RESEARCH

Dimensional

A Historical Perspective on Multifaceted Tax Management

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February 2025

Dimensional offers four tax management approaches in its SMA program: No tax management, Light, Standard, and Aggressive. To help financial advisors and their clients evaluate the tradeoffs across these approaches, we simulate applying each one to three equity strategies (US All Cap Market, US All Cap Core 1, and US All Cap Core 2). Compared to No tax management, Light, Standard, and Aggressive resulted in lower average tax costs and higher after-tax returns on average. The 1%–2% outperformance of Aggressive and Standard for investors with external gains is in line with the results reported in other studies even though we do not assume frequent cash contributions. This speaks to the power of tax management that goes beyond tax loss harvesting. The outperformance of Light also shows that thoughtful tax management can improve after-tax returns even without systematic loss harvesting. By effectively balancing the tradeoffs among premiums, costs, and diversification, these multifaceted tax management approaches not only minimized tax costs, but also captured the size, value, and profitability premiums.

Dimensional offers four tax management approaches in its separately managed accounts (SMA) program: No tax management, Light, Standard, and Aggressive.[1] To help financial advisors and their clients evaluate the tradeoffs across these approaches, we simulate applying each one to three equity strategies (US All Cap Market, US All Cap Core 1, and US All Cap Core 2) over three decades (the 1990s, 2000s, and 2010s).[2]

For each strategy in each decade, we start with $1 million in cash and rebalance the portfolio at the end of each month. The monthly rebalancing incorporates key aspects of real-world investing. We apply realistic trading costs to each buy and sell order. We observe the wash-sale rule within the portfolio and comply with whole-share trading. We apply today's highest federal capital gains tax rates each year. Unlike other studies, we do not report results only for the case when investors always have unlimited short-term gains outside the SMA to offset with losses harvested in the SMA. We also examine what happens when investors have only long-term gains outside the SMA and when investors have no external gains. Finally, we report both pre- and post-liquidation outcomes. Pre-liquidation outcomes matter for investors planning to gift their assets or pass their assets to their heirs, taking advantage of the step-up in basis upon death. Post-liquidation outcomes are relevant for investors planning to sell all the assets in the SMA. Altogether we examine 216 simulated investment paths (3 investment strategies x 3 decades x 4 tax management approaches x 3 assumptions about external gains x 2 disposal approaches).

The key takeaways from our study:

- Light, Standard, and Aggressive tax management resulted in lower average tax costs than No tax management, with the Aggressive approach yielding the lowest tax cost.
- Light, Standard, and Aggressive tax management also resulted in higher after-tax returns on average. Investors with short-term (ST) external gains saw the largest benefit. Aggressive, Standard, and Light outperformed No tax management by 1.67%, 1.50%, and 0.88%, respectively, on an annualized after-tax, pre-liquidation basis.[3] For investors with long-term (LT) external gains, Aggressive, Standard, and Light outperformed No tax management by 1.14%, 1.11%, and 0.76%, respectively, on an annualized after-tax, pre-liquidation basis. Even for investors without external gains, the three active tax management approaches delivered higher after-tax returns, with outperformance at least half as large as for investors with LT gains. The outperformance was generally about half as large post-liquidation as pre-liquidation.
- The 1%–2% outperformance of Aggressive and Standard for investors with external gains is in line with the results reported in other studies even though we do not assume frequent cash contributions. This speaks to the power of tax management that goes beyond tax loss harvesting. The outperformance of Light also shows that thoughtful tax management can improve after-tax returns even without systematic loss harvesting.
- The relative performance of Aggressive and Standard varied across investor profiles and investment strategies. While on average, Aggressive yielded the highest after-tax returns for investors in the US All Cap Market strategy and for investors with ST external gains, Standard outperformed for investors in US All Cap Core 2 without ST gains.

- In the 1990s and 2000s, when the size, value, and profitability premiums were all positive on average, US All Cap Core 1 and Core 2 outperformed US All Cap Market under Light, Standard, and Aggressive on an after-tax basis. In other words, all three approaches managed to both deliver the premiums and minimize tax costs!
- Because the active tax management approaches studied here are applied to broadly diversified portfolios and go beyond tax loss harvesting, they tended to generate tax benefits long after portfolio inception.

I. Setup

1. Investment Strategies

We run historical simulations of three equity strategies: US All Cap Market ("Market"), US All Cap Core 1 ("Core 1"), and US All Cap Core 2 ("Core 2"). The simulations are run over three nonoverlapping 10-year periods (December 31, 1990–December 31, 2000, December 31, 2000–December 31, 2010, and December 31, 2010–December 31, 2020) using stock data from CRSP and Compustat.

For each strategy, we construct a "target" portfolio at every month-end. For the US All Cap Market strategy, this portfolio consists of all US common stocks (excluding REITs and ADRs) that have a total market capitalization of at least $100 million and a share price greater than $2 at month-end. The stocks in the eligible set are weighted by market cap.[4]

The "target" portfolios for US All Cap Core 1 and Core 2 differ from the Market strategy portfolio in two ways. First, the eligible universes for Core 1 and Core 2 exclude small cap stocks with lower expected returns: small growth low profitability stocks and small high investment stocks. We define small cap stocks as stocks in the bottom 8% of the aggregate market capitalization of common stocks. Within small caps, small growth low profitability stocks are either in the bottom half on profitability and the top quarter on relative price, or in the bottom quarter on profitability and the top half on relative price. Profitability is defined as operating income before depreciation and amortization minus interest expense scaled by book equity. Relative price is defined as market capitalization scaled by book equity. Small high investment stocks are defined as companies whose asset growth for the latest fiscal year exceeds the higher of the 95th percentile across all small cap stocks and 75%. As in prior academic studies, we require a minimum six-month lag for financial data from Compustat.

The "target" portfolios for Core 1 and Core 2 also differ from the "target" portfolio for the Market in the weights they apply to eligible stocks. Both Core 1 and Core 2 overweight groups of stocks with higher expected returns (which have lower market capitalization, lower relative price, and higher profitability) and underweight groups with lower expected returns. Core 2 applies stronger over- and underweights than Core 1. Both strategies use a weighting

schema that seeks to minimize unnecessary turnover, trading costs, and tax costs. It applies controlled over- and underweights to groups of securities with similar characteristics, gradually changes those over- and underweights across groups, and takes advantage of the natural rebalancing that happens within an expected-return group since securities in a group are generally weighted by market cap relative to each other.

2. Rebalancing

For each strategy, we start with $1 million in cash at the end of December 1990, 2000, or 2010 and rebalance the portfolio at the end of each month T over the next 10 years. When we rebalance the portfolio, we consider multiple inputs, which is similar to the way we rebalance our live portfolios daily:

- Current holdings at the tax lot level
- Current cash holdings
- The "target" portfolio
- Expected implicit trading costs
- Each stock's size, price-to-book, and profitability
- Each stock's momentum and short-term reversal characteristics
- Each stock's average traded volume
- Each stock's sector[5]
- Each stock's price per share
- Upcoming delistings

Using all those inputs and one of the tax management approaches discussed below, we apply our proprietary rebalancing optimization to generate buy and sell orders that aim to get the held portfolio closer to the "target" portfolio not only in terms of individual stock weights, but also in terms of size, value, profitability, and sector characteristics while minimizing expected trading costs, tax costs, momentum costs, and short-term reversal costs.

The wash-sale rule states that a loss from the sale of a security below its basis cannot be recognized immediately if an investor buys the same or a substantially identical security within 30 days of the sale (before or after). Since we rebalance at each month-end, we assume that our buys and sells across different rebalancing dates do not violate the wash-sale rule within this portfolio.[6] We also do not allow the simultaneous sale and purchase of a company's stock on the same rebalancing date. Because the simulated portfolios hold over a thousand securities, it is not hard to avoid wash-sale-rule violations and preserve the desired portfolio characteristics.

The rebalancing at the end of each month T also accounts for stocks that are going to be delisted in month T+1 (typically due to mergers and acquisitions). These stocks are sold at

the end of month T. Many mergers are cash mergers that would result in a taxable event for shareholders of the delisting company upon completion of the merger. While some mergers are structured as stock mergers or a mix between stock and cash, the tax implications for investors are not always straightforward. So we assume conservatively that all upcoming delistings will result in forced sells, and we execute those sells at the end of the last full month of a stock's history. These forced sells trigger the realization of capital gains or losses and impact the tax costs of the simulated strategies. By incorporating forced sells into the analysis, we aim to provide a more realistic evaluation of tax costs and after-tax returns.

As in our live tax management, we use a tax-advantaged lot relief method, namely highest cost, to identify the lots that will be fully or partially sold. This method leads to the relief of losses before the relief of gains. Moreover, it leads to the highest loss per dollar of sells, which aims to improve after-tax returns through each rebalancing.[7]

Trading of fractional shares is becoming popular, but it is still not available across all major custodians and all US stocks. Hence, to make the simulations more realistic, the rebalancing process does not allow trades of fractional shares. All buys and sells are rounded to whole shares.[8] This tends to be immaterial for portfolios worth hundreds of millions of dollars, but it could be impactful for SMA portfolios with $1 million to $2 million in assets that need to allocate across more than a thousand securities, with some of those securities having share prices well over $100.

Once we determine all buy and sell orders at the end of month T, the portfolio is rebalanced, paying buy and sell trading costs aimed to represent implicit costs, such as the bid-ask spread. We assume 0.10% round-trip trading costs.[9] At the end of each December after we rebalance the portfolio, we deduct advisory fees of 0.29% based on the year-end portfolio value.[10] Cash needed to pay those fees is raised at the end of the following January.

Cash dividends paid by the holdings in the account each month are incorporated into the portfolio at month-end rebalancing. Unlike other studies, our study does not assume that investors contribute cash flows to the account every month or quarter or year since cash flows vary across investors. For example, we do not generally observe frequent contributions across our live SMAs. Moreover, assuming frequent contributions would stack the deck in favor of tax management approaches using tax loss harvesting as new contributions create new tax lots and thus new opportunities for realizing short-term losses, and we want to provide an honest and balanced evaluation of different tax management options.

3. Tax Assumptions

We consider three different scenarios for computing year-end after-tax returns.

- Under the first scenario, at the end of each December after the portfolio is rebalanced, investors net their short-term gains and losses as well as their long-term gains and losses. If they end up with net short- and/or long-term losses, they use those losses to offset unlimited **short-term** capital gains generated outside the SMA. The tax savings from the offset are added to the cash balance of the portfolio and reinvested at the end of January. If the investors end up with net gains in the portfolio at the end of the year, the tax liability is debited from the cash balance of the portfolio at the end of December, and if the balance becomes negative, cash is raised at the end of January. Similarly, tax due on dividends received during the year is debited from the cash balance at the end of December, and if the cash balance becomes negative, cash is raised at the end of January.
- The second scenario differs from the first one only in assuming that investors use losses generated in the SMA to offset unlimited **long-term** capital gains generated outside the SMA.
- Under the third scenario, investors have **no external** capital gains. Under this scenario, investors net their short-term gains/losses against their long-term gains/losses generated within the SMA at the end of each year. If they end up with net capital losses, they use them to offset up to $3,000 of ordinary income (short-term losses applied first) and add the resulting tax savings to the cash in the account. Any remaining unused capital losses from the SMA are carried forward (preserving their term character).[11]

Scenario one is relevant for investors with allocations to hedge funds and derivative instruments that frequently generate short-term capital gains. Scenario two is relevant for investors with frequent sales of long-term investments in securities, businesses, and properties. Scenario three is relevant for investors with no other investments or whose other investments are in ETFs.

While other studies tend to focus on scenario one, it is important to report results for scenarios two and three as well since many investors might not have meaningful ongoing short-term capital gains outside the SMA. By examining all three cases, we aim to provide financial advisors and their clients with a better perspective on the potential benefits of different tax management approaches.

To determine tax liabilities, we use the current highest marginal federal tax rates for short-term and long-term capital gains (40.8% and 23.8%, respectively).[12] Since we exclude REITs from the investment strategies, we assume all cash dividends are qualified and therefore taxed at the long-term capital gain rate. We assume that ordinary income is taxed at the current highest marginal federal income rate (39.35%).[13] We assume counterfactually that the marginal tax rates on short- and long-term capital gains as well as on ordinary income remain the same over time. The main goal of the study is to compare different tax management approaches across different investor profiles, investment strategies, and different stock market conditions, not across different tax regimes.[14]

4. Tax Management Approaches

Now that we have outlined the basic setup of our simulations, it is time to describe the four tax management approaches we are going to study:

- **No Tax Management:** This approach is designed for tax-exempt accounts and investors. It does not incorporate any additional tax management considerations beyond the exclusion of REITs, the observance of the wash-sale rule, and the use of a tax-advantaged lot relief methodology. In other words, it applies no penalty for capital gains in the monthly rebalancing, no constraints on net short-term and long-term gains, and no systematic tax loss harvesting.
- **Light Tax Management:** This approach is designed for investors with limited tax sensitivity. It expands upon the No tax management approach by seeking to minimize both short-term and overall net capital gains. It also places a mild emphasis on capital gains considerations in the evaluation of tradeoffs among premiums, costs, and diversification during the monthly rebalancing. However, it does not apply systematic tax loss harvesting.
- **Standard Tax Management:** This approach is designed for investors with moderate tax sensitivity. It seeks to minimize both short-term and overall net capital gains and expands upon the Light approach by systematically harvesting losses, and by placing more emphasis on capital gains considerations in the evaluation of tradeoffs among premiums, costs, and diversification. This approach focuses on harvesting losses only in months with meaningful tax loss harvesting opportunities—when there are positions in the portfolio with embedded losses representing at least 5% of the position value and the aggregate value of those losses exceeds 2% of the portfolio value. In such months, we can sell lots with at least 5% unrealized losses, but we do not do so naively across all such lots. We choose which lots to sell fully or partially after evaluating the impact of potential loss harvesting trades on the size, value, profitability, and momentum characteristics of the portfolio, expected trading costs, and portfolio diversification.
- **Aggressive Tax Management:** This approach is designed for investors with strong tax sensitivity. It applies the same multifaceted tax management approach as Standard, with an even stronger emphasis on tax loss harvesting and capital gains considerations when evaluating tradeoffs among premiums, costs, and diversification.

II. Results

The goal of this study is to evaluate the four tax management approaches across different strategies, decades, and investor profiles. We start by examining how efficient each of the tax management approaches is in minimizing the gap between pretax and after-tax returns.

1. Tax Costs

Exhibit 1 reports the annualized pretax return, after-tax return, and the difference between the two, which we call "tax cost," both pre- and post-liquidation for each of the four tax management approaches.[15] All numbers are averages across the three decades and the three investment strategies. Panel A shows results for investors who always use harvested losses to offset external ST gains. Panel B shows results for investors who always use harvested losses to offset external LT gains. And Panel C reports results for investors who have no external gains to offset and use harvested losses to offset up to $3,000 in ordinary income, carrying forward the rest.

We begin by analyzing the results in Panel A. Focusing on the pre-liquidation results, which apply to investors planning to gift or bequeath their portfolio, we see that the average annualized pretax returns are quite similar across the four tax management approaches, ranging from 11.51% to 11.65%. The average after-tax returns, however, differ noticeably, ranging from 10.54% for No tax management to 12.21% for Aggressive. As a result, the tax cost is 0.97% for No tax management, 0.22% for Light, –0.44% for Standard, and –0.69% for Aggressive. In other words, with the No tax management approach, investors would have seen their annualized return drop by 1% after taxes. The Light tax management approach would have reduced that tax cost by more than three quarters, while Standard and Aggressive would have turned the tax cost into a tax benefit.

To put in perspective the difference in average annualized after-tax returns across the tax management options, $1 million would have grown to about $2.7 million in 10 years under No tax management, whereas it would have grown to close to $3.2 million under Aggressive, for an overall difference of over $400,000 in ending wealth. In summary, for investors who have systematic ST gains from other sources and plan to donate their assets, Aggressive would have been the best tax management option, with Standard a close second.

Does this advantage persist if investors liquidate their portfolio at the end of the 10-year investment horizon and pay taxes on all the realized gains? This is an important question as tax loss harvesting tends to defer the realization of capital gains to the end of the investment horizon. Hence, the post-liquidation results help us assess whether the active tax management approaches can add value once taxes are paid on all deferred gains. The post-liquidation results in Panel A show that Aggressive again produces the lowest tax cost, followed by

EXHIBIT 1: Tax Costs, Averaged Across Three Decades and Three Investment Strategies

Panel A: Offsetting ST Gains

	Donation			Liquidation		
	Annualized Pretax Return	Annualized After-Tax Return	Annualized Tax Cost	Annualized Pretax Return	Annualized After-Tax Return	Annualized Tax Cost
No tax management	11.51%	10.54%	0.97%	11.51%	9.35%	2.16%
Light	11.65%	11.43%	0.22%	11.64%	9.82%	1.82%
Standard	11.61%	12.05%	–0.44%	11.60%	10.21%	1.39%
Aggressive	11.53%	12.21%	–0.69%	11.52%	10.31%	1.21%

Panel B: Offsetting LT Gains

	Donation			Liquidation		
	Annualized Pretax Return	Annualized After-Tax Return	Annualized Tax Cost	Annualized Pretax Return	Annualized After-Tax Return	Annualized Tax Cost
No tax management	11.51%	10.47%	1.04%	11.51%	9.27%	2.24%
Light	11.64%	11.23%	0.41%	11.64%	9.62%	2.01%
Standard	11.62%	11.58%	0.04%	11.61%	9.76%	1.85%
Aggressive	11.52%	11.61%	–0.09%	11.51%	9.73%	1.78%

Panel C: No External Gains

	Donation			Liquidation		
	Annualized Pretax Return	Annualized After-Tax Return	Annualized Tax Cost	Annualized Pretax Return	Annualized After-Tax Return	Annualized Tax Cost
No tax management	11.51%	10.42%	1.09%	11.51%	9.27%	2.24%
Light	11.64%	11.06%	0.58%	11.63%	9.59%	2.04%
Standard	11.60%	11.12%	0.48%	11.59%	9.60%	1.99%
Aggressive	11.54%	11.09%	0.46%	11.54%	9.58%	1.96%

Past performance, including simulated performance, is no guarantee of future results, and there is always the risk that a client may lose money.

Source: Dimensional using CRSP and Compustat data. The exhibit reports averages of annualized pretax return and after-tax returns across three investment strategies (US All Cap Market, US All Cap Core 1 and US All Cap Core 2) over three decades (the 1990s, 2000s, and 2010s). Annualized tax cost is the difference between annualized pretax and after-tax returns. Each panel shows separate averages for four tax management approaches (No tax management, Light, Standard, and Aggressive) and two disposal methods at the end of the 10-year investment horizon (donation or liquidation of the investment). See Setup section for more information on the differences across the tax management approaches. The simulations assume monthly rebalancing. The simulated returns include the reinvestment of dividends (all panels), as well as the reinvestment of tax savings from offsetting external ST capital gains in Panel A, external LT gains in Panel B, and up to $3,000 of ordinary income in Panel C. The simulated returns also reflect the deduction of advisory fees (0.29%) and transaction costs (0.10%).

Standard, Light, and No tax management. The tax costs are now all positive on average, but the tax impact is only 1.2% for Aggressive while it is 2.2% for No tax management, translating into an average difference in after-tax ending wealth of over $200,000.

An integrated process can help a portfolio stay focused on the premiums, as it systematically uses the proceeds from harvesting losses to buy stocks with higher expected returns.

Some studies suggest that investors should expect negative tax costs with aggressive tax loss harvesting, even post-liquidation, but we find that this result is highly sensitive to the selected period. In the 2000s, which started with broad stock market losses in 2001 and 2002, investors could have invested large tax savings into their SMA portfolio early on, and this would have enabled them to end up with higher after-tax returns than pretax returns both pre- and post-liquidation. But in the other two decades we study, the after-tax post-liquidation returns are on average lower than the pretax returns even if investors can use losses to offset unlimited ST gains generated outside the SMA. While investors cannot control the timing and magnitude of stock market returns and hence the size of the tax cost they will incur, what they can control is the tax management approach they choose. As our analysis suggests, the Light, Standard, and Aggressive tax management options can all reduce the gap between pretax and after-tax annualized returns across different market conditions.

Panel B reports results for investors who have only LT capital gains outside the SMA to offset with losses harvested in the SMA. Since tax rates are lower for LT capital gains than for ST capital gains under current tax law, the power of harvested losses to offset gains and generate inflows through tax savings is lower. As a result, the average tax costs for Light, Standard, and Aggressive are not as low as in Panel A, but all three yield lower tax costs than No tax management. Moreover, the average tax cost for Aggressive is still negative for investors planning to donate (–0.09% on an annualized basis).

The patterns from Panel B continue in Panel C. With no external gains to offset, investors now see positive tax costs across all four tax management approaches under both disposal options.[16] Once again, however, Light is more tax efficient than No tax management, Standard is more efficient than Light, and Aggressive is more efficient than Standard.

2. Tax Alphas

So far, we have seen that the three active tax management approaches consistently outperformed the No tax management approach in minimizing tax costs. As Equation 1 shows, however, after-tax returns are impacted by both pretax returns and tax costs.

Pretax Return – Tax Cost = After-Tax Return (1)

Hence, differences in after-tax returns are driven by both differences in pretax returns and differences in tax costs across tax management approaches.

Difference in Pretax Returns – Difference in Tax Costs = Difference in After-Tax Returns (2)

The difference in after-tax returns is often called Tax Alpha. Therefore, we can define Tax Alpha as follows:

Difference in Pretax Returns – Difference in Tax Costs = Tax Alpha (3)

We saw in Exhibit 1 that differences in pretax returns were on average quite small across the four tax management options, which means that the tax alphas of Light, Standard, and Aggressive vs. No tax management were primarily driven by the observed differences in tax costs. **Exhibit 2** demonstrates that.

EXHIBIT 2: Tax Alphas, Averaged Across Three Decades and Three Investment Strategies

Past performance, including simulated performance, is no guarantee of future results, and there is always the risk that a client may lose money.

Source: Dimensional using CRSP and Compustat data. The exhibit reports averages of tax alpha across three investment strategies (US All Cap Market, US All Cap Core 1 and US All Cap Core 2) over three decades (the 1990s, 2000s, and 2010s). Tax alpha is the difference between the annualized after-tax return of a simulated strategy applying Light, Standard, or Aggressive tax management and the annualized after-tax return of the same strategy applying No tax management. See Setup section for more information on the differences across the tax management approaches. The simulations assume monthly rebalancing. The simulated returns include the reinvestment of dividends (all panels), as well as the reinvestment of tax savings from offsetting external ST capital gains in Panel A, external LT gains in Panel B, and up to $3,000 of ordinary income in Panel C. The simulated returns also reflect the deduction of advisory fees (0.29%) and transaction costs (0.10%).

In Panel A, we report the average tax alphas of Light, Standard, and Aggressive relative to No tax management for investors with unlimited ST gains to offset. The tax alpha of Aggressive is 1.67% in the case of donation. The tax alpha for Standard is almost as large at 1.50%. Even Light, which does not engage in systematic tax loss harvesting to offset external gains, yields a tax alpha of 0.88%. This shows that a multifaceted tax management approach can add meaningful value even without systematic tax loss harvesting. In the case of liquidation, the tax alphas are about half as large, with Aggressive still generating a tax alpha of nearly 1%.

Panel B of Exhibit 2 plots the results for investors offsetting LT gains. In the case of donation, these investors achieve the highest average tax alpha (1.14% annualized) with the Aggressive tax management approach. The tax alpha of Standard is almost the same at 1.11%. In the case of liquidation, Standard slightly surpasses Aggressive with a tax alpha of 0.49% vs. 0.46% for Aggressive.

The slight dominance of Standard continues in Panel C, which reports results for investors with no external gains to offset. The tax alphas for Standard and Aggressive are 0.70% and 0.66%, respectively, in the case of donation, and 0.33% and 0.30% in the case of liquidation. The tax alpha for Light is nearly the same as for Aggressive in the case of donation, at 0.64%, and falls between Standard and Aggressive in the case of liquidation, at 0.32%. As expected, the tax alphas in Panel C are lower than those in Panels A and B, as investors in Panel C cannot use harvested losses to offset external gains and, as a result, cannot add cash flows to the portfolio from saved taxes on capital gains. Even so, investors on average benefit from an active tax management approach, as they can defer or eliminate capital gains taxes by minimizing capital gains realizations at rebalancing and by carrying forward harvested losses. They can also use harvested capital losses to offset up to $3,000 in same-year ordinary income.

In summary, Exhibit 2 shows that the three active tax management approaches consistently deliver higher after-tax returns than the No tax management approach. The other key finding from Exhibit 2 is that Aggressive does not always dominate Light and Standard. Is this finding driven by all three investment strategies? Exhibit 3 provides the answer by reporting the same results separately for US All Cap Market, All Cap Core 1, and All Cap Core 2.

Focusing on the All Cap Market portfolio, Aggressive delivers the highest average tax alpha for investors with external gains regardless of whether they donate or liquidate the assets in the SMA. For investors with no external gains, Aggressive still delivers the highest average tax alpha, but the tax alpha of Standard comes in a close second.

Turning to All Cap Core 1, Aggressive yields the highest tax alpha for investors with external ST gains. For investors with external LT gains, Aggressive and Standard yield quite similar outcomes, while for investors with no external gains, all three active tax management approaches provide similar levels of average tax alpha.

Finally, let's examine All Cap Core 2. Aggressive outperforms Light and Standard only for investors who have ST gains. For investors with external LT gains, Standard yields the highest tax alpha, whereas for investors with no external gains, Light and Standard yield similar outcomes.

The takeaway from Exhibit 3 is that while Aggressive yields the highest after-tax returns for investors with ST external gains, Standard tends to outperform for investors with LT or no external gains, especially when applied to portfolios with a strong emphasis on the size, value, and profitability premiums. For investors with no external gains, Light yields similar levels of after-tax performance to Standard in portfolios with a strong emphasis on the premiums. These results could be driven by the tradeoff among premiums, taxes, and costs. While a more aggressive tax management approach is likely to generate more tax losses, it can also result in more turnover and less overlap with the "target" portfolio. A lower overlap can lead to less emphasis on the premiums, while higher turnover can lead to more trading costs. Both can lower the pretax returns of Aggressive relative to Light and Standard.

EXHIBIT 3: Tax Alphas for US All Cap Market, US All Cap Core 1, and US All Cap Core 2, Averaged Across Three Decades

Panel A: Offsetting ST Gains

	All Cap Market		All Cap Core 1		All Cap Core 2	
	Donation	Liquidation	Donation	Liquidation	Donation	Liquidation
Light	0.62%	0.36%	0.89%	0.46%	1.14%	0.59%
Standard	1.08%	0.64%	1.58%	0.91%	1.85%	1.03%
Aggressive	1.34%	0.84%	1.72%	0.98%	1.94%	1.06%

Panel B: Offsetting LT Gains

	All Cap Market		All Cap Core 1		All Cap Core 2	
	Donation	Liquidation	Donation	Liquidation	Donation	Liquidation
Light	0.46%	0.20%	0.77%	0.36%	1.03%	0.41%
Standard	0.78%	0.35%	1.15%	0.49%	1.40%	0.59%
Aggressive	0.89%	0.40%	1.18%	0.48%	1.34%	0.53%

Panel C: No External Gains

	All Cap Market		All Cap Core 1		All Cap Core 2	
	Donation	Liquidation	Donation	Liquidation	Donation	Liquidation
Light	0.27%	0.14%	0.68%	0.33%	0.96%	0.48%
Standard	0.40%	0.22%	0.71%	0.32%	0.98%	0.45%
Aggressive	0.43%	0.24%	0.70%	0.32%	0.86%	0.35%

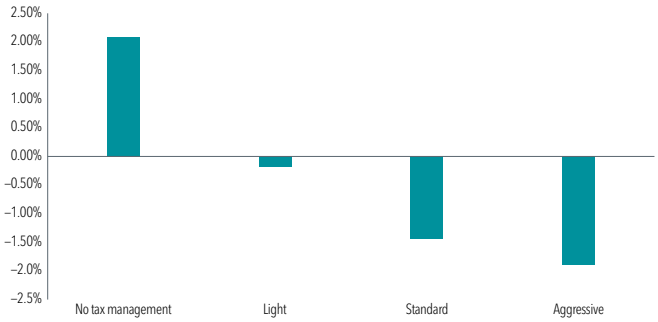
Past performance, including simulated performance, is no guarantee of future results, and there is always the risk that a client may lose money.

Source: Dimensional using CRSP and Compustat data. The exhibit reports averages of tax alpha for each of three investment strategies (US All Cap Market, US All Cap Core 1 and US All Cap Core 2), averaged over three decades (the 1990s, 2000s, and 2010s). Tax alpha is the difference between the annualized after-tax return of a simulated strategy applying Light, Standard, or Aggressive tax management and the annualized after-tax return of the same strategy applying No tax management. See Setup section for more information on the differences across the tax management approaches. The simulations assume monthly rebalancing. The simulated returns include the reinvestment of dividends (all panels), as well as the reinvestment of tax savings from offsetting external ST capital gains in Panel A, external LT gains in Panel B, and up to $3,000 of ordinary income in Panel C. The simulated returns also reflect the deduction of advisory fees (0.29%) and transaction costs (0.10%).

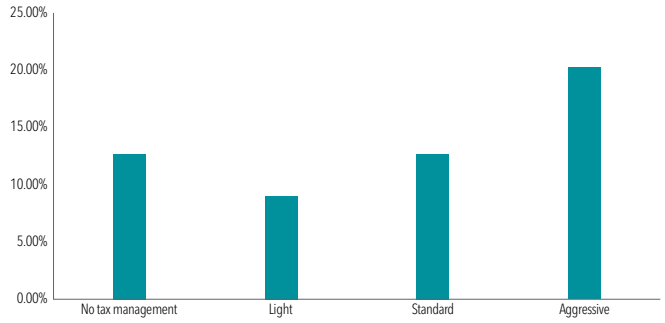
To explore this further, **Exhibit 4** reports average annual net realized gains as a percentage of the beginning-of-year assets (Panel A), average annual turnover (Panel B), and average monthly overlap with the "target" portfolio (Panel C). In all three panels, the numbers are once again

EXHIBIT 4: Average Realized Capital Gains, Turnover, and Overlap, Assuming Unlimited ST Gains and Donation at the End

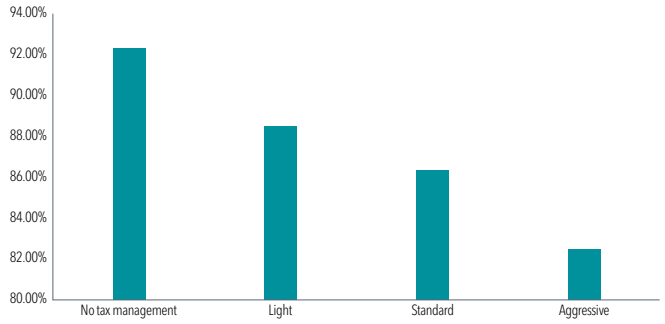
Panel A: Average Annual Realized Gains as a Percentage of Assets



Panel B: Average Annual Turnover as a Percentage of Assets



Panel C: Average Monthly Overlap with "Target" Portfolio



Simulated data. Actual results will vary.

Source: Dimensional using CRSP and Compustat data. The exhibit reports average annual net realized gains as a percentage of the beginning-of-year assets (Panel A), average annual turnover (Panel B), and average monthly overlap with the "target" portfolio (Panel C). Annual net realized gains reflects the sum of net ST and LT gains realized in the portfolio over a calendar year. Annual turnover reflects the value of sells in the portfolio over a calendar year as a percentage of the beginning-of-year portfolio value. Monthly overlap with the "target" portfolio represents the common weight across held securities between the simulated portfolio at each month-end after portfolio rebalancing and its "target" portfolio at that month-end. The results in each panel are averaged across three investment strategies (US All Cap Market, US All Cap Core 1 and US All Cap Core 2) and three decades (the 1990s, 2000s, and 2010s). Each panel shows results for four tax management approaches (No tax management, Light, Standard, and Aggressive). See Setup section for more information on the differences across the tax management approaches.

averaged across the three decades and the three investment strategies we study. For brevity, we report averages only for investors with unlimited external ST gains who plan to donate at the end. The results for the other scenarios are qualitatively the same.

Panel A shows that No tax management generates capital gains amounting to 2.1% of the beginning-of-year assets per year on average. In contrast, Light, Standard, and Aggressive yield about 0.2%, 1.5%, and 1.9%, respectively, in capital losses per year on average. Relative to Standard, Aggressive places more emphasis on tax loss harvesting and on penalizing capital gains when rebalancing. As a result, it tends to realize more capital losses. The larger amount of realized losses, however, comes with higher turnover than and lower overlap with the underlying "target" portfolio, as Panels B and C show.

On average, Standard generates about half the turnover of Aggressive (13% vs. 20% average annual sell turnover). While the difference in average annual turnover is less than 10 percentage points, there are periods when the difference is much larger. For example, in 2001, when the S&P 500 fell by nearly 12%, Aggressive generated sells that represented more than 100% of the initial portfolio value across all three investment strategies. In contrast, Standard triggered sells that represented approximately 50% of the initial portfolio value. The large difference in turnover was accompanied by a 6% difference in realized ST losses that year (ranging from 14% to 19% for Standard and from 21% to 25% for Aggressive across the three investment strategies), but it also led to a difference in round-trip trading costs of 0.06%.

Panel C focuses on differences in overlap with the "target" portfolio. On average, the overlap for Standard is 86.4%, and the overlap for Aggressive is 82.5%. The difference in average overlap is relatively small, which is expected since the monthly rebalancing process seeks to balance the tradeoffs among staying focused on the desired portfolio characteristics, minimizing trading and tax costs, and maintaining broad diversification. While the difference in average monthly overlap is less than 4 percentage points, there are periods when the difference is much larger and can lead to meaningful differences in short-term realized returns. For example, at the end of September 2001 the overlap of Standard was 15% higher than that of Aggressive (86% vs. 71%) for investors in Core 2 who have unlimited ST gains. The large difference in overlap was mainly driven by Aggressive completely selling out of names such as Cisco and Intel to harvest losses. Both names had large positive returns (39% and 19%, respectively) in the subsequent month and contributed to Aggressive underperforming Standard by 1.18% in October 2001, the largest difference in returns across the two management approaches in that decade.[17]

Putting it all together, our analysis suggests that Aggressive's higher realized capital losses benefit its tax cost, while the lower overlap and the higher turnover can hurt its relative pretax performance. Whether the tax alpha of Aggressive ends up higher than that of Standard depends on how much benefit investors can extract from the harvested losses vs. the potential drag on performance from lower overlap and higher turnover.

3. Tax Alphas and the Pursuit of Premiums

In the prior section we focused on the relative after-tax performance of the four tax management approaches—overall and separately for each of the three investment strategies. Now, we turn our attention to the relative performance of the tax management approaches across investment strategies to answer two important questions. First, are tax alphas higher for the core strategies than for the market strategy? Second, can we apply an active tax management approach and still capture the premiums?

Exhibit 3 shows that the tax alphas of Light, Standard, and Aggressive grow monotonically from All Cap Market to All Cap Core 2. This trend applies to all three cases of external gains (ST, LT, or none) and both cases of disposal (donation and liquidation). For example, the tax alphas of Standard are 0.40%, 0.71%, and 0.98% for All Cap Market, All Cap Core 1, and All Cap Core 2, respectively, in the case of investors who have no external gains and plan to donate.

Further analysis shows that the tax alphas are greater for the tilted portfolios than for the market portfolio because the active tax management approaches are more effective at minimizing tax costs when applied to strategies pursuing the premiums. This is intuitive since these strategies tend to generate higher turnover and capital gains relative to the market strategy. Indeed, the average annual realized capital gains are about 0.5%, 2.4%, and 3.3% for Market, Core 1, and Core 2, respectively, under No tax management for investors with unlimited external ST gains.

The result also implies that the pretax returns are similar across all tax management approaches for a given investment strategy. Hence, applying an active tax management approach does not appear to hurt the capture of the premiums. To explore this more directly, we will compare the after-tax annualized returns under Standard and Aggressive for the Market, Core 1, and Core 2 in each of the three decades studied.

As **Exhibit 5** shows, in the 1990s and 2000s the average monthly size, value, and profitability premiums were all positive, with the premiums twice as large in the 2000s vs. the 1990s. In the 2010s, both size and value had negative average monthly returns, while the profitability premium was positive but relatively low.

EXHIBIT 5: Average Monthly Returns on the Size, Value, and Profitability Premiums

	SMB	HML	RMW
1991–2000	0.02%	0.43%	0.30%
2001–2010	0.64%	0.28%	0.51%
2011–2020	−0.08%	−0.46%	0.11%

Past performance is no guarantee of future results. Actual results will vary.

SMB is the US Fama/French size factor, HML is the US Fama/French value factor, and RMW is the US Fama/French profitability factor. Source: Fama/French factors data are from Kenneth French's data library mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

Hence, with a rebalancing approach that seeks to balance the tradeoffs among premiums, costs, and taxes, Core 1 and Core 2 should outperform Market in the first two decades. We test this hypothesis in **Exhibit 6**. We show the after-tax annualized returns for Standard (Panel A) and Aggressive (Panel B) across the three investment strategies decade by decade. For brevity, we report the after-tax returns only for investors with unlimited external ST gains who plan to donate at the end. The results for the other scenarios are qualitatively the same.

Exhibit 6 confirms our hypothesis. In the 1990s and 2000s, the annualized after-tax returns of Core 1 and Core 2 are higher than those of Market, and the outperformance is much greater in the second decade. We see this both in Panel A (Standard tax management) and Panel B (Aggressive tax management).

EXHIBIT 6: After-Tax Returns across Investment Strategies

Panel A: Standard Tax Management

	Annualized After-Tax Returns		
	All Cap Market	All Cap Core 1	All Cap Core 2
1991–2000	16.74%	16.99%	17.25%
2001–2010	4.21%	6.25%	6.70%
2011–2020	13.95%	13.25%	13.10%

Panel B: Aggressive Tax Management

	Annualized After-Tax Returns		
	All Cap Market	All Cap Core 1	All Cap Core 2
1991–2000	16.95%	17.22%	17.47%
2001–2010	4.49%	6.24%	6.75%
2011–2020	14.25%	13.44%	13.11%

Past performance, including simulated performance, is no guarantee of future results, and there is always the risk that a client may lose money.

Source: Dimensional using CRSP and Compustat data. The exhibit reports annualized after-tax returns for three investment strategies (US All Cap Market, US All Cap Core 1 and US All Cap Core 2) over three decades (the 1990s, 2000s, and 2010s). Panel A reports results for investors applying Standard tax management, while panel B reports results for investors applying Aggressive tax management. See Setup section for more information on the differences across the tax management approaches. Both panels present outcomes for investors who have unlimited external ST gains and plan to donate their investments at the end of the 10-year investment horizon. The simulations assume monthly rebalancing. The simulated returns include the reinvestment of dividends (all panels), as well as the reinvestment of tax savings from offsetting external ST capital gains. The simulated returns also reflect the deduction of advisory fees (0.29%) and transaction costs (0.10%).

To sum up, in the two decades when emphasizing companies with lower market capitalization, lower relative prices, and higher profitability would have led to outperformance relative to the market, the All Cap Core 1 and Core 2 strategies outperformed the All Cap Market strategy under both Standard and Aggressive tax management on an after-tax basis. In other words, they managed to both deliver the premiums and minimize tax costs.

Overall, this study shows that active tax management, when implemented thoughtfully, can benefit investors regardless of whether they have external gains and how they plan to dispose of their assets at the end of the investment horizon.

This is not surprising because the rebalancing process we apply considers not only taxes, but also premiums, costs, and diversification. An integrated rebalancing process can step away from loss harvesting trades if they would force the portfolio to deviate meaningfully from its emphasis on the premiums. An integrated rebalancing process can delay the sale of a security to convert a short-term capital gain realization into a long-term capital gain realization when the sale of the security is unlikely to materially affect the expected return profile of the portfolio. An integrated process can also help the portfolio stay focused on the premiums, as it systematically uses the proceeds from harvesting losses to buy stocks with higher expected returns.

4. Tax Alphas after Portfolio Inception

Since stocks have positive expected returns, the average stock position tends to appreciate over time, minimizing the opportunities for tax loss harvesting. Hence, the benefits of active tax management approaches solely focused on loss harvesting tend to decline a few years after portfolio inception. This, however, does not have to be the case for multifaceted tax management approaches that go beyond loss harvesting, like the ones studied in this paper. Moreover, separately managed accounts with a few hundred securities will have fewer opportunities for tax loss harvesting through the life of an account than the simulated SMAs here that include about 3,000 names on average. The larger name count provides more opportunities for tax loss harvesting through the life of the account.

Exhibit 7 plots the difference in annual after-tax returns between each active tax management approach and No tax management for Year 1 to Year 10, averaged across the three decades and the three investment strategies. We present the evolution of tax alpha for investors with unlimited ST external gains, with unlimited LT gains, and with no external gains. In all three cases, the results assume donation at the end so that the tax alpha for Year 10 is not impacted by the liquidation event.

Panel A shows the annual tax alphas for Light. This tax management approach considers taxes in the monthly rebalancing of the portfolio and seeks to minimize both short-term and overall net gains, but it does not systematically apply tax loss harvesting to offset external gains. Still, it ends up generating positive tax alphas in most years after inception.

In Panels B and C, we examine the annual tax alphas for Standard and Aggressive. Under those approaches, the tax alphas do tend to be highest in Year 1, but they tend to stay positive in most years after inception as well. For example, under Standard all three tax alphas (assuming ST, LT, and no external gains) exceed 1.5% in Year 8, exceed 0.3% in Year 9, and exceed 0.5% in Year 10.[18] Hence, a multifaceted tax management approach that goes beyond tax loss harvesting can outperform a strategy with no tax management through the years.

Is the spike in Year 8 driven by the global financial crisis, when the US stock market fell by over 40%? We examine annual tax alphas averaged across investments strategies and averaged across the 1990s and 2010s, excluding the 2001–2010 decade. The results remain largely similar and are omitted for brevity.

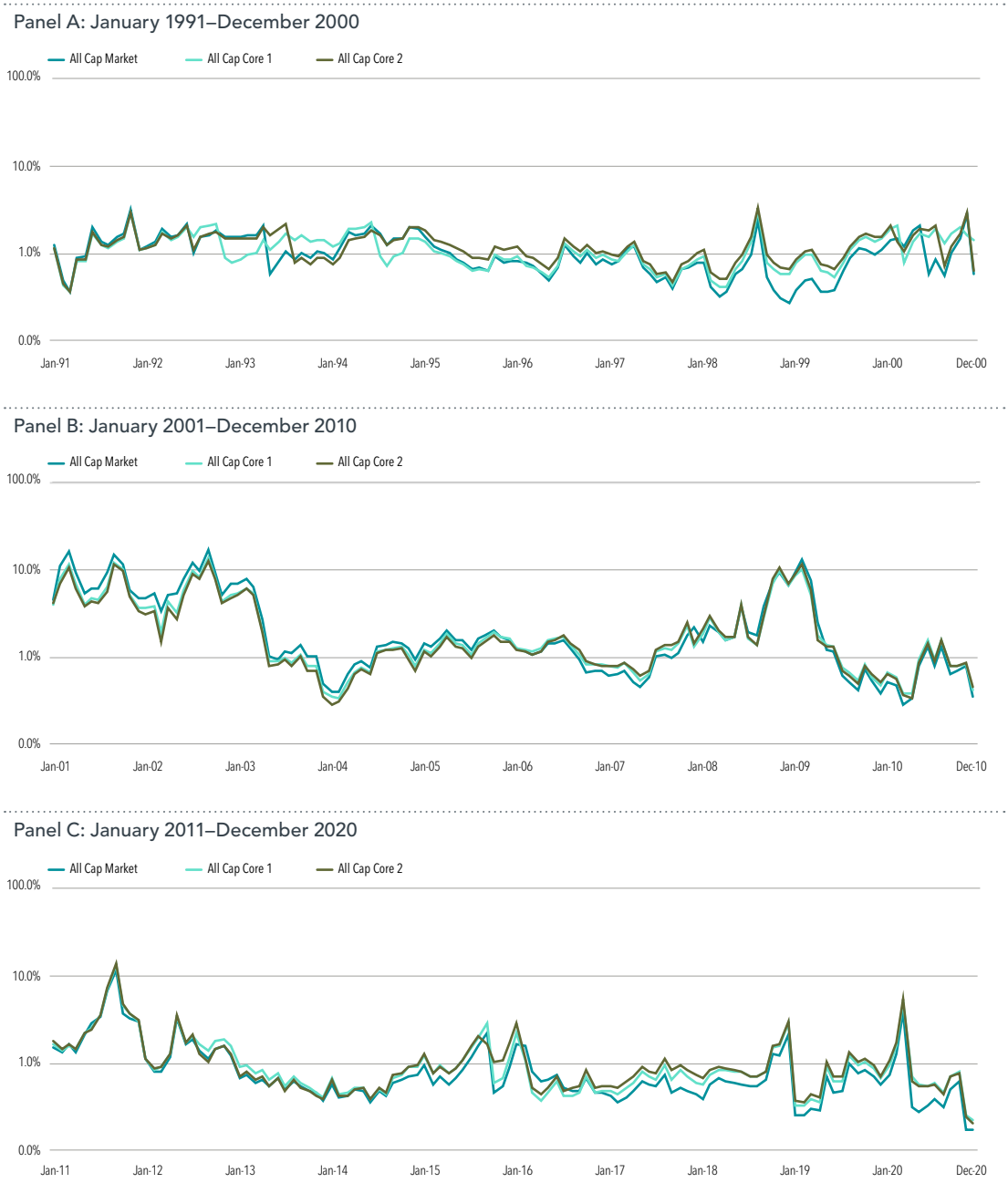
EXHIBIT 7: Annual Tax Alphas, Averaged Across Decades and Investment Strategies

Past performance, including simulated performance, is no guarantee of future results, and there is always the risk that a client may lose money.

Source: Dimensional using CRSP and Compustat data. The exhibit reports annual tax alphas, averaged across three investment strategies (US All Cap Market, US All Cap Core 1 and US All Cap Core 2) and three decades (the 1990s, 2000s, and 2010s). Tax alpha is the difference between the annual after-tax return of a simulated strategy applying Light, Standard, or Aggressive tax management and the annual after-tax return of the same strategy applying No tax management. See Setup section for more information on the differences across the tax management approaches. The simulations assume monthly rebalancing. The simulated returns include the reinvestment of dividends (all panels), as well as the reinvestment of tax savings from offsetting external ST capital gains (dark teal bars), external LT gains (light teal bars), and up to $3,000 of ordinary income (grey bars). The simulated returns also reflect the deduction of advisory fees (0.29%) and transaction costs (0.10%).

To provide more intuition behind the finding that tax alpha can persist over a 10-year horizon, **Exhibit 8** plots the available (unrealized) capital losses as a percentage of the portfolio value at the end of each month in each decade for each investment strategy, assuming Standard tax management and unlimited ST gains.

EXHIBIT 8: Available Capital Losses as a Percentage of Portfolio Value



Past performance, including simulated performance, is no guarantee of future results, and there is always the risk that a client may lose money.

Source: Dimensional using CRSP and Compustat data. The exhibit reports available capital losses as a percentage of end-of-month portfolio value (prior to rebalancing) for three investment strategies (US All Cap Market, US All Cap Core 1 and US All Cap Core 2) over three decades (the 1990s, 2000s, and 2010s). Vertical Axis in log scale. All panels present outcomes for investors who apply Standard tax management, have unlimited external ST gains, and plan to donate their investments at the end of the 10-year investment horizon. See Setup section for more information on the differences across the tax management approaches.

The plots in Exhibit 8 suggest that applying a multifaceted tax management approach to broadly diversified portfolios provides consistent opportunities for realizing capital losses. Indeed, the median monthly available losses in All Cap Market, All Cap Core 1, and All Cap Core 2 are 0.97%, 1.04%, and 1.18%, respectively, in the 1990s; 1.45%, 1.38%, and 1.36% in the 2000s; and 0.66%, 0.80%, and 0.84% in the 2010s. In summary, the results in Exhibits 7 and 8 show that tax alpha can last for many years if pursued thoughtfully.

V. Takeaways

This study compares three active tax management approaches (Light, Standard, and Aggressive) to a No tax management approach when applied to three broadly diversified US all cap strategies (All Cap Market, All Cap Core 1, and All Cap Core 2). All three active tax management approaches yield lower tax costs and higher after-tax returns than the No tax management approach on average. Aggressive yields the highest after-tax returns for investors with ST gains and investors in the market portfolio. For investors in All Cap Core 1 with LT gains, Aggressive and Standard yield similar results, while for investors with no external gains, all three active tax management approaches perform similarly. For investors in All Cap Core 2 with LT gains, Standard outperforms, while for investors with no external gains, Light and Standard provide similar results.

All three active tax management approaches not only improve tax outcomes but also deliver the size, value, and profitability premiums. Under these approaches, All Cap Core 1 and Core 2 outperform All Cap Market in the two decades when the average size, value, and profitability premiums are all positive.

Finally, we find that all three active tax management approaches generate tax alphas throughout the 10-year investment period. Broad diversification across securities and multifaceted tax management that goes beyond tax loss harvesting help with that.

Overall, this study shows that active tax management, when implemented thoughtfully, can benefit investors regardless of whether they have external gains and how they plan to dispose of their assets at the end of the investment horizon.

1. Certain UMA account types such as IRAs, solo 401(k)s, and other non-ERISA tax-advantaged accounts may only select no tax management when choosing a tax management approach.
2. Dimensional offers US and global equity strategies with a range of emphasis on the size, value, and profitability premiums. To illustrate the impact of differing emphasis on premiums, we simulate tax management approaches for a strategy that applies no emphasis on the premiums (US All Cap Market), a strategy that applies a moderate emphasis (US All Cap Core 1), and a strategy that applies a strong emphasis (US All Cap Core 2).
3. Throughout, we are using percent and percentage points interchangeably for ease of reading.
4. As in our live SMA strategies, we exclude REITs since they tend to generate nonqualified dividend income and we focus on many aspects of tax management—not just capital gains and losses.
5. We use a proprietary mapping from historical SIC industry codes to GIC sectors.
6. The simulations can violate the wash-sale rule in months shorter than 31 days or when there are less than 30 calendar days between the last trading days of two adjacent months. The wash-sale rule also applies across multiple accounts held by the same owner, though the simulations assume only one account. While we do explicitly incorporate the wash-sale rule, including over multiple linked accounts, in our live implementation process, we don't do this here to simplify the rebalancing process.
7. The highest-cost methodology provides similar tax efficiency with less operational complexity than tax lot relief methods called "least liability" or "tax sensitive." For more information on this, please see "Dimensional SMAs: Frequently Asked Questions" (Dimensional Fund Advisors, April 2022).
8. The only exception is full liquidation of a lot, which could involve a partial share due to corporate actions.
9. This assumption is in line with the trade cost analysis of our live SMAs and recent academic studies of retail equity trades [see, for example, Barber et al (2022), available at SSRN].
10. The highest advisory fee charged on Dimensional SMAs is 29 basis points as of January 2025.
11. An investor who does not have any capital gains from other investments to offset needs to compute separately the net short-term and long-term realized capital gains for the year. If both the net short-term and long-term results are capital gains, then the investor needs to pay taxes on both types of gains. If both the net short-term and long-term results are capital losses, then the investor will need to carry both losses forward to offset future gains of the same character—long-term gains with carried-forward long-term losses, and short-term gains with carried-forward short-term losses. An investor who has a net short-term gain and net long-term loss or vice versa needs to net out the net short-term and long-term capital gains and losses. If the total net is a gain, then the investor needs to pay short-term capital gains tax on it if the short-term gains exceed the long-term losses and long-term capital gains tax if the long-term gains exceed the short-term losses. If the total net is a loss, then the investor needs to carry the net total losses forward to offset future gains of the same type as the net loss.
12. As of 2022, 37% and 20% are the highest short-term and long-term capital gain federal tax rates, and we add 3.8% additional investment tax for households with income above $250,000.
13. As of 2022, the highest personal income federal tax rate is 39.35% (37% highest marginal income federal tax rate + 1.45% standard Medicare tax + 0.9% additional Medicare tax for households earning over $250,000).
14. Investor profiles are based on the availability of external gains and on the disposal method at the end of the investment period.
15. The pretax returns in each panel differ slightly between the donation and liquidation scenarios because, under the donation scenario, the investor performs a regular portfolio rebalancing at the end of the last month, while under the liquidation scenario, the investor sells all held securities and pays trading costs on all those sales at the end of the last month.
16. Standard and Aggressive yield positive tax costs in Panel C because the tax savings from offsetting up to $3,000 of ordinary income with harvested losses every year are relatively small and do not exceed the annual tax obligations from dividends. Moreover, while monthly rebalancing under Standard and Aggressive aims to avoid realizing net ST and LT gains, the carried-forward harvested losses are sometimes not enough to offset forced capital gains realizations from corporate actions.
17. Differences in overlap can have a persistent impact on performance if they lead to systematic differences in emphasis on the long-term or short-term drivers of expected stock returns. In results omitted for brevity, we examine six-factor regressions of pretax portfolio returns on the Fama-French market, size, value, profitability, momentum, and ST reversal factors for the baseline case of investors with ST external gains who donate at the end. Since tax loss harvesting (TLH) tends to sell out of losers and losers tend to be companies with declining valuations, we tend to see a slight drop in the size and value coefficients and a slight rise in the profitability coefficient as we shift from No tax management to Aggressive tax management. Overall, however, the regression results do not suggest that Aggressive has a systematically lower emphasis on the long-term drivers of stock returns than Standard. The loadings on the short-term drivers of returns (momentum and ST reversal) are close to zero across portfolios. Not surprisingly, as we shift from No tax management to Aggressive tax management, the coefficient on momentum gets a little higher and the coefficient on ST reversal gets a little lower, but again we find no systematic impact on the performance difference between Standard and Aggressive.
18. The negative tax alphas in some years are due to differences in pretax returns, which in turn are due to differences in rebalancing decisions and holdings across the different tax management approaches. On average, we expect and see similar annual pretax returns across the approaches.

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The simulated performance is "net of fee," which includes the reinvestment of dividends and other earnings and reflects the deduction of advisory fees (0.29%) and transaction costs (0.10%). A client's investment returns will be reduced by the advisory fees and other expenses that may be incurred in the management of the advisory account.

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Dimensional is not a tax advisor and does not know the effective tax position of any individual client. Tax management in Dimensional SMAs is limited to managing the account's investment approach in a tax-sensitive manner.