

# Separately Managed Account Design in the Presence of Taxes



Russell Investments Research



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As Jeffrey & Arnott (1993) pointed out in their seminal paper on taxes, “for many investors, taxes are clearly the largest source of portfolio management inefficiency, and thus of mediocre investment returns.” This finding is not limited to one paper, or to other academic studies, but something that investors and their advisors face each year. Taxes can and do erode active returns. But these statements, which are true on average, mask wide differences we found across types of active strategies. Fortunately, this variation is not random; tax drag varies with characteristics we know ahead of time and can use in making investment decisions. We can also leverage another tool at our disposal to improve after-tax outcomes: active tax management. Russell Investments has a long track record of managing tax outcomes for clients in our tax-managed mutual funds. Here, we introduce a new implementation: tax management of Separately Managed Accounts (SMAs).

## Introduction

Many studies have explored the relationship between taxes and active management<sup>1</sup>. The research covers estimates of tax drag, comparisons of active and passive strategies, and investigations of different types of active tax management that can be employed.

Considering the wide-ranging body of work, what new insights does our study provide?

We found that the available studies primarily fall into two buckets: simulated returns of individual accounts or live returns but of mutual funds. It is not terribly surprising that there is a lack of studies on live returns of SMA style vehicles or active manager representative accounts, given returns of those are not published in the same way as mutual funds. But Russell Investments has access to a differentiated dataset that can be leveraged to provide insight. For our study:

1. We use real portfolios. We leverage our extensive database of real active managers' portfolios to form the basis of our study.
2. We use an SMA-style investment vehicle rather than a mutual fund. An individual investing in a SMA faces different tax features than investing in a mutual fund and tax outcomes vary by investment vehicle<sup>2</sup>.

<sup>1</sup> See Appendix for a full review of the literature.

<sup>2</sup> While many of our conclusions are directionally the same regardless of investment vehicle, the final estimates of tax drag are for SMAs, and where this distinction is relevant, we will point it out.

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Our dataset includes 157 active managers going back up to 18 years. The length of history varies by manager depending on when the manager entered Russell Investments' research database. While it may at first seem like inconsistent start dates would be undesirable, this variation is one of several features that we exploit to build a model of how tax outcomes vary. Rather than a weakness, this variation is a necessity. We also exploit natural variation across different levels of turnover, concentration, initial conditions, and investment styles. Each of these dimensions gives another way to categorize the universe, and furthermore provides the variation needed to understand how each dimension impacts tax outcomes.

## Our research proceeds in two phases.

1. What is the expected tax drag of active management and how does that vary depending on the characteristics of the strategy?
2. How does applying tax management to active strategies mitigate that tax drag?

Throughout, our goal will be to identify what characteristics are most important in determining the outcome we are measuring. For phase 1, we want to understand tax drag. What characteristics determine tax drag? In phase 2, we want to measure effectiveness of tax management strategies. What determines effectiveness? Are they the same characteristics or something different?

## Tax Drag of Active Strategies

First, we evaluate tax drag on active managers. We replicate the same portfolio that the manager held each quarter and calculate the subsequent tax drag of that portfolio. Due to data availability we use quarterly manager holdings, rather than daily or monthly. This means that we are approximating the experience of being invested with the manager, rather than replicating it exactly<sup>3</sup>. Our universe includes managers of different styles (value, growth and market-oriented), market capitalization tiers (small, small and mid caps or SMID, and large), and regions (US and global)<sup>4</sup>.

We will use this variation across managers to understand how their style and portfolio characteristics (turnover and name count) impact tax drag and tax management effectiveness. The key to building such a model is variation. What happens if our managers do not have enough variation to fully cover the spectrum? Then there will be gaps in our understanding. In order to have enough observations across these buckets to draw conclusions, we simulate portfolios where necessary to fill a grid covering the range of possibilities.

The figure below contains observations bucketed according to name count and turnover characteristics. Thresholds were selected to roughly line up with our intuition of what defines high and low turnover or name count, with the goal of spanning the universe, providing enough granularity to observe whether a pattern was consistent and monotonic (i.e. more than 2 or 3 buckets), and leading to a sufficient number of observations in each bucket so that our conclusions are less likely to be driven by idiosyncrasies<sup>5</sup>. Because we are working with real data, the number of observations varies.

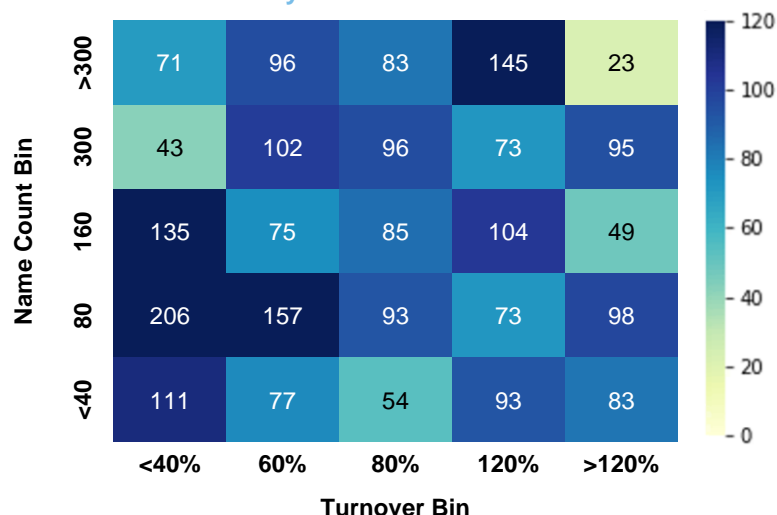
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<sup>3</sup> In particular, intra-quarter trades that are closed out by the manager will not be captured in our estimate of tax drag and so our findings will underestimate tax drag. We will further explore the implications of this in the results and robustness sections that follow.

<sup>4</sup> See Appendix for a summary of the manager dataset.

<sup>5</sup> To avoid datamining the selection of buckets, these thresholds were selected prior to testing and stuck with for the subsequent analysis. After the analysis was complete however, as a robustness check, we tried variations of the buckets and the conclusions were unchanged.

## Annual Observations by Name Count and Turnover



The places where we did not have enough observations were very high turnover (more than 120% one-way turnover per year) and high name count portfolios (more than 300 names). To simulate these, we sample from the universe of manager securities constructing portfolios that meet the turnover and name count constraints we seek. After adding these simulated portfolios, we now have observations in each bucket of the grid above, as desired. Turnover on the x-axis refers to the one-way turnover of the portfolio in the year. The numbers in each box represent how many annual observations are in our sample for the given name count and turnover level.

An obvious alternative to describe our universe would have been to report stats by manager instead of by annual observations (i.e. by manager and by year) and the reader may be wondering why we choose the method we did. For e.g. instead of saying we have 135 annual observations of managers with between 80-160 names and less than 40% turnover, we could have said we have 9 managers who, on average, met these criteria. For one thing, we observed that manager turnover varied considerably year to year. Our objective is to identify the relationship between turnover and tax drag as precisely as possible, so this type of imprecision would be confounding. We also know that tax drag will be largely determined by market environment, which varies by year. In the analysis that follows, we will use annual observations so that we can understand as precisely as possible how these characteristics relate to subsequent tax drag, after isolating for major determinants like market environment, which would not be possible when looking at averages over an entire time series.

To measure tax drag we first calculate the manager's pre-tax return and the gains and losses incurred over the year (using quarterly holdings). On an annual basis we calculate taxes owed from capital gains, using a short-term rate of 43.4% and a long-term rate of 23.8%<sup>6</sup>.

$$Tax\ Drag_{t,cap\ gains} = \frac{Tax\ liability_t}{Portfolio\ Size_{start\ of\ period}}$$

Where:

$$Tax\ liability_t = \max(0, ST_{rate}(Net\ Short\ Term\ Gains) + LT_{rate}(Net\ Long\ Term\ Gains))$$

When net gains are negative, no taxes are owed and tax drag from capital gains is zero<sup>7</sup>. So far, we have focused on tax drag from capital gains rather than dividends. We can also calculate the total tax drag as follows<sup>8</sup>:

$$\begin{aligned} Tax\ Drag_{t,total} &= Tax\ Drag_{t,cap\ gains} + Tax\ Drag_{t,dividends} \\ &= Tax\ Drag_{t,cap\ gains} + \frac{LongTermRate * Dividends_t}{Portfolio\ Size_{start\ of\ period}} \end{aligned}$$

<sup>6</sup> Reflecting the maximum short term and long term tax rates during our study.

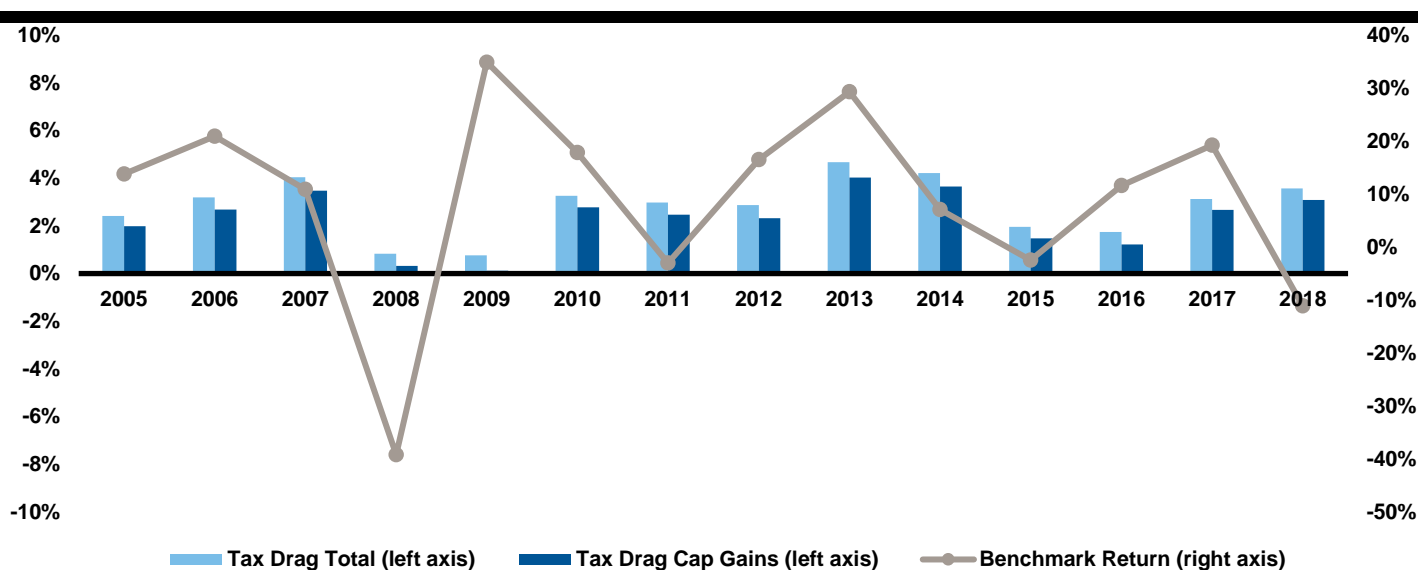
<sup>7</sup> This choice was made to reflect that the use of capital losses is limited, i.e. can only offset current or future capital gains. Ehling et al. (2010) refer to this as the Limited Use of Losses (LUL) model. Much of the theoretical work on taxes overestimates the benefit of losses by assuming the use of capital losses is unrestricted (Full Use of Losses model). See Ehling et al. for a discussion of the implications of this estimation.

<sup>8</sup> Here we assume dividends are qualified and taxed at the long term rate.

## Findings

Consistent with previous studies, we find that tax drag on active strategies is substantial, averaging 2.8% annually across our manager universe. This number, which is true on average, masks a lot of variation across market environments and types of strategies. First let's consider market environments. Unsurprisingly, tax drag and market return are positively correlated, with higher tax burden when markets returns are positive. It is also clear however, that much of the story is still unexplained. For example, in 2018 markets were down but tax drag was positive; in 2009, markets recorded their highest return in our period, but tax drag was among the lowest. We will dig into these relationships further, but the reader can probably already guess that not just market environment but also embedded gains or losses are important.

### Tax Drag and Market Return



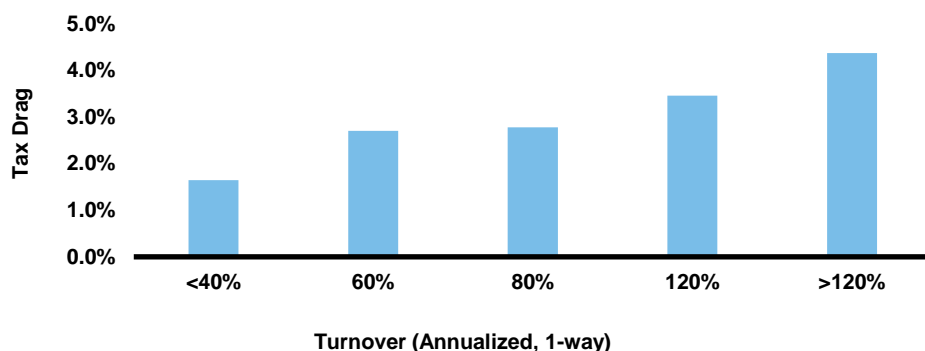
Also of note in the figure above is the consistency of difference between tax drag from capital gains and total tax drag. In other words, tax drag from dividends is stable. As further evidence, the headline figure of average tax drag of 2.8% can further be decomposed into an average 0.5% tax drag from dividends and 2.3% from capital gains. The standard deviation of total tax drag and tax drag of capital gains is 2.47% and 2.46% respectively, compared to standard deviation of tax drag from dividends of 0.2%. Clearly, most of the variation in tax drag is coming from capital gains, and as a result, our analysis will focus on tax drag of capital gains, unless otherwise noted<sup>9</sup>.

While understanding the relationship between market environment and embedded gains is important in building a model of tax impact, knowledge about these variables is not particularly actionable in the sense that there is little an investor can do to change market environment or embedded gains. So next let's dig into something an investor can control: what types of strategies they hold and how tax drag varies with types of investment strategies.

First, we consider turnover, where we find that tax drag is increasing with turnover, and the differences are meaningful. On average, a manager with more than 120% turnover has close to three times the tax drag of a manager with less than 40% turnover.

<sup>9</sup> The focus on taxes from realized capital gains is also consistent with most of the literature on the subject including Jeffery & Arnott (1993), Geddes & Tymoczko (2019). Other papers suggest it is difficult to manage dividend exposure without reducing implementation efficiency, especially in high dividend strategies (Israel et al 2019).

## Tax Drag and Turnover



It is hardly surprising that market environment and turnover impact taxes and the reasons are straightforward. Companies in the portfolio are more likely to be held at a loss relative to their purchase price in a down market rather than an up market. A manager who trades frequently will face more taxable events and, since stock prices on average increase over time, will frequently realize gains from trading. But even these two explanations hint at how many other factors matter and inspire their own set of challenges:

- Even in a down market if the security has been held for a long time it is still likely to be at a gain, or in other words, embedded gains also matter
- Even though trades on average tend to realize gains, some managers will be realizing losses, and this type of behavior may vary with investment style

How do all these characteristics come together to determine taxes? We build a more flexible model that incorporates each of these characteristics. Breaking the universe down further we have over 1,500 annual observations. Each of these is a function of market environment, turnover of the manager, and potentially other characteristics like style or years since inception of the portfolio. To build a model of how tax drag is impacted by these factors, we build a simple regression model with tax drag as the dependent variable. Results of this regression are presented below.

DEPENDENT VARIABLE: TAX DRAG	COEFFICIENT	T-STATISTIC <sup>10</sup>
<b>Benchmark Return</b>	0.0143	7.30
<b>Turnover</b>	0.0164	20.64
<b>Name Count</b>	-0.0001	-2.79
<b>Value</b>	0.0008	0.93
<b>Growth</b>	-0.0010	-1.09
<b>Years Since Inception</b>	0.0007	8.16

$R^2 = 0.554$     Adjusted  $R^2 = 0.552$     Number of observations = 1562

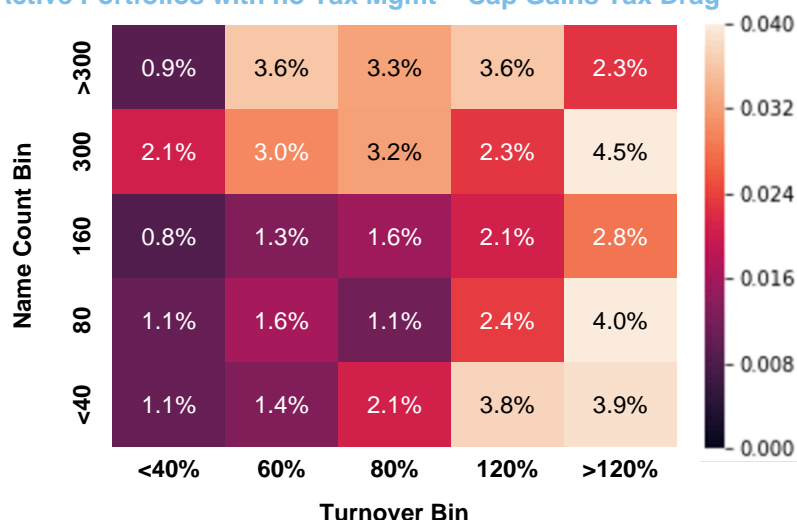
<sup>10</sup> Statistically significant coefficients at 95% level are marked in bold.

## What do these coefficients tell us?

- An increase in the benchmark of 1 (i.e. 100%) led to a 1.43% increase in tax drag. Framed in a magnitude that is more sensible, each 1% increase in the benchmark return led to an increase in tax drag of 1.4bps.
- An increase in turnover of 100% led to a 1.64% increase in tax drag.
- As name count increased from 10 to 1000 names, tax drag decreased by 1%.
- After controlling for other characteristics, neither Value nor Growth styles were statistically significantly different from market-oriented managers.
- Tax drag increases with years since inception, which is consistent with the intuition we introduced above: if a security has been held for a long time it is likely to be held at a gain since on average and stocks go up over time.

Both turnover and name count were statistically significant, and since they are also characteristics that we have control over (i.e. we can pick managers on the basis of portfolio concentration or expected turnover but can't pick the market environment), we will also explore these further below. The regression results tell us how these variables relate to tax drag after controlling for the other factors, and help tell us which variables to focus on, but the coefficients are not particularly easy to visualize. To illustrate these relationships, we next categorize the universe into 25 bins based on name count and turnover<sup>11</sup>. Figure below shows a heatmap based on these two characteristics for tax drag of active managers.

### Active Portfolios with no Tax Mgmt – Cap Gains Tax Drag



We see higher tax drag as we move from left to right, from low to high turnover portfolios. Interestingly, we also see higher tax drag as we move from the bottom to top, or low to high name count portfolios. Recall the coefficient on name count in our regression above was negative. This highlights how important it is to not rely on the two-dimensional heatmap alone – the heatmap does not control for other variables and tells us the increasing tax drag we are observing here is likely not due to name count. The magnitude is also more tangible now – the highest bin where turnover is above 120% has a tax drag almost four times the tax drag in the lowest turnover bucket of less than 40%.

The focus in this paper is on the tax drag implications of these features, rather than addressing performance implications of the features, which could be considerable. While the analysis has provided some information about how we can expect tax drag to vary with portfolio characteristics, tax drag is still high. Fortunately, we have a more powerful tool at our disposal that we turn to now: active tax management.

<sup>11</sup> Why do we focus on these characteristics? Benchmark return and years since inception are statistically significant and will be critical in explaining the sources of tax drag. But these are not characteristics that we have control over. As investors, we can choose managers with certain turnover levels, portfolio concentration or investment style but we cannot choose the market environment.

## Tax Management of Active Strategies

After studying tax drag of active managers, we investigate how tax management strategies can be employed to mitigate tax drag. We apply our active tax management strategy to the manager portfolios, simulating what would have happened if we ran a tax management overlay on top of the active strategy.

### The following are features of the tax management strategy:

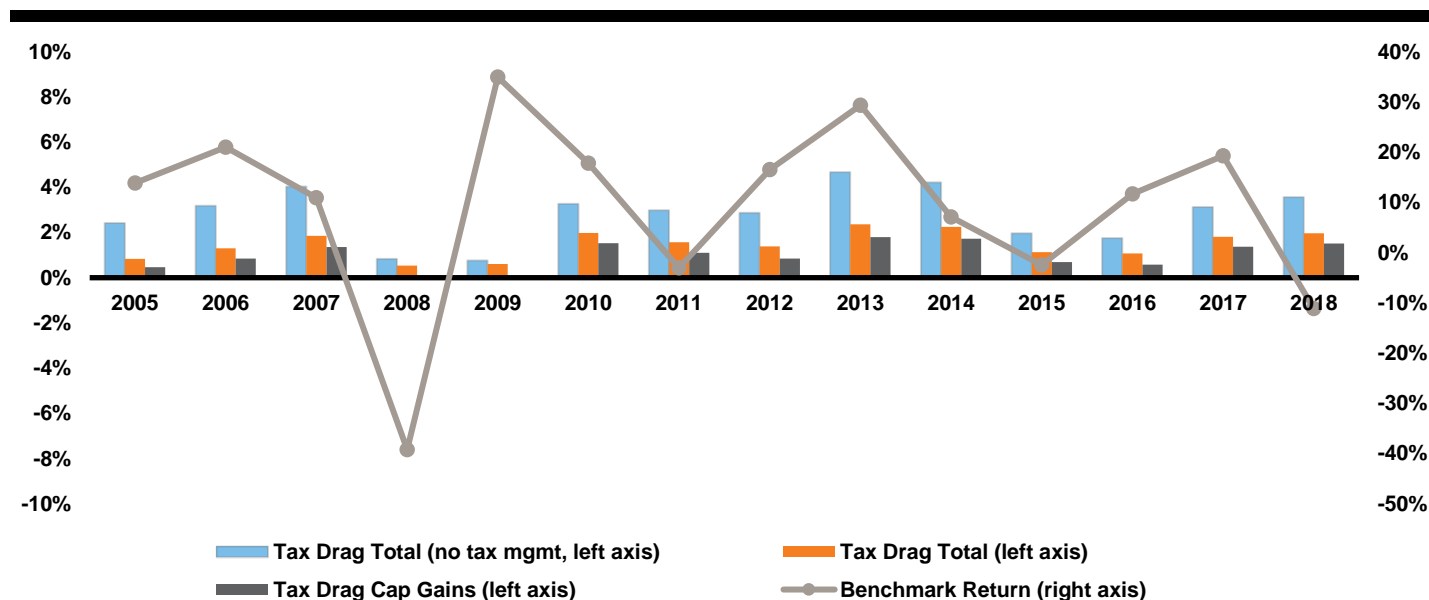
- Tax loss harvesting<sup>12</sup>
- Tax lot management
- No wash sales
- Holding period management
- Minimization of active risk versus the manager portfolio

Even though the principles of tax management tend to be consistent, the details of how those principles actually get implemented varies. There is a natural tension between reducing tax drag and maintaining tight tracking error to the underlying portfolio. The relative importance given to these two opposing forces is a balancing act, and the optimal tradeoff varies depending on context. In our case, we start with an active portfolio and seek to preserve the embedded manager insights. We use a 50bps max active weight constraint relative to the underlying portfolio in conjunction with an optimization objective to minimize tracking error to the underlying portfolios, where parameters are calibrated to achieve approximately 1% expected tracking error.

### How effective is this strategy in mitigating taxes and how does effectiveness vary with different characteristics?

### Results – tax managed strategies

Similar to the figure for non-tax managed strategies, here we present tax drag of the tax managed strategy to the market return. The tax drag without tax management is also included for comparison.



<sup>12</sup> In this paper, we are just trying to reach tax liability of zero, we are not generating additional losses for the investor to be used elsewhere.

Here we see that tax management strategies effectively mitigate taxes on SMA accounts. The headline tax drag cited previously of 2.8% is reduced to 1.5% with the application of the tax management strategy. In an environment where costs of financial services are rightfully weighed diligently against their benefit to clients, tax management overlays present a very compelling value proposition.

Do the same characteristics that impacted tax drag determine effectiveness of the strategy? Let's turn again to the model introduced above and regress tax drag of the tax-managed strategy on a set of determinants: benchmark return, turnover, name count, style and years since inception. What has changed? For one thing, the R-squared declines from 55% to 40%. In other words, the tax drag of the tax managed strategy is not as well explained by these variables.

### After Tax Mgmt:

DEPENDENT VAR: TAX DRAG OF TAX-MANAGED STRATEGY	COEFFICIENT	T-STATISTIC <sup>13</sup>
Benchmark Return	<b>0.0088</b>	<b>5.60</b>
Turnover	<b>0.0109</b>	<b>15.10</b>
Name Count	<b>-0.0002</b>	<b>-8.06</b>
Value	-0.0007	-1.07
Growth	<b>-0.0009</b>	<b>-1.27</b>
Years Since Inception	<b>0.0007</b>	<b>10.72</b>

R<sup>2</sup>= 0.404  
Adjusted R<sup>2</sup>= 0.402  
Number of observations = 1562

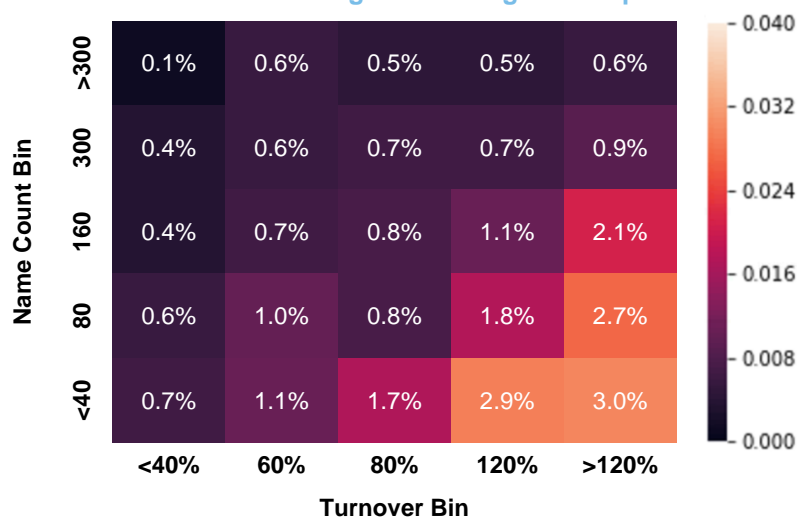
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Value	0.0008	0.93
Growth	-0.0010	-1.09
Years Since Inception	<b>0.0007</b>	<b>8.16</b>

R<sup>2</sup>= 0.554  
Adjusted R<sup>2</sup>= 0.552  
Num of observations=1562

Beyond that, it may at first seem that not much has changed. There are many similarities between the regressions including that all the (statistically significant) coefficients are directionally the same with or without tax management. So, the same things that led to higher tax drag will still lead to higher tax drag and vice versa. Direction is consistent but what about magnitude? The coefficients on benchmark return and turnover decline by almost half. The coefficient on name count has doubled in magnitude, though it may not be immediately evident how meaningful these differences are. To help illustrate what this means in practice, we report tax drag of the tax managed portfolios using the same heat map introduced above. Consistent with the previous finding, looking at the average misses most of the story, and we again see wide differences across the various manager portfolios studied.

### Active Portfolios with Tax Mgmt Tax Drag Heatmap



<sup>13</sup> Statistically significant coefficients at 95% level are marked in bold.



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In working with real data, it is rare to find patterns as strikingly consistent as this. Tax drag is still increasing with turnover. But the real change is across the y-axis. There is a clear pattern of higher name count portfolios having lower tax drag. The high turnover, low name count corner of the grid on the bottom right still has a whopping 3% tax drag. This is about a 25% improvement. In fact, across the bottom of the figure we are not doing much better than 25% improvement compared to the “before” heatmap. In contrast, the high name count portfolios have mitigated tax drag by 80-90%.

Why are high name count portfolios such a good starting point for tax management? Simply put, when it comes to mitigating taxes, having flexibility is a good thing. With more names in the portfolio, it is more likely that we can find securities with embedded losses. It is also easier to make changes to the portfolio while still maintaining the original investment thesis when there are many securities to choose from with similar industry, country, and size characteristics.

### Let’s distill these findings into some key takeaways:

- i. Of the characteristics that the investor can choose, turnover is very important in determining tax drag – the lower the better
- ii. Portfolio name count is critical in determining effectiveness of a tax management strategy – the higher the better

### What do these results mean for the portfolio?

Ultimately, the goal of this research is to improve the likelihood of successful after-tax outcomes. One way we can do this is in quantifying and simplifying a fundamental question for our investors: when will the decision to invest actively pay off, after taxes?

A few formulas are useful in helping us break this down. Consider an active equity strategy with after-tax return,  $Return_{active,After-tax}$ . We want to know what conditions are satisfied when:

$$Return_{active,After-Tax} > Return_{passive,After-Tax}$$

We can break this down further into its subcomponents:

$$\alpha + r_{mkt} - fee_{active} - TaxDrag_{active} > r_{mkt} - fee_{passive} - TaxDrag_{passive}$$

Where  $\alpha$  is the (before tax) excess return of active manager above the market return,  $r_{mkt}$ . An active manager charges  $fee_{active}$  and is subject to a tax drag,  $TaxDrag_{active}$ . The passive return follows similar nomenclature on the right-hand side. Next, we make some assumptions that while conservative (i.e. will overstate the passive return) are close to accurate and very helpful in simplifying down to what really matters.

We assume that a passive vehicle can be found that is 1) free and 2) does not incur capital gains<sup>14</sup>, i.e.:

$$fee_{passive} = 0$$
$$TaxDrag_{passive, cap gains} = 0$$

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<sup>14</sup> These assumptions are not considering a higher passive fee associated with accessing some universes (e.g., smid), a non-zero capital gains tax drag for passive on a post liquidation basis and are likely to lead to a higher estimate of required alpha than needed in practice. We discuss this further in the paper.

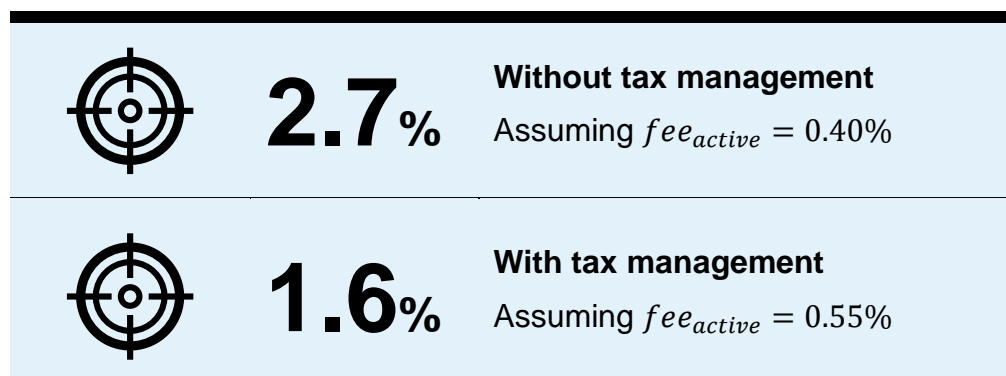
As we highlighted above, tax drag from dividends is very consistent across active strategies, and indeed this turns out to also be the case across active and passive, so to simplify further we assume that both active and passive vehicles, on average, face approximately the same tax drag from dividends:

$$TaxDrag_{passive, dividends} = TaxDrag_{active, dividends}$$

We are now left with a very basic representation:

$$\alpha > fee_{active} + TaxDrag_{active, cap\ gains}$$

The beauty of this formula is that we know  $fee_{active}$  ahead of time and we just built a model to understand  $TaxDrag_{active, cap\ gains}$ . What does this tell us about the  $\alpha$  required for the decision to pay off, after-tax? Let's start by looking at the averages across the before and after-tax management portfolios. We use a hypothetical 40bps fee assumption for the active strategy alone (with no tax management), and 55bps for the active strategy with a tax overlay run on top.



With tax management required alpha drops from 2.7% to 1.6%. When the active manager generates 2.7%, on average even after the higher tax drag of active management, the investor is better off in the active portfolio. In the case of tax management, the active manager only needs to generate 1.6% excess return. These are higher than the before tax alpha targets investors may be used to seeing, (by an amount equal to the tax drag from capital gains of active managers). Unsurprisingly, buy and hold is basically the most effective tax strategy you can have. That is, until you have to sell the portfolio. All comparisons so far have been to pre-liquidated portfolios. At liquidation, the passive portfolio holds much more embedded gains -- the cost basis has never been reset, whereas the active portfolio has been buying new securities all along. So that's one key point. So far, we are talking pre-liquidation. Post-liquidation,  $TaxDrag_{passive, cap\ gains}$  is no longer equal to zero, and these hurdles are cut in half.

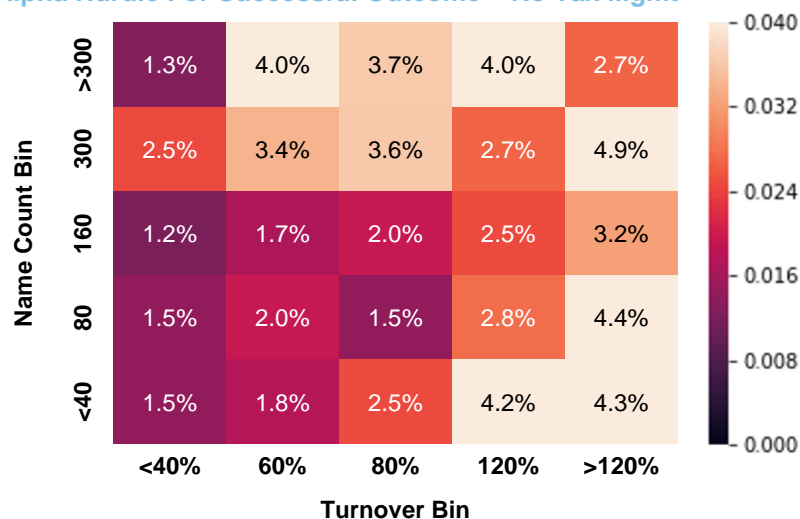
The savings from tax management more than make up for fee for the overlay. Recall these alpha hurdles already include the cost, taking into account the incremental fee for a tax overlay.

### The key takeaways are:

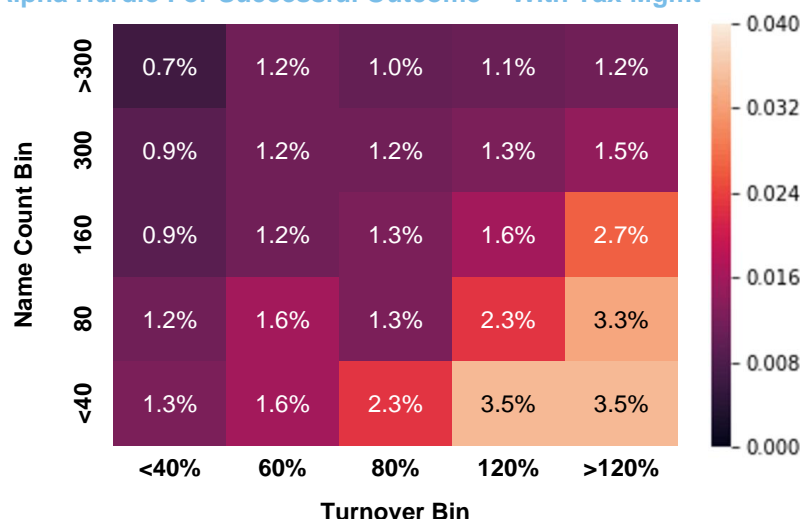
- Using tax management improves the likelihood of successful after-tax outcomes.
- Alpha hurdles on average are masking a ton of variation between portfolio characteristics.

To illustrate the power of the framework we will use simple fee assumptions cited above, reasonable for an active SMA, but you can take any fee you prefer and add it to the tax drag heatmaps in the previous sections. The variation is the key point here anyway. The high turnover manager needs to have a lot more alpha than the low turnover manager for the investor to come out ahead after taxes. We are not saying don't invest in X, but rather, only invest in X when your alpha expectation is high enough to justify the expected tax cost.

### Alpha Hurdle For Successful Outcome – No Tax Mgmt



### Alpha Hurdle For Successful Outcome – With Tax Mgmt



## Conclusion

The results presented relate to a SMA-style investment vehicle. We believe these structures are attractive for their customization and cost. But one area we have not addressed here is how these findings relate to our own tax-managed mutual funds. While we hope to expand on this in future papers, briefly stated, we believe the live tax drag of our own tax-managed mutual funds compares favorably to what has been shown for a SMA. While the SMA has many attractive features, we believe the tax benefits of the mutual fund are still compelling.

An additional potential advantage of a SMA vehicle we have not addressed here is the idea of enhanced tax loss harvesting. This involves going beyond a minimum tax liability of zero (as we did here) and actively generating losses to pass back to the SMA investor to offset losses in other parts of the portfolio. This too can be an area of future research.

Ultimately, we find that tax management represents an attractive value proposition, with the expected benefits considerably outweighing the costs. We identify characteristics that help predict how taxes will vary across different conditions and manager types and can be used in designing taxable portfolios. And finally, we show that a combination of active tax management and appropriate selection of underlying portfolios, can be used to improve the likelihood of successful after-tax outcomes for clients.

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## Appendix

### Review of the literature on active management and taxes

Many studies have explored the relationship between taxes and active management. Jeffrey & Arnott (1993) assume a constant growth rate of 6% and model portfolios with different levels of turnover and measure the impact on terminal portfolio values after 20 years. They show that the tax impact increases with turnover and that the marginal impact of taxes is decreasing. For example, above 100% turnover there is no additional impact and at very low levels of turnover, the change from even small increases in turnover is large. They also estimate the extra growth in the portfolio above 6% needed to offset the taxes. At 5% turnover, 70bps is needed, at 10%, 120bps is needed, 215bps required at 25% and 323bps at 100% or higher. Luck (1999) found that active portfolios needed to deliver 3.2% alpha in order to beat passive. Consistent with Jeffrey & Arnott, Luck suggests that the standard mutual fund turnover of approximately 100% is far above the efficient level of 8-10 years.

To combat the high tax impact of active investing, several papers have explored how these costs can be offset by employing active tax management. Stein and Narasimhan (1999) introduce several versions of tax management and show how these can mitigate tax impact on passive portfolios, as well as provide a framework for attributing returns to stock selection and tax management in active portfolios. Berkin and Ye (2003) use Monte Carlo simulations to quantify the benefits of loss harvesting and FIFO accounting and show how difference market environments impact performance of a tax management strategy. Geddes and Tymoczko (2019) looked at mutual fund data from Morningstar comparing pre-tax and post-tax returns of all actively managed US equity funds in the trailing 20-year period. Excluding dividends and liquidation, they found the tax drag on active managers was 1.6%. They also found that by moving from a passive ETF to a tax-managed ETF, the gains range from 0.8% to 1.9%, excluding liquidation and assuming ETFs generate no taxes from capital gains.

Rogers (2001) looked at tax drag of value versus growth managers. He employed a metric of tax efficiency and found that growth managers are more tax efficient than value managers. Israel, Liberman, Sosner and Wang (2019) evaluate whether taxable investors should avoid dividends and find that avoidance reduces expected pre-tax returns by more than the reduction in taxes, especially for value style strategies.

There is also a body of work exploring the tax implications of quantitative factor strategies. We plan to cover this part of the research, along with our own findings on the subject, in a subsequent research piece.

### General summary of managers dataset

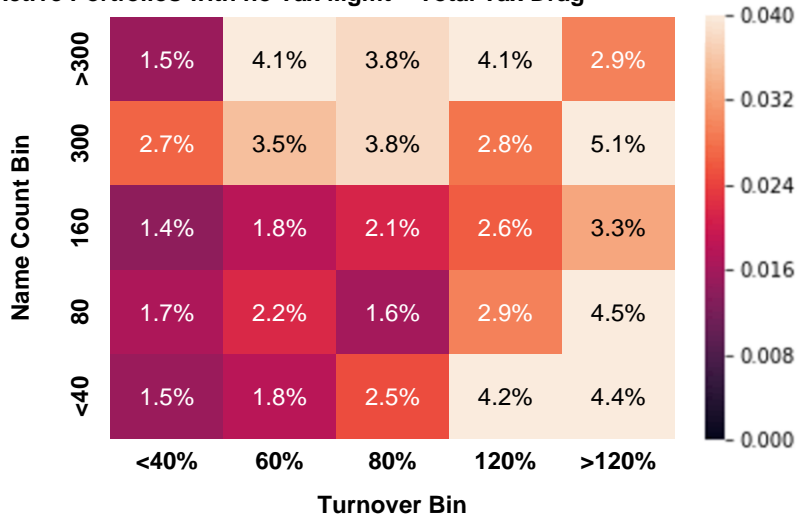
MANAGER CHARACTERISTICS	
# of Managers	157
Total # of Annual Observations	1600
Growth Managers	31%
Value Managers	30%
Large Cap Managers	59%
Small Cap Managers	26%
SMID Managers	15%
Global Managers	28%
US Managers	72%

Summary of managers according to the characteristics used in heatmaps:

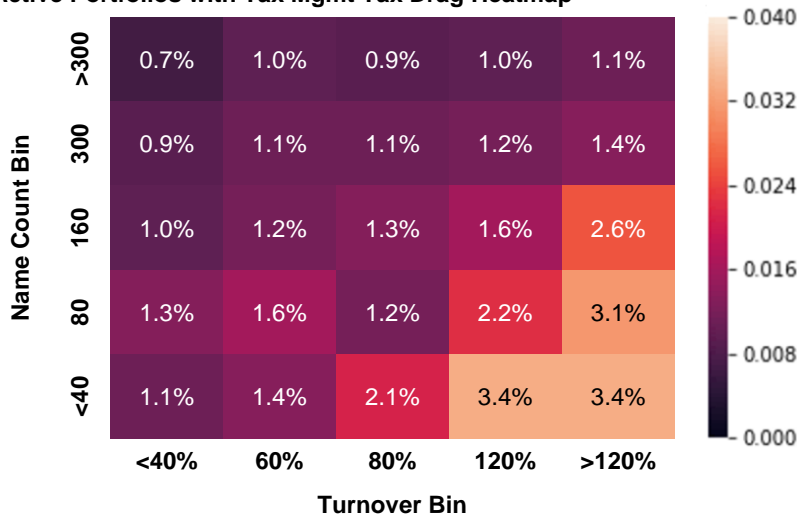
	MEAN	STD	MIN	25%	50%	75%	MAX
Portfolio Name Count	117	139	15	41	71	127	940
Average Annual Turnover (2-way)	129%	62%	24%	80%	115%	169%	320%

Total Tax Drag Heatmaps – Tax Drag from Capital Gains + Dividends

Active Portfolios with no Tax Mgmt – Total Tax Drag



Active Portfolios with Tax Mgmt Tax Drag Heatmap



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## For more information

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