Tax-Managed Factor Strategies

This presentation is based on Aperio’s Tax-Managed Factor Strategies research paper.

Aperio v. [Latin] to make clear, to reveal the truth
Tax-managed factor investing seeks to balance three objectives:

1. Maintain factor exposures (factor alpha)
2. Maximize the value of losses (tax alpha)
3. Minimize risk (forecast tracking error or total risk)

Turnover required to maintain factor exposures can erode tax alpha.

Can investors still enjoy the benefits of loss harvesting while attempting to capture factor premiums?
**Beta-1 Strategies**

- Value Tilt
- Small Size + Value Tilt
- Value + Momentum Tilt
- Multi-Factor

**Lower-Risk Strategies**

- Quality
- Quality Light
- Min Vol + Value

**Beta-1 strategies** are typically used by investors seeking to outperform a benchmark by tilting toward factors while maintaining reasonable levels of tracking error.

**Lower-risk strategies** are typically used by investors seeking to reduce total portfolio volatility while outperforming on a risk-adjusted basis. They fit the description of “forgoing some market upside in exchange for some downside protection.” They are more than “tilts”—the low beta exposure drives up tracking error.
Methodology

• Launch simulated index-tracking and factor-tilted strategies each quarter between June 1995 and March 2018* (52 historical back-tests per strategy)

• Rebalance monthly; round-trip trading costs of 12 bps

• Use highest 2018 federal tax rates (40.8% and 23.8%)**

• Analyze US and global portfolios at different horizons and dispositions (estate/donation vs. liquidation)***
  • We focus on US portfolios at a 10-year horizon in the estate/donation disposition
  • Other scenarios are available on request

*Many of the historical back-tests ran through one or both of the volatile periods between 2000 and 2010, during which loss harvesting was especially effective.

**We are effectively asking the question, “How would a loss-harvesting strategy have performed had the federal tax rates of January 2018 prevailed throughout history?”

***For more information, see Aperio’s paper “Tax-Managed Factor Strategies.”
Decomposition of After-Tax Active Return

- **After-Tax Active Return**: the difference between portfolio and benchmark returns after tax

\[
\text{After-Tax Active Return} = \text{Factor Alpha} + \text{Tax Alpha} + \text{Pre-Tax Residual}
\]

- **Factor Alpha**: active return due to factors, ignoring taxes
- **Tax Alpha**: active return due to loss harvesting
- **Pre-Tax Residual**: the difference between a tax-managed strategy and its otherwise equivalent tax-indifferent counterpart
Decomposition of After-Tax Active Return

Basic Results

10-Year Estate/Donation

Beta-1 Strategies

Lower-Risk Strategies

Tax alpha (green bars) tends to diminish with beta as we move from left to right in the chart.

Source: Aperio Group, LLC. See Appendix for actual data.
Median after-tax active return was uniformly positive, but lower-volatility strategies had a greater dispersion of outcomes in our historical back-tests.

### After-Tax Active Return

#### US 10-Year Estate/Donation

**Basic Results**

<table>
<thead>
<tr>
<th>Portfolio</th>
<th>Index Tracking</th>
<th>Value</th>
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<th>Multi-Factor</th>
<th>Quality Light</th>
<th>Quality</th>
<th>Min Vol Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Median</strong></td>
<td>2.27</td>
<td>2.76</td>
<td>2.68</td>
<td>3.87</td>
<td>3.44</td>
<td>2.73</td>
<td>2.37</td>
<td>2.34</td>
</tr>
</tbody>
</table>

Factor alpha isolates the component of after-tax active return attributable only to factors in our historical back-tests.

### Beta-1 Strategies

<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Median</td>
<td>0.84</td>
<td>0.32</td>
<td>2.09</td>
<td>0.91</td>
<td>1.80</td>
<td>2.37</td>
<td>1.98</td>
</tr>
</tbody>
</table>

Trends in Factor Alpha

While 10-year median factor alpha for US strategies was positive in our historical back-tests, it generally declined over time for beta-1 strategies.

We observed the same trend in global portfolios (see Appendix).

Source: Aperio Group, LLC. Rolling 10-year estate/donation factor alpha for six factor tilts in the US market. For more information, see Aperio’s paper “Tax-Managed Factor Strategies.”
Tax Alpha

Lower-risk strategies delivered significantly less tax alpha than beta-1 strategies in our historical back-tests.

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</thead>
<tbody>
<tr>
<td>Median</td>
<td>2.16</td>
<td>1.82</td>
<td>1.70</td>
<td>2.00</td>
<td>1.77</td>
<td>1.65</td>
<td>0.46</td>
<td>0.19</td>
</tr>
</tbody>
</table>

Estate/Donation vs. Liquidation Tax Alpha

Under liquidation, where taxes are merely deferred, tax alpha tended to be lower in our historical back-tests for beta-1 strategies.

Hurdle Rate

To break even, lower tax alpha in a factor strategy must be compensated with factor alpha.

\[
\text{Hurdle Rate} = \text{Base Tax Alpha} - \text{Factor Strategy Tax Alpha}
\]
Median hurdle rates were lower for beta-1 strategies than for lower-risk strategies in our historical back-tests.

In order for a tilt to be a rational choice for a taxable investor, its factor alpha must exceed its hurdle rate.

### Beta-1 Strategies

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<th>Quality</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Estate/Donation</td>
<td>0.46</td>
<td>0.61</td>
<td>0.32</td>
<td>0.50</td>
<td>0.58</td>
<td>1.50</td>
<td>2.20</td>
</tr>
<tr>
<td>Liquidation</td>
<td>0.04</td>
<td>0.06</td>
<td>-0.12</td>
<td>-0.01</td>
<td>0.24</td>
<td>0.55</td>
<td>1.00</td>
</tr>
</tbody>
</table>

In our historical back-tests, loss harvesting was most effective in turbulent, declining markets when Quality factor alpha was strongest. Value factor alpha had no apparent relationship to index returns.
Implicit Tax Arbitrage

- Maintaining factor tilts requires turnover, which raises the cost basis of the portfolio and facilitates the harvesting of short-term losses.

- The full benefits of loss harvesting can be enjoyed only by investors with ample short-term gains to offset.
Incremental Risk Due to Loss Harvesting

• Loss harvesting increases risk, but by how much?

\[
\text{Incremental Risk} = \text{Tax-Managed Risk} - \text{Tax-Indifferent Risk}
\]

• Incremental risk is the increase in the width of the distribution of relative returns due to loss harvesting.
The incremental risk from loss harvesting was generally lower for beta-1 strategies in our historical back-tests.

### Incremental Risk

**US 10-Year**

The incremental risk from loss harvesting was generally lower for beta-1 strategies in our historical back-tests.

#### Table: Incremental Risk

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<tr>
<th>Portfolio</th>
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</thead>
<tbody>
<tr>
<td>Median</td>
<td>0.18</td>
<td>0.19</td>
<td>0.11</td>
<td>0.30</td>
<td>0.41</td>
<td>0.61</td>
<td>0.31</td>
</tr>
</tbody>
</table>

Source: Aperio Group, LLC. Difference in realized risk (tracking error or volatility) between tax-managed and tax-indifferent factor tilts at a 10-year horizon in the US market. June 1995–March 2018. For more information, see Aperio’s paper “Tax-Managed Factor Strategies.”
Summary

• Aperio’s tax-managed factor strategies captured both factor alpha and tax alpha in our historical back-tests

• Index-tracking strategies typically had the highest tax alpha under estate/donation but not under liquidation in our historical back-tests

• In our historical back-tests, tax alpha was higher in beta-1 strategies than in lower-risk strategies and in turbulent markets than in calm markets

• Incremental risk due to loss harvesting was typically not more than 0.61% in our historical back-tests
Limitations of This Study

- The results reflect the period over which the study was run. The future may be different from the past
- The construction of the tax-indifferent tilt affects the results
- The Min Vol Value portfolios in this study have betas of ~0.5
- The strategies in our historical study are robotic, while live strategies may reflect real-time judgment
- The benchmark is not taxed in the estate/donation disposition
- Tax-loss harvesting strategies may have higher fees than straightforward indexing strategies, and that cost can diminish benefits
- A historical test is subject to look-ahead bias, no matter how hard a researcher tries to eliminate it
Appendix
Guide to Box Plots

A box plot shows a range of observed or simulated outcomes and provides a broader perspective than a simple average or median.
Results: Tax Alpha (Global)

Source: Aperio Group, LLC. Ten-year estate/donation tax alpha for a tax-managed indexing strategy and six factor tilts in the global market. June 1995–March 2018. For more information, see Aperio’s paper “Tax-Managed Factor Strategies.”
Global portfolios experienced the same decline in factor alpha we observed in US portfolios.

Source: Aperio Group, LLC. Rolling 10-year estate/donation factor alpha for six factor tilts in the global market. For more information, see Aperio’s paper “Tax-Managed Factor Strategies.”
Hurdle Rate

US 10-Year Estate/Donation

In order for a tilt to be a rational choice for a taxable investor, its factor alpha must exceed its hurdle rate.

![Beta-1 Strategies vs. Lower-Risk Strategies]

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</thead>
<tbody>
<tr>
<td>Median</td>
<td>0.39</td>
<td>0.24</td>
<td>0.32</td>
<td>0.41</td>
<td>0.49</td>
<td>1.25</td>
<td>1.57</td>
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</table>

# Strategy Benchmarks/Universes

## Menu of Factor Tilts

<table>
<thead>
<tr>
<th></th>
<th>US</th>
<th>Global</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Universe &amp; Performance Benchmark</td>
<td>Universe &amp; Performance Benchmark</td>
</tr>
<tr>
<td>Index Tracking</td>
<td>R1000</td>
<td></td>
</tr>
<tr>
<td>Value</td>
<td>R1000</td>
<td></td>
</tr>
<tr>
<td>Value Momentum</td>
<td>R1000</td>
<td></td>
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<tr>
<td>Small Value</td>
<td>R3000</td>
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<tr>
<td>Multi-Factor</td>
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<tr>
<td>Quality Light</td>
<td>R1000</td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td>R1000</td>
<td></td>
</tr>
<tr>
<td>Min Vol Value</td>
<td>R1000</td>
<td>MSCI ACWI</td>
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</table>
## Decomposition of After-Tax Active Return

### 10-Year Estate/Donation

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Factor Alpha</td>
<td>0.00</td>
<td>0.00</td>
<td>1.13</td>
<td>1.93</td>
<td>1.01</td>
<td>2.01</td>
<td>2.60</td>
<td>2.54</td>
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<tr>
<td>Tax Alpha</td>
<td>2.26</td>
<td>2.39</td>
<td>1.77</td>
<td>2.02</td>
<td>1.59</td>
<td>2.12</td>
<td>1.89</td>
<td>2.07</td>
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<tr>
<td>Pre-Tax Residual</td>
<td>-0.10</td>
<td>0.00</td>
<td>0.00</td>
<td>0.06</td>
<td>0.27</td>
<td>-0.02</td>
<td>-0.51</td>
<td>-0.12</td>
</tr>
</tbody>
</table>
Disclosure

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