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An Empirical Evaluation of Tax-Loss-Harvesting Alpha

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Advances in financial technology have made tax-loss harvesting more feasible for retail investors than such strategies were in the past. We evaluated the magnitude of this “tax alpha” with the use of historical data from the CRSP monthly database for the 500 securities with the largest market capitalizations from 1926 to 2018. Given long-term and short-term capital gains tax rates of 15% and 35%, respectively, we found that a tax-loss-harvesting strategy yielded a before-transaction-cost tax alpha of 1.08% per year for our sample period. When the strategy was constrained by the “wash sale rule,” the tax alpha decreased from 1.08% per year to 0.82% per year.

Tax-loss harvesting is a strategy of closing losing positions in securities with the goal of generating capital losses that can be used to reduce taxes. Prior academic work has described the underlying logic of tax-loss harvesting and calculated the effective alpha that can be derived from such a strategy (Garland 1987; Stein and Narasimhan 1999; Arnott, Berkin, and Ye 2001; Berkin and Ye 2003). For example, using simulated securities, Arnott et al. reported that a tax-aware portfolio outperformed a similar buy-and-hold portfolio by a total of 27% over a 25-year period.

When these earlier papers were published, there were two barriers to the widespread implementation of tax-loss harvesting. First, transaction costs in the form of commissions and bid-ask spreads were relatively high. Second, administrative costs involved in keeping track of trades and producing the correct filings were also relatively high. As a consequence, a paper from this earlier period argued that recognizing tax alpha is “easier said than done” (Jeffrey 2001). Because of these costs, tax-advantaged trading was primarily undertaken by taxable entities, both institutional and individual, with large accounts for which the fixed costs of this strategy created a smaller percentage drag on the portfolio.

In the decades since this original work, however, the costs associated with trading have declined significantly. For example, commissions have experienced a persistent decline and are zero at some firms (e.g., Charles Schwab). With the advent of decimalization, bid-ask

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spreads have also declined significantly. Finally, the overall decline in computing costs has made execution and recordkeeping of trades much less expensive than in the past. A tax-alpha strategy is now practical for entities with much smaller accounts than before (Stein and Garland 2008).

These decreasing costs have led to a number of new “fintech” startup firms that market tax-loss-harvesting strategies to entities with account balances below \$100,000. The fintech companies, often called “robo-advisors,” advertise a significant tax alpha for the investor. The firms both solicit funds through their tax-alpha claims and run live portfolios for clients.

Although the decline in costs has made tax-aware investing more favorable, other trends in investing are moving in the opposite direction. Investors have moved toward passive investing via mutual funds and exchange-traded funds (ETFs). Mutual funds are barred from passing through security-level tax losses. Similarly, index-tracking ETFs are not designed to harvest tax losses.

With tax-aware investing becoming more cost-effective, we believe it will, consequently, become more important for investors. In fact, the benefits of harvesting losses may now be large enough to slow or reverse the powerful trend toward passive investing.

Given this possibility, we returned to the earlier academic work on tax-loss harvesting. Using simulated returns, we replicated the prior academic analyses and extended that work by using historical data for US equities broken down into important subperiods.

We found that tax alpha was important in the historical US data but that it varied strongly in different time periods. Furthermore, we found that because the alpha from loss harvesting comes from the ability to use capital losses to offset capital gains derived from other activities, tax alpha is highest in periods when investors are least likely to be able to use the capital losses to reduce taxes.

Methods

The primary contribution of this article is an examination of the value of tax-loss harvesting using historical returns. Therefore, we used the same methods as earlier studies that used simulated security returns (e.g., Berkin and Ye 2003). Like Berkin and Ye, we made a number of assumptions

when implementing a simulated tax-loss-harvesting strategy. First, we assumed that the transaction costs were negligible and that securities could be traded with no market frictions. Under these assumptions, tax-loss harvesting realized losses whenever the market price of a holding fell below its cost basis, where the cost basis was determined by highest in, first out (HIFO) accounting. This assumption should not have had a significant impact on the results of our analysis because our assumptions approximate trading highly liquid, large-capitalization securities. Note, however, that an actual implementation would harvest losses only if they exceeded a threshold defined by market frictions, especially in illiquid markets.

Second, in our initial analysis, we assumed that the tax-loss-harvesting strategy was not constrained by the “wash sale rule,” and thus shares that had been sold at a loss could be repurchased immediately.¹ Although this assumption likely overstated the benefits of loss harvesting, its effect should have been marginal because a stock with similar return characteristics could be purchased, in practice, albeit with greater tracking error. Indeed, when we applied the wash sale rule and assumed the proceeds from harvesting losses remained in cash for one month before those securities were repurchased, the average annualized tax alpha across the entire historical sample, from 1926 to 2018, decreased from 1.08% to 0.82%.

Third, we assumed that the tax credit created by harvesting losses could be treated as a cash inflow that could immediately be reinvested into the portfolio. This assumption is reasonable because the tax savings of harvesting losses, especially when applied to quarterly tax estimates, provide a nearly contemporaneous cash flow benefit. The money saved from paying lower taxes remains available for continued investment.

Fourth, we confined our attention to long-only strategies, although we acknowledge that, in practice, sophisticated investors may be able to achieve greater tax-loss harvesting than our estimates indicate. A series of papers showed that adding short positions increases the tax alpha (Means 2002; Farr 2004; Gallmeyer, Kaniel, and Tompaidis 2006; Berkin and Luck 2010; Sialm and Sosner 2018). For example, Berkin and Luck wrote, “Extended mandates are especially effective for investors subject to taxes” (p. 33). Few retail investors engage in active short selling, however, and our goal was to gauge the benefits of tax-loss harvesting for the broadest population of individuals, not high-net-worth long-short

equity hedge fund investors, who have many tax-optimization channels, including offshore funds, low-tax “opportunity zones,” and various charitable gifting and estate-planning structures.

Finally, we applied a marginal tax rate of 35% to all short-term capital gains and a 15% tax rate to all long-term capital gains and dividends. (Actual US tax rates varied dramatically during the time period of our analysis.) Because long-term capital gains are often taxed at lower rates than short-term gains, tax-loss harvesting can improve a portfolio’s performance by shifting the realization of losses toward the short term. This step effectively reduces the amount of highly taxed short-term capital gains as a fraction of the total capital gains. To study the strategy’s performance when the investor cannot affect the tax character of the gains, we also applied a constant marginal tax rate of 35% to all gains.

Although we varied tax rates between analyses, each individual analysis used a constant set of tax rates throughout the entire time period. An additional analysis that we considered involved combining the historical return data with historical tax regimes, which could provide insights into the actual tax alpha that could have been obtained by investors over the period of our analysis going back to 1926. Such analyses would rely on a detailed understanding of the tax code in many different regimes, however, and, therefore, were beyond the scope of this work.

In our simulation, we used the same methodology as Berkin and Ye (2003). Each month, we liquidated all tax lots that had losses and then immediately repurchased the same number of shares. We aggregated the tax credits from any harvested losses with the tax obligations from dividends and realized capital gains, and we reinvested the net cash flow back into the portfolio. In the event of a net cash outflow, the tax lots with the highest cost basis, as determined by the FIFO accounting strategy, were sold first. Because our interest was quantifying the after-tax returns of the fund following tax-loss harvesting in various historical market conditions, we tracked the portfolio’s net value after subtracting any deferred taxes that had not yet been realized. As Berkin and Ye pointed out, this value is defined as the net-of-tax liquidation value of the portfolio.

We extracted stock return data with and without dividends from the University of Chicago’s CRSP monthly database. Only US common stocks were included, which eliminated real estate investment

trusts, American Depositary Receipts, and some other types of securities.

We applied tax-loss harvesting to a portfolio of the 500 largest securities by market cap from July 1926 through June 2018. The constituents of this market cap-weighted index were rebalanced on the first trading day of each month. When a stock was removed from the index, it was replaced with a new index constituent.

For this 92-year sample period, we calculated the performance history of tax-loss harvesting for four nonoverlapping 23-year subperiods: 1926–1949, 1949–1972, 1972–1995, and 1995–2018. Each subperiod begins on the first trading day in July and ends on the last trading day of June. These subperiods were chosen to illustrate various market conditions—from economic recession and financial turbulence to economic expansion and reduced volatility.

We assumed counterfactually, however, that the marginal tax rates on dividends and short- and long-term capital gains remained constant throughout these periods. The primary goal of this study was to explore the value of tax-loss harvesting under current US tax regulations by using historical returns to sample various market conditions.

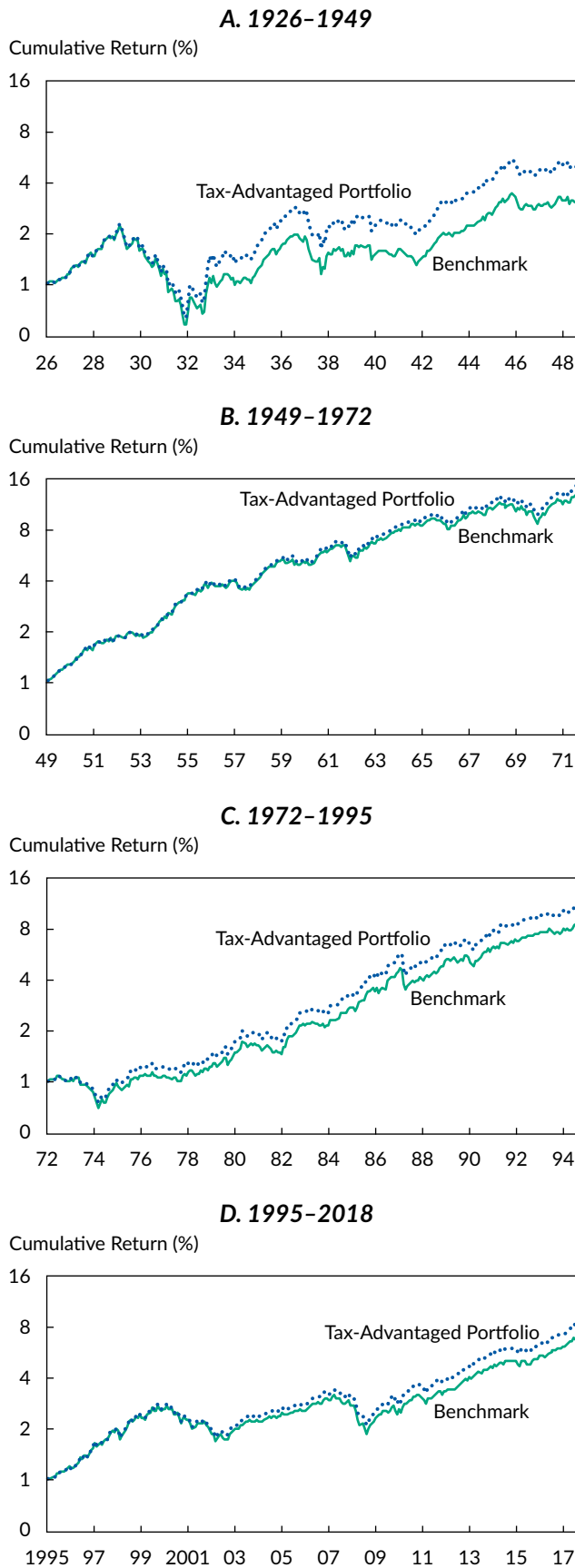
Results

We validated our methods by first replicating the results of Berkin and Ye (2003). Then, we extended the analysis by using the same portfolio construction and measurement but with historical returns instead of simulated returns.

Our measure of performance was the portfolio’s annualized alpha after liquidation taxes. This metric was calculated as the return on the tax-advantaged portfolio minus the return on the passive benchmark portfolio, which did not implement loss harvesting. We formed monthly returns by subtracting the investor’s cash contribution from the end-of-month after-tax-liquidation value of the portfolio, then dividing the result by the initial portfolio value. In the base scenario, we assumed investor deposits were equal to 1% of the gross benchmark portfolio value per month. For completeness, we report performance statistics that include the annualized alpha of loss harvesting before liquidation taxes.

We accumulated the returns for each portfolio geometrically and show the plots for each of the four subperiods in **Figure 1**. We found that tax-loss

Figure 1. Cumulative Returns of the Tax-Advantaged and Benchmark Portfolios for Four Subperiods



harvesting improved the after-tax returns during each subperiod but its performance varied substantially according to market conditions. Not surprisingly, the strategy performed well when stock returns were highly volatile and there were more opportunities to harvest losses. In contrast, the strategy closely tracked the benchmark's performance during periods of reduced volatility and economic expansion. **Table 1** reports the summary statistics for the monthly returns of the tax-advantaged portfolio.

During the 1926–1949 subsample, which includes the Great Depression and its subsequent recovery, Table 1 reports that the average annualized alpha was an impressive 2.13%. Conversely, during the post–World War II economic expansion, the 1949–1972 subperiod, the average annualized alpha was a modest 0.51%. Finally, the 1972–1995 and 1995–2018 periods fell between those extremes of financial turbulence and moderation. Consequently, their average annual alphas were, respectively, 1.08% and 0.81%.

To examine these dynamics more closely, we calculated the 12-month moving average of the

tax-advantaged portfolio's annualized alpha during the 1926–1949 period. This graph is provided in Panel A of **Figure 2**. We also computed the rolling distribution of normalized prices for our benchmark index of large-cap stocks, which is provided in Panel B of Figure 2. Normalizing prices sets all the prices to 1.0 at the start of the period. It allows effective visualization of volatility.

As shown in Panel A of Figure 2, the tax-advantaged portfolio outperformed the benchmark portfolio during the price declines between 1929 and 1932. This result is understandable because the tax-loss harvesting tilts the balance of losses toward the short term, reducing the amount of highly taxed short-term capital gains as a fraction of total capital gains. This effect outweighs the fact that as prices declined, the benchmark portfolio benefitted from having a higher cost basis once liquidation taxes were taken into account.

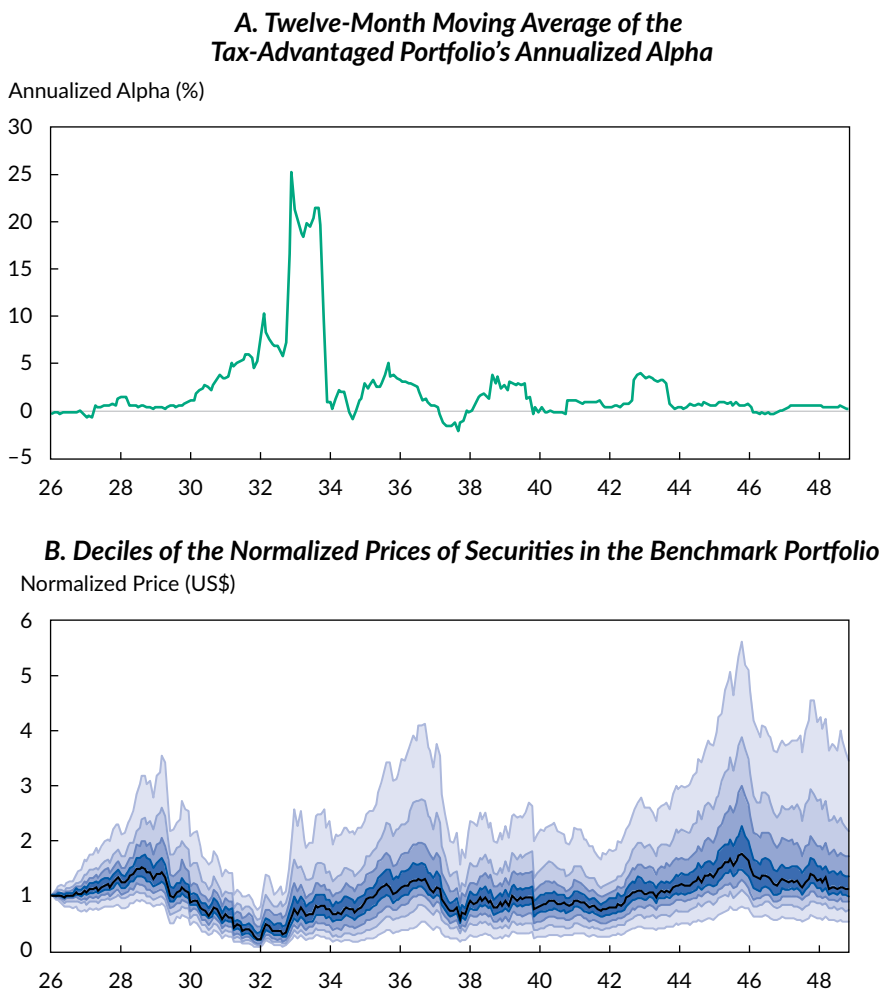
As prices recovered from their 1932 nadir, the tax alpha increased substantially. Because the benchmark portfolio did not harvest losses during the decline, the tax credits that augment the

Table 1. Annualized Alpha of the Tax-Advantaged Portfolio and Summary Statistics of the Monthly Returns of the Benchmark Portfolio

Period	Per Year					
	Annualized Alpha	Annualized Turnover	Benchmark Mean	Benchmark Std. Dev.	Benchmark Avg. CSD	Benchmark Max. DD
<i>After liquidation taxes</i>						
1926–1949	2.13%	30.62%	5.00%	20.19%	6.85%	74.64%
1949–1972	0.51	21.68	12.04	10.43	4.51	25.25
1972–1995	1.08	28.95	10.19	12.95	5.47	36.24
1995–2018	0.81	25.89	8.84	11.99	6.16	41.05
1926–2018	1.08	25.85	9.01	14.46	5.74	74.64
<i>Before liquidation taxes</i>						
1926–1949	3.05%	30.62%	4.98%	26.56%	6.85%	83.42%
1949–1972	0.79	21.68	12.97	12.25	4.51	29.60
1972–1995	1.50	28.95	10.95	15.52	5.47	44.35
1995–2018	1.17	25.89	9.74	14.04	6.16	46.41
1926–2018	1.46	25.85	9.56	17.95	5.74	83.42

Notes: “Annualized Alpha” is the annualized alpha of the tax-advantaged portfolio relative to the benchmark portfolio. “Annualized Turnover” is the one-sided annualized turnover of the tax-advantaged portfolio. “Benchmark Mean” indicates the average annualized return of the benchmark portfolio. “Benchmark Std. Dev.” indicates the annualized standard deviation of returns of the benchmark portfolio. “Benchmark Avg. CSD” is the average cross-sectional dispersion of the returns of the benchmark portfolio's constituents, where dispersion is measured by the absolute deviation. “Benchmark Max. DD” is the maximum drawdown of the benchmark portfolio.

Figure 2. Moving Average of the Tax-Advantaged Portfolio's Annualized Alpha and Normalized Prices of Securities in the Benchmark Portfolio, 1926–1949



liquidation value of a tax-advantaged portfolio, especially in a rising market where the benefit is compounded, were never realized. As a result, the tax-advantaged portfolio substantially outperformed the passive benchmark during the recovery period. This effect was strengthened during this period because of the extreme nature of the price fluctuations. In particular, almost all stocks fell below their initial normalized cost basis of \$1 during the price decline. Similar dynamics can be observed over the course of subsequent business cycles, but to a lesser extent.

Of course, this result assumes that investors have other short-term gains to offset, and in an environment with few gains, like that of the Great Depression, the value from harvesting losses would have to be carried forward to offset future gains. Often, the amount of loss that can be carried forward or deducted against ordinary income is limited, which would decrease the overall benefit of harvesting

losses early. These risks are only compounded once transaction costs and regulatory constraints (such as the wash sale rule) are imposed on the portfolio.

The Impact of Transaction Costs. Corwin and Schultz (2012) estimated that the average bid-ask spread for a large-cap US stock is 50 basis points (bps). We used this bid-ask spread to examine the transaction costs caused by turnover for our portfolio. (The large-cap cost is appropriate for this study because we focused on the 500 largest stocks.) If the midpoint of the bid-ask spread is assumed to represent fair value and each trade is assumed to be small enough to have a negligible price impact, then any one buy or sell would incur a cost of 25 bps. A swap of one security for another would incur two such costs, for a total of 50 bps.

Using this transaction cost estimate and approach, we calculated that every 1% of annual turnover would create 0.5 bp of transaction cost. Across

the entire 1926–2018 time period, we report an average annual alpha of 108 bps and average turnover of 25.85%. With 26% annual turnover, using 0.5 bp per 1% of turnover would subtract 13 bps to yield approximately 95 bps of annual alpha net of transaction costs.

Applying a Constant Marginal Tax Rate.

Table 2 reports the tax alpha when a constant marginal tax rate is applied across all capital gains, both short-term and long-term, and dividends. In this case, the tax advantage from tilting the balance of losses toward the short term is reduced because both long- and short-term capital gains are taxed at the same rate. For example, the annualized tax alpha for the entire period decreased from 1.08% to 0.53% when the long-term capital gains tax rate increased from 15% to 35% and the short-term capital gains tax rate was held constant at 35%. Harvesting losses still provides positive alpha, however, because the tax credits the losses generate, even when short-term losses are used to offset long-term gains, compound over time in rising markets. As prices increase, these compounded tax credits counterbalance and exceed the benefit the benchmark portfolio gains from having a higher cost basis once liquidation taxes are taken into account.

Sensitivity Analysis. We also studied the returns of the tax-advantaged portfolio in a wide range of market conditions and examined the effect of portfolio-specific factors and tax regulations on the performance of the strategy. In this section, we consider the impact of three of these factors: the rate of investor cash contributions, different

combinations of marginal tax rates on long- and short-term capital gains, and the wash sale rule.

In addition to our analysis of historical data, we also carried out a series of Monte Carlo simulations in which asset returns followed the capital asset pricing model (CAPM) of Sharpe (1964) and Lintner (1965). Specifically,

$$r_i = r_f + \beta_i(r_m - r_f) + \varepsilon_i, \tag{1}$$

where

r_i = the return on asset i

r_f = the risk-free rate

β_i = the sensitivity of asset i to market fluctuations

r_m = the return on the market

ε_i = the idiosyncratic component of r_i

Like Berkin and Ye (2003), we used historical values to calibrate the model. The risk-free rate was fixed at 0.28% per month, and the expected market return was set to 0.94% with a monthly volatility of 5.32%. The betas were drawn randomly from a normal distribution with mean 1 and standard deviation 0.3 truncated at 0.1 and 3, and the dividend yield and idiosyncratic volatility were set to 0.12% per month and 9% per month, respectively. We simulated a 500-asset portfolio for 92 years (i.e., 1926–2018) and assumed index composition turnover of one security each month. We repeated this process 1,000 times to estimate the median annualized alpha.

As shown in **Table 3**, the performance of the tax-loss-harvesting strategy can be substantially affected by the rate of investor transfers into and out of the portfolio. As capital flows into the portfolio, new shares need to be bought, generally at a higher cost basis than the shares already in the portfolio. This situation provides the strategy with more opportunities to harvest losses and generate tax credits. In addition, the higher cost basis has a nonlinear effect on the relative liquidation value of the tax-advantaged and benchmark portfolios. The results in **Table 3** show that the combination of these effects is such that the tax alpha generally increases with contributions in all market environments. On average, the results for the entire historical period closely match the CAPM simulated results.

We also considered the effect of varying the short-term capital gains tax rate between 20% and 50%

Table 2. Annualized Alpha of Tax-Loss-Harvesting Strategy for Constant Marginal Tax Rates Applied to All Capital Gains

Period	Constant Marginal Tax Rate		
	20%	35%	50%
1926–1949	0.54%	0.90%	1.15%
1949–1972	0.15	0.23	0.28
1972–1995	0.35	0.56	0.70
1995–2018	0.19	0.31	0.40
1926–2018	0.32	0.53	0.69

Note: Alpha is reported per year.

Table 3. Annualized Alpha of Tax-Loss-Harvesting Strategy for Varying Rates of Investor Cash Contributions

Period	-1% per Month	0% per Month	1% per Month	2% per Month
1926-1949	1.84%	1.88%	2.13%	2.27%
1949-1972	0.12	0.20	0.51	0.66
1972-1995	0.95	0.97	1.08	1.14
1995-2018	0.27	0.39	0.81	0.99
1926-2018	0.57	0.72	1.08	1.23
CAPM	0.45	0.50	1.16	1.46

Notes: Alpha is reported per year. Deposits are a percentage of the gross benchmark portfolio value per month. A negative cash contribution rate denotes investor withdrawals. For the Monte Carlo simulated CAPM results, the median annualized alpha is reported.

and the long-term rate between 0% and 30%. In each of these analyses, we used the same tax rate throughout the entire time period. (A possible extension would be to vary the tax rates across the sample and use historical tax rates.) **Table 4** reports the results for three short-term/long-term rate combinations. Note that the tax alpha increases monotonically with the tax rate for all subperiods and the CAPM simulation. The annualized tax alpha for the most recent period (1995-2018) increased from 0.63% in the 20% short-term/0% long-term case to 0.98% in the 50% short-term/30% long-term case.

This tax alpha is substantial and over time could have a considerable impact on the portfolio's value.

Finally, we constrained the tax-loss harvesting by the wash sale rule and assumed the proceeds from harvesting losses remained in cash for one month before those securities could be repurchased. In practice, the investor could purchase a stock with similar return characteristics immediately rather than holding the receipts in cash, so this implementation provides a lower bound on performance. As **Table 5** shows, under this conservative assumption, the average annualized tax alpha across the entire historical sample, 1926-2018, decreased from 1.08% to 0.82%. Furthermore, if 0.13% was subtracted for transaction costs and the strategy conformed to the wash sale rule, the tax alpha for the whole sample period dropped to 0.69%.

Discussion

This study is an update and extension to prior academic work on tax alpha strategies. Unlike earlier studies, which used simulated returns to model tax-aware strategies, ours used historical US returns to extend the conclusions. We reported that tax alpha exists in a wide variety of real market conditions. After dividing the data into four historically relevant time periods and a relatively small number of market regimes, we reported finding positive tax alpha in each period.

In our original analysis, we ignored the wash sale rule. In a live portfolio, however, an investor would

Table 4. Annualized Alpha of Tax-Loss-Harvesting Strategy for Varying Combinations of Short-Term and Long-Term Capital Gains Tax Rates

Period	Tax Rate		
	Short-Term 20%, Long-Term 0%	Short-Term 35%, Long-Term 15%	Short-Term 50%, Long-Term 30%
1926-1949	1.70%	2.13%	2.52%
1949-1972	0.39	0.51	0.61
1972-1995	0.80	1.08	1.32
1995-2018	0.63	0.81	0.98
1926-2018	0.81	1.08	1.32
CAPM	0.84	1.16	1.54

Notes: Alpha is reported per year. For the Monte Carlo simulated CAPM results, the median annualized alpha is reported.

Table 5. Annualized Alpha of the Tax-Loss-Harvesting Strategy with and without the Wash Sale Rule

Period	Without Wash Sale Rule	With Wash Sale Rule
1926–1949	2.13%	1.79%
1949–1972	0.51	0.21
1972–1995	1.08	0.77
1995–2018	0.81	0.55
1926–2018	1.08	0.82
CAPM	1.16	0.98

Notes: Alpha is reported per year. For the Monte Carlo simulated CAPM results, the median annualized alpha is reported. With the wash sale rule, the proceeds from harvesting losses remained in cash for one month before those securities were repurchased.

have to honor the wash sale rule; instead of reinitiating the same position, the investor would have to buy a different security with similar characteristics and a high return correlation with the sold security. Honoring the wash sale rule introduces some tracking error between the portfolio and the benchmark.

The equity market regimes can be characterized by three market attributes related to tax-loss harvesting. The first attribute is the geometric mean return for the market. In general, the higher the market return, the lower the investor's ability to find losses to harvest. The second attribute is the volatility of the market. The higher the volatility of the market, the more losses exist for the investor to harvest. The third attribute is the cross-sectional dispersion of the individual security returns. Again, the higher the dispersion, the greater the opportunity for tax-loss harvesting. Thus, the ideal environment for generating tax credits through tax-loss harvesting is a volatile stock market with high dispersion and low overall market returns. If this period of market turbulence is followed by a recovery period with high returns, the benefit of harvesting earlier losses is compounded. In the historical data, the period from 1926 to 1949 had exactly the characteristics that would be predicted to generate high tax alpha, and this period did indeed generate the highest annual alpha in our analysis.

Tax-loss harvesting yielded substantial value in the historical US data from 1926 to 2018: a geometric average of 1.08% in tax alpha per year and a positive

tax alpha in every subperiod that we examined. Three caveats need to be kept in mind, however, in interpreting these results.

The first caveat is that the benefits of tax-loss harvesting are quite variable. In our analysis, the lowest annual value of tax harvesting was 0.51%, and the maximum was 2.13%. This finding suggests that investors need to consider the variation in tax alpha together with its average characteristics.

The second caveat is that our focus was on long-only strategies, which may understate the potential benefits of tax optimization, especially to investors with access to dynamic long-short trading strategies, such as statistical arbitrage. A way to gauge the tax alpha of such strategies would be to compare the before-tax and after-tax historical performance of simple long-short market-neutral mean-reversion strategies, as found in Lo and MacKinlay (1990), or a passive long-short strategy, such as the rules-based 130/30 index (130% in long positions and 30% in short positions) of Lo and Patel (2008). We hope to pursue this analysis in future work.

The third caveat is the assumption—adopted both in this article and in the prior literature—that investors have other gains that would give the harvested losses value as a means of reducing the overall taxes paid. In an environment without any gains, the tax losses will have no immediate value. (Under current US law, losses can be carried forward to offset future gains.) The relevance of this caveat to tax-loss harvesting is made clear when we note that the highest tax alpha in the historical data occurred during the Great Depression. Almost every asset class declined in price during the Great Depression, and the large majority of investors experienced losses.

Our estimate of 108 bps per year in tax alpha over the entire 1926–2018 time period is subject to important assumptions and qualifications. Abiding by the wash sale rule and including transaction costs decrease the tax alpha. Combining tax-loss harvesting, however, with some process of simultaneously donating highly appreciated securities to charity could increase the tax alpha. Finally, the base case in our analysis assumed a 1% per month addition to the portfolio. A higher contribution per month would increase the tax alpha; using a lower contribution rate would decrease it.

Our analysis was performed under the US tax code. Capital gains rules vary widely among countries, and although some effort has been made toward

harmonization, such convergence is not complete (Zielke 2009). Because of the important variations in legal structure, detailed analysis of the tax alpha from similar strategies in other countries was beyond the scope of this article. As long as capital gains are taxed and losses can be applied against gains, however, the potential exists for tax alpha from similar strategies in other countries.

More broadly, the technological removal of cost barriers to tax-aware strategies is likely to make tax-advantaged strategies accessible to the smaller investor in the same way that increased technological ease of calculating an option price stimulated the growth of the options market and the increased technological ease of rebalancing a portfolio led to the growth of index funds. We predict that the decreasing cost of computing and portfolio management will change the cost-benefit evaluation of tax-aware investing, and lead to a significant increase in the use of tax-loss harvesting for a wide range of

investors, even those with modest amounts to invest. Given this anticipated change in the investment landscape, it is important for such investors to know the best conditions under which to apply a tax-aware strategy. For example, a volatile market with low overall returns under a high marginal tax rate may favor a tax alpha strategy over passive investment. We believe that tax-aware investing strategies will increase in importance because of lower transaction costs and automated fintech processes.

Editor's Note

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Notes

1. A wash sale is a sale of a security at a loss and a repurchase of the same or a substantially identical security shortly

before or after. Losses from such sales are not deductible in most cases in the United States.

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