Macrothink Institute™

Asian Journal of Finance & Accounting
ISSN 1946-052X
2023, Vol. 15, No. 1

A Study on the Effect of Portfolio Allocation on Mutual Funds

Mihir Dash

(Research Scholar of Department of Statistics, Periyar University)

& Interim Associate Dean

School of Applied Mathematics, Alliance University

Bangalore, India - 562106

Rita Samikannu

Head of Department, Department of Statistics, Periyar University

Salem, India – 636011

Received: May. 8, 2023 Accepted: June 10, 2023 Published: June 10, 2023

doi:10.5296/ajfa.v15i1.18970 URL: https://doi.org/10.5296/ajfa.v15i1.18970

Abstract

There are hundreds of mutual funds in the market, each offering different returns. The investors always look at funds which give high returns and have low risk. Thus while making a portfolio the asset management company should make investment allocations where returns are definite and to give justified returns for every rupee the investors pay, considering the different risks.

The objective of the study was to find the short-term effects of portfolio allocation on the performance of mutual funds. The data for the study was consisted of the portfolio allocations and the performance statistics of one hundred and fifty-nine open-ended mutual funds, of which fifty were diversified debt/ income funds and one hundred and nine were diversified equity funds. These funds were further classified into different mutual fund schemes. Each of the mutual funds had a different portfolio and investments were made in different instruments like bonds, certificates of deposit, commercial papers, etc. (in case of debt) and in different sectors like technology, chemicals, services, etc. (in case of equity).

The findings from the study indicate that, for debt funds, allocation in bonds and government securities tend to impact the performance of the fund, while for equity funds, allocation in

engineering, energy, and service sector stocks tend to impact the performance of the fund.

Keywords: asset management company, portfolio allocations, returns, performance, debt funds, equity funds

Introduction

There are hundreds of mutual funds in the market, each offering different returns. The investors always look at funds which give high returns and have low risk. Thus while making a portfolio allocation the asset management company (AMC) should make investment allocations where returns are definite, giving justified returns for every Rupee the investors pay, considering the different risks. On the other hand, there are lots of sectors and instruments in which the pool of money collected can be invested. The main aim of the AMC is to make a portfolio allocation that gives maximum returns to the investors.

The problem of asset allocation for mutual funds is a long-standing field of interest for researchers. It can be traced back to the beginning of portfolio theory itself. In particular, Markowitz (1987) discussed some of the early models and approaches in portfolio construction.

Sharpe (1994) studied the effect of asset allocation and management style on mutual fund performance. He proposed an asset class model for the management of mutual fund investments.

Ibbotson and Kaplan (1998) examined the effect of asset allocation on returns for balanced funds and pension funds. They found that that about 90% of the variability of returns of a typical fund across time was explained by policy; about 40% of the variation of returns across funds was explained by policy; and that on average, about 100% of the return level was explained by policy return.

Kadiyala (2004) studied the effect of investment in mutual funds on stock market returns. She found that stock market returns are related to contemporaneous flows into mutual funds that invest in risky stocks and bonds, but are unrelated to flows into funds that invest in safer stocks and bonds; in particular, this means that asset allocations of funds have an impact on market returns.

Data & Methodology

The present study examines the short-term effects of portfolio allocation on performance for open-ended mutual funds. The study was conducted with a random sample consisting of one hundred and fifty-nine different open-ended mutual funds, of which one hundred and nine diversified equity funds were used to study the allocation of funds in different sectors and fifty diversified debt/ income funds were used to study the allocation in different instruments. The sample of diversified debt/ income funds were classified as Debt: ultrashort-term funds (24%), Debt short term funds (2%), Debt: floating-rate short-term funds (6%), Debt: medium-term funds (26%), Gilt: short-term funds (6%), Gilt: medium-term funds (18%), and Hybrid funds (18%). The sample of diversified equity funds were classified as Equity: diversified funds (70.6%), Equity: index funds (13.8%) and Equity: tax planning funds (15.6%). The data for the study consisted of the portfolio allocations and the performance measures of the sample funds. The data was collected from the websites valueresearchonline.com and amfiindia.com.

The primary objective of the study was to analyze the short-term effects of the portfolio allocation on the performance of funds. In the case of diversified debt/ income funds, this involved analyzing the effect of differences in allocation of different debt/ income funds in different instruments on the differences in performance. On the other hand, in the case of diversified equity funds, this involved analyzing the effect of differences in allocation in different sectors on the difference in performance. Stepwise multiple regression analysis was used in both situations to identify statistically significant effects.

Analysis & Interpretation

Diversified Debt/ Income Funds

The overall allocation of the sample diversified debt/ income funds is shown in Table 1:

TABLE 1: Overall allocation of debt/ income funds in different instruments

Descriptive Statistics

	Mean
Bonds	33.8808%
Govt. Securities	15.5846%
Others	13.1120%
Cash, call & others	9.6396%
Comm Pap	7.4802%
Debt	6.0148%
Cert of Deposit	5.7076%
Tresury Bills	4.4026%
Reverse Repo	1.9400%
Term Deposits	1.1908%
CP/CD	1.0470%

It was found that bonds had the highest allocation (33.88%), followed by government securities (15.58%) and others (13.11%). Amongst the least preferred instruments were reverse repos, term deposits and CP/CD's.

The descriptive statistics of the performance measures for the sample diversified debt/ income funds is shown in Table 2:

Table 2. Descriptive statistics of performance measures of debt/ income funds

Descriptive Statistics

	Mean	Std.	Skewnes	Kurtosis
mean returns	.3004	.73436	4.660	22.948
standard deviation of returns	.5582	1.16057	4.530	21.655
beta	.2994	.33645	1.543	1.526
R2	.3120	.32071	.941	-.447
Sharpe ratio	.4505	.57141	1.015	.423
Treynor ratio	.6491	1.17430	2.029	4.413

The allocation in each type of debt/ income fund in the sample is shown in Table 3:

Table 3. Allocation in different instruments for different debt/ income funds

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Mean

	Category							
	Debt: ultrashort-term	Debt: short-term	Debt: floating-rate short-term	Debt: medium term	Gilt: short-term	Gilt: medium-term	Hybrid	Total
Bonds	26.4950%	40.6300%	52.2433%	53.0246%	.0000%	.0000%	54.3800%	33.8808%
CP/CD	.0000%	.0000%	6.2500%	.8662%	.0000%	.0000%	2.4822%	1.0470%
Cert of Deposit	19.9767%	26.4500%	.0000%	1.4777%	.0000%	.0000%	.0000%	5.7076%
Comm Pap	20.0908%	22.6700%	14.3500%	4.2292%	.0000%	.0000%	1.3578%	7.4802%
Cash, call & others	5.9075%	.0000%	2.3567%	4.1877%	27.4700%	23.034%	6.6511%	9.6396%
Debt	2.9025%	.0000%	15.8600%	7.3231%	.0000%	.0000%	13.6811%	6.0148%
Govt. Securities	.0000%	.0000%	.0000%	16.5738%	12.5100%	58.072%	.3989%	15.5846%
Term Deposits	2.5800%	.0000%	.0000%	.0000%	.0000%	3.1756%	.0000%	1.1908%
Tresury Bills	2.6892%	.0000%	.0000%	.4154%	14.8500%	15.323%	.0000%	4.4026%
Reverse Repo	.0000%	.0000%	.0000%	2.9192%	19.6833%	.0000%	.0000%	1.9400%
Others	19.3583%	10.2500%	8.9400%	8.9831%	25.4867%	.3944%	21.0489%	13.1120%

It was found that the Debt: ultrashort-term funds allocated primarily in bonds (26.50%), commercial papers (20.09%), certificates of deposit (19.98%), and others (19.36%). Debt short term funds showed a similar pattern, with bonds having the highest allocation (40.63%), followed by certificates of deposit (26.45%), commercial papers (22.67%), and others (10.25%). In the case of Debt Floating-rate short-term funds, bonds had the highest allocation (52.24%), followed by debt (with 15.86%), commercial papers (14.35%), and others (8.94%). Debt: Medium term funds had highest allocation in bonds (53.02%), followed by government securities (16.57%) and others (8.98%). In contrast, Gilt short term funds had highest allocation in cash, call, and others (27.47%) and others (25.48%), followed by reverse repos (19.68%), T-bills (14.85%), and government securities (12.51%). Gilt medium term funds allocated heavily in government securities (58.07%), followed by cash, call, and others (23.03%) and Treasury bills (15.32%). Finally, Hybrid funds allocated highest in bonds (54.38%), followed by others (21.04%) and debt (13.68%).

The descriptive statistics of the performance measures for each type of debt/ income fund are shown in Tables 4, and the ANOVA tests for differences in performance between different types of debt/ income funds are shown in Table 5:

Table 4. descriptive statistics of performance measures for each type of debt/ income fund

Report

		Category						
		Debt: ultrashort-term	Debt: short-term	Debt: floating-rate short-term	Debt: medium term	Gilt: short-term	Gilt: medium-term	Hybrid
mean returns	Mean	.0967	.1600	1.5333	.2585	.0900	.1322	.4756
	Std. Deviation	.01303	.	2.49127	.36113	.01000	.16679	.89847
standard deviation of	Mean	.0292	.0900	2.2933	.4469	.0733	.6711	.9467
	Std. Deviation	.04814	.	3.95485	.25094	.00577	.31102	1.50889
beta	Mean	.0492	.2100	.5733	.3408	.3867	.5200	.2422
	Std. Deviation	.04660	.	.45938	.23333	.11240	.46425	.38745
R2	Mean	.0742	.0300	.3567	.5762	.0667	.5022	.1556
	Std. Deviation	.09199	.	.29006	.27467	.04041	.36148	.23093
Sharpe ratio	Mean	1.0556	.8889	1.2104	.1959	.1310	.0006	.2660
	Std. Deviation	.46782	.	.70824	.45745	.12542	.19331	.13776
Treynor ratio	Mean	1.0576	.3810	1.5881	.2865	.0322	-.1281	1.3276
	Std. Deviation	1.47770	.	2.49420	.79861	.03470	.30577	.83324

Table 5. ANOVA tests for differences in performance between different types of debt/ income funds

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
mean returns * Category	Between Groups	(Combined)	5.765	6	.961	2.000	.087
	Within Groups		20.660	43	.480		
	Total		26.425	49			
standard deviation of returns * Category	Between Groups	(Combined)	14.949	6	2.491	2.099	.073
	Within Groups		51.051	43	1.187		
	Total		66.000	49			
beta * Category	Between Groups	(Combined)	1.497	6	.250	2.649	.028
	Within Groups		4.050	43	.094		
	Total		5.547	49			
R2 * Category	Between Groups	(Combined)	2.398	6	.400	6.505	.000
	Within Groups		2.642	43	.061		
	Total		5.040	49			
Sharpe ratio * Category	Between Groups	(Combined)	9.595	6	1.599	10.738	.000
	Within Groups		6.404	43	.149		
	Total		15.999	49			
Treynor ratio * Category	Between Groups	(Combined)	17.150	6	2.858	2.438	.041
	Within Groups		50.420	43	1.173		
	Total		67.570	49			

It was found that there is no statistically significant difference in mean returns and standard deviation of returns between different types of debt/ income funds. Among the sample funds, the Debt floating rate short term funds had the highest mean returns, but with a lot of variation. On the other hand, there were statistically significant differences in all of the other performance measures between different types of debt/ income funds. Among the sample funds, the Debt floating rate short term funds had the highest mean beta, followed by the Gilt: medium-term funds, while the Debt: ultrashort-term funds had the lowest mean beta; the Debt medium term funds had the highest mean R^2, followed by the Gilt: medium-term funds, while the Debt: ultrashort-term funds had the lowest mean R^2; finally, the Debt floating rate short

term funds had the highest mean Sharpe and Treynor ratios, followed by the Debt: ultrashort-term funds, while the Gilt: medium-term funds had the lowest mean Sharpe and Treynor ratios.

The correlation of the allocations of the debt/ income funds in the different instruments is shown in Table 6:

Table 6. Correlation of the allocations of the debt/ income funds in different instruments

Correlations

		Bonds	CP/CD	Cert of Deposit	Comm Pap	Cash, call & others	Debt	Govt. Securities	Term Deposits	Tresury Bills	Reverse Repo	Others
Bonds	Pearson Correlation	1	-.024	-.202	-.158	-.312*	.195	-.439**	-.226	-.391**	-.113	-.148
	Sig. (1-tailed)		.435	.079	.136	.014	.088	.001	.057	.003	.218	.152
	N	50	50	50	50	50	50	50	50	50	50	50
CP/CD	Pearson Correlation	-.024	1	-.105	-.099	.035	.213	-.155	-.058	-.087	-.049	.143
	Sig. (1-tailed)	.435		.235	.246	.404	.068	.141	.343	.274	.369	.161
	N	50	50	50	50	50	50	50	50	50	50	50
Cert of Deposit	Pearson Correlation	-.202	-.105	1	-.008	-.215	-.124	-.261*	.200	-.044	-.085	.320*
	Sig. (1-tailed)	.079	.235		.479	.067	.195	.034	.082	.381	.277	.012
	N	50	50	50	50	50	50	50	50	50	50	50
Comm Pap	Pearson Correlation	-.158	-.099	-.008	1	-.101	-.133	-.244*	-.098	-.146	-.081	-.061
	Sig. (1-tailed)	.136	.246	.479		.243	.178	.044	.249	.156	.287	.338
	N	50	50	50	50	50	50	50	50	50	50	50
Cash, call & others	Pearson Correlation	-.312*	.035	-.215	-.101	1	-.242*	.180	-.134	.048	-.111	-.267*
	Sig. (1-tailed)	.014	.404	.067	.243		.045	.105	.176	.370	.221	.030
	N	50	50	50	50	50	50	50	50	50	50	50
Debt	Pearson Correlation	.195	.213	-.124	-.133	-.242*	1	-.257*	-.129	-.191	-.107	.053
	Sig. (1-tailed)	.088	.068	.195	.178	.045		.036	.187	.092	.230	.359
	N	50	50	50	50	50	50	50	50	50	50	50
Govt. Securities	Pearson Correlation	-.439**	-.155	-.261*	-.244*	.180	-.257*	1	.127	.136	.099	-.421**
	Sig. (1-tailed)	.001	.141	.034	.044	.105	.036		.190	.174	.246	.001
	N	50	50	50	50	50	50	50	50	50	50	50
Term Deposits	Pearson Correlation	-.226	-.058	.200	-.098	-.134	-.129	.127	1	.173	-.048	-.002
	Sig. (1-tailed)	.057	.343	.082	.249	.176	.187	.190		.115	.371	.494
	N	50	50	50	50	50	50	50	50	50	50	50
Tresury Bills	Pearson Correlation	-.391**	-.087	-.044	-.146	.048	-.191	.136	.173	1	-.071	.030
	Sig. (1-tailed)	.003	.274	.381	.156	.370	.092	.174	.115		.312	.419
	N	50	50	50	50	50	50	50	50	50	50	50
Reverse Repo	Pearson Correlation	-.113	-.049	-.085	-.081	-.111	-.107	.099	-.048	-.071	1	-.117
	Sig. (1-tailed)	.218	.369	.277	.287	.221	.230	.246	.371	.312		.209
	N	50	50	50	50	50	50	50	50	50	50	50
Others	Pearson Correlation	-.148	.143	.320*	-.061	-.267*	.053	-.421**	-.002	.030	-.117	1
	Sig. (1-tailed)	.152	.161	.012	.338	.030	.359	.001	.494	.419	.209	
	N	50	50	50	50	50	50	50	50	50	50	50

*. Correlation is significant at the 0.05 level (1-tailed).

**. Correlation is significant at the 0.01 level (1-tailed).

Correlation analysis of the allocations in the different instruments has yielded the following results:

- Allocation in bonds was not positively correlated to allocation in any of the securities, and was negatively correlated to allocation in cash, call, and others, government securities, and treasury bills.

- Allocation in CP/CD was uncorrelated with allocation in the other security.

- Allocation in certificates of deposit was positively correlated to allocation in others, and negatively correlated to allocation in the government securities

- Allocation in commercial papers was not positively correlated to allocation in any of the securities, and was negatively correlated to allocation in government securities.

- Allocation in cash, call, and others was not positively correlated to allocation in any of the securities, and was negatively correlated to allocation in the bonds, debt, and others.
- Allocation in debt was not positively correlated to allocation in any of the securities, and was negatively correlated to allocation in cash, call, and others and government securities.
- Allocation in government securities was not positively correlated to allocation in any of the securities, and was negatively correlated to allocation in bonds, certificates of deposit, commercial papers, debt, and others.
- Allocation in term deposits was uncorrelated with the allocation in any other security.
- Allocation in Treasury bills was not positively correlated to allocation in any of the securities, and was negatively correlated to allocation in bonds.
- Allocation in reverse repos was uncorrelated with allocation in any other security.
- Allocation in others was positively correlated to allocation in certificates of deposit, and was negatively correlated to allocation in cash, call, and others and in government securities.

Regression analysis was performed to analyze the effect of allocation in different instruments on the performance of debt/ income funds.

The results of stepwise multiple regression of mean returns of debt/ income funds on the portfolio allocation in different instruments is shown in Table 7:

Table 7. Stepwise multiple regression of mean returns on portfolio allocation in different instruments

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.036	.153		.236	.814
	Bonds	.008	.003	.311	2.267	.028

a. Dependent Variable: mean returns

It was found that variation in mean returns of debt/ income funds was explained by variation in allocation in only one instrument, viz. bonds, that the allocation in this instrument explained 9.7% of the variation in mean returns of the debt mutual funds, and that this effect was statistically significant.

The results of stepwise multiple regression of standard deviation of returns of debt/ income funds on portfolio allocation in different instruments showed that variation in standard deviation of returns of debt/ income funds was not affected by allocation in any of the instruments.

The results of stepwise multiple regression of beta of debt/ income funds on the portfolio allocation in different instruments is shown in Table 8:

Table 8. Stepwise multiple regression of beta on portfolio allocation in different instruments

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.209	.052		4.054	.000
	Govt. Securities	.006	.002	.424	3.246	.002

a. Dependent Variable: beta

It was found that variation in beta of debt/ income funds was explained by variation in allocation in only one instrument, viz. government securities, that the allocation in this instrument explained 18% of the variation in beta of the debt/ income funds, and that this effect was statistically significant.

The results of stepwise multiple regression of R^2 of debt/ income funds on the portfolio allocation in different instruments is shown in Table 9:

Table 9. Stepwise multiple regression of R^2 on portfolio allocation in different instruments

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.215	.048		4.510	.000
	Govt. Securities	.006	.002	.477	3.762	.000

a. Dependent Variable: R2

It was found that variation in R^2 of debt/ income funds was explained by variation in allocation in only one instrument, viz. government securities, that the allocation in this instrument explained 22.8% of the variation in R^2 of the debt/ income funds, and that this effect was statistically significant.

The results of stepwise multiple regression of the Sharpe ratio of debt/ income funds on the portfolio allocation in different instruments is shown in Table 10:

Table 10. Stepwise multiple regression of the Sharpe ratio on portfolio allocation in different instruments

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.583	.090		6.482	.000
	Govt. Securities	-.009	.003	-.369	-2.748	.008

a. Dependent Variable: Sharpe ratio

It was found that variation in the Sharpe ratio of debt/ income funds was explained by variation in allocation in only one instrument, viz. government securities, that the allocation in this instrument explained 13.6% of the variation in the Sharpe ratio of the debt/ income funds, and that this effect was statistically significant.

The results of stepwise multiple regression of the Treynor ratio of debt/ income funds on the portfolio allocation in different instruments is shown in Table 11:

Table 11. Stepwise multiple regression of the Treynor ratio on portfolio allocation in different instruments

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.327	.207		1.583	.120
	Others	.025	.010	.330	2.420	.019
2	(Constant)	-.156	.279		-.560	.578
	Others	.028	.010	.377	2.879	.006
	Bonds	.013	.005	.321	2.452	.018

a. Dependent Variable: Treynor ratio

It was found that variation in Treynor of debt/ income funds was explained by variation in allocation in only two instruments, viz. others and bonds. Together, allocation in these two instruments explained 21% of the variation in the Treynor ratio of the debt/ income funds, and this effect was statistically significant. Of the allocations in the two instruments, allocation in others had the greater impact on the Treynor ratio than allocation in bonds had.

Diversified Equity Funds

The overall allocation of the sample diversified equity funds is shown in Table 12:

Table 12. Overall allocation of equity funds in different sectors

Descriptive Statistics

	Mean
Others	32.0731%
Technology	17.7861%
Fin Services	10.2243%
Energy	9.8389%
Engineering	8.2821%
Diversified	5.2116%
services	3.9085%
Metals	3.8983%
Consu Non Dur	2.2239%
Health Care	2.1537%
Construction	1.9894%
Automobile	1.9103%
Chemicals	.4999%

It was found that others had the highest allocation (32.07%), followed by technology (17.79%) and financial services (10.22%). Amongst the least preferred sectors were construction,

automobile, and chemicals.

The descriptive statistics of the performance measures for the sample diversified equity funds is shown in Table 13:

Table 13. Descriptive statistics of performance measures of equity funds

Descriptive Statistics

	Mean	Std.	Skewnes	Kurtosis
	Statistic	Statistic	Statistic	Statistic
mean returns	3.4580	.73472	-1.094	7.769
std dev of ret	5.7580	1.10827	-2.950	14.705
beta	.9396	.58738	9.548	97.341
R2	.7598	.16722	-.860	1.659

The allocation in each type of equity fund in the sample is shown in Table 14:

Table 14. Allocation in different sectors for different equity funds

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Mean

	Category			
	Equity: diversified	Equity: index	Equity: tax-planning	Total
Engineering	8.7543%	3.8033%	10.0953%	8.2821%
Automobile	2.2921%	.0000%	1.8665%	1.9103%
Energy	8.3540%	19.3540%	8.1688%	9.8389%
Chemicals	.6219%	.0000%	.3882%	.4999%
Construction	2.1240%	.0000%	3.1347%	1.9894%
Diversified	6.1670%	2.4740%	3.2994%	5.2116%
Health Care	2.4527%	.0000%	2.6994%	2.1537%
Technology	16.7930%	24.7440%	16.1447%	17.7861%
Fin Services	8.9595%	19.7433%	7.5541%	10.2243%
Consu Non Dur	1.9922%	3.0187%	2.5724%	2.2239%
Metals	3.9439%	2.5767%	4.8576%	3.8983%
services	4.9114%	.0673%	2.7553%	3.9085%
Others	32.6339%	24.2187%	36.4635%	32.0731%

Amongst the Equity: diversified funds, others had the highest allocation (32.63%), followed by technology (16.79%), financial services (8.95%), and engineering (8.75%). In the case of Equity: index funds, technology had the highest allocation (24.74%), followed by others (24.21%), financial services (19.74%), and energy (19.35%). Finally, in the case of Equity: tax planning funds, others had the highest allocation (36.46%), followed by technology (16.14%) and engineering (10.09%).

The descriptive statistics of the performance measures for each type of equity fund are shown in Table 15, and the ANOVA tests for differences in performance between different types of debt/ income funds are shown in Table 16:

Table 15. Descriptive statistics of performance measures for each type of equity fund

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Category		mean returns	std dev of ret	beta	R2
Equity: diversified	Mean	3.4764	5.6803	.9508	.7400
	Std. Deviation	.80126	1.22193	.69799	.15960
	N	77	77	77	77
Equity: index	Mean	3.1700	5.6573	.9400	.9560
	Std. Deviation	.32894	.88905	.06908	.07908
	N	15	15	15	15
Equity: tax-planning	Mean	3.6288	6.1988	.8888	.6765
	Std. Deviation	.62378	.51169	.08455	.13005
	N	17	17	17	17

Table 16. ANOVA tests for differences in performance between different types of equity funds

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
mean returns * Category	Between Groups	(Combined)	1.766	2	.883	1.656	.196
	Within Groups		56.534	106	.533		
	Total		58.300	108			
std dev of ret * Category	Between Groups	(Combined)	3.920	2	1.960	1.614	.204
	Within Groups		128.731	106	1.214		
	Total		132.652	108			
beta * Category	Between Groups	(Combined)	.053	2	.027	.076	.927
	Within Groups		37.208	106	.351		
	Total		37.262	108			
R2 * Category	Between Groups	(Combined)	.726	2	.363	16.764	.000
	Within Groups		2.294	106	.022		
	Total		3.020	108			

It was found that there is no statistically significant difference in mean returns, standard deviation of returns, and beta between different types of equity funds. Among the sample funds, the Equity: tax planning funds had the highest mean returns, but with highest variation and lowest beta. On the other hand, there were statistically significant differences in R^2 between different types of equity funds. Among the sample funds, the Equity: index funds had the highest mean R^2, followed by the Equity: diversified funds, while the Equity: tax planning funds had the lowest mean R^2.

The correlation of the allocations of the equity funds in the different sectors is shown in Table 17:

Table 17. Correlation of the allocations of the equity funds in different sectors

Correlations

		Engineering	Automobile	Energy	Chemicals	Construction	Diversified	Health Care	Technology	Fin Services	Consu Non Dur	Metals	services	Others
Engineering	Pearson Correlation	1	.328**	-.340**	-.121	.217*	-.060	.087	-.194*	-.236**	.053	-.096	-.205*	-.049
	Sig. (1-tailed)		.000	.000	.105	.012	.269	.183	.022	.007	.291	.160	.016	.308
	N	109	109	109	109	109	109	109	109	109	109	109	109	109
Automobile	Pearson Correlation	.328**	1	-.341**	-.039	.078	.144	.031	-.317**	-.192*	.006	-.163*	-.120	.142
	Sig. (1-tailed)	.000		.000	.344	.210	.068	.373	.000	.023	.474	.046	.107	.070
	N	109	109	109	109	109	109	109	109	109	109	109	109	109
Energy	Pearson Correlation	-.340**	-.341**	1	-.205*	-.348**	-.169*	-.255**	.454**	.198*	-.093	-.004	-.326**	-.349**
	Sig. (1-tailed)	.000	.000		.016	.000	.039	.004	.000	.019	.168	.483	.000	.000
	N	109	109	109	109	109	109	109	109	109	109	109	109	109
Chemicals	Pearson Correlation	-.121	-.039	-.205*	1	-.101	-.105	.206*	-.159*	-.079	-.033	.211*	.112	.114
	Sig. (1-tailed)	.105	.344	.016		.149	.139	.016	.050	.206	.365	.014	.124	.119
	N	109	109	109	109	109	109	109	109	109	109	109	109	109
Construction	Pearson Correlation	.217*	.078	-.348**	-.101	1	.017	-.047	-.262**	-.260**	-.194*	.126	.166*	.108
	Sig. (1-tailed)	.012	.210	.000	.149		.429	.314	.003	.003	.022	.096	.042	.132
	N	109	109	109	109	109	109	109	109	109	109	109	109	109
Diversified	Pearson Correlation	-.060	.144	-.169*	-.105	.017	1	-.080	-.160*	-.076	-.153	-.141	-.009	-.004
	Sig. (1-tailed)	.269	.068	.039	.139	.429		.203	.049	.217	.056	.071	.464	.485
	N	109	109	109	109	109	109	109	109	109	109	109	109	109
Health Care	Pearson Correlation	.087	.031	-.255**	.206*	-.047	-.080	1	.033	-.299**	.289**	-.157	-.067	-.045
	Sig. (1-tailed)	.183	.373	.004	.016	.314	.203		.367	.001	.001	.051	.245	.321
	N	109	109	109	109	109	109	109	109	109	109	109	109	109
Technology	Pearson Correlation	-.194*	-.317**	.454**	-.159*	-.262**	-.160*	.033	1	.095	.039	-.311**	-.189*	-.545**
	Sig. (1-tailed)	.022	.000	.000	.050	.003	.049	.367		.162	.343	.001	.025	.000
	N	109	109	109	109	109	109	109	109	109	109	109	109	109
Fin Services	Pearson Correlation	-.236**	-.192*	.198*	-.079	-.260**	-.076	-.299**	.095	1	-.149	-.106	-.066	-.465**
	Sig. (1-tailed)	.007	.023	.019	.206	.003	.217	.001	.162		.061	.135	.246	.000
	N	109	109	109	109	109	109	109	109	109	109	109	109	109
Consu Non Dur	Pearson Correlation	.053	.006	-.093	-.033	-.194*	-.153	.289**	.039	-.149	1	-.192*	-.061	-.100
	Sig. (1-tailed)	.291	.474	.168	.365	.022	.056	.001	.343	.061		.023	.265	.150
	N	109	109	109	109	109	109	109	109	109	109	109	109	109
Metals	Pearson Correlation	-.096	-.163*	-.004	.211*	.126	-.141	-.157	-.311**	-.106	-.192*	1	.184*	.027
	Sig. (1-tailed)	.160	.046	.483	.014	.096	.071	.051	.001	.135	.023		.028	.389
	N	109	109	109	109	109	109	109	109	109	109	109	109	109
services	Pearson Correlation	-.205*	-.120	-.326**	.112	.166*	-.009	-.067	-.189*	-.066	-.061	.184*	1	.017
	Sig. (1-tailed)	.016	.107	.000	.124	.042	.464	.245	.025	.246	.265	.028		.432
	N	109	109	109	109	109	109	109	109	109	109	109	109	109
Others	Pearson Correlation	-.049	.142	-.349**	.114	.108	-.004	-.045	-.545**	-.465**	-.100	.027	.017	1
	Sig. (1-tailed)	.308	.070	.000	.119	.132	.485	.321	.000	.000	.150	.389	.432	
	N	109	109	109	109	109	109	109	109	109	109	109	109	109

**. Correlation is significant at the 0.01 level (1-tailed).

*. Correlation is significant at the 0.05 level (1-tailed).

Correlation analysis of the allocations to the different sectors has yielded the following results:

- Allocation in the engineering sector was positively correlated with allocation in the automobiles and construction sectors, and negatively correlated with allocation in the energy, technology, financial services and services sectors.

- Allocation in the automobile sector was positively correlated with allocation in the engineering sector, and negatively correlated with allocation in the energy, technology, and financial services sectors.

- Allocation in the energy sector was positively correlated with allocation in the technology and financial services sectors, and negatively correlated with allocation in the engineering, automobile, chemical, construction, diversified, health-care, and services sectors.

- Allocation in the health-care sector was positively correlated with allocation in the metals sector, and negatively correlated with allocation in the energy and technology sectors.

- Allocation in the construction sector was positively correlated with allocation in the engineering and services sectors, and negatively correlated with allocation in the energy, technology, financial services, and consumer non-durables sectors.

- Allocation in the diversified sector was negatively correlated with allocation in the energy and technology sectors.
- Allocation in the health-care sector was positively correlated with allocation in the chemical and consumer non-durables sectors, and negatively correlated with allocation in the energy and financial services sectors.
- Allocation in the technology sector was positively correlated with allocation in the energy sector, and negatively correlated with allocation in the automobile, chemical, construction, metals, services, and diversified sectors.
- Allocation in the financial services sector was positively correlated with allocation in the energy sector, and negatively correlated with allocation in the engineering, automobile, construction, and health-care sectors.
- Allocation in the consumer non-durables sector was positively correlated with allocation in the health-care sector, and negatively correlated with allocation in the construction and metals sectors.
- Allocation in the metals sector was positively correlated with allocation in the chemicals and services sectors, and negatively correlated with allocation in the automobiles, technology, and consumer non-durables sectors.
- Allocation in the services sector was positively correlated with allocation in the construction and metals sectors, and negatively correlated with allocation in the engineering, energy, and technology sectors.

Regression analysis was performed to analyze the effect of allocation in different instruments on the performance of equity funds.

The results of stepwise multiple regression of mean returns of equity funds on the portfolio allocation in different sectors is shown in Table 18:

Table 18. Stepwise multiple regression of mean returns on portfolio allocation in different sectors

Coefficients[a,b]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	Others	.021	.007	.298	2.764	.013
	Engineering	.094	.031	.313	2.985	.008
	Energy	.193	.050	.414	3.864	.001
	services	.184	.062	.283	2.963	.009

a. Dependent Variable: mean returns

b. Linear Regression through the Origin

It was found that variation in mean returns of equity funds was explained by variation in allocation in four sectors, viz. others, engineering, energy and services sectors. Together,

allocation in these four sectors explained 88% of the variation in mean returns of the equity funds, and this effect was statistically significant. Of the allocations in the three sectors, allocation in financial services had the greatest impact on mean returns.

The results of stepwise multiple regression of standard deviation of returns of equity funds on the portfolio allocation in different sectors is shown in Table 19:

Table 19. Stepwise multiple regression of mean returns on portfolio allocation in different sectors

Coefficients[a,b]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Others	.030	.007	.276	4.211	.001
Engineering	.135	.032	.288	4.179	.001
services	.308	.056	.304	5.539	.000
Energy	.242	.046	.332	5.316	.000
Automobile	.166	.058	.171	2.878	.011
Chemicals	.378	.135	.145	2.801	.013

a. Dependent Variable: std dev of ret

b. Linear Regression through the Origin

It was found that variation in standard deviation of returns of equity funds was explained by variation in allocation in six sectors, viz. others, engineering, services, energy, automobiles and chemicals. Together, allocation in these six sectors explained 96.6% of the variation in standard deviation of returns of the equity funds, and this effect was statistically significant. Of the allocations in the six sectors, allocation in energy and services had the greatest impact on standard deviation of returns.

The results of stepwise multiple regression of beta of equity funds on the portfolio allocation in different sectors is shown in Table 20:

Table 20. Stepwise multiple regression of beta on portfolio allocation in different sectors

Coefficients[a,b]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Others	.009	.001	.495	8.994	.000
Consu Non Dur	.027	.007	.185	3.964	.001
Fin Services	.021	.005	.200	3.841	.002
Construction	.052	.008	.303	6.443	.000
Chemicals	.059	.020	.139	2.901	.011
Automobile	.029	.008	.182	3.707	.002

a. Dependent Variable: beta

b. Linear Regression through the Origin

It was found that variation in beta of equity funds was explained by variation in allocation in six sectors, viz. others, consumer non-durables, financial services, construction, chemicals and automobiles. Together, allocation in these six sectors explained 97.3% of the variation in

beta of the equity mutual funds, and this effect was statistically significant. Of the allocations in the six sectors, allocation in others had the greatest impact on beta.

The results of stepwise multiple regression of R^2 of equity funds on the portfolio allocation in different sectors is shown in Table 21:

Table 21. Stepwise multiple regression of R^2 on portfolio allocation in different sectors

Coefficients[a,b]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Others	.009	.001	.612	8.424	.000
Technology	.008	.004	.195	2.162	.045
Engineering	.012	.005	.199	2.401	.028
Fin Services	.015	.007	.178	2.160	.045

a. Dependent Variable: R2

b. Linear Regression through the Origin

It was found that variation in R^2 of equity funds was explained by variation in allocation in four sectors, viz. financial services, technology, others and engineering. Together, allocation in these four sectors explained 93.7% of the variation in R^2 of the equity funds, and this effect was statistically significant. Of the allocations in the four sectors, allocation in others had the greatest impact on R^2.

The results of stepwise multiple regression of the Sharpe ratio of equity funds on the portfolio allocation in different sectors is shown in Table 22:

Table 22. Stepwise multiple regression of the Sharpe ratio on portfolio allocation in different sectors

Coefficients[a,b]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Others	.004	.001	.414	5.528	.000
Technology	.014	.002	.427	6.973	.000
Metals	.026	.005	.348	5.569	.000
Chemicals	-.052	.015	-.199	-3.414	.004
Diversified	.017	.006	.182	2.925	.010

a. Dependent Variable: Sharpe

b. Linear Regression through the Origin

It was found that variation in Sharpe ratio of equity funds was explained by variation in allocation in five sectors, viz. others, technology, metals, chemicals, diversified and health-care. Together, allocation in these five sectors explained 95.3% of the variation in Sharpe ratio of the equity funds, and this effect was statistically significant. Of the allocations in the five sectors, allocation in technology had the greatest impact on the Sharpe ratio.

The results of stepwise multiple regression of the Treynor ratio of debt/ income funds on the portfolio allocation in different sectors is shown in Table 23:

Table 23. Stepwise multiple regression of the Treynor ratio on portfolio allocation in different sectors

Coefficients[a,b]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	Others	.000	.000	.234	2.096	.051
	Technology	.001	.000	.456	4.908	.000
	Metals	.002	.000	.399	4.201	.001
	Diversified	.001	.001	.213	2.268	.037

a. Dependent Variable: Treynor

b. Linear Regression through the Origin

It was found that variation in Treynor ratio of equity funds was explained by variation in allocation in four sectors, viz. others, technology, metals and diversified. Together, allocation in these four sectors explained 8.84% of the variation in Treynor ratio of the equity funds, and this effect was statistically significant. Of the allocations in the four sectors, allocation in technology had the greatest impact on Treynor ratio.

Discussion

The findings from the study indicate that, for diversified debt/ income funds, allocation in bonds and government securities impact the performance of the fund, while for diversified equity funds, allocation in engineering, energy, and service sector stocks tend to impact the performance of the fund.

The study suffers from a few mild limitations. Firstly, the study considers a sample of one hundred and fifty-nine mutual funds only. Though this is a reasonably-sized sample, a larger sample would have yielded more statistically significant results. Further, the high level of variation observed in the sample indicates that the sampling method used may be inadequate – i.e. stratified sampling may have been more appropriate in this situation. It may be possible that, along with the classification of funds used in the study, other moderating factors would be required to stratify the funds. Though the results of the study are statistically significant, there is scope for further research in order firstly to identify such factors, and secondly to take these factors into consideration in examining the effect of portfolio allocation on performance of mutual funds.

A further limitation of the study is the limited period (one month) which it encompasses. In order to generalize the results, a similar methodology would have to be applied to monthly data for different months. This would have to be undertaken in subsequent studies. It would perhaps be expected that the results of the analysis for diversified debt/ income funds would be relatively unchanged, while the results of the analysis for diversified equity funds would vary, depending on the performance of the sectors; of course, sectors which have been

performing consistently well would be expected to have a significant effect throughout.

References

Ibbotson, R.G. and Kaplan, P.D. (1998). Does Asset Allocation Policy Explain 40%, 90%, or 100% of Performance?. *Yale Working Paper Series*

Kadiyala, P. (2004). Asset Allocation Decision of Mutual Fund Investors. *Financial Services Review*, Academy of Financial Services

Markowitz, H.M. (1987). Mean-Variance Analyses in Portfolio Choice and Capital Markets. Oxford: Basil Blackwell, Inc.

Sharpe, W.F. (1988). Determining a Fund's Effective Asset Mix. *Investment Management Review*

Sharpe, W.F. (1994). Asset Allocation: Management Style and Performance Measurement. *Journal of Portfolio Management*, Institutional Investor, Inc.