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IMPACT OF TAX-BURDEN ON MUTUAL FUNDS PERFORMANCE

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ABSTRACT

This study investigated association between tax-burden and mutual funds performance from both a theoretical and an empirical perspective. The results of this study show that the performance of Pakistani mutual open ended funds is related to their tax burden. And also tax-efficient funds have better performance due to favorable investment style, lower trading costs, and better selection of stocks. This study analyzed the data of 211 Pakistani open ended mutual funds from 2014 to 2017. The results provide current mutual funds performance analysis, which is useful for individual investors, institutional investors and asset management companies. The fund managers can also get help from this research while watching investors as well as funds own interests.

1. INTRODUCTION

Capital markets help to gear up investment and economic development in the country. Mutual fund has long history being a key instrument of capital market. Mutual Fund performance can be affected by variety of factors (characteristics) i.e. expense ratio, management fee, fund cash flow, fund family, fund size, fund liquidity and fund age. These factors have a key impact on the fund return over the period of time. Along with this, mutual funds performance is also affected due to investment taxes. Because, shareholders of mutual funds receive dividend income and realized capital gains. And different tax rates are applied on these distributions. Particularly, higher tax rates are applied on short-term capital gains than long-term capital gains distributions. Different investment strategies like deferring realization capital gains, avoiding those securities that have more dividend yields and accelerating of capital losses can reduce tax burden on shareholders (Bergstresser and Poterba 2002). However, these strategies on one hand restrict investment styles and before-tax performance. And on the other hand, superior investment abilities may be exercised by those fund managers who tried to save taxes.

Extent literature is available on mutual funds performance. Researchers explore different determinants of mutual fund like expense ratio, management fee, load fee, fund turnover, fund age, fund value, fund size, fund liquidity and fund flow. These are characteristics of fund, which investors use in their decision while investing in mutual funds. But still optimal level of fund characteristics to check fund performance has been a challenge for fund managers because they have to watch investor's interests as well as fund's own interests. This study is related to implication of tax burden on mutual fund returns because investment taxes have important role to fund investors (Arnott, Kalesnik, and Schuesler, 2018). While managing capital gains distributions, the managers face conflicts of getting incentives by realizing capital gains and reducing capital gains overhang, just to attract investors (Barclay, Pearson, and Weisbach, 1998). There is association between funds after-tax returns and cash inflows to funds (Bergstresser and Poterba, 2002). So, tax burdens may reduce investors' ability to reinvest in funds, which can affect mutual funds performance. What are the determinants of tax burden of mutual funds in Pakistan and how does tax burden influence on mutual funds performance in Pakistan? is the unexplored area of literature.

After increase in capital gain taxes, more assets are allocated to mutual funds (exchange traded funds, ETFs) than other institutions (Moussawi, Shen, &Velthuis, 2020) and also flows from active mutual funds to ETFs. The investment strategies and fund's performance; both are different for pension investors and other investors, with focusing on tax clienteles (Sialm and Starks, 2012). The better after-tax performance as well as before-tax performance of tax-efficient mutual funds can be achieved due to favorable investment style, better picking of funds,

and less trading cost (Sialm and Zhang, 2020). Another recent study investigated the tax behavior of mutual funds and found that capital gain taxes creates agency cost problem (Chaim, 2020) due to mutual fund managers and their tax-sensitive shareholders. Currently, many corporate governance practices have been used to overcome this conflict of interest but still these practices have not achieved their goals. So, this study will try to investigate that in presence of agency relationship within the context of tax burden and funds' performance, how conflict of interest can be overcome.

Nevertheless, there is need of a comprehensive study, which will find and identify the impact of tax-burden on mutual funds performance because investors may invest in tax-efficient funds rather than tax-burdened funds. So, this study will investigate the fund's performance from tax burden point, which is untouched area of study in literature still.

1.1. Research Objectives

- To test the relationship between fund characteristics and fund returns
- To investigate the impact of tax-burden on mutual funds' performance in Pakistan.
- To test the effect of different funds factors on investors' decision making on funds

2. REVIEW OF LITERATURE AND HYPOTHESES DEVELOPMENT

Bergstresser and Pontiff (2013) found that after tax funds performance represents meaningful results for investors who want to manage in taxable portfolios. Further, they evidenced that cost of tax burden is associated not only with dividend but also to portfolio style. This style creates from different dividend yield. In addition, the implications of their findings are useful in finance and economics literature. As their findings showed that tax burden reduces premium of value stocks over premium of growth stock. And similarly tax burden reduces the premium of small market capitalization over premium of large market capitalization. As it supports the findings of finance literature (Fama and French, 1995) that higher average return are associated with value stock portfolios than growth stock portfolios. And higher average returns are associated with small market capitalization portfolios than large market capitalization portfolios.

Two types of taxes have been paid by investors. First, tax on dividends and second, taxes on capital gains. Capital gain taxes are paid when realized. Deferring realization of capital gain reduces cost of tax burden on investors due to low tax rates on long holding securities. This shows that different holding stock strategies imposes different tax burden on investors. If mutual funds hold securities for less than one year, the CGT is 12.5% but in case, where funds hold securities for one year to less than two year then CGT will be 10% and it will be 0%, if holding period of securities is two year to above.

The fund managers have the choice to hold the stocks as per their holding policy. If funds hold securities for short run, it creates heavy tax burden on investors but for more than two year holding, the burden of capital gain tax will be zero. This will put investors in a position to select funds whose management is tax-efficient or inefficient.
Normally, burden of tax is reduced with deferring realization of capital gain. These are portfolio strategies which can be adopted by investors to defer realization of capital gain. Investing in small firms and valued stocks can enhance the realization of capital gains because such investors will sell stocks of small firms that become large and thus more capital gain realized. It is clear that this strategy put high tax burden cost on investors. In contrast, the other portfolio strategy, which holds large market capitalization stocks and growth stocks, put lower capital gain tax burden on investors.

Portfolio managers manage their funds in less tax-efficient manner, having more defined contribution money (Sialm and Starks, 2012). Moreover, Bergstresser and Pontiff (2013) added contribution to literature on tax-deferred retirement investing and evidenced that matter of tax burden should be considered to some investors because holding specific stocks outside of or inside of tax-deferred accounts, is determined by different trading strategies.
Dividends, short-term capital gains and long-term capital gains are taxable income generated by mutual funds for investors. In addition to these taxable incomes, due to fluctuation in fund stock prices, equity funds may also generate untaxed capital gain. With the increase in fund's stock value the net asset value of fund increases and tax

burden on this appreciation depends upon fund manager behavior. The liability of capital gain occurs when manager sells such stocks.

In past literature, the researchers focused on pre-tax returns as fund performance. Pre-tax returns are the sum of above mentioned three returns. But recently, the laureates focusing on after tax return and fund performance. Because, asset management companies are required to report their pre-tax and after-tax returns. Some discussions turned to possibility that if investors purchase funds with large unrealized capital gain then they have to bear tax on that gain, which they never earn. The net asset value of fund will decrease as a result of large capital gain distribution. Although decrease in net asset value generates loss but it is equal to capital gain distribution and importantly investors face this loss when they sell their funds stock. The investment strategies and fund's performance, both are different for pension investors and other investors, with focusing on tax clienteles (Sialm and Starks, 2012). The better after-tax performance as well as before-tax performance of tax-efficient mutual funds can be achieved due to favorable investment style, better picking of funds, and less trading cost (Sialm and Zhang, 2020). Although tax-efficient funds and tax burden (short term capital gain tax) on funds return are related but this study captures different characteristics of tax burden as a determinant of mutual fund.

Currently, many corporate governance practices have been used to overcome this conflict of interest but still these practices have not achieved their goals. So, this study will try to investigate that in the presence of agency relationship within the context of tax burden and funds' performance, how conflict of interest can be overcome. Still optimal level of fund characteristics to check fund performance has been a challenge for fund managers because they have to watch investor's interests as well as fund's own interests. This situation puts managers in conflict of interest which arises from agency. So, this situation creates conflict of interest between principal and agent and firms have to bear its cost. As managing capital gains distributions, the managers face conflicts of getting incentives by realizing capital gains and reducing capital gains overhang, just to attract investors (Barclay, Pearson, and Weisbach, 1998). So, this incentive puts tax burden on investors (Arnott, Kalesnik, and Schuesler, 2018). In addition, there is strong relationship between funds after-tax returns and cash inflows to funds (Bergstresser and Poterba, 2002). So, tax burdens may reduce investors' ability to reinvest in funds, which can affect mutual funds performance. What are the determinants of tax burden of mutual funds in Pakistan and how does tax burden influence on mutual funds performance in Pakistan? are the unexplored area of literature.

From above discussion, in this study it is hypothesized that negative relationship persists between tax-burden and mutual funds returns.

H1: The tax-burden is negatively associated with mutual funds returns.

Smaller fund size has higher operating efficiency (Dahlquist et al. 2000; Berk and Green, 2004; Chen et al. 2004;and Yan, 2008). Some past studies suggested that funds in smaller size are more efficient. But other past studies suggested that larger fund size get benefits of economies of scale(Tufano and Sevick,1997; and Eltonet al., 2012).So, it shows the relationship between size of funds and mutual funds returns is still ambiguous. So, the following hypothesis is tested.

H2: The size of funds is positively related with mutual funds returns.

Fund Turnover provides information that how funds are circulating. It is calculated as total income divided by fund total assets. Stakeholders learn about trading activities from this ratio (Carhart, 1997; Dahlquist et al, 2000;Wermers, 2000; Chen et al., 2004; Rehman, 2018; Naveed, 2019).Normally, a lower turnover is result of investment style like buy-and-hold securities but high turnover depends upon short term trading. The association between fund turnover and fund returns is positive significantly (Dahlquist et al., 2000 and Wermers, 2000). So, positive relationship between fund turnover and funds' returns is hypothesized. The following hypothesis is tested.

H3. The fund turnover is positively related with funds returns.

Fund expenses are necessary to run internal administration of funds like accounting processing, regulatory filing, and collection fee. Past studies document that negative association between fund expenses and fund returns exist (Carhart, 1997; Gil-Bazo and Ruiz-Verdú,2009; Nguyen and Nguyen, 2019). So, the following hypothesis is tested.

H4: The mutual funds expenses are negatively associated with fund returns.

Liquidity means easiness of buying and selling of financial assets. The net inflows will be positive with increase in fund size to boost capital markets. But if there are negative net flows, it will cease fund size. This study measured liquidity by the log of fund's total cash on annual basis (Afza and Rauf, 2009; Rehman, 2018; Naveed, 2019).In this study, a positive relationship is hypothesized between liquidity and fund's performance. The following hypothesis is tested.

H5: The mutual fund liquidity has a positive relationship with mutual fund returns.

The more fund age means more fund returns. (Ferreira et al., 2013; Rehman, 2018; and Naveed, 2019). So, the following hypothesis is tested.

H6: The mutual fund age has a positive relationship with the fund returns.

From above discussion this study developed following theoretical framework. Figure 1 indicates relationship between tax-burden and mutual fund performance with some control variables.

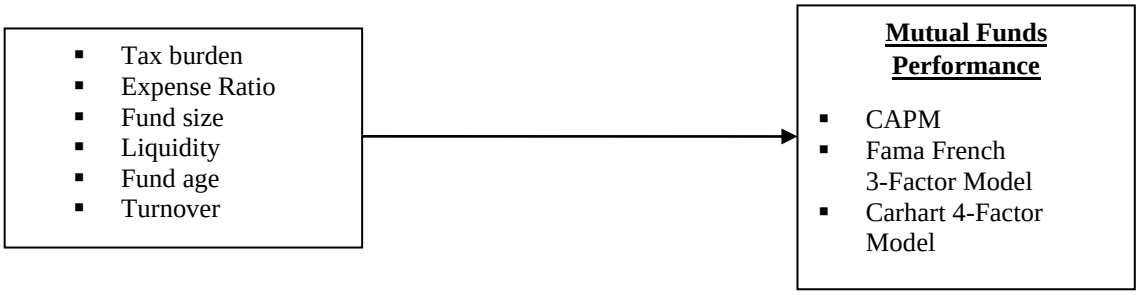

Fig. 1. Theoretical Framework

3. RESEARCH METHODOLOGY

The population of this study is framed from the total number of open end mutual funds traded on the Mutual Fund Association of Pakistan (MUFAP) from 2014 to 2017. There are total 233 mutual funds consisting 211 open end funds, 3 close end funds, and 19 pension mutual funds (MUFAP, 2017). However, 211 open end mutual funds are the population of this study and available data of all open end mutual funds is considered as sample of this study. The data is longitudinal/panel. (Ahmed and Siddiqui, 2018; Arif, Samim, Khurshid, and Ali, 2019).

3.1. Model

The objective of this study is to test the impact of tax-burden on mutual funds performance. For this purpose, the following panel data regression analysis is used to analyze the data.

$$\mathbf{F.Per.}_{f,t} = \alpha + \beta_1 \mathbf{TB}_{f,t} + \beta_2 \mathbf{EXP}_{f,t} + \beta_3 \mathbf{FUNDSIZE}_{f,t} + \beta_4 \mathbf{AGE}_{f,t} + \beta_5 \mathbf{TURN}_{f,t} + \beta_7 \mathbf{LIQ}_{f,t} + \varepsilon_{f,t}$$

3.2. Measuring Instruments

In Table 1, there is complete detail of dependent variables and independent variable with control variables used in this study.

Table 1. Variables and Measurement

Variable	*Measurement*	*Sources*
CAPM	**Dependent Variables** $r_p - r_f = \alpha + \beta_i(r_m - r_f) + \varepsilon_i$ Where, α = Intercept of regression line r_p = The return on portfolio $_i$ r_f = The risk-free interest rate r_m = Return of market portfolio ε_i = Standard error (residuals of the regression model) β= Beta value of independent variables, r_m-r_f	(Sialm, 2009; Khan and Rehman, 2019; Naveed, 2019; Sialm and Zhang, 2020)
Fama French 3-Factor Model	$r_p - r_f = \alpha + \beta_{1i}(r_m - r_f) + \beta_{2i}(SMB) + \beta_{3i}(HML) + \varepsilon_i$ Where, α = Intercept of regression line r_p = The return on portfolio $_i$ r_f = The risk-free interest rate r_m = Return of market portfolio (SMB) = Return of size factor (Small market capitalization Minus Big market capitalization) (HML)= Return of BE/ME factor (High book-to-market ratio Minus low book-to-market ratio) ε_i = Standard error (residuals of the regression model) $\beta_{1, 2, 3}$ = Beta values of three independent variables, r_m-r_f, SMB, and HML	(Sialm, 2009; Khan and Rehman, 2019; Naveed, 2019; Sialm and Zhang, 2020)
Carhart 4-Factor Model	$r_i - r_f = \alpha + \beta_{1i}(r_m - r_f) + \beta_{2i}(SMB) + \beta_{3i}(HML) + \beta_{4i}(WML) + \varepsilon_i$ Where, α = Intercept of regression line r_i = The return on asset $_i$ r_f = The risk-free interest rate r_m = Return of market portfolio (SMB) = Return of size factor (Small market capitalization Minus Big market capitalization) (HML)= Return of BE/ME factor (High book-to-market ratio Minus low book-to-market ratio) (WML) = Return of momentum factor (Winner Minus Loser) ε_i = Standard error (residuals of the regression model) $\beta_{1\text{-}2\text{-}3\text{-}4}$ = Beta values of four independent variables, r_m-r_f, SMB, HML, and WML.	(Sialm, 2009; Khan and Rehman, 2019; Naveed, 2019; Sialm and Zhang, 2020)
Tax-burden	**Independent Variable** $TB_{f,t} = R^{BT}_{f,t} - R^{AT}_{f,t} = \tau_t^{DIV} Y^{DIV}_{f,t} + \tau_t^{CG} Y^{CG}_{f,t} + \tau_t^{FP} Y^{FP}_{f,t}$	(Sialm, 2009; Sialm and Zhang, 2020)
Expense Ratio	**Control Variables** The amount of total funds expenses divided by total net asset value of fund	(Karlssen and person, 2005; Haslem, 2010; Afza and Rauf, 2009; Rehman, 2018; Naveed,2019)
Liquidity	The log of fund's total cash on annual basis	(Afza and Rauf, 2009; Rehman, 2018; Naveed, 2019)
Fund Age	The log of the number of years of fund existence.	(Ferreira et al., 2013; Rehman, 2018; Naveed, 2019)

Funds Size	Natural logarithm has been taken of the net asset value of assets	(Afza and Rauf, 2009; Rehman, 2018; Naveed, 2019)
Turnover	It is calculated as total income divided by fund total assets	(Rehman, 2018; Naveed, 2019).

4. DATA ANALYSIS

Table 1 represents descriptive statistics of all variables of the study. The mean of tax-burden is 29.1 % which shows high tax rates on mutual funds investment. The mean of Rp-Rf is 7.53% which indicates extra return of portfolio on T-bills. The mean of Rm-Rf is 11.53% that represents market premium return and it is better than portfolio premium return. The descriptive statistics of other important variables are given below in detail.

Table 2. Descriptive Statistics

Variable Name	Obs.	Mean	Std. Dev.	Min	Max
Tax-burden	530	29.1	8.454	19	37.5
Rp-Rf	530	7.534	13.067	-20	75.21
Rm-Rf	530	11.526	21.243	-21.383	33.482
SMB	530	.98	1.405	-.614	3.432
HML	530	-2.674	.949	-3.866	-1.281
WML	530	38.374	19.508	13.39	63.62
Expense ratio	530	3.186	3.718	-.373	45.133
Liquidity	530	6.667	1.438	2.987	9.986
Fundage	530	.924	.209	0.001	1.748
Fundsize	530	16.776	3.149	11.218	23.253
Turnover	530	13.498	11.138	-3.972	139.257

Panel A of Table 3 presents annual regression of tax burden on before-tax return with additional control variable. The inverse relationship between tax burden and before-tax mutual funds performance is shown at significant level. Thus, it shows increase in tax burden significantly decreases before-tax mutual funds performance. These results also indicate that before-tax mutual funds performance significantly decreases with increase in expense ratio (Gil-Bazo and Ruiz-Verdú,2009; Nguyen and Nguyen, 2019), increases with increase in liquidity (Gruber, 1996;Zheng, 1999; Nguyen, Shahid and Kernohan, 2018), increases with increase in fund age (Afza and Rauf,2009; and Belgacem and Hellara, 2011;Ferreira, Keswani,Miguel, and Ramos,2013; Nguyen, Shahid and Kernohan, 2018), increases with increase in fund turnover (Dahlquist, Engström, and Söderlind, 2000; Wermers, 2000), and decreases with increase in fund size (Becker and Vaughan, 2001; Yan, 2008;Berk and Green, 2004; Chen, Hong, Huang, and Kubik, 2004; Nguyen, Shahid and Kernohan, 2018).

The R^2 indicates before-tax mutual funds performance is explained by tax-burden and other factors by 36.2% significantly. It suggests mutual fund investors should carefully consider all these factors including tax-burden while investing in mutual funds because it is difficult to predict before-tax mutual fund performance. Panel B of Table 3 presents annual regression of tax burden on after-tax return with additional control variable. There is significant negative relationship between tax-burden and after-tax mutual fund performance. It indicates that increase in tax-burden significantly decreases after-tax performance. The above results also indicate that mutual fund after-tax performance decreases significantly with increase in expense ratio (Gil-Bazo and Ruiz-Verdú,2009; Nguyen and Nguyen, 2019), increases with increase in liquidity (Gruber, 1996;Zheng, 1999; Nguyen, Shahid and Kernohan, 2018), increases with increase in fund age (Afza and Rauf,2009; and Belgacem and Hellara, 2011;Ferreira et al.2013; Nguyen, Shahid and Kernohan, 2018), increases with increase in fund turnover (Dahlquist et al. 2000;

Wermers, 2000), and decreases with increase in fund size (Chen, Hong, Huang, and Kubik, 2004; Becker and Vaughan, 2001; Yan, 2008;Berk and Green, 2004; Nguyen, Shahid and Kernohan, 2018).

The R^2 indicates after-tax mutual fund performance is explained by tax-burden and other factors by 45.5% significantly. It suggests that mutual fund investors should consider these factors particularly tax-burden while investing in mutual funds.

Panel C of Table 3shows comparison of annual regressions of before-tax returns, tax-burden, and after-tax returns with additional control variables. It indicates the difference between before-tax performance and after-tax performance. The difference between before-tax return $R^2$and after-tax return R^2 is apparently 9.3% significant. Thus, it shows that with tax-burden factor, this model is good explained.

Table 3. Funds Performance predictability by Tax-burden

Panel A:	***Before-Tax Return***		
Tax-burden	-0.661***		
Expense ratio	-0.655***		
Liquidity	5.164***		
Fund age	22.735***		
Fund size	-1.355**		
Turnover	0.375***		
Constant	0.529**		
R-squared	***0.362***		
Number of observations	***530***		
F	***0.0000***		
Panel B:	**After-Tax Return**		
Tax-burden	-0.672***		
Expense ratio	-0.545***		
Liquidity	4.51***		
Fund age	20.337***		
Fund size	-1.434***		
Turnover	0.286***		
Constant	5.693**		
R-squared	***0.455***		
Number of observations	***530***		
F	***0.0000***		
Panel C:	**Before-Tax Return**	**Tax-burden**	**After-Tax Return**
Tax-burden	-0.661***	0.011***	-0.672***
Expense ratio	-0.655***	-0.11***	-0.545***
Liquidity	5.164***	0.654***	4.51***
Fund age	22.735***	2.398***	20.337***
Fund size	-1.355**	0.079**	-1.434***
Turnover	0.375***	0.089***	0.286***
Constant	0.529**	-5.164**	5.693**

R-squared	***0.362***	***-0.093***	***0.455***
Number of observations	***530***	***530***	***530***
F	***0.0000***	***0.0000***	***0.0000***

*** p<.01, ** p<.05, * p<.1

4.1. Risk Adjusted Performance:

4.1.1. Capital Asset Pricing Model (CAPM):

Panel A of Table 4, indicates regressions results of CAPM on before-tax mutual fund performance with additional control variables. The market premium (Rm-Rf) has significant negative impact on before-tax mutual funds performance, it shows increase in market premium decreases excess portfolio return significantly. The CAPM before-tax alpha also indicates significant results. The other variables like expense ratio, liquidity, fund age, and fund turnover significantly impact on excess portfolio before-tax return. The R^2 23.4% indicate that above factors explained the model well significantly.

Panel B of Table 4, indicates regressions results of CAPM on after-tax mutual fund performance with additional control variables. The market premium (Rm-Rf) has insignificant negative impact on after-tax mutual funds performance. However, CAPM after-tax alpha indicate significant results. The other control variable like expense ratio, liquidity, fund age, and fund turnover significantly impact on excess portfolio before-tax return. The R^2 24.7% indicate that above factors explained the model well significantly.

Panel C of Table 4, indicates regressions results of CAPM on before-tax return, tax-burden, and after-tax mutual fund performance with additional control variables. In this panel, the difference between before-tax CAPM alpha and after-tax CAPM alpha is factor-adjusted tax-burden shown in middle column. It is apparent form results that for both before-tax alpha and after-tax alpha, the tax burden is important predictor. The difference between before-tax return R^2 and after-tax return R^2 is apparently 1.3% significant. Thus, it shows that with tax-burden factor, this model is good explained.

Table. 4 Risk Adjusted Performance (CAPM) by Tax-burden

Panel A:	***Rp-Rf***
Rm-Rf	-0.066***
Expense ratio	-0.73***
Liquidity	4.567***
Fund age	-24.931***
Fund size	-1.549**
Turnover	0.393***
Constant	24.246**
R-squared	***0.234***
Number of observations	***530***
F	***0.0000***
Panel B:	**Rpat-Rf**
Rm-Rf	-0.025**
Expense ratio	-0.621***
Liquidity	3.912***
Fund age	-22.459***

Fund size		-1.529***	
Turnover		0.315***	
Constant		22.02***	
R-squared		***0.247***	
Number of observations		***530***	
F		***0.0000***	
Panel C:	**Rp-Rf**	**Tax-Burden**	**Rpat-Rf**
Rm-rf	-0.066***	-0.041	-0.025**
Expense ratio	-0.73***	-0.109	-0.621***
Liquidity	4.567***	0.655	3.912***
Fund age	-24.931***	-2.472	-22.459***
Fund size	-1.549**	-0.02	-1.529***
Turnover	0.393***	0.078	0.315***
Constant	24.246**	2.226	22.02***
R-squared	***0.234***	***-0.013***	***0.247***
Number of observations	***530***		***530***
F	***0.0000***		***0.0000***

**** p<.01, ** p<.05, * p<.1*

4.1.2. Fama French 3-Factor Model:

Panel A of Table 5, indicates regressions results of Fama and French 3-factor model on before-tax mutual fund performance with additional control variables. The market premium (Rm-Rf), SMB, and HML have significant impact on excess before-tax portfolio return. It indicates that increase in market premium increases excess before-tax portfolio return significantly. Moreover, the Fama French 3-Factor model alpha has also significant negative impact on excess before-tax portfolio return. The other control variables like expense ratio, liquidity, fund age, and fund turnover significantly impact on excess portfolio before-tax return. The R^2 33.6% indicate that above factors explained the model well significantly.

Panel B of Table 5, indicates regressions results of Fama and French 3-factor model on after-tax mutual fund performance with additional control variables. The market premium (Rm-Rf), SMB, and HML have significant impact on excess after-tax portfolio return. It indicates that increase in market premium increases excess after-tax portfolio return significantly. Moreover, the Fama French 3-Factor model alpha has also significant negative impact on excess after-tax portfolio return. The other control variables like expense ratio, liquidity, fund age, and fund turnover significantly impact on excess portfolio after-tax return. The R^2 38% indicate that above factors explained the model well significantly.

Panel C of Table 5, indicates regressions results of Fama and French 3-factor model on before-tax return, tax-burden, and after-tax mutual fund performance with additional control variables. In this panel, the difference between before-tax Fama French 3-Factor model alpha and after-tax Fama French 3-Factor model alpha is factor-adjusted tax-burden shown in middle column. From results, it is apparent that for both before-tax alpha and after-tax alpha, tax burden is important predictor. The difference between before-tax return R^2 and after-tax return R^2 is apparently 4.4% significant. Thus, it shows that with tax-burden factor, this model is well explained.

Table 5: Risk Adjusted Performance (Fama French 3-factor Model) by Tax-burden

Panel A:	***Rp-Rf***		
Rm-Rf	0.191***		
SMB	-2.165***		
HML	3.928***		
Expense ratio	-0.546***		
Liquidity	4.499***		
Fund age	17.356**		
Fund size	-1.41**		
Turnover	0.341***		
Constant	-4.542***		
R-squared	***0.336***		
Number of observations	***530***		
F	***0.0000***		
Panel B:	**Rpat-Rf**.		
Rm-Rf	0.235***		
SMB	-2.398***		
HML	3.552***		
Expense ratio	-0.459***		
Liquidity	4.018***		
Fund age	20.913***		
Fund size	-1.409***		
Turnover	0.265***		
Constant	-9.445***		
R-squared	***0.38***		
Number of observations	***530***		
F	***0.0000***		
Panel C:	**Rp-Rf**	**Tax-Burden**	**Rpat-Rf**
Rm-Rf	0.191***	0.044	0.235***
SMB	-2.165***	0.233	-2.398***
HML	3.928***	0.376	3.552***
Expense ratio	-0.546***	-0.087	-0.459***
Liquidity	4.499***	0.481	4.018***
Fund age	17.356**	-3.557	20.913***
Fund size	-1.41**	-0.001	-1.409***
Turnover	0.341***	0.076	0.265***
Constant	-4.542***	4.903	-9.445***
R-squared	*0.336*	*0.044*	*0.38*
Number of observations	*530*		*530*
F	*0.0000*		*0.0000*

**** p<.01, ** p<.05, * p<.1*

4.1.3. Carhart Four Factor Model

Panel A of Table 6, indicates regressions results of four factor model of Carhart on before-tax mutual fund performance with additional control variables. The market premium (Rm-Rf), SMB, HML and WML have significant impact on excess before-tax portfolio return. It indicates that increase in market premium decreases excess before-tax portfolio return significantly. Moreover, the Carhart 4-Factor model alpha has also significant negative impact on excess before-tax portfolio return. The other control variables like expense ratio, liquidity, fund age, and fund turnover significantly impact on excess portfolio before-tax return. The R^2 39.4% indicate that above factors explained the model well significantly.

Panel B of Table 6, indicates regressions results of four factor model of Carhart on after-tax mutual fund performance with additional control variables. The market premium (Rm-Rf), SMB, HML, and WML have significant impact on excess after-tax portfolio return. It indicates that increase in market premium decreases excess after-tax portfolio return significantly. Moreover, the Carhart 4-Factor model alpha has also significant negative impact on excess after-tax portfolio return. The other control variables like expense ratio, liquidity, fund age, and fund turnover significantly impact on excess portfolio after-tax return. The R^2 44% indicate that above factors explained the model well significantly.

Panel C of Table 6, indicates regressions results of four factor model of Carhart on before-tax return, tax-burden, and after-tax mutual fund performance with additional control variables. In this panel, the difference between before-tax Carhart 4-Factor model alpha and after-tax Carhart 4-Factor model alpha is factor-adjusted tax-burden shown in middle column. Results show, for both before-tax alpha and after-tax alpha, tax burden is important predictor. The difference between before-tax return R^2 and after-tax return R^2 is apparently 4.6% significant. Thus, it shows that with tax-burden factor, this model is well explained.

Table 6: Risk Adjusted Performance (Carhart 4-factor Model) by Tax-burden

Panel A:	***Rp-Rf***
Rm-Rf	-0.106*
SMB	-5.988***
HML	3.192***
WML	0.579***
Expense ratio	-0.535***
Liquidity	4.358***
Fund age	51.75***
Fund size	-1.103*
Turnover	0.284***
Constant	-58.048***
R-squared	***0.394***
Number of observations	***530***
F	***0.0000***
Panel B:	**Rpat-Rf**
Rm-Rf	-0.011**
SMB	-5.574***
HML	2.94***
WML	0.481***
Expense ratio	-0.449***

Liquidity		3.9***	
Fund age		49.489***	
Fund size		-1.154**	
Turnover		0.218***	
Constant		-53.9***	
R-squared		***0.44***	
Number of observations		***530***	
F		***0.0000***	
Panel C:	**Rp-Rf**	**Tax-Burden**	**Rpat-Rf**
Rm-Rf	-0.106*	-0.095	-0.011**
SMB	-5.988***	-0.414	-5.574***
HML	3.192***	0.252	2.94***
WML	0.579***	0.098	0.481***
Expense ratio	-0.535***	-0.086	-0.449***
Liquidity	4.358***	0.458	3.9***
Fund age	51.75***	2.261	49.489***
Fund size	-1.103*	0.051	-1.154**
Turnover	0.284***	0.066	0.218***
Constant	-58.048***	-4.148	-53.9***
R-squared	***0.394***	***-0.046***	***0.44***
Number of observations	***530***		***530***
F	***0.0000***		***0.0000***

**** p<.01, ** p<.05, * p<.1*

5. DISCUSSION AND CONCLUSION OF THE STUDY

In past studies, attempts were made to create value for investors through focusing on traditional variables like expense ratio, fund age, fund size, liquidity, and fund turnover. However, an additional cost that mutual funds management facing is tax-burden imposed on fund investors which is often ignored both in practice and in academia. For fund managers, it is difficult to create persistent mutual funds performance just getting stocks or timing the market. But it is easy to manage investment taxes for valuable funds investors.

This paper shows that investment taxes are also important as other fund expenses and fund factors. However, funds that impose higher tax burden on funds investors don't outperform before and after-tax return. Rather, funds that are tax-efficient have out performance both before and after-tax through careful tax management.

6. LIMITATIONS AND CALL FOR FUTURE RESEARCH

Although this study investigated the impact of tax-burden on mutual funds performance from 2014 to 2017 and concluded that tax-burden has negative impact on funds performance. The results provide current mutual funds performance analysis, which is useful for individual investors, institutional investors and asset management companies. The fund managers can also get help from this research while watching investors as well as funds own interests. But still, the future researchers may investigate and compare the performance of different types of funds regarding tax-burden and may suggest the best tax-efficient funds for mutual fund investors. And they can also use the latest mutual funds data from 2017 to onward.

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