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ANALYZING MUTUAL FUND MANAGERS' STOCK SELECTION VS. MARKET TIMING ABILITIES: PORTFOLIO AND SEVEN STRATEGIES DRIVEN APPROACH

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Abstract

The study adopts a portfolio-driven approach to investigate the stock selection and timing (SSMT) abilities of the fund managers of Open-Ended Mutual Funds in Pakistan through Treynor and Mazuy (1966) [T&M] and Henriksson and Merton (1981) [H&M] models. Time series data collected monthly for 190 firms from 2012 to 2022 is analyzed. Seven distinct strategies including cash holding levels, logarithmic fund size, unit redemptions, management fees, front-end and back-end loads, and the number of funds managed within a family are used to create portfolios annually, which also mitigate survivor bias concerns. The findings show that fund managers perform poorly with respect to stock selection abilities; however, they better time market in all seven cases. Further the average portfolio returns are relatively higher of low cash holding, small size, less redemption, low expense ratio, less number in family and front-end load funds relative to their corresponding funds. It is recommended that during the bullish trend in the market, fund managers should keep more cash, reduce operating expenses, increase redemption, decrease number of funds in family and shall not charge any front-end fee. Besides the implications of the outcomes for mutual fund firms and their stakeholders this study adds fresh perspectives to the existing literature by adopting the portfolio and seven-strategy based approach.

Keywords: Mutual Fund, Stock Selection, Market Timing, Portfolio, Cash Holdings, Redemption, Load

JEL: G11 & G2

Introduction

Investment in mutual fund is considered sound and secure. Small investors but large in number prefer to invest in mutual funds. The funds are operated by qualified and skillful professionals. In addition, investments in mutual funds are generally well diversified, have low transaction costs, high liquidity and offer other such benefits. Due to its attractiveness as a mean of investment, understanding and evaluation of mutual funds' performance have become important. Therefore,

like other stakeholders, academicians have started taking keen interest in this area of knowledge (Chaderina and Scheuch, 2018, Khan et al., 2021, Morris et al., 2017).

Our study focuses on fund managers' stock selection and market timing (SSMT) abilities in the context of seven strategies. Stock selection abilities refer to micro level analysis of shares' prices i.e., forecasting movements of individual shares prices to determine whether they are over or under-valued. Whereas market timing managerial skill refers to macro forecasting that foretell if a market will adopt a bullish or bearish trend. Treynor and Mazuy (1966), T&M hereafter, were the first to examine the fund managers' market timing ability. Henriksson and Merton (1981), H&M hereafter, formulated a model to assess fund managers' market timing skills, later tested in 1984. Majority of the existing studies have evaluated fund managers' abilities separately of each of mutual fund.

This study answers the question that "Do fund managers with relatively low cash holdings, size, management fee, redemption, front & back-end load, and Funds under management within the family have better SSMT abilities than their corresponding counterparts? For this purpose, the study adopts a different approach from the previous studies in two aspects. First, interestingly this study highlights significance of fund managers' abilities in the light of seven different strategies. The strategies are funds' cash holdings, size, redemption, front & back-end load, management fee, and number of funds in family. Second, this study adopts portfolio approach based on the seven strategies and assesses abilities of managers of the sample funds. However, the portfolio approach is not widely used in existing literature, especially in the case of an emerging market like Pakistan.

Sections 2 to 5 are about review of literature, data and methodology, results and conclusion of the study respectively.

Literature Review

T&M were the first to evaluate managers' market timing performance skills. They reported that only one out of fifty or 2% of the fund managers' performance was statistically significant. Following this, H&M formulated a model to analyze the market timing abilities of mutual funds managers. Henriksson (1984) applied the model to document that 2.6% or three out of 116 funds' performance was statistically significant in terms of their market timing attribute. Whereas Jensen (1969) used Security Market Line (SML) method to determine stock selection ability and reported that fund managers earned negative returns on their selected portfolios. However, this model is critically discussed and determined unreliable (see for details Grinblatt and Titman, 1989). Chang and Lewellen (1985) followed technique in line with arbitrage pricing theory and reported that only two of sixty-seven or 3% funds statistically significantly observed stock selection criteria. Mohamad and Ngu (1997) used T&M assessed stock selection performance of thirty-one (31) mutual funds from the year 1990 to year 1995. They concluded that twenty-five (81%) of these funds were effective and demonstrated better stock selection skills but lacked market timing ability.

In contrast to the trend in practice, this study tests seven hypotheses regarding whether funds' cash holding, size, redemptions, management fee structure, front and back-end load, and numbers of fund in the family to determine managers' SSMT abilities. For instance, keeping more cash as reserve do not fetch returns and results in high opportunity cost, and therefore reduces profits. Chordia (1996) documented that with increase in redemption instability firms' exhibit corresponding increase in their cash holding. Indro et al. (1999) suggested that funds should maintain a reasonable size to substantiate the various operating expenses, leading to favorable returns per unit of risk. Gao and Grinstein (2014) argued that due to relatively more experience,

economies of scale and resources, larger firms outperform their smaller counterparts; though, because of increased agency problem, in the case of large firms, it might not happen (Dittmar *et al*., 2003). For investors, one of the appealing features of open-end funds is that they offer the option of retrieval of their invested capital. This results in more precautionary cash holding by these firms relative to other. The existing literature suggests that performance of mutual funds increases in cash inflows because the later enlarge opportunity set of funds and enhance attraction for the investors to commit their capital in favor of such funds. Redemption, on the other hand reduces size of useable cash (Morris et al., 2017) and therefore negatively affect performances of funds (Chaderina and Scheuch, 2018). This stifles sense of goodwill of the funds and creates an atmosphere of increased redemption by the investors thus forcing the funds to sell assets at lower prices and further decreases funds' performance (Liu and Mello, 2011). According to Barber et al., (2003) front-end load feature of funds is relatively more negatively influential towards flow of investors' funds. As such redemption hinders funds' investments in low liquid but higher returns generating securities. However, the case is different for the back-end load funds. Back-end-load fee often called a deferred load is a fee levied by mutual funds at the time of repurchasing units (or selling back by investors). It is used by funds to reduce redemption levels and is expected to discourage desire of hoarding cash and also allows them to commit investable cash relatively lesser liquid assets and long-term securities to earn higher returns (Nanda et al., 2000; Delve & Olson, 1998). In support of these views Dellva and Olson (1998) documented that funds without front-end load and with back-end load perform better than front-end load and without back-end load funds respectively. Likewise, Gruber (1996) reported an inverse relationship between operating expenses and funds' performance. J. Chen *et al*., (2004) discussed that growth in funds' family boost performance of the funds which invite further investors and cash inflow. An increase in numbers of fund family enhances fund performance due to relatively more and wider investments and diversification. Yan (2006) found that large family funds which are large, diversified and possess variety of investments, styles and risks levels of assets can readily acquire cash from others to manage unexpected redemptions therefore hold less cash. The very structure of these funds allows their mangers to generate relatively higher returns.

Data Description and Methodology

This study analyzes ten years' data of the period 2012 to 2022 of 190 open-ended mutual funds having 21 different investment objectives. The reason for the sample selection is the enormous increase of 325% (decrease of 84%) in open-end (close-end) funds during the given time period. The data sources include the official websites of MUFAP and PSX for the data of KSE-100 index to calculate market returns and risk. The study uses time series data and T&M and H&M models to measure funds' managerial SSMT abilities.

Portfolios Construction

In the evaluation of managers' SSMT abilities one of the major issues faced is survivorship of mutual funds in long-run. Thus to address this, we adopt a portfolio based approach. We construct portfolios each year based on the aforementioned seven strategies. These portfolios are ranked from low to high denoted by P1 to P5 respectively. For instance, P1 refers to a portfolio of funds with the lowest cash holding and P5 to the highest cash holding funds and so on. Measurement of the seven strategies is discussed in the following text.

Cash Holding: Cash holding is the sum of cash and cash balance in bank divided by total asset less total liabilities (Baker et al., 2009; Dellva & Olson, 1998; and Yan, 2006). Dittmar et al. (2003) also preferred net assets as assets are the means of generating earnings. In the equation, CH and TNA symbolize cash holding and total net assets where i and t stands for a particular fund at year t.

$$CH_{it} = CASH_{it}/TNA_{it} \quad (1)$$

Size: Size is measured through natural log of total net assets (Afza & Rauf, 2009 and Saddour, 2006). It is represented by LNTNA.

$$Size_{it} = Ln\ (TNA_{it}) \quad (2)$$

Redemption: The log of redeemed amount in a particular year is used to measure redemption (Khan et al., 2021).

$$Redemption = Ln\ (Red) \quad (3)$$

Front-end-load Fee: Symbolize by FL, it is the fee paid at the time of purchasing units. It is the gap between the initial investment and its corresponding value shown on the first monthly statement. It is reported separately and is not merged in operating expenses (Barber *et al*., 2003).

Back-end-load Fee: It is a fee levied from investors in time of repurchasing units (or selling back by investors). It is used by funds to reduce redemption levels (Nanda *et al*., 2000).

Operating Expenses: Following the extant literature (e.g., see Afza & Rauf, 2009; Chen et al., 2004a) this (EXP) is determined by total operating costs scaled by total net assets. The costs include management, trustee, and 12b-1 fees and taxes on the managements' remuneration. However, front-end and deferred load levies are excluded. In equation (4), *ERit, OEit, and TNAit* symbolizes expense ratio, total operating costs, and total net assets of fund 'i' at year 't' respectively.

$$ER_{it} = OE_{it}/TNA_{it} \quad (4)$$

Number of Funds in Family: The number of funds within a family is determined by the specific categories contained within a single mutual fund. For example, the breadth of a family fund measured as three (3) might consist of equity fund, balanced funds and fixed-income funds; each designed to fulfill distinct financial goals. The diversity of funds reflects the multifaceted nature of investment possibilities.

Statistical Models

This study follows T&M and H&M to examine the SSMT ability of fund managers by exploring seven different investment approaches so called the seven strategies. Some researchers criticize market timing ability test for its use of monthly data and suggest the use of data of a single day interval they argue that decisions are more frequently made than once a month (Bollen & Busse, 2001) .

Treynor and Mazuy (1966) Model: T&M put forward that employment of capital by a manager may vary due the prevailing bullish or bearish trend in a market. Hence, the use of a quadratic term becomes imperative within the linear market model to test the market timing ability.

$$Rp_t = \alpha + \beta R_{Mt} + \gamma {R_M}^2{}_t + \varepsilon_t \quad (5)$$

In Equation (5), Rp_t and R_{Mt} represent the excess portfolio returns and excess market return, respectively. Whereas both "α" and "γ" represents the SSMT abilities respectively. The β and ε are the sensitivity random error terms. Here, a positive and statistically significant γ indicates that the managers are able to make decisions in accordance with market trends and vice versa.

Henriksson and Merton (1981) Model: H&M model is a little different than T&M model as they suggest that fund manager should adjust beta as high or low in accordance to their forecasting of the market condition. A high or low beta shall thus be associated with up/ bullish market ($R_m > R_f$) or down/ bearish market ($R_m < R_f$) respectively. The proposed model equation is as under:

$$Rp_t = \alpha + \beta R_{Mt} + \gamma[D(R_{Mt})] + \varepsilon_t \qquad (6)$$

Here 'D' equals 1 or 0 if market is up or down respectively. α exhibits good or poor selection of stock by the managers, whereas β stands for a bullish trend of the market. β-γ explains low or bearish market condition. Consequently, the coefficient γ demonstrates the difference in betas associated with upward and downward market movements. A positive and statistically significant γ suggests that managers can make decisions aligned with market trends, and vice versa.

Results and Discussion

In the following text first, we discuss results estimated to predict both SSMT abilities of fund managers through T&M and H&M models generated in the light of the seven investment strategies. Second, we also compare these results across the strategies.

Cash Holding and Fund Managers Abilities

Panel-A of Table I from Column 1 to Column 5 presents cash holding based portfolios of funds, and their corresponding average cash holding, returns, total risk, and relative risk respectively. CH-1 shows funds with the lowest (3.2%) cash holding and CH-5 represents funds with the highest (68.30%) cash level. These statistics reveal that managers of mutual funds with the lowest cash holdings outperform those with the highest cash holdings (12.2% - 8.0%). In the last column, relative risk is the portfolio risk to portfolio returns. Relative risk also indicates that funds in *CH-1* perform relatively better than rest of the funds in the other portfolios.

Panel - B & C of Table I show results estimated through H&M and T&M models respectively of the analysis of SSMT abilities of the fund managers. Regardless of the models used, the test results reveal that managers' stock selection ability is similarly poor across the five cash holdings scenarios. The values of '**α**' are statistically insignificant in the five different cash based portfolios of mutual funds. These results suggest that fund managers lack the ability of better stock selection. In Panel – C of the table, the coefficient value of gamma (γ), an indicator of the market timing ability, is positive and statistically significant (19.3328) in portfolio with the highest cash holding (*CH-5*). Its corresponding beta (4.0143) is the highest and statistically significant. In line with the theory of risk and return *CH-5* also earns more returns during upward market. Holding more cash is expected to be costly with respect to a fund's performance. For instance, Chen et al. (2000) documented that holding relatively more cash reduces funds' returns by 0.7% per year. Therefore, to mitigate this negative impact of increased cash on performance, the fund managers are expected to make effective investment decisions and should better time the market and outperform. Though, market-timing skills are mainly focused to correctly forecast the market up/ down condition. Better market timing ability of fund managers could explain but partially the relatively better performance of the funds with the highest cash holding than the lower cash funds (Simutin, 2010).

Table I: Cash Holding Based Mutual Funds' Portfolios and Managers' Abilities

Panel - A: Descriptive Statistics – Cash Based Portfolio Returns				
Variable	**CH % age**	**Port. Ret.**	**Port. Risk (Std. Dev.)**	**Relative Risk (Coeff. of Var.)**
(1)	**(2)**	**(3)**	**(4)**	**(5)**
CH-1	03.20%	0.122	0.954	07.82
CH-2	11.00%	0.048	0.650	13.54
CH-3	23.30%	0.104	1.064	10.23
CH-4	44.40%	0.015	0.892	59.47
CH-5	68.30%	0.080	0.996	12.45

Panel - B: Cash Holding Based Portfolio Results -H&M Model $Rp_t = \alpha + \beta R_{Mt} + \gamma[D(R_{Mt})] + \varepsilon_t$					
Variables	**CH-1**	**CH-2**	**CH-3**	**CH-4**	**CH-5**
$(Rm-R_f)$	-1.0910	0.1805	0.1034	-1.1961	3.5522**
	(-1.6299)	(-1.0827)	(-1.8111)	(-1.5498)	(-1.7087)
R_{Mt}	0.2695	0.1498	0.1194	0.1962	-0.2128
	(-0.2137)	(-0.1437)	(-0.2404)	(-0.2032)	(-0.2240)
A	-0.0495	-0.0543	0.025	-0.102	0.1852
	(-0.1407)	(-0.0938)	(-0.1569)	(-0.1338)	(-0.1475)
R^2	0.0106	0.0168	0.0036	0.0060	0.0299

Panel - C: Cash Holding Based Portfolio Results –T & M Model ($Rp_t = \alpha + \beta R_{Mt} + \gamma R_M{}^2{}_t + \varepsilon_t$)					
Variables	**CH-1**	**CH-2**	**CH-3**	**CH-4**	**CH-5**
$(Rm-R_f)$	0.2938	0.6066	0.6174	-0.056	4.0143***
	(-1.2728)	(-0.8166)	(-1.3686)	(-1.2078)	(-1.2959)
$(Rm-R_f)^2$	-0.8577	-5.143	-1.7545	0.9564	19.3328***
	(-6.3927)	(-4.2003)	(-7.0391)	(-6.0658)	(-6.5084)
A	0.1047	0.0519	0.0991	0.0032	-0.0191
	(-0.0802)	(-0.0532)	(-0.0892)	(-0.0761)	(-0.0816)
R^2	0.0007	0.0192	0.0025	0.0003	0.0760

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Size and Fund Managers Abilities

Table II is similar in terms of results presentation to Table I; however, these results are driven by size (*TNA*) based funds' portfolios. *TNA-1* is the smallest and *TNA-5* is the biggest sized portfolio. Descriptive statistics in Panel – A of Table II, shows that small size funds average raw portfolio returns is slightly higher than the returns of larger size funds (7.9% Vs 7.4%). However, the Column (5) of Table II indicates that the relative risk of the small size funds is relatively lower than those of larger size funds. Atta et al. (2019) documented that smaller funds exhibit lesser performance variability than larger funds.. Small sized funds are easily managed in comparison to large sized fund.

Table II: Size Based Mutual Funds' Portfolios and Managers' Abilities

Panel – A: Descriptive Statistics – Size Based Portfolio Returns				
Variable	**TNA**	**Port. Ret.**	**Port. Risk (Std. Dev.)**	**Relative Risk (Coeff. of Var.)**
(1)	**(2)**	**(3)**	**(4)**	**(5)**
TNA-1	11.809	0.079	0.652	8.25
TNA -2	13.014	0.044	0.744	16.91
TNA -3	13.789	0.037	0.84	22.70
TNA -4	14.609	0.129	0.975	7.56
TNA -5	15.895	0.074	0.982	13.27

Panel - B: Size Based Portfolio Results -H&M Model $Rp_t = \alpha + \beta R_{Mt} + \gamma[D(R_{Mt})] + \varepsilon_t$					
Variables	**TNA-1**	**TNA-2**	**TNA-3**	**TNA-4**	**TNA-5**
$(Rm-R_f)$	-0.2324	-0.9690	-0.9026	0.5673	2.8722*
	(1.1059)	(1.2642)	(1.4564)	(1.6418)	(1.6444)
R_{Mt}	0.0938	0.1380	0.1163	0.2364	-0.0572
	(0.1468)	(0.1678)	(0.1909)	(0.2179)	(0.2183)
A	0.0138	-0.0434	-0.0412	-0.0190	0.0840
	(0.0958)	(0.1095)	(0.1257)	(0.1422)	(0.1425)
R^2	0.0032	0.0045	0.0028	0.0224	0.0299

Panel - C: Size Based Portfolio Results –T & M Model $(Rp_t = \alpha + \beta R_{Mt} + \gamma R_M{}^2{}_t + \varepsilon_t)$					
Variables	**TNA-1**	**TNA-2**	**TNA-3**	**TNA-4**	**TNA-5**
$(Rm-R_f)$	0.0892	-0.3396	-0.2980	1.5084	4.0085***
	(0.8354)	(0.9564)	(1.1331)	(1.2425)	(1.2065)
$(Rm-R_f)^2$	-2.4807	-1.5497	-0.2886	-4.5036	19.4682***
	(4.2967)	(4.9194)	(5.6908)	(6.3907)	(6.2056)
A	0.0769	0.0400	0.0250	0.1323	-0.0361
	(0.0544)	(0.0623)	(0.0714)	(0.0809)	(0.0786)
R^2	0.0028	0.0010	0.0005	0.0184	0.0844

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Panel – B & C of Table II again show that regardless of the models used, the managers' stock selection ability is similarly poor across the different sizes scenarios. While the value of γ (19.4682) in T&M model is statistically significant and positive and indicates that large size fund better time the market. Moreover, relative market risk (beta) of the large size funds has a higher and significant value (4.008) and these funds earn relatively more returns during up market condition. Indro *et al*. (1999) argued that a fund needs to keep a reasonable size to effectively manage the costs thereby achieving comparable risk adjusted returns. The advantage of easier access to external financing enhances as the size of funds grow (Saddour, 2006). Yan (2006) explained that firm bigger in size hold relatively more liquid assets and lesser cash and therefore could easily arrange funds to invest in up market conditions. Chen et al. (2004) also noted that

increase in inflows to mutual funds underscores the importance of fund size on performance. Big firms are expected to be more driven to exhibit better performance.

Redemption and Fund Managers Abilities

Panel – A of Table III reports descriptive statistics of redemption based portfolios of the funds. *RED-1* and *RED-5* stands for the lowest to the highest categories of funds with respect to their redemption feature. In general, returns of funds with lower redemption are relatively higher. *RED-1* has the highest returns and the returns are relatively higher by 5.3% (9.8% Vs 4.5%) than that of *RED-5*. In addition, relative risk of *RED-1* is also relatively lower than that of *RED-2* through *RED-5*. These findings indicate that the lowest redemption funds relatively perform better than funds with more redemption funds. Khan et al. (2021) reported that redemption exhibit direct association with cash level and inverse relation with performance of funds. A Fund performance is negatively affected due to idle cash holding to meet redemption needs of the fund.

Table III: Redemption Based Mutual Funds' Portfolios and Managers' Abilities

Panel – A: Descriptive Statistics – Redemption Based Portfolio Returns

Variable	RED	Port. Ret.	Port. Risk (Std. Dev.)	Relative Risk (Coeff. of Var.)
RED 1	566672.4	0.098	0.834	8.51
RED 2	3198745	0.098	0.822	8.39
RED 3	11391761	0.031	0.687	22.16
RED 4	51757119	0.093	0.93	10.00
RED 5	6.48E+08	0.045	1.074	23.87

Panel - B: Redemption Based Portfolio Results -H&M Model $Rp_t = \alpha + \beta R_{Mt} + \gamma[D(R_{Mt})] + \varepsilon_t$

Variables	RED -1	RED -2	RED -3	RED -4	RED -5
$(Rm-R_f)$	-0.5868	-0.3260	-0.8457	3.3434**	0.0112
	(1.3982)	(1.3923)	(1.1678)	(1.5920)	(1.8661)
R_{Mt}	0.2579	0.1878	0.1293	-0.1642	0.1067
	(0.1856)	(0.1848)	(0.1550)	(0.2087)	(0.2446)
A	-0.0644	-0.0204	-0.0504	0.1682	-0.0289
	(0.1211)	(0.1206)	(0.1012)	(0.1374)	(0.1611)
R^2	0.0157	0.0093	0.0044	0.0330	0.0025

Panel - C: Redemption Based Portfolio Results –T & M Model ($Rp_t = \alpha + \beta R_{Mt} + \gamma R_M{}^2{}_t + \varepsilon_t$)

Variables	RED -1	RED -2	RED -3	RED -4	RED -5
$(Rm-R_f)$	0.6368	0.7825	-0.0272	4.2414***	-0.2330
	(1.0616)	(1.0547)	(0.8835)	(1.1923)	(1.4426)
$(Rm-R_f)^2$	-2.2588	1.2849	1.6289	21.4088***	-9.8401
	(5.4602)	(5.4246)	(4.5442)	(5.9880)	(7.2452)
A	0.0886	0.0777	0.0137	-0.0181	0.0741
	(0.0692)	(0.0687)	(0.0576)	(0.0751)	(0.0909)
R^2	0.0051	0.0034	0.0010	0.1019	0.0128

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Result of the two models in Panels – B & C of Table III show that fund managers poorly perform with respect to stock selection. It is so indicated by the insignificant values of **α**. Further, the coefficient value of gamma of T&M model indicates that the second highest redemption fund

(*RED-4*) better time the market (21.4088). Relative market risk (β = 4.2414) and returns in up-market of *RED-4* is also the highest. These results are similar to results in Section 4.1 that high cash holding funds better time the market then low cash holding funds. Hence, more redemption encourages more cash holding which further allow managers to time the market when there is upward trend in equity market. These results are in line with the results of earlier studies (Khan et al., 2021, Chaderina & Scheuch, 2018, Choi & Shin, 2016) .

Operating Expense and Fund Managers Abilities

Descriptive statistics in Panel – A of Table IV exhibits that keeping operating expenses to its minimum boost returns of the funds. The portfolio returns of *ER-1* and *ER-5* show a difference of 2.3% (3.6% Vs 1.3%). Results in Panel B and C again highlight the failure of appropriate stock selection by the managers as the values of alpha in all columns of the two panels are statistically not different from zero. While the coefficient values of gamma of T&M model indicates that the lowest operating expense fund better time the market (21.5621). Further, it also reveals that funds with low operating expense have higher significant market beta (3.5905) and earn more returns during upward market. Gruber (1996) argued that investors avoid investing in mutual fund with high operating expenses due to their negative effect on profitability. Golec (1996) found that funds with lower administrative expenses perform relatively better but it does not mean that funds charging high management fees certainly perform poor. Later, Barber et al. (2003) explained that despite investors readily choose funds with lesser operating costs however in parallel they gravitate toward funds with 12b-1 fee because of the ability of their expensive marketing actions. That is how these attract more cash flows and scale efficiencies. Baker et al. (2009) reported mix results in their investigation to determine if low-expense class of funds beat high-expense class of funds.

Table IV: Operating Expense Based Mutual Funds' Portfolios and Managers' Abilities

Panel – A: Descriptive Statistics – Operating Expense Based Portfolio Returns

Variable	ER	Port. Ret.	Port. Risk (Std. Dev.)	Relative Risk (Coeff. of Var.)
ER – 1	0.007	0.036	0.895	24.86
ER – 2	0.016	0.101	0.82	8.12
ER – 3	0.024	0.105	0.967	9.21
ER – 4	0.036	0.104	0.928	8.92
ER – 5	0.178	0.013	0.62	47.69

Panel - B: Operating Expense Based Portfolio Results -H&M Model $Rp_t = \alpha + \beta R_{Mt} + \gamma[D(R_{Mt})] + \varepsilon_t$

Variables	ER -1	ER -2	ER -3	ER -4	ER -5
$(Rm-R_f)$	2.5903*	-0.7277	0.1327	-0.4542	-0.0411
	(1.5435)	(1.3905)	(1.6442)	(1.5627)	(1.0415)
R_{Mt}	-0.1477	0.1920	0.1025	0.2317	0.1395
	(0.2024)	(0.1846)	(0.2183)	(0.2074)	(0.1383)
A	0.1060	-0.0178	0.0347	-0.0430	-0.0804
	(0.1332)	(0.1205)	(0.1425)	(0.1354)	(0.0902)
R^2	0.0201	0.0072	0.0035	0.0107	0.0119

Panel - C: Operating Expense Based Portfolio Results –T & M Model ($Rp_t = \alpha + \beta R_{Mt} + \gamma R_M{}^2{}_t + \varepsilon_t$)

Variables	ER -1	ER -2	ER -3	ER -4	ER -5
$(Rm-R_f)$	3.5905***	0.4738	0.1733	0.5965	0.5680
	(1.1519)	(1.0530)	(1.2382)	(1.1840)	(0.7885)

$(Rm-R_f)^2$	21.5621***	2.2362	-6.9015	-2.6829	-1.9336
	(5.7853)	(5.4163)	(6.3684)	(6.0899)	(4.0556)
A	-0.0718	0.0783	0.1227	0.0974	0.0056
	(0.0726)	(0.0686)	(0.0807)	(0.0771)	(0.0514)
R^2	0.0962	0.0016	0.0093	0.0044	0.0071

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Number of Funds in Family and Fund Managers Abilities

Statistics in Panel–A of Table V shows that neither portfolio of funds with the lowest (*NOF-1*) nor the highest (*NOF-5*) numbers in family have the highest returns. However, funds with average numbers in family, *NOF-3*, (average number of funds in family is 14) has the highest average returns (10.9%). Moreover, managers of these funds lack the ability of better stock selection. The "α" values are insignificant in all the cases of Panel-B & C of Table V.

Further, the coefficient values of gamma of T&M model indicate that *NOF-2* better time the market (21.6607) and have higher significant market beta (4.2822). *NOF-2* earns more returns during upward market as compared to funds in the other portfolios. Atta et al. (2019) reported existence of an inverse and statistically significant association between number of funds in family and selectivity performance. It suggests that increase in number of funds increase complexity and managers find it difficult to select most appropriate investment alternatives.

Table V: Numbers of Fund Based Mutual Funds' Portfolios and Managers' Abilities

Panel-A: Descriptive Statistics – Numbers of Fund Based Portfolio Returns

Variable	NOF	Port. Ret.	Port. Risk (Std. Dev.)	Relative Risk (Coeff. of Var.)
NOF – 1	5.269	0.07	0.989	14.13
NOF – 2	10.252	0.079	0.956	12.10
NOF – 3	13.734	0.109	0.838	7.69
NOF – 4	16.458	0.106	1.34	12.64
NOF – 5	17.91	0.022	0.624	28.36

Panel-B: Numbers of Fund Based Portfolio Results -H&M Model $Rp_t = \alpha + \beta R_{Mt} + \gamma[D(R_{Mt})] + \varepsilon_t$

Variables	NOF-1	NOF-2	NOF-3	NOF-4	NOF-5
$(Rm-R_f)$	-0.2872	3.4207**	-0.3599	0.6433	-1.6217
	(1.6752)	(1.6309)	(1.4103)	(2.3884)	(1.0567)
R_{Mt}	0.1765	-0.1749	0.3048	0.0869	0.1369
	(0.2224)	(0.2138)	(0.1872)	(0.3167)	(0.1403)
α	-0.0449	0.1563	-0.0710	0.0368	-0.0615
	(0.1451)	(0.1408)	(0.1222)	(0.2131)	(0.0915)
R^2	0.0058	0.0324	0.0259	0.0034	0.0143

Panel - C: Numbers of Fund Based Portfolio Results –T & M Model ($Rp_t = \alpha + \beta R_{Mt} + \gamma R_M^2{}_t + \varepsilon_t$)

Variables	NOF-1	NOF-2	NOF-3	NOF-4	NOF-5
$(Rm-R_f)$	0.4572	4.2822***	1.3521	0.3755	-0.8278
	(1.2669)	(1.2228)	(1.0735)	(1.9253)	(0.8003)
$(Rm-R_f)^2$	-2.7986	21.6607***	0.9131	-7.8019	0.7449
	(6.5160)	(6.1416)	(5.5217)	(9.2133)	(4.1161)
α	0.0655	-0.0371	0.0935	0.1220	0.0109
	(0.0825)	(0.0770)	(0.0699)	(0.1206)	(0.0521)

R^2	0.0031	0.0993	0.0103	0.0079	0.0088

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Front-End Load and Fund Managers Abilities

In Table VI, *FL-1* and *FL-2* symbolize funds that levy and do not levy any front-end load fee, respectively. In Panel-A, the average portfolio returns of *FL-1* are high but *FL-2* comparatively performs better with respect to both total and relative risks. Likewise, Panel- B & C confirms funds managers' inability of better stock selection. Whereas the coefficient values of gamma of T&M model indicates that *FL-2* relatively better time the market (21.2389). FL-2 funds have higher significant market beta (5.2541) and earn relatively more returns during upward market situation. These results are similar to the findings documented by Dellva and Olson (1998). Further, Khan et al. (2021) argue that levying a high front-end load fee discourages the cash inflows and urge firms to hold relatively more cash for precautionary motives. Consequently, it increases the opportunity cost and reduces fund performance (Barber *et al*., 2003; Yan, 2006).

Table *VI*: Front End Load Based Mutual Funds' Portfolios and Managers' Abilities

Panel-A: Descriptive Statistics – Front End Load Based Portfolio Returns

Variable	FL	Port. Ret.	Port. Risk (Std. Dev.)	Relative Risk (Coeff. of Var.)
FL-1	1	0.197	2.654	13.47208
FL-2 (no front end load)	0	0.179	1.27	7.094972

Panel-B: Front End Load Based Portfolio Results -H&M Model $Rp_t = \alpha + \beta R_{Mt} + \gamma[D(R_{Mt})] + \varepsilon_t$

Variables	FL-1	FL-2
$(Rm-R_f)$	-1.8105	3.4895
	(4.4927)	(2.1778)
R_{Mt}	0.5295	-0.0013
	(0.5964)	(0.2855)
α	-0.1272	0.1604
	(0.3892)	(0.1880)
R^2	0.0055	0.0315

Panel - C: Front End Load Based Portfolio Results –T & M Model ($Rp_t = \alpha + \beta R_{Mt} + \gamma R_M{}^2{}_t + \varepsilon_t$)

Variables	FL-1	FL -2
$(Rm-R_f)$	0.4494	5.2541***
	(3.3990)	(1.6586)
$(Rm-R_f)^2$	-8.0343	21.2389**
	(17.4825)	(8.3300)
α	0.2024	0.0658
	(0.2214)	(0.1045)
R^2	0.0020	0.0698

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table *VII*: Deferred-End Load Based Mutual Funds' Portfolios and Managers' Abilities

Panel-A: Descriptive Statistics – Front End Load Based Portfolio Returns				
Variable	**DL**	**Port. Ret.**	**Port. Risk (Std. Dev.)**	**Relative Risk (Coeff. of Var.)**
DL-1(no deferred end load)	0	0.405	3.255	8.037037
DL-2	1	-0.036	0.28	-7.77778

Panel-B: Front End Load Based Portfolio Results -H&M Model $Rp_t = \alpha + \beta R_{Mt} + \gamma[D(R_{Mt})] + \varepsilon_t$		
Variables	**DL-1**	**DL-2**
$(Rm-R_f)$	1.7406	-0.3454
	(5.4993)	(0.4867)
R_{Mt}	0.4990	0.0380
	(0.7300)	(0.0638)
α	0.0865	-0.0658
	(0.4765)	(0.0420)
R^2	0.0109	0.0033

Panel - C: Front End Load Based Portfolio Results –T & M Model ($Rp_t = \alpha + \beta R_{Mt} + \gamma R_M{}^2{}_t + \varepsilon_t$)		
Variables	**DL-1**	**DL -2**
$(Rm-R_f)$	5.2114	-0.0955
	(4.1561)	(0.3785)
$(Rm-R_f)^2$	10.4914	0.5342
	(21.3767)	(1.9011)
α	0.3151	-0.0470*
	(0.2708)	(0.0238)
R^2	0.0095	0.0015

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Deferred-End Load and Fund Managers Abilities

DL-1 and *DL-2* represent funds that do not charge and funds that charge deferred-end load fees respectively as shown in Table VII. Results reported in Panel - B and C show that values of α and γ are statistically insignificant in the cases of the two types of portfolios of funds. Overall the results indicate inadequate performance of the mangers concerning their SSMT skills.

Conclusion

This study adopts a portfolio approach and tests SSMT abilities of managers of 190 open-end mutual funds over the period from 2012 to 2022 in Pakistan. While majority of the existing studies analyze fund managers' SSMT abilities on an individual basis, this current study constructs portfolios based on factors such as funds' cash holdings, size, redemption of units, expense ratio, front-end load, back-end load, and the number of funds in a family. Time series data with monthly intervals is analyzed through T&M (Treynor & Mazuy, 1966) and H&M (Henriksson & Merton,

1981) models. During the period an increase of 325% and a decrease of 84% are observed in the open-end and close-end funds. It is found that fund managers lack stock selection ability regardless of the type of seven different investment strategies used and the two different testing models employed. Further, the average portfolio returns of the lowest cash holding, smallest size, lowest redemption, and operating expenses funds are better relative to the others sets of portfolios of funds. Further, the highest cash holding, the largest sized funds, and the second highest redemption fund are found to earn relatively higher returns and better time the market during the bullish (upward market) trend. However, in the case of portfolios based on operating expenses, it is observed that funds with the lowest operating expense ratio better time the market and earn more returns during upward market trend. Moreover, the average portfolio returns of portfolio of fourteen funds (*NOF-3*) are higher than those of portfolios with fewer or more funds. Within these funds, managers of *NOF-2* funds are found to time the market better and achieve relatively higher returns during a bullish market trend. The average portfolio returns of funds with front-end load are higher than funds that do not charge front-end load. However, the funds with no front-end load time the market better and earn relatively higher returns during up market conditions. Finally, we found no evidence to state that fund managers have stock selection or market timing abilities when the funds are grouped in portfolios on the basis of deferred-end load.

The findings reveal several significant implications for various stakeholders. First, **i**nvestors should be cautious about relying on fund managers' stock selection abilities. Investors shall choose to invest in funds with lower expenses, higher cash holdings, and larger in size. Similarly, analysts of mutual funds shall consider operating expense ratios, and cash holding metrics into their evaluations, and must monitor to convey the issue of poor stock selection. Regulators shall ensure that funds fully enhance their disclosures about stock selection and performance matrices for informed decisions by various stakeholders. Performance claims by the funds shall be closely monitored. Managers of these funds shall closely manage the operating costs, opt for more diversified strategy. Most importantly, they shall focus to train and develop with respect to stock selection skills. At the same time, firms shall appropriately market their strength related to expenses, cash holding and fund size to differentiate their funds in the market. This research study identifies scope for future research. We propose that in future investigation shall be directed to assess if the managers' ability of better market time and earning higher returns is in fact managerial function and ability in up-market condition or if it is a market driven outcome. Moreover, in future, weekly and daily data sets might be used. Other specific skills of managers relevant to SSMT and qualitative research for in-depth analysis may prove significant. Technological advancements in artificial intelligence and its impact on decision-making by the mangers is also a potential area.

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