was realized that a different conclusion could be drawn for fund performance dependent on the size of the securities used in the analysis or the inefficient method for estimating the necessary factor model.

MATERIALS AND METHODS

The data for this research consist of 10 equity funds listed on the Ghana Stock Exchange. Although, the total number of equity funds offered on the stock exchange is 15 the remaining 5 were not considered since they listed without a long history hence have incomplete data. The study duration consisted of 5 years beginning from 2010 to 2015. This culminated
into 1300 trading days excluding weekends and national holidays.

**Model Specification**

For the evaluation techniques of the rate of return, Sharpe and Treynor’s index, and variance were use. Treynor (1995) developed a ‘reward to volatility’ ratio on the argument that potential mutual fund’s returns must be analyzed in the light of the underlying systematic or market risk, in this case the Beta (β) and not by averaging the returns over the periods. The ratio is a risk –adjusted measure of return based on systematic risk. It is similar to the Sharpe ratio but the Treynor ratio uses the beta (β) a measure of volatility. The Treynor ratio is calculated as

\[
T_p = \frac{(R_p - R_f)}{\beta_p}
\]

This is useful in evaluating the quality rather than the quantity of the returns of the mutual funds. Systematic risk could be estimated by regressing the mutual fund’s returns on the return to a market benchmark index.

\[
\beta_p = \frac{\text{Covar}(R_p, R_m)}{\sigma_m^2}
\]

In other words, the Treynor index is only used to differentiate the evaluation of funds performance and was not adapted in the optimization model. Variance, on the other hand, was a measure of risk and higher risk might give higher returns. On the other hand, Sharpe (1966) developed a ‘reward to variability’ ratio in an attempt to analyze portfolio performance and argued that a portfolio is said to exhibit a good performance only when it earns excess return relative to its benchmark market equilibrium return. This is in tandem with contemporary portfolio theory, which stipulates that there is linear relationship between the expected return on an efficient portfolio E (Rp) and its associated risk (σp). Standard deviation of returns is the total risk of the portfolio. The Sharpe index provides a pure number useful as a comparative tool and proportional to the risk-adjusted return of the fund. Higher Sharpe ratio denotes superior risk-adjusted performance of the fund whiles negative means risk-free asset is better option than the analyzed fund.

Sharpe Index, \( S_R = \frac{R_p - R_f}{\sigma_p} \)

\( R_p \) is the average return of the portfolio

\( R_f \) = Average risk – free rate of return

\( \sigma_p \) = is the standard deviation of the portfolio

Similarly, the benchmark market index, \( S_R = \frac{(R_m - R_f)}{\sigma_m} \)

Here, \( R_m \) = is the average market return of the GSE – CI,

\( \sigma_m \) = is the standard derivation of the benchmark market return

Standard deviation, \( \sigma = \sqrt{\frac{1}{N-1} \sum_{i=1}^{N} (R_p - \bar{R})^2} \)

Where \( N \) = Number of returns observed

\( \bar{R} \) = Expected returns observed

\( \bar{R} = \) Arithmetic average of the returns observed

Secondly, the best allocation of money in the portfolio of mutual funds can be done by either maximizing the return for a given risk or minimizing risk for a given return. The rate of return and the variance were represented as fuzzy numbers in order to reflect the uncertainty at the evaluation stage. Further, the optimization method for fuzzy models is developed based on Ammar and Khalifa model [1]. In this study, given the past return of each cluster, we approximate values such as future expected return and future risk. As in Chen and Huang [2], the fuzzy return rates are denoted as a triangular fuzzy numbers, \( \bar{R} = (l, m, n) \) whose membership function is as follows:

\[
\mu_t = \begin{cases} 
\frac{(t - l)}{(m - l)}, & l \leq t \leq m, \\
1, & t = 0, \\
\frac{(n - t)}{(n - m)}, & m \leq t \leq n, \\
0, & t < l \text{ or } t > n.
\end{cases}
\]

The \( \alpha \)-level confidence \( \bar{R} \) of in terms of interval values corresponding to the triangular fuzzy numbers \( \bar{R} = (l, m, n) \) as follows:

\[
\bar{R} = [\bar{R}_l, \bar{R}_n]
\]

\[
\alpha = \{(m - l)\alpha + l, n - (n - m)\alpha \} \forall \alpha \in [0, 1],
\]

Where \( (m - l)\alpha \) and \( (n - (n - m)\alpha \) are the lower and upper bounds of the \( \alpha \)-level confidence can also be obtained. The portfolio optimization problem can be developed in two ways by using (5) and (7).

Firstly, to maximize the expected return subject to a given risk. \( M \) is the crisp maximum of fuzzy variance and \( x_i \) is the investment proportion in cluster \( i \)

Maximise :

\[
\text{Maximise} : \quad \tilde{Z}_R^\alpha(\alpha) = \sum_{i=1}^{N} (\bar{R}_i)(\tilde{R}_i)(\alpha) x_i
\]

Subject to :

\[
\sum_{i=1}^{N} x_i = 1
\]

\( x_i \geq 0 \)

\( i = 1, 2, \ldots, N \)
Secondly, to minimize future risk subject to an expected return. \( L \) is the crisp minimum of fuzzy return and \( x_i \) is the investment proportion in cluster \( i \)

Minimise :

\[
\sum_{i=1}^{N} \left[ (\sigma^-_i)^2 \sigma^+_i \right] x_i^2 \leq M,
\]

Subject to

\[
\sum_{i=1}^{N} x_i = 1, \quad \text{where} \quad x_i \geq 0, i = 1, \ldots, N.
\]

Both of the problems could be solved by satisfying the Kuhn-Tucker conditions based on the lower and upper bounds, separately, at different \( \alpha \)-level confidences. The optimal solutions at \( \alpha \) level will be in \([\hat{Z}_L(x), \hat{Z}_U(x)] = Z_\alpha(x)\).

In conclusion, investors can choose either one of these model based on their preferences to solve the optimization problem.

**Benchmark** - the appropriate performance benchmark selected for the study is Ghana Stock Exchange composite index (GSE-CI) obtained from the GSE website from 2010 to 2014.

**Arithmetic means** - Annualized arithmetic average was computed for risk-adjusted return, non-risk-adjusted return, 91-day Treasury bill rate and the GSE-CI.

**Standard deviation (SD)** - The total risk of mutual fund is measured by the standard deviation. The standard deviation demonstrates the dispersion of the expected returns from the historical returns. Its measures the degree to which the expected return of the mutual fund fluctuate relative to the arithmetic average return for a specified period. The higher the standard deviation the more volatile the NAV of the mutual fund and therefore more risky than a fund with low standard deviation.

**DATA ANALYSIS**

4.1 Analysis of Non Risk-Adjusted Performance of the Funds

The results given in Table 1 indicate that all the Mutual Funds recorded positive average annualized raw returns during the study period

<table>
<thead>
<tr>
<th>FUND NAME</th>
<th>MEAN (%)</th>
<th>RANKING</th>
<th>( \sigma )</th>
<th>FUND TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fund 1</td>
<td>24.63</td>
<td>6</td>
<td>17.03</td>
<td>Balanced Fund</td>
</tr>
<tr>
<td>Fund 2</td>
<td>27.24</td>
<td>5</td>
<td>17.54</td>
<td>Balanced Fund</td>
</tr>
<tr>
<td>Fund 3</td>
<td>22.66</td>
<td>7</td>
<td>14.95</td>
<td>Balanced Fund</td>
</tr>
<tr>
<td>Fund 4</td>
<td>21.13</td>
<td>8</td>
<td>10.35</td>
<td>Balanced Fund</td>
</tr>
<tr>
<td>Fund 5</td>
<td>32.41</td>
<td>2</td>
<td>35.09</td>
<td>Equity Fund</td>
</tr>
<tr>
<td>Fund 6</td>
<td>27.25</td>
<td>4</td>
<td>26.61</td>
<td>Equity Fund</td>
</tr>
<tr>
<td>Fund 7</td>
<td>33.84</td>
<td>1</td>
<td>37.68</td>
<td>Equity Fund</td>
</tr>
<tr>
<td>Fund 8</td>
<td>17.21</td>
<td>10</td>
<td>24.99</td>
<td>Equity Fund</td>
</tr>
<tr>
<td>Fund 9</td>
<td>18.53</td>
<td>9</td>
<td>5.68</td>
<td>Money Market Fund</td>
</tr>
<tr>
<td>Fund 10</td>
<td>28.96</td>
<td>3</td>
<td>8.29</td>
<td>Money Market Fund</td>
</tr>
</tbody>
</table>

| AVERAGE   | 26.61    | 8       | 31.99       | - |

Correlation coefficient between average raw returns & total risk = +0.6089

Source: Author’s computations.

It was observed that 30% of the Mutual Funds earned superior average annualized raw returns than the GSE-CI and the remaining 70% performed below the GSE-CI average annualized raw return for the same period. The top performed Mutual Funds in terms of the average annualized raw return was Fund 10, Fund 7 and Fund 5. On the average, the GSE-CI outperformed the average return of all the Mutual Funds for the study period.

Now the question is whether these returns are in association with the degree of risk involved in the investment or not. The standard deviation represents the total risk involved in the investment of each fund. A glance at Table 1, shows that higher risks are associated with higher returns and the correlation coefficient between return and risk was +0.6089 with the exception for Fund 10 and Fund 8.

Fund 10 recorded an average return of 28.96 with a total risk of 8.29 while Fund 8 had average return of
17.21 for a total risk of 24.99. Fund 10 is a money market fund whereas Fund 8 equity fund. There may be some factors contributing to these changes in trend.

**4.2 Analysis of Sharpe Indices**

Sharpe index is the surplus return earned over the risk-free return per unit of risk involved, thus, per unit of the standard deviation. Positive Sharpe index means superior performance while negative shows poor performance of the Fund. Moreover, lesser negative Sharpe index of the Fund than that of the benchmark index depicts superior performance than that of the benchmark index whiles higher positive Sharpe index of a Fund than that of the benchmark index means superior performance of the Fund relative to the benchmark index. The objective of this present subsection is to evaluate the performance of the Mutual Funds by comparing their respective Sharpe indices to that of the market benchmark index i.e. the GSE-CI. The results of the Sharpe indices of the Mutual Funds for the study period 2010-2014 are exhibited in the Table 2 below:

<table>
<thead>
<tr>
<th>TABLE 4: Sharpe Indices Computed Over the Period 2010-2014</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FUND NAME</strong></td>
</tr>
<tr>
<td>Fund 1</td>
</tr>
<tr>
<td>Fund 2</td>
</tr>
<tr>
<td>Fund 3</td>
</tr>
<tr>
<td>Fund 4</td>
</tr>
<tr>
<td>Fund 5</td>
</tr>
<tr>
<td>Fund 6</td>
</tr>
<tr>
<td>Fund 7</td>
</tr>
<tr>
<td>Fund 8</td>
</tr>
<tr>
<td>Fund 9</td>
</tr>
<tr>
<td>Fund 10</td>
</tr>
<tr>
<td>AVERAGE</td>
</tr>
<tr>
<td>GSE-CI</td>
</tr>
</tbody>
</table>

The results showed in Table 4 indicate that 90% of the Mutual Funds had positive Sharpe indices which mean superior returns relative to the degree of risk involved. It was also observed that 80% of the Funds had superior Sharpe indices than the benchmark index. Fund 8 and Fund 9 recorded the worst Sharpe indices of -0.025 and 0.122 respectively than the benchmark index of 0.300. The best superior performing Mutual Fund over the study period was Fund 10 with Sharpe index of 1.342 whilst the worst performing Fund is Fund 8 with a Sharpe index of -0.025. Average Sharpe index of the ten Schemes used for the study period was 1.351, indicating superior performance over the benchmark index. This indicates that on average the Mutual Funds in Ghana during the study period 2010-2014 have outperformed the GSE-CI on the basis of the Sharpe index. This is due to the fact the most of the Mutual Funds were able to earn positive annualized return in surplus over the risk-free return. The average risk-free rate over the study period was 17.84% compared to the highest average Mutual Fund return of 33.84%. In General, Mutual Funds in Ghana, have performed better over the study period by exhibiting high variability in their returns as the standard deviation over the study period were high.

<table>
<thead>
<tr>
<th>TABLE 5: Average Sharpe Indices of the Schemes and the Benchmark Index (2010-2014)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fund Type</strong></td>
</tr>
<tr>
<td>Sharp e Index</td>
</tr>
</tbody>
</table>

**Balanced Fund**

It was observed from Table 2 that during the study period, all the balanced fund schemes had positive Sharpe indices, which indicate superior returns relative to the risk free return per the degree of risk involved. From Table 5, the average Sharpe index for the balanced fund schemes during the 2010-2014 period was 0.394 as against the benchmark index of 0.300, meaning on average the balanced fund schemes performed better than the benchmark index. It was also observed that all the balanced fund schemes had higher Sharpe indices than the benchmark index. This implies that the balanced fund had outperformed the benchmark index for the study period.

**Equity Fund**

For the study period, it was observed from Table 2 that 75% of the equity fund schemes had positive Sharp indices, meaning they had adequate returns over the risk-free return per the degree of risk involved while 25% had negative Sharpe index. And also it was observed that 75% of the equity fund...
schemes had higher Sharpe indices than the benchmark index, indicating their superiority over the benchmark index for the study period while 25% had lower Sharpe index than the benchmark index. From Table 2.1, the average Sharpe index for the equity fund schemes for the study period was 0.292 and that of the benchmark index was 0.300, indicating poor performance of the equity fund schemes for the 2010-2014 period.

**Money Market Fund**
The result given in Table 2, shows that during the study period all the money market schemes had a positive Sharpe indices, meaning the scheme had outperformed the risk free return per the degree of risk involved. It was also observed that 50% of the money market schemes had higher Sharpe index than the benchmark index while 50% of the schemes performed poorly relative to the benchmark index. On average, the money market schemes outperformed the benchmark index with a superior Sharpe index of 0.732 relating to the risk free return per unit of systematic risk, thus, beta. Positive Sharpe index indicates superior performance whereas negative indicates inferior return of the fund relative to the risk-free return as against the degree of risk involved in the investment.

**Analysis of Treynor Indices**
Treynor index is the surplus return earned over the risk involved in the investment. It was also observed that 50% of the money market schemes had higher Sharpe index than the benchmark index while 50% of the schemes performed poorly relative to the benchmark index. This implies that the money market fund had a superior performance than the benchmark index for the study period.

The objective of this present subsection is to evaluate the performance of the Mutual Funds by comparing their respective Treynor indices to that of the market benchmark index i.e. the GSE-CI, to check whether the portfolio risk is sufficiently rewarded. From Table 3 it was observed that 90% of the funds had positive Treynor indices whiles 10% recorded a negative Treynor index. The positive Treynor indices indicate superior performance of the Funds i.e. surplus returns earned over the risk-free return per unit of systematic risk involved.

Results from table 3 shows that 90% of the Funds had superior Treynor indices than that of the benchmark index and 10% performed poorly relative to the benchmark index. The best superior performing Schemes was Fund 10 with a Treynor index of 146.31 whiles the worse performing scheme was Fund 8, with a Treynor index of -0.94. On average, the Funds exhibited a superior Treynor index of 12.68 as against that of the benchmark index’s Treynor index of 9.59. According to this performance evaluation measure, this indicates that the Mutual Fund Schemes in Ghana exhibited superior performance over the study period against the benchmark index.

<table>
<thead>
<tr>
<th>FUND NAME</th>
<th>MEAN (R) (%)</th>
<th>MEANS EXCESS RETURN (%)</th>
<th>T</th>
<th>FUND TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fund 1</td>
<td>24.63</td>
<td>6.79</td>
<td>0.48</td>
<td>14.00</td>
</tr>
<tr>
<td>Fund 2</td>
<td>27.24</td>
<td>9.40</td>
<td>0.50</td>
<td>18.80</td>
</tr>
<tr>
<td>Fund 3</td>
<td>22.66</td>
<td>4.82</td>
<td>0.45</td>
<td>10.69</td>
</tr>
<tr>
<td>Fund 4</td>
<td>21.13</td>
<td>3.30</td>
<td>0.30</td>
<td>10.71</td>
</tr>
<tr>
<td>Fund 5</td>
<td>32.41</td>
<td>14.57</td>
<td>0.95</td>
<td>15.26</td>
</tr>
<tr>
<td>Fund 6</td>
<td>27.25</td>
<td>9.41</td>
<td>0.82</td>
<td>11.45</td>
</tr>
<tr>
<td>Fund 7</td>
<td>33.84</td>
<td>16.00</td>
<td>1.14</td>
<td>13.95</td>
</tr>
<tr>
<td>Fund 8</td>
<td>17.21</td>
<td>(0.63)</td>
<td>0.67</td>
<td>(0.94)</td>
</tr>
<tr>
<td>Fund 9</td>
<td>18.53</td>
<td>0.69</td>
<td>0.05</td>
<td>13.27</td>
</tr>
</tbody>
</table>

**Table 6: Treynor’s Index (T<sub>R</sub>) Computed Over the Period 2010-2014**

**Table 7 Average Treynor Indices of the Schemes and the Benchmark Index (2010-2014)**

<table>
<thead>
<tr>
<th>FUND TYPE</th>
<th>BALANCED FUND</th>
<th>EQUITY FUND</th>
<th>MONEY MARKET FUND</th>
<th>AVERAGE INDEX</th>
<th>BENCHMARK INDEX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treynor Index</td>
<td>13.55</td>
<td>9.93</td>
<td>79.79</td>
<td>12.68</td>
<td>9.59</td>
</tr>
</tbody>
</table>

Source: Author’s computation.

**Balanced Fund**
Results in Table 7 indicate, that all the balanced funds had higher Treynor indices than that of the benchmark index for the study period. Higher Treynor indices mean that the balanced funds had superior returns than that of the benchmark index. Hence, irrespective of the market conditions, the
balanced funds outperformed the benchmark index for the study period. From Table 3.1, the result given shows that balanced fund had, on average, a Treynor index of 13.55, outperforming the benchmark index of 9.59 for the study period.

**Equity Fund**
The Treynor indices of the equity fund depicted in Table 6 reveal that 90% of the Funds had positive Treynor indices during the study period whiles 10% exhibited negative Treynor index. Also 90% of the equity funds had higher Treynor indices than that of the benchmark index whiles 10 % had lesser Treynor indices than that of the benchmark. It means during the study period majority of the equity funds had superior returns than that of risk-free return per unit of the systematic risk involved to outperform the benchmark index. This good performance of the equity funds may be credited to favorable market conditions in the bull period. From Table 5, results show that on average, equity funds had a Treynor index of 9.93, outperforming the market benchmark of 9.59, for the same period

**Money Market Fund**
The result given in Table 2, shows that during the study period all the money market schemes had a positive Treynor indices, meaning the scheme had outperformed the risk free return per the degree of risk involved. It was also observed that all of the money market schemes had higher Treynor index than the benchmark index .On average, the money market schemes outperformed the benchmark index with a superior Treynor index of 79.79 relative to 9.59 of the benchmark index. This implies that the money market fund had a superior performance than the benchmark index for the study period.

**CONCLUSION**
This study sought to evaluated the risk-adjusted performance for a sample of ten Ghanaian Mutual Funds selected on the basis of consecutive data availability during the period of 1st January 2010 to 31st December, 2014, using classical technique namely Sharpe index and Treynor index to ascertain whether the Mutual Funds provide reward for volatility and variability.

The results revealed that 80% of the Mutual Funds recorded high raw returns with a strong correlation coefficient of +0.6089 between the raw returns and total risk. This finding agreed with literature that there exist a trade-off between returns and total risk of investment. Most of the Mutual Funds were relatively exposed to less risk than the benchmark but with a high degree of volatility.

Moreover, Majority of the Mutual Funds outperformed the benchmark (GSE-CI) on the basis of Sharpe and Treynor indices. On average, the Mutual Funds recorded Sharpe and Treynor indices of 1.351 and 12.68 respectively. This implies that most of the Mutual Funds generated enough excess returns over the risk-free return. Hence retail and institutional investors are being rewarded for the volatility and variability of their investment. The money market fund had a superior performance than the balanced and equity funds under all the three performance evaluation techniques of Treynor and Sharpe for the study, recording an average Sharpe index of 0.732 and that of Treynor index, 79.79. The best performing fund is the money market fund for the study period.

**REFERENCE**
Regression and Response Surface Methodology.


