Tax Efficient Asset Management: Evidence from Equity Mutual Funds

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Motivation

- Investment taxes have a substantial impact on the performance of long-term mutual fund investors.

- There is a paucity of research on the impact of taxes on fund investment strategies and fund performance.

Our paper empirically investigates the costs and benefits of tax efficient asset management using a sample of U.S. equity mutual funds between 1990-2012.

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- Mutual funds are required to "pass-through" the dividends and the realized capital gains to their shareholders to avoid being subject to the corporate tax.

- Taxable fund investors are required to pay taxes on fund dividends and capital gains distributions, even if they do not liquidate their fund positions.

- Taxable investors have to pay taxes on the remaining capital gains when they liquidate their mutual fund shares.

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Cumulative Returns for Highest Tax Burden Decile
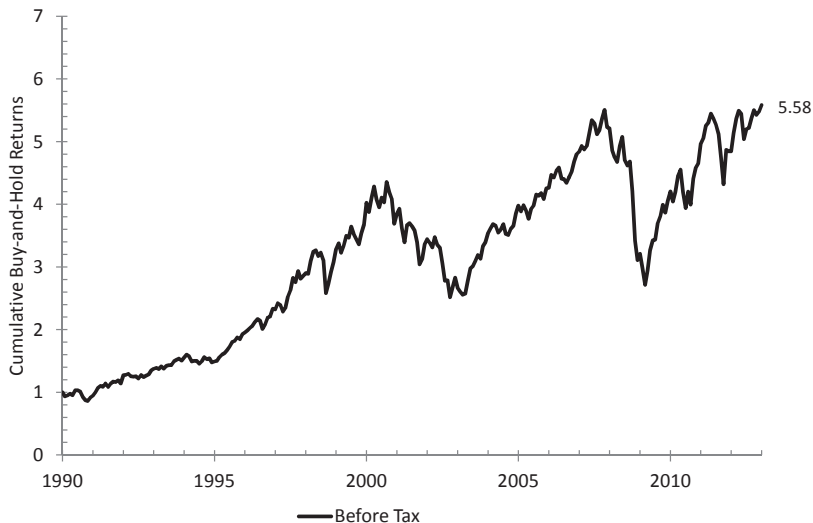
Cumulative Returns for Highest Tax Burden Decile
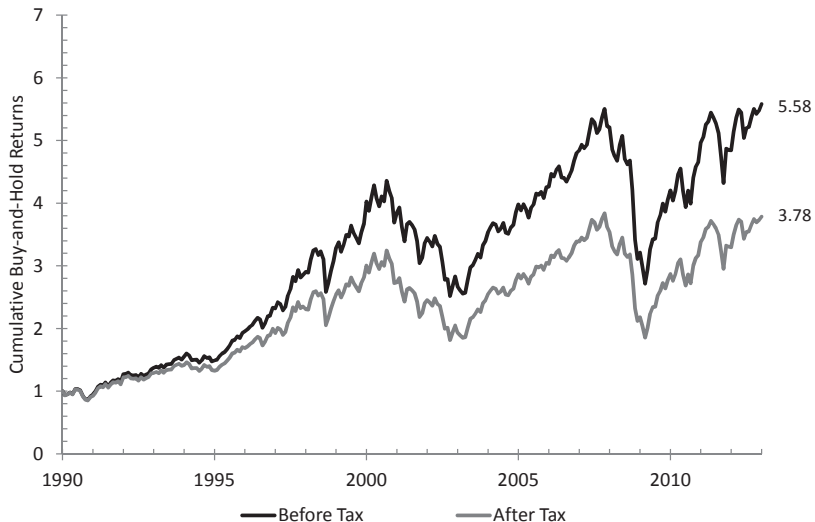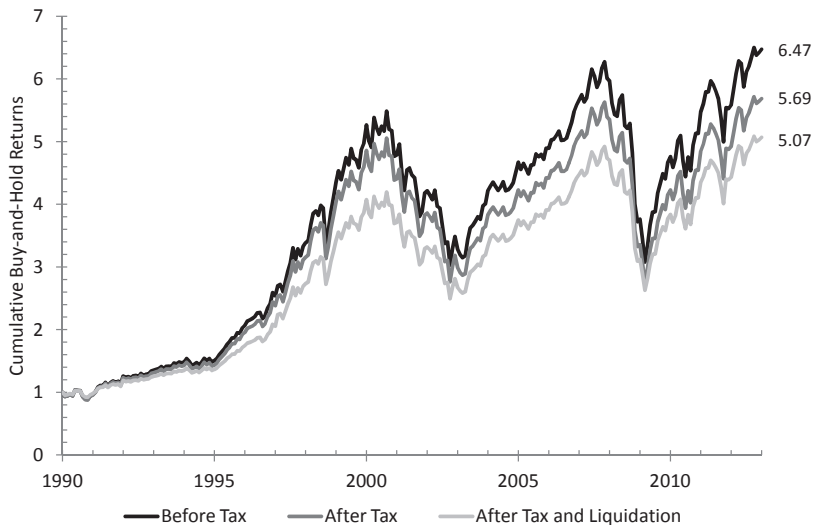
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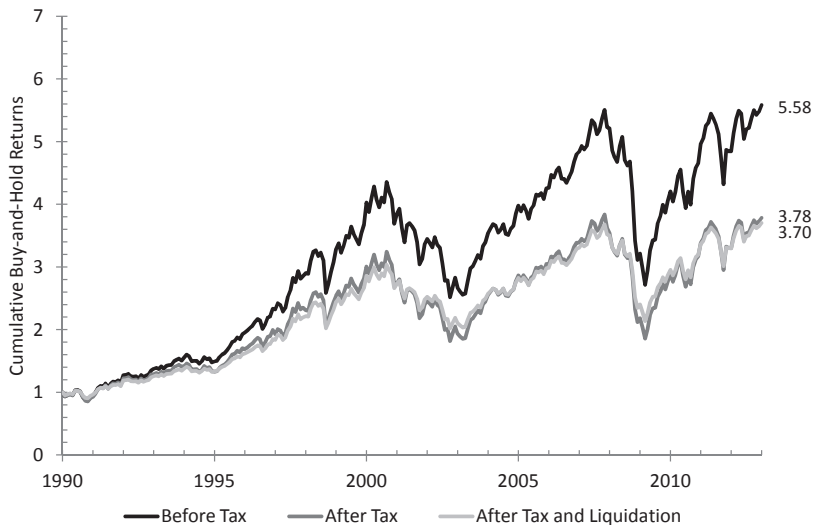
Cumulative Returns for Lowest Tax Burden Decile
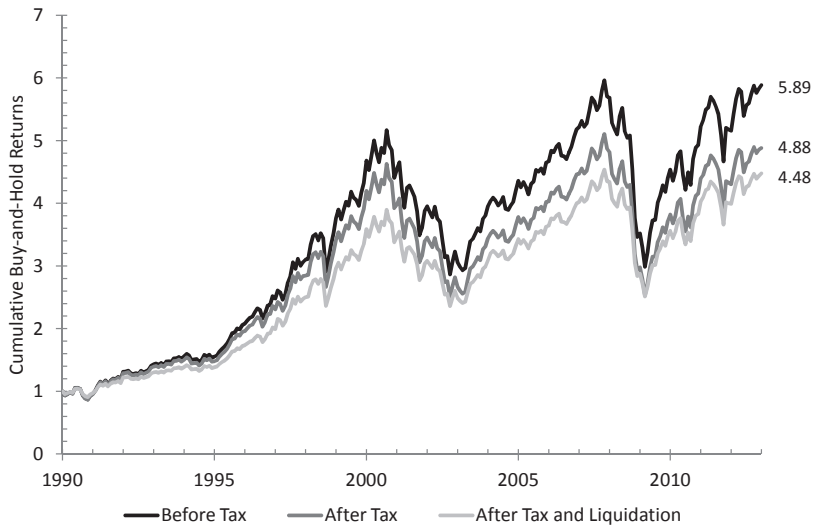
Cumulative Returns for Vanguard S&P 500 Index Fund

Tax-Efficient Asset Management Strategies

Mutual funds can reduce the tax burdens of their shareholders by:

- Deferring the realization of capital gains.

- Accelerating the realization of capital losses.

- Avoiding securities that are heavily taxed.

Tax avoidance strategies constrain the investment opportunities of fund managers and might reduce the before- and after-tax performance of mutual funds.

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Related Literature

Tax Implications of Mutual Fund Management:

- Dickson and Shoven (1995), Barclay, Pearson, and Weisbach (1998), Dickson, Shoven, and Sialm (2000), Gibson, Safieddine, and Titman (2000), Bergstresser and Poterba (2002), Huddart and Narayanan (2002), Christoffersen, Geczy, Musto, and Reed (2006), Ivkovic and Weisbenner (2008), and Sialm and Starks (2012).

Tax Implications of Investment Styles:

- Bergstresser and Pontiff (2013) and Israel and Moskowitz (2012).

Main Questions

- Do the benefits of tax-efficient asset management offset the costs for taxable investors?

- What is the association between tax-efficient asset management and before-tax performance?

- What factors drive the performance differences between tax-sensitive and tax-insensitive investing?

Main Results

- Tax-efficient funds exhibit superior after-tax performance.

- Tax-efficient funds exhibit also superior before-tax performance.

- Tax-efficient funds exhibit lower trading costs and superior investment ability.

Outline

- Introduction

- Data and Measures of Tax Efficiency

- Summary Statistics

- Determinants of Tax Burdens

- Mutual Fund Performance

- Robustness Tests

- Conclusions

Data Sources

- U.S. equity mutual funds between 1990-2012 using the CRSP mutual fund database.

- Mutual fund equity holdings using the Thomson-Reuters fund holdings database.

- Average marginal tax rates on dividends and capital gains from the NBER.

- Defined Contribution fund assets from *Pensions & Investments*.

Tax Burden

- Before-Tax Return:

$$
\begin{aligned}
R_{f,t}^{BT} &= \frac{DIV_{f,t} + SCG_{f,t} + LCG_{f,t} + P_{f,t} - P_{f,t-1}}{P_{f,t-1}} \\
&= Y_{f,t}^{DIV} + Y_{f,t}^{SCG} + Y_{f,t}^{LCG} + Y_{f,t}^{UCG},
\end{aligned}
$$

- After-Tax Return:

$$
\begin{aligned}
R_{f,t}^{AT} &= (1 - \tau_t^{DIV}) Y_{f,t}^{DIV} + (1 - \tau_t^{SCG}) Y_{f,t}^{SCG} + (1 - \tau_t^{LCG}) Y_{f,t}^{LCG} + Y_{f,t}^{UCG} \\
&= R_{f,t}^{BT} - \tau_t^{DIV} Y_{f,t}^{DIV} - \tau_t^{SCG} Y_{f,t}^{SCG} - \tau_t^{LCG} Y_{f,t}^{LCG},
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Marginal Tax Rates
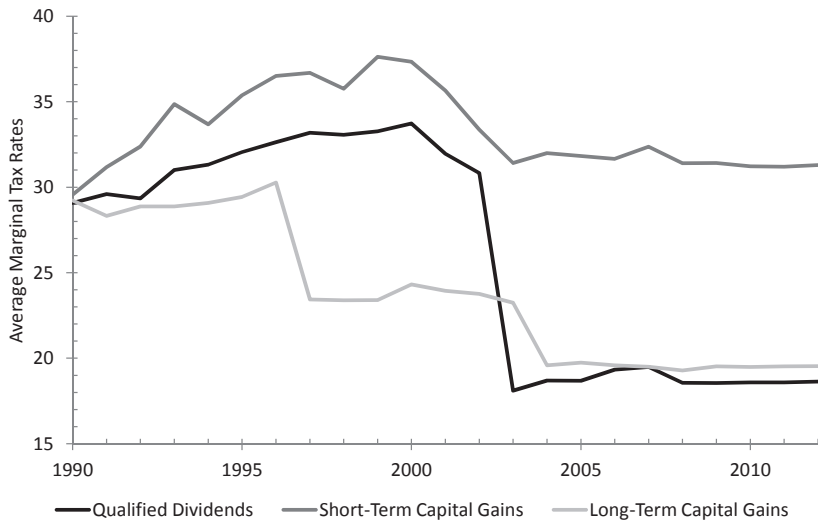
Average Fund Distributions

Taxable Distributions (in %)

Dividends — Long-Term Capital Gains — Short-Term Capital Gains
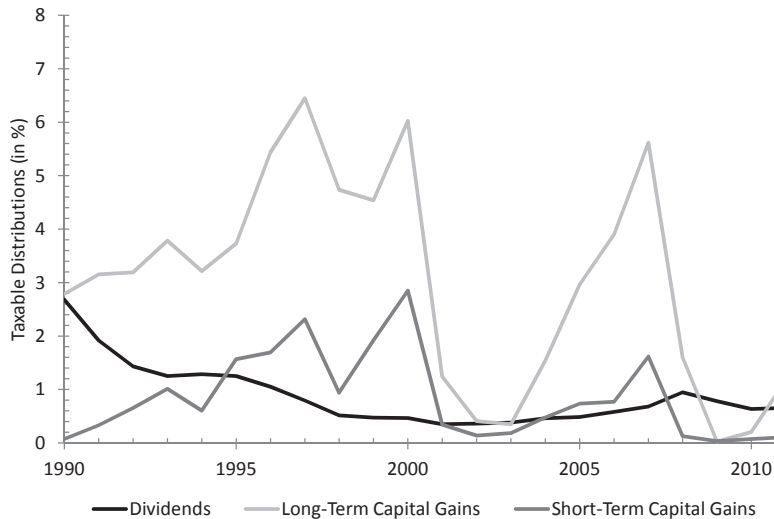
Cross-Sectional Tax Burdens

Quartile 1 —— Median —— Quartile 3
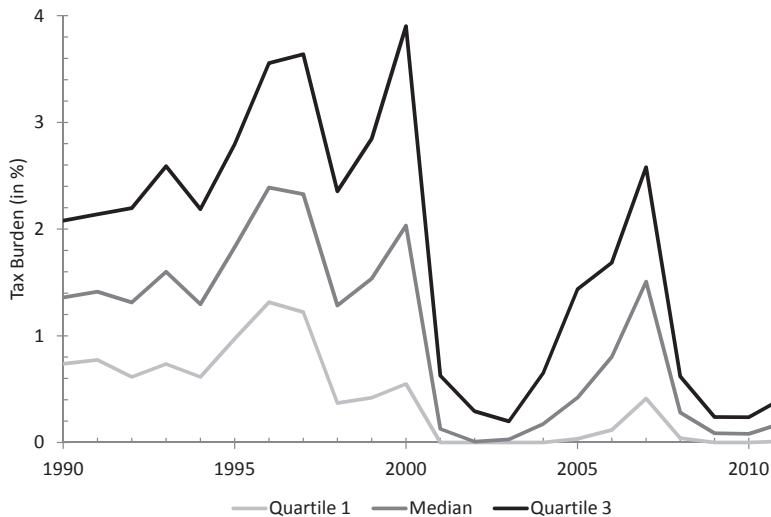
Summary Statistics

	Actively-Managed Mutual Funds	Tax-Managed Funds	Index Mutual Funds	Exchange-Traded Funds
Tax Burden (in % per year)	1.14	0.27	0.77	0.34
Before-Tax Return (in % per month)	0.66	0.37	0.59	0.50
After-Tax Return (in % per month)	0.56	0.34	0.53	0.47
Before-Tax Market-Adjusted Return (in % per month)	−0.01	−0.02	0.03	0.04
After-Tax Market-Adjusted Return (in % per month)	−0.10	−0.04	−0.04	0.01
Total Distributions (in % per year)	4.38	1.25	3.19	1.74
Dividend Yield (in % per year)	0.69	0.57	1.31	1.67
Short-Term Gains (in % per year)	0.84	0.09	0.29	0.05
Long-Term Gains (in % per year)	2.85	0.59	1.59	0.02
Expense Ratio (in % per year)	1.26	1.16	0.45	0.30
Turnover (in % per year)	91.81	70.26	22.30	31.93
TNA (in $M)	1,194.37	495.32	3,365.52	3,257.74
Age (in Years)	12.79	6.10	8.37	5.14
Flow (in % per month)	0.79	0.92	1.15	3.24
Std. Dev. of Flow (in % per month)	2.85	2.54	2.73	8.45
Size Score (Range [1,5])	4.11	4.34	4.34	
Value Score (Range [1,5])	2.82	2.82	2.79	
Momentum Score (Range [1,5])	3.13	3.02	2.96	
Short-Term Gains Overhang (in %)	1.88	1.05	0.26	
Long-Term Gains Overhang (in %)	10.22	7.81	11.18	
Number of Monthly Observations	391,959	6,299	22,434	10,363

Persistence of Tax Burden

Prior 1-Year Tax Burden Portfolio	Proportion	Tax Burden					
		Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Low	24.26	0.13	0.71	0.99	1.12	1.16	1.22
P2	18.93	0.56	0.97	1.14	1.24	1.25	1.28
P3	18.95	1.07	1.33	1.36	1.38	1.38	1.33
P4	18.95	1.70	1.61	1.53	1.48	1.47	1.43
High	18.91	3.26	2.05	1.82	1.71	1.63	1.49
High - Low			1.34***	0.82***	0.59***	0.47***	0.27***
			(0.17)	(0.12)	(0.10)	(0.08)	(0.07)

Determinants of Tax Burden

	Tax Burden		Short-Term Capital Gains		Long-Term Capital Gains	
Size Score	−0.08***	−0.11***	−0.22***	−0.20***	−0.54***	−0.64***
	(0.01)	(0.01)	(0.03)	(0.03)	(0.05)	(0.05)
Value Score	0.29***	0.36***	0.33***	0.28***	0.53***	0.87***
	(0.03)	(0.03)	(0.05)	(0.04)	(0.12)	(0.11)
Momentum Score	0.05*	0.00	0.32***	0.09	0.36***	0.21**
	(0.03)	(0.03)	(0.05)	(0.05)	(0.10)	(0.11)
Fund Flow		−0.09***		−0.03***		−0.37***
		(0.00)		(0.01)		(0.02)
Fund Flow Std. Dev.		0.02***		−0.01		0.10***
		(0.01)		(0.01)		(0.02)
Expense Ratio		−0.19***		−0.16***		−0.20*
		(0.03)		(0.04)		(0.11)
Turnover		0.04***		0.30***		0.02
		(0.02)		(0.05)		(0.05)
Fund Age		0.03*		−0.02		0.10
		(0.02)		(0.03)		(0.06)
Log Fund Size		0.00		−0.00		0.02
		(0.01)		(0.01)		(0.03)
ST CG Overhang		0.05***		0.08***		0.16***
		(0.00)		(0.01)		(0.01)
LT CG Overhang		0.00***		−0.02***		0.03***
		(0.00)		(0.00)		(0.00)
Time-Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	28,011	27,063	28,011	27,063	28,011	27,063
R-squared	0.01	0.07	0.02	0.08	0.01	0.07

▶ Back

Fund Performance

- We analyze the subsequent performance of funds sorted according to their prior tax efficiency.

  - Prior Tax Burden Quintile Portfolios
  - Multivariate Regression Analysis
  - Performance Decomposition

Fund Performance: Prior Tax Burden Quintile Portfolios

Prior 3-Year	Excess Market Return		
Tax Burden Portfolio	Before Tax	After Tax	Tax Burden
Low	0.56	-0.19	0.75^{***}
	(0.83)	(0.83)	(0.13)
P2	-0.50	-1.64^{***}	1.14^{***}
	(0.58)	(0.59)	(0.18)
P3	-0.40	-1.78^{***}	1.38^{***}
	(0.54)	(0.56)	(0.20)
P4	-0.31	-1.89^{***}	1.58^{***}
	(0.55)	(0.59)	(0.23)
High	-0.34	-2.29^{***}	1.94^{***}
	(0.69)	(0.74)	(0.27)
High-Low	-0.91	-2.10^{***}	1.19^{***}
	(0.64)	(0.68)	(0.17)

Fund Performance: Prior Tax Burden Quintile Portfolios

Prior 3-Year	Excess Market Return			Carhart Alpha		
Tax Burden Portfolio	Before Tax	After Tax	Tax Burden	Before Tax	After Tax	Tax Burden
Low	0.56	−0.19	0.75***	−0.17	−0.81	0.64***
	(0.83)	(0.83)	(0.13)	(0.73)	(0.74)	(0.12)
P2	−0.50	−1.64***	1.14***	−1.05**	−2.04***	0.98***
	(0.58)	(0.59)	(0.18)	(0.52)	(0.55)	(0.17)
P3	−0.40	−1.78***	1.38***	−0.88**	−2.06***	1.18***
	(0.54)	(0.56)	(0.20)	(0.44)	(0.48)	(0.19)
P4	−0.31	−1.89***	1.58***	−0.79*	−2.16***	1.37***
	(0.55)	(0.59)	(0.23)	(0.46)	(0.52)	(0.22)
High	−0.34	−2.29***	1.94***	−0.94	−2.63***	1.69***
	(0.69)	(0.74)	(0.27)	(0.59)	(0.67)	(0.25)
High-Low	−0.91	−2.10***	1.19***	−0.77	−1.82***	1.05***
	(0.64)	(0.68)	(0.17)	(0.56)	(0.59)	(0.17)

Fund Performance: Regression Analysis

| | Excess Market Returns | | | | | |
	Before Tax		After Tax		Tax Burden	
Prior Tax Burden	−0.27***	−0.40***	−0.65***	−0.74***	0.37***	0.35***
	(0.10)	(0.10)	(0.09)	(0.09)	(0.02)	(0.02)
Prior Return		0.08***		0.06***		0.03***
		(0.01)		(0.01)		(0.00)
Expense Ratio		−1.35***		−1.24***		−0.15***
		(0.18)		(0.18)		(0.03)
Log(TNA)		−0.18***		−0.18***		−0.01**
		(0.04)		(0.04)		(0.01)
Age		−0.00		0.05		−0.08***
		(0.10)		(0.10)		(0.02)
Turnover		0.15		0.13		0.01
		(0.11)		(0.11)		(0.01)
Flow		−0.22***		−0.11***		−0.12***
		(0.03)		(0.03)		(0.01)
Style-Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Time-Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	306,786	298,026	306,786	298,026	25,745	24,895
R-squared	0.00	0.00	0.00	0.00	0.06	0.09

Fund Performance: Regression Analysis

	Carhart Alphas					
	Before Tax		After Tax		Tax Burden	
Prior Tax Burden	−0.03	−0.06	−0.25***	−0.25***	0.20***	0.19***
	(0.08)	(0.07)	(0.08)	(0.08)	(0.03)	(0.03)
Prior Return		0.06***		0.03***		0.03***
		(0.01)		(0.01)		(0.00)
Expense Ratio		−1.01***		−0.92***		−0.13***
		(0.15)		(0.15)		(0.03)
Log(TNA)		−0.06*		−0.05*		−0.01**
		(0.03)		(0.03)		(0.01)
Age		−0.21***		−0.14*		−0.12***
		(0.08)		(0.08)		(0.02)
Turnover		0.02		0.01		0.01
		(0.08)		(0.08)		(0.01)
Flow		−0.05*		0.07**		−0.13***
		(0.03)		(0.03)		(0.01)
Style-Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Time-Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	306,433	297,803	306,433	297,803	25,734	24,893
R-squared	0.00	0.00	0.00	0.00	0.02	0.08

Return Decomposition

To obtain some indications of the causes for the differences in performance, we decompose the before-tax returns into different components:

- Decomposition of Fund Returns (R) into Holdings Return (RH), Expense Ratio (EXP), and Return Gap (RG) based on Kacperczyk, Sialm, and Zheng (2008):

$$R_{f,t}^{BT} = RH_{f,t} - EXP_{f,t} + RG_{f,t}$$

- Decomposition of Holdings Return (RH) into Characteristic Selectivity (CS), Characteristic Timing (CT), and Average Style (AS) based on Daniel, Grinblatt, Titman, and Wermers (1997):

$$R_{f,t}^{BT} = CS_{f,t} + CT_{f,t} + AS_{f,t} - EXP_{f,t} + RG_{f,t}$$

- Decomposition of Return Gap (RG) into Interim Trading Benefits (ITB) and Trading Costs (TC) using trading cost measures of Edelen, Evans, and Kadlec (2013):

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Performance Decomposition by Tax Burden

$$R_{f,t}^{BT} = RH_{f,t} - EXP_{f,t} + RG_{f,t}$$
$$= CS_{f,t} + CT_{f,t} + AS_{f,t} - EXP_{f,t} + ITB_{f,t} - TC_{f,t}$$

Portfolio	Before Tax Return R^{BT}	Characteristic Selectivity CS	Characteristic Timing CT	Average Style AS	Return Gap RG	Expense Ratio EXP	Trading Costs TC
Low	10.31***	0.97*	0.41	10.60***	0.41	1.37***	1.88***
	(3.52)	(0.50)	(0.37)	(3.59)	(0.25)	(0.01)	(0.02)
P2	9.19***	0.55	0.41	10.22***	−0.16	1.18***	1.65***
	(3.36)	(0.38)	(0.32)	(3.51)	(0.16)	(0.01)	(0.02)
P3	9.29***	0.47	0.46	10.36***	−0.08	1.16***	1.63***
	(3.26)	(0.31)	(0.32)	(3.47)	(0.16)	(0.00)	(0.02)
P4	9.39***	0.53*	0.36	10.33***	0.06	1.11***	1.75***
	(3.26)	(0.32)	(0.33)	(3.48)	(0.15)	(0.01)	(0.02)
High	9.31***	0.50	0.26	10.54***	−0.05	1.17***	2.19***
	(3.42)	(0.39)	(0.33)	(3.56)	(0.17)	(0.01)	(0.02)
High-Low TB	−1.00	−0.48	−0.15	−0.06	−0.46**	−0.20***	0.31***
	(0.65)	(0.41)	(0.16)	(0.39)	(0.22)	(0.01)	(0.03)

Fund Style Subsamples: Average Returns

	Excess Market Return			Carhart Alpha		
	Before Tax	After Tax	Tax Burden	Before Tax	After Tax	Tax Burden
Panel A: Funds Sorted into Terciles by Size Score						
Small-Cap	1.34	−0.09	1.43***	−0.66	−1.89	1.23***
	(1.49)	(1.48)	(0.20)	(1.14)	(1.16)	(0.19)
Medium-Cap	−0.57	−1.99***	1.42***	−0.85*	−2.07***	1.22***
	(0.52)	(0.56)	(0.22)	(0.51)	(0.55)	(0.21)
Large-Cap	−1.45***	−2.73***	1.28***	−0.87**	−1.98***	1.11***
	(0.40)	(0.47)	(0.19)	(0.34)	(0.40)	(0.18)
Panel B: Funds Sorted into Terciles by Value Score						
Growth	−0.31	−1.56	1.25***	−0.95	−2.01**	1.06***
	(1.13)	(1.13)	(0.21)	(0.92)	(0.95)	(0.20)
Blend	−0.36	−1.72***	1.36***	−0.90**	−2.07***	1.17***
	(0.51)	(0.53)	(0.20)	(0.45)	(0.49)	(0.19)
Value	−0.01	−1.54	1.53***	−0.51	−1.85***	1.34***
	(0.94)	(0.97)	(0.20)	(0.53)	(0.57)	(0.19)
Panel C: Funds Sorted into Terciles by Momentum Score						
Contrarian	−1.20	−2.58***	1.38***	−0.77	−1.97***	1.21***
	(0.92)	(0.96)	(0.19)	(0.63)	(0.66)	(0.18)
Neutral	−0.47	−1.82***	1.34***	−0.93**	−2.09***	1.16***
	(0.50)	(0.53)	(0.19)	(0.42)	(0.46)	(0.18)
Momentum	0.97	−0.44	1.41***	−0.69	−1.88	1.19***
	(1.45)	(1.44)	(0.23)	(1.19)	(1.22)	(0.22)

Fund Style Subsamples: Difference Between High and Low Tax Burden Portfolios

	Excess Market Return			Carhart Alpha		
	Before Tax	After Tax	Tax Burden	Before Tax	After Tax	Tax Burden
Panel A: Funds Sorted into Terciles by Size Score						
Small-Cap	−1.53*	−2.65***	1.13***	−0.74	−1.75**	1.01***
	(0.84)	(0.88)	(0.18)	(0.76)	(0.79)	(0.17)
Medium-Cap	−0.22	−1.37*	1.15***	−0.25	−1.23*	0.98***
	(0.69)	(0.70)	(0.19)	(0.64)	(0.65)	(0.18)
Large-Cap	−0.48	−1.61**	1.13***	−0.71	−1.68**	0.98***
	(0.71)	(0.73)	(0.15)	(0.68)	(0.70)	(0.15)
Panel B: Funds Sorted into Terciles by Value Score						
Growth	−0.34	−1.45**	1.11***	−0.31	−1.26*	0.95***
	(0.64)	(0.68)	(0.17)	(0.63)	(0.67)	(0.17)
Blend	−0.85	−2.01**	1.16***	−0.99	−1.99**	1.00***
	(0.76)	(0.78)	(0.18)	(0.77)	(0.80)	(0.18)
Value	−0.44	−1.48**	1.04***	0.06	−0.88	0.94***
	(0.58)	(0.61)	(0.15)	(0.54)	(0.56)	(0.15)
Panel C: Funds Sorted into Terciles by Momentum Score						
Contrarian	−0.12	−1.27**	1.14***	−0.28	−1.30**	1.02***
	(0.62)	(0.64)	(0.17)	(0.58)	(0.60)	(0.16)
Neutral	−0.52	−1.76**	1.24***	−0.71	−1.79***	1.09***
	(0.64)	(0.69)	(0.19)	(0.63)	(0.67)	(0.18)
Momentum	−0.63	−1.80**	1.18***	−0.59	−1.60**	1.02***
	(0.72)	(0.77)	(0.20)	(0.68)	(0.72)	(0.19)

Robustness Tests

- Persistence of quintile portfolios ▸ Dividends ▸ ST CG ▸ LT CG

- Alternative sorting horizons for quintile portfolios ▸ Prior 1 Year ▸ Prior 5 Years

- Alternative factor models for quintile portfolios ▸ CAPM ▸ Fama-French

- Performance by distribution type for quintile portfolios ▸ Long-Term Capital Gains ▸ Short-Term Capital Gains ▸ Dividends

- Performance difference by capital gains overhang ▸ Capital Gains Overhang

- Performance difference by prior return ▸ Prior Return

- Performance difference by DC proportion ▸ DC Ratio

- Performance difference by subsamples ▸ Subsamples

Conclusions

- Tax-efficient funds exhibit superior after-tax performance.

- Tax-efficient funds exhibit also superior before-tax performance.

- Tax-efficient funds exhibit lower trading costs and superior investment ability.

Computation of Cumulative Returns

- Cumulative Buy-and-Hold Return Before Tax:

$$BHR_{f,t}^{BT} = BHR_{f,t-1}^{BT} \left(1 + R_{f,t}^{BT}\right), \text{ where } BHR_{f,1990}^{BT} = 1.$$

- Cumulative Buy-and-Hold Return After Tax:

$$BHR_{f,t}^{AT} = BHR_{f,t-1}^{AT} \left(1 + R_{f,t}^{AT}\right), \text{ where } BHR_{f,1990}^{AT} = 1.$$

- Cumulative Buy-and-Hold Return After Tax and After Liquidation:

$$
\begin{aligned}
BHR_{f,t}^{ATL} &= BHR_{f,t}^{AT} - \tau_t^{LCG} \left(BHR_{f,t}^{AT} - CB_{f,t}^{AT}\right), \\
CB_{f,t} &= CB_{f,t-1} + BHR_{f,t-1}^{AT} \\
&\quad \left((1-\tau_t^{DIV})Y_{f,t}^{DIV} + (1-\tau_t^{SCG})Y_{f,t}^{SCG} + (1-\tau_t^{LCG})Y_{f,t}^{LCG}\right), \\
&\quad \text{where } CB_{f,1990} = 1.
\end{aligned}
$$

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Persistence of Dividend Distributions

Prior 1-Year		Dividend Distributions					
Dividend Portfolio	Proportion	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Low	34.97	0.03	0.13	0.13	0.14	0.16	0.17
P2	16.23	0.33	0.41	0.42	0.42	0.42	0.44
P3	16.27	0.84	0.82	0.76	0.73	0.71	0.69
P4	16.29	1.44	1.34	1.25	1.16	1.12	1.09
High	16.24	2.80	2.33	2.13	2.01	1.91	1.83
High - Low			2.20***	2.00***	1.87***	1.75***	1.66***
			(0.14)	(0.12)	(0.11)	(0.10)	(0.09)

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Persistence of Short-Term Capital Gains

Prior 1-Year		Short-Term Capital Gains					
STCG Portfolio	Proportion	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Low	69.04	0.00	0.44	0.60	0.70	0.71	0.72
P2	7.71	0.21	0.58	0.77	0.71	0.87	0.77
P3	7.75	0.84	1.21	1.01	1.16	1.04	0.91
P4	7.78	1.97	1.67	1.51	1.51	1.57	1.17
High	7.72	6.09	2.93	2.70	2.07	1.86	1.74
High - Low			2.48***	2.10***	1.37***	1.15***	1.01***
			(0.35)	(0.41)	(0.25)	(0.27)	(0.27)

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Persistence of Long-Term Capital Gains

Prior 1-Year		Long-Term Capital Gains					
LTCG Portfolio	Proportion	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Low	42.91	0.01	1.37	2.34	2.72	2.97	3.18
P2	14.24	0.80	2.52	2.92	3.24	3.40	3.50
P3	14.29	2.59	3.82	3.93	4.11	4.07	3.90
P4	14.30	4.94	4.87	4.72	4.46	4.49	4.28
High	14.27	10.58	6.44	5.61	5.30	4.76	4.40
High - Low			5.07***	3.27***	2.58***	1.79***	1.22***
			(0.55)	(0.46)	(0.45)	(0.33)	(0.35)

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Prior Tax Burden Quintile Portfolios (1 Year)

Prior 1-Year	Excess Market Return			Carhart Alpha		
Tax Burden Portfolio	Before Tax	After Tax	Tax Burden	Before Tax	After Tax	Tax Burden
Low	0.72	−0.04	0.76***	−0.27	−0.92	0.65***
	(1.01)	(1.00)	(0.13)	(0.85)	(0.86)	(0.13)
P2	−0.10	−1.08*	0.99***	−0.36	−1.21**	0.85***
	(0.54)	(0.56)	(0.15)	(0.48)	(0.51)	(0.14)
P3	−0.69	−2.01***	1.32***	−1.08***	−2.22***	1.14***
	(0.48)	(0.51)	(0.19)	(0.40)	(0.44)	(0.18)
P4	−0.51	−2.13***	1.62***	−1.03**	−2.42***	1.40***
	(0.53)	(0.58)	(0.22)	(0.46)	(0.53)	(0.21)
High	−0.25	−2.30***	2.05***	−0.80	−2.59***	1.79***
	(0.75)	(0.79)	(0.26)	(0.69)	(0.75)	(0.25)
High-Low	−0.97	−2.26***	1.29***	−0.53	−1.66**	1.13***
	(0.79)	(0.84)	(0.17)	(0.70)	(0.73)	(0.16)

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Prior Tax Burden Quintile Portfolios (5 Years)

Prior 5-Year	Excess Market Return			Carhart Alpha		
Tax Burden Portfolio	Before Tax	After Tax	Tax Burden	Before Tax	After Tax	Tax Burden
Low	0.11	−0.73	0.84***	−0.31	−1.03	0.72***
	(0.71)	(0.72)	(0.15)	(0.66)	(0.68)	(0.14)
P2	−0.08	−1.32**	1.24***	−0.55	−1.63***	1.07***
	(0.59)	(0.60)	(0.19)	(0.51)	(0.54)	(0.18)
P3	−0.42	−1.85***	1.43***	−0.86*	−2.09***	1.23***
	(0.54)	(0.57)	(0.21)	(0.45)	(0.50)	(0.20)
P4	−0.59	−2.22***	1.62***	−1.02**	−2.43***	1.41***
	(0.56)	(0.61)	(0.23)	(0.46)	(0.53)	(0.22)
High	−0.40	−2.25***	1.85***	−1.19**	−2.78***	1.59***
	(0.70)	(0.74)	(0.27)	(0.59)	(0.66)	(0.25)
High-Low	−0.51	−1.52**	1.01***	−0.88	−1.74***	0.87***
	(0.59)	(0.61)	(0.16)	(0.54)	(0.56)	(0.15)

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Prior Long-Term Capital Gains Quintile Portfolios

LCG Portfolio	Excess Return			Carhart Alpha		
	Before Tax	After Tax	Tax Burden	Before Tax	After Tax	Tax Burden
Low	0.39	−0.48	0.86***	−0.31	−1.06	0.74***
	(0.72)	(0.72)	(0.14)	(0.65)	(0.66)	(0.14)
P2	−0.17	−1.41**	1.25***	−0.67	−1.75***	1.08***
	(0.59)	(0.61)	(0.16)	(0.53)	(0.55)	(0.16)
P3	−0.45	−1.92***	1.48***	−1.01**	−2.29***	1.28***
	(0.58)	(0.61)	(0.20)	(0.51)	(0.56)	(0.19)
P4	−0.38	−2.00***	1.62***	−0.88*	−2.28***	1.41***
	(0.60)	(0.64)	(0.22)	(0.49)	(0.55)	(0.21)
High	−0.13	−2.06***	1.92***	−0.80	−2.47***	1.68***
	(0.70)	(0.74)	(0.25)	(0.58)	(0.66)	(0.24)
High-Low	−0.52	−1.58**	1.06***	−0.48	−1.42**	0.93***
	(0.62)	(0.66)	(0.16)	(0.55)	(0.59)	(0.16)

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Prior Short-Term Capital Gains Quintile Portfolios

SCG Portfolio	Excess Return			Carhart Alpha		
	Before Tax	After Tax	Tax Burden	Before Tax	After Tax	Tax Burden
Low	−0.40	−1.63***	1.23***	−0.94*	−2.00***	1.06***
	(0.61)	(0.62)	(0.19)	(0.54)	(0.58)	(0.18)
P2	−0.63	−1.95***	1.32***	−0.74*	−1.90***	1.16***
	(0.49)	(0.53)	(0.16)	(0.43)	(0.47)	(0.16)
P3	0.20	−1.33**	1.53***	−0.42	−1.75***	1.33***
	(0.63)	(0.65)	(0.20)	(0.53)	(0.57)	(0.19)
P4	0.10	−1.52**	1.63***	−0.76	−2.16***	1.40***
	(0.74)	(0.77)	(0.22)	(0.65)	(0.70)	(0.20)
High	0.11	−1.63*	1.74***	−0.78	−2.28**	1.50***
	(0.96)	(0.98)	(0.25)	(0.87)	(0.92)	(0.23)
High-Low	0.51	−0.00	0.52***	0.16	−0.28	0.44***
	(0.61)	(0.63)	(0.13)	(0.59)	(0.62)	(0.13)

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Prior Dividend Quintile Portfolios

DIV Portfolio	Before Tax	After Tax	Tax Burden	Before Tax	After Tax	Tax Burden
Low	0.51	−0.76	1.26***	−1.15	−2.22*	1.08***
	(1.59)	(1.58)	(0.22)	(1.29)	(1.31)	(0.21)
P2	−0.21	−1.54**	1.33***	−0.81	−1.95***	1.14***
	(0.70)	(0.72)	(0.20)	(0.60)	(0.65)	(0.19)
P3	−0.09	−1.50***	1.41***	−0.52	−1.73***	1.21***
	(0.52)	(0.56)	(0.20)	(0.44)	(0.49)	(0.19)
P4	−0.51	−1.96***	1.45***	−0.48	−1.75***	1.27***
	(0.66)	(0.71)	(0.19)	(0.45)	(0.51)	(0.18)
High	−0.71	−2.16**	1.45***	−0.20	−1.49**	1.29***
	(0.93)	(0.97)	(0.18)	(0.57)	(0.60)	(0.17)
High-Low	−1.22	−1.41	0.19*	0.94	0.73	0.21**
	(2.25)	(2.26)	(0.10)	(1.65)	(1.66)	(0.09)

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Alternative Factor Models for Tax Burden Quintile Portfolios

Prior 3-Year	CAPM Alpha			Fama-French Alpha		
Tax Burden Portfolio	Before Tax	After Tax	Tax Burden	Before Tax	After Tax	Tax Burden
Low	0.25	−0.48	0.73***	0.56	−0.17	0.72***
	(0.82)	(0.82)	(0.13)	(0.77)	(0.77)	(0.13)
P2	−0.58	−1.69***	1.11***	−0.76	−1.86***	1.09***
	(0.58)	(0.60)	(0.18)	(0.53)	(0.55)	(0.18)
P3	−0.32	−1.66***	1.34***	−0.77*	−2.09***	1.32***
	(0.54)	(0.56)	(0.20)	(0.44)	(0.48)	(0.21)
P4	−0.21	−1.75***	1.54***	−0.63	−2.15***	1.53***
	(0.55)	(0.59)	(0.23)	(0.46)	(0.51)	(0.24)
High	−0.52	−2.42***	1.89***	−0.84	−2.72***	1.87***
	(0.69)	(0.74)	(0.26)	(0.59)	(0.66)	(0.28)
High-Low	−0.77	−1.94***	1.17***	−1.40**	−2.55***	1.15***
	(0.65)	(0.68)	(0.17)	(0.61)	(0.65)	(0.18)

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Capital Gains Overhang Subsamples: Difference Between High and Low Tax Burden Portfolios

	Excess Market Return			Carhart Alpha		
	Before Tax	After Tax	Tax Burden	Before Tax	After Tax	Tax Burden
Panel A: Funds in the Lowest Capital Gains Overhang Tercile						
High-Low TB	−0.69	−1.71**	1.02***	0.03	−0.88	0.91***
	(0.77)	(0.79)	(0.16)	(0.69)	(0.70)	(0.16)
Panel B: Funds in the Middle Capital Gains Overhang Tercile						
High-Low TB	−0.49	−1.54**	1.05***	−0.26	−1.18**	0.93***
	(0.68)	(0.72)	(0.18)	(0.56)	(0.60)	(0.17)
Panel C: Funds in the Highest Capital Gains Overhang Tercile						
High-Low TB	−1.30	−2.74***	1.44***	−1.71**	−2.96***	1.25***
	(0.81)	(0.85)	(0.19)	(0.78)	(0.82)	(0.19)

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Prior Return Subsamples: Difference Between High and Low Tax Burden Portfolios

	Excess Market Return			Carhart Alpha		
	Before Tax	After Tax	Tax Burden	Before Tax	After Tax	Tax Burden
Panel A: Funds in the Lowest Prior 36-Month Return Tercile						
High-Low TB	−1.21	−2.12**	0.91***	−0.59	−1.39*	0.80***
	(0.83)	(0.86)	(0.15)	(0.75)	(0.77)	(0.15)
Panel B: Funds in the Middle Prior 36-Month Return Tercile						
High-Low TB	−0.81	−2.00**	1.19***	−0.56	−1.62**	1.06***
	(0.77)	(0.80)	(0.18)	(0.74)	(0.76)	(0.17)
Panel C: Funds in the Highest Prior 36-Month Return Tercile						
High-Low TB	−0.57	−1.84**	1.27***	−0.88	−1.98***	1.10***
	(0.78)	(0.81)	(0.22)	(0.73)	(0.75)	(0.21)

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Defined Contribution Proportion Subsamples: Difference Between High and Low Tax Burden Portfolios

	Excess Market Return			Carhart Alpha		
	Before Tax	After Tax	Tax Burden	Before Tax	After Tax	Tax Burden
Panel A: Funds in Lowest DC Tercile						
High-Low TB	−0.13	−1.38	1.25***	−0.44	−1.48	1.05***
	(0.94)	(1.04)	(0.34)	(0.85)	(0.95)	(0.31)
Panel B: Funds in Middle DC Tercile						
High-Low TB	−1.30	−2.40**	1.20***	−1.37	−2.39**	1.02***
	(1.06)	(1.14)	(0.31)	(0.96)	(1.01)	(0.23)
Panel C: Funds in Highest DC Tercile						
High-Low TB	0.74	−0.54	1.28***	0.89	−0.29	1.17***
	(1.03)	(1.07)	(0.29)	(0.89)	(0.91)	(0.27)

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Subperiods: Difference Between High and Low Tax Burden Portfolios

	Excess Market Return			Carhart Alpha		
	Before Tax	After Tax	Tax Burden	Before Tax	After Tax	Tax Burden
Panel A: 1990-1997						
High-Low TB	-1.44	-2.85^{***}	1.41^{***}	-0.94	-1.96^{**}	1.03^{***}
	(0.99)	(1.04)	(0.19)	(0.86)	(0.93)	(0.20)
Panel B: 1998-2002						
High-Low TB	-3.07^{**}	-4.33^{***}	1.26^{*}	-2.36^{**}	-3.48^{***}	1.12
	(1.32)	(1.43)	(0.46)	(1.16)	(1.21)	(0.55)
Panel C: 2003-2012						
High-Low TB	0.60	-0.37	0.97^{***}	0.38	-0.59	0.97^{***}
	(1.05)	(1.10)	(0.29)	(0.71)	(0.80)	(0.26)

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