FIRST QUADRANT

Having Your Cake and Eating It Too: The Before and After Tax Efficiencies of an Extended Equity Mandate

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ABSTRACT: Recent studies have shown that adding a short extension to a long-only tax exempt equity portfolio leads to a more efficient portfolio. In this work, we show that these extended mandates are even more effective for investors subject to taxes. Not only is the portfolio more efficiently positioned from a pretax perspective, but it offers significant after-tax benefits from increased loss harvesting opportunities and the presence of tax arbitrage between tax rates on long and short positions. We present both conceptual arguments and simulations to validate our thesis. Because these tax effects are known in advance, they can be captured with certainty to provide substantial after-tax value added.

Introduction

Equity strategies that add a short extension to a long-only portfolio have surged in popularity in recent years. Sometime referred to as "130/30" mandates, these strategies sell short some percentage of the portfolio and use this as leverage to increase the long side by the same percent, with 30% a typical amount. The portfolio thus remains net 100% long with respect to the market, but is designed to more effectively implement active strategies. In particular, disliked assets can be underweighted to a greater extent than allowed by a portfolio constrained to be long-only. This elimination of the long-only constraint leads to more efficient portfolios, with greater alpha capture.

Current work on extended strategies has so far been focused on tax exempt mandates. Yet there are significant amounts of money which are subject to taxes, and as we will show, the advantages of extended mandates are even greater for these accounts. A basic principle of tax sensitive[1] investing is to defer gains and realize losses. Yet as markets rise over time, more and more assets trade at values above their purchase price, and can only be sold with an accompanying tax obligation. In an extended mandate, one side, either the long or more typically the short, will always be lagging. This is true even if the specific assets chosen outperform the market; gains and losses for tax purposes are with respect to the original purchase price. With an extended mandate, there will always be assets which can be sold at a loss, and thus help performance on an after-tax basis. There are also tax arbitrage opportunities related to differences in tax rates on the long and short sides. Additionally, this after-tax alpha is predictable and easy to measure, in contrast to the uncertainty of the more familiar pretax alpha. We will show that for these reasons, an extended equity strategy is a compelling alternative to long-only mandates for taxable investors.

This paper provides conceptual and empirical evidence of the power of employing extended equity mandates in a taxable setting. It therefore not only contributes to our understanding of how to manage taxable assets, but does so in a straightforward and practical manner. This paper should thus be of interest to anyone who manages taxable assets. We organize the paper as follows. In the next section, we review extended mandates and the principles of taxable investing. We then give a brief summary of the relevant tax regulations for long and short holdings. That is followed by a conceptual rationale and discussion of why this strategy works so well for taxable investors. To test and quantify our rationale, we run a series of Monte Carlo simulations. The set up

and assumptions of these simulations are given in one section, with a detailed examination of results in the next. We then discuss some practical considerations in implementing such a strategy, and finally close with a summary.

Review of Existing Work

Extended Strategies

Extended strategies are mandates which utilize long and short positions to "extend" traditional long portfolios in a risk-controlled manner, while keeping 100% net exposure to the market (Clarke, de Silva and Sapra 2004; Sorensen, Hua and Qian 2007; Clarke, de Silva, Sapra and Thorley 2008). These are popularly know as 130/30 strategies, (as opposed to a traditional long-only 100/0 strategy), since it is common to extend by 30%. They are by definition active strategies – they seek to invest in stocks that are mispriced, and to do so in a more efficient manner than traditional long-only mandates.

The addition of short positions allows managers to more effectively underweight securities viewed as unfavorable, leading to a more effective portfolio. Long-only managers are faced with the inability to effectively underweight stocks, since they are constrained from shorting securities. For stocks with a large weight in the benchmark, not holding that security can comprise a meaningful underweight. But for securities with small weights, or securities not even in the benchmark, long-only managers are unable to utilize negative forecast alpha information very effectively or at all. By allowing extended managers to short stocks, negative predicted alpha information can be more fully exploited. This symmetry in reflecting information should lead to significantly higher transfer coefficients[1], and consequently higher value added and risk to reward ratios as well for skillful active managers.

Tax Sensitive Investing

Tax-advantaged strategies can offer significant benefits relative to tax-insensitive strategies for taxable investors. For taxable investors the focus should be on maximizing risk-adjusted *after-tax* return. This is a significantly different paradigm than a focus on maximizing risk-adjusted *pretax* return, as would be the goal for tax-exempt investors. Active strategies that are tax-insensitive often serve to deliver sub-optimal after-tax returns (Jeffrey and Arnott 1993; Dickson and Shoven 1993; Arnott, Berkin and Ye 2000; Arnott, Berkin and Ye 2001a). Of course, one component of delivering superior after-tax performance can be to deliver superior pretax performance. But the use of active stock selection strategies should always be considered in an after-tax context, by considering the tax implication of the stock selection decision.

It is not necessary that tax-sensitive strategies should be passive; rather they should integrate tax consequences into portfolio management. Indeed, there are several straightforward steps that an investor can take to outperform a benchmark on an after-tax basis. These include:

- Limiting the realization of gains, especially at higher tax rates, in order to defer the payment of the resulting tax liability. This essentially serves as a tax-free loan from the government relative to a tax-insensitive strategy, and allows this "loan" to essentially compound at the equity market rate of return.
- Harvesting losses to reduce or eliminate capital gains, and possibly generate direct refunds from the tax authorities. Realized losses can be used to offset realized gains both inside and outside of the portfolio. They can also offset up to $3,000 annually for an individual investor, and can be carried forward indefinitely. This technique is quite powerful (Dickson and Shoven 1994; Arnott, Berkin and Ye 2001b; Berkin and Ye 2003).
- Utilizing HIFO (highest in, first out) accounting. Whenever shares need to be sold, sell those shares with the highest cost basis first. This benefit can be particularly important in the presence of cash withdrawals.
- Minimizing dividend income, particularly if it is taxed at higher rates.
- Ensuring that the transition to tax management, for portfolios with legacy assets, is as tax-sensitive as the on-going management of the portfolio.

Tax Treatment of Long and Short Positions

In this section we briefly review the tax consequences for both long and short positions in a portfolio, all from the viewpoint of individual United States investors. We ignore state and local taxes, which can further add to the tax burden. In addition to individuals, a large amount of institutional money is also subject to taxes. This includes insurance reserves, certain Voluntary Employees Beneficiary Association (VEBA) trusts, nonqualified post-retirement plans, and asset retirement obligations such as Nuclear Decommissioning Trusts. The tax treatment for these investors is different again. While we deal explicitly with individual rates in this paper, the effects are often similar for institutional investors, and are discussed briefly later.

Capital gains and losses on long positions are recognized on sale of the positions, or tax lots. Stocks held greater than one year from time of purchase are considered when sold to have long-term gains or losses, and are taxed at preferential rates. Stocks sold less than one year from date of purchase are considered to have short-term gains or

losses, and are taxed at higher rates. Dividends received from stocks are taxed at preferential rates for "qualified" dividends, if the stock is held more than 60 days and if the company making the dividend is considered a qualified company. Stocks held less than 61 days or from a non-qualified company are taxed at higher rates. The primary group of non-qualified companies in the US is REIT stocks, since they are not taxed at the federal level.

The rules on the short side are different. Capital gains and losses on short positions are recognized when the stock is covered. However, all covers of short positions are treated as short-term gains or losses, irrespective of holding period. And of course on the short side if a stock rises in value from the short date, the stock would be covered at a loss, and vice-versa for a stock that falls in value.

Short sellers are also responsible for paying any dividends on the borrowed stock to the holder of the stock. The treatment of that dividend payment is considered an interest expense, and therefore a tax deduction at ordinary income rates, so long as the short position is held for greater than 45 days. If the security is held for less than that time period, the dividend for tax purposes is treated as an adjustment to the cost basis of the shorted security.

Conceptual Rationale

We have earlier summarized the advantages of extended mandates for tax exempt portfolios, and these same efficiencies should hold as well for taxable portfolios. Much as with tax-sensitive long-only strategies, while tax effects will limit the ability to generate pretax alpha, tax management also offers opportunities to add after-tax value. However, the inclusion of a short extension offers significant additional benefits, allowing the taxable investor to effectively harvest additional losses, reposition the portfolio and engage in tax arbitrage due to differences in tax rules for the long and short sides. Investors benefit from both pretax return enhancement and superior tax management opportunities.

Taxes can be a significant drag on a long-only portfolio, acting as an effective transaction cost on gains when a security is sold. At current individual tax rates on short term gains of 35% and 15% for long term gains, this can be quite significant. As the stock market in general goes up over time, positions increasingly have a low cost basis relative to their current price, making them expensive to sell. This is particularly true for those stocks which have run up the most, leading to large positions in assets that may now violate desired risk bounds and additionally may be viewed as no longer attractively valued. The portfolio manager must choose between holding assets which may be too risky and no longer desired, or rebalancing and incurring a significant tax obligation. This can lead to a lock-in effect on the one hand, where holdings are not traded as often as desired, or a portfolio whose after-tax returns suffer.

Loss harvesting helps mitigate the tax impact, as the tax credit from these losses can be used to offset the taxes on gains from either inside the portfolio or from other investments as well. However as the market goes up there are fewer opportunities to do so. This result is clearly presented in a prior paper (Arnott, Berkin and Ye 2001b, Figure 8), which plots the turnover versus time for a loss harvesting strategy. The turnover falls notably over the first 5 years as loss harvesting opportunities diminish in a rising market. A very significant benefit of extended portfolios is that they help mitigate the lock-in problem. The presence of the short side will consistently offer opportunities to harvest losses in a rising market, as these short side securities appreciate along with the market. This is an advantage that a long-only portfolio cannot duplicate.

In fact, an extended mandate offers loss harvesting opportunities in both up and down markets. From an active management perspective, the goal is for shorts to lag the market. For tax management purposes however, shorts can be sold at a loss when they have risen in value. In bull markets where stocks advance by double digit levels for a number of years, virtually all shorts will have risen in value and thus can be sold at a loss, providing a significant tax benefit. Furthermore, these losses are at the 35% rate for the short side, an added bonus as they can offset even short-term gains. In a bear market, the long side will of course offer loss harvesting opportunities, while the short side will be the one with gains.

Because the portfolio can be rebalanced more frequently in a tax efficient manner, this creates a virtuous cycle, as new positions enter with price equal to cost basis. They thus are more likely to be candidates for further loss harvesting should their prices move adversely. When markets decline, both long-only and extended portfolios will be able to harvest losses on the long side, but the latter will be further advantaged by having fewer legacy positions at low cost basis.

Another tax advantage of short extension strategies comes from the differential treatment of dividends (Gordon 2004). Because dividend payments are typically taxed at 15% on the long side[3] but expensed at 35% on the short side, there is a 20% tax advantage. For example, a 130/30 strategy with comparable yields on both the long and short sides, creates an effective dividend tax rate of 9%[4]. Taking positions with lower yield on the long side and higher yield on the short side provides an even greater advantage.

loss harvesting opportunities and an effective arbitrage on differential tax rates. These losses can be used to reposition holdings in a more tax efficient manner than with in the long-only case, and to offset gains from outside the portfolio. Furthermore, the portfolio formed is more optimal from a pretax point of view as well, containing the benefits expounded by its proponents.

Based on the discussion above, we therefore have the following hypotheses about how an extended strategy will perform when subject to taxes: (1) the extended mandate will have greater tax efficiency than a long-only mandate, (2) the extended mandate will be more efficiently positioned from an alpha perspective than a long-only mandate, (3) the extended mandate will maintain more of the pretax performance than a long-only mandate, compared to their equivalent tax-exempt portfolios, and (4) the extended mandate will maintain greater turnover than a long-only portfolio.

Empirical Testing

To further investigate our conceptual expectations and provide empirical quantitative support, we ran a series of Monte Carlo simulations. We based these on actual historical returns for the individual stocks in the S&P 500. In this section, we discuss the nature of these simulations, including the basic framework of our forecasts, the portfolio formation procedure, and tax rates.

Because extended mandates are an active strategy, we need both a set of forecasts and associated returns for the history of stocks. For the latter, we chose the monthly returns of the S&P 500 constituents from January 1983 through December 2007, giving us a sufficiently lengthy 25 year history to examine the effects of taxes on the portfolio. While we obviously do not expect the future to exactly replicate the past, this period comprised both bull and bear markets that allow us to demonstrate the advantages of an extended equity mandate in a real world setting.

Rather than choose a specific alpha strategy, such as a value or momentum tilt, we used actual returns mixed with a significant amount of noise to give forecasts with a modest amount of information. Every month we added a large random component to the actual returns, generating a forecast for each stock given by

$$Z_i(t) = IC * R_i^M(t)/\sigma^M + SQRT(1 - IC^2) * \varepsilon_i^M(t)$$

where $Z_i(t)$ is the forecast for stock i in period t, IC is the cross-sectional information coefficient (the cross-sectional correlation between forecast and return), $R_i^M(t)$ is the excess return of stock i over the next M months at time t, $\sigma^M(t)$ is the standard deviation of $R_i^M(t)$, and $\varepsilon_i^M(t)$ is the random number with mean 0 and standard deviation 1. The first term thus gives standardized actual returns, while the second term is noise, also standardized. As the IC increases, the portion of the forecast determined by actual returns increases, while the portion determined by the random component decreases. This process was repeated 100 times, thereby giving us 100 sets of forecasts at a monthly level, which were used for our simulations.

We average both returns and random numbers over M months to keep the serial correlation of the forecasts reasonably high and therefore the turnover at a moderate level. Averaging over 18 months gave us approximately 100% turnover a year for our long-only tax-exempt simulations, a number in line with typical active managers. The IC was chosen empirically to be 0.075, which is a respectable but not excessive amount of skill (Grinold and Kahn 1994). Under the assumptions of our simulations, this gave annual outperformance for the long-only tax exempt portfolios of just under 1.5% per year. It also shows the significant negative impact taxes can have on performance, and the positive effects of tax management. Further details will be presented in the next section.

Portfolios were formed monthly by using a standard quadratic optimizer. The target tracking error is 4%, using Barra's USE3L risk model. Portfolios are constrained to be beta neutral within a tolerance of 5% and are always fully invested. Active asset, industry and sector positions are all initially kept to be no more than +/- 1% relative to benchmark positions; they can grow to a maximum difference of +/- 2.5% before being cut back to this threshold. We also assumed one way transaction costs of 50 basis points.

Tax-aware optimization is done in a similar fashion to the more familiar tax exempt version, with a few notable exceptions. Individual asset positions are tracked by tax lot, since cost basis and holding period matter. We harvest losses on a monthly basis, sweeping through the portfolio and selling all positions for which the tax benefit outweighs transaction costs, subject to portfolio constraints[5]. Any selling of a position for alpha purposes is weighed against the tax consequences, generally leading to a much lower turnover rate than for a tax-exempt portfolio. When constraints force part of a position to be sold, it is done on a HIFO basis in order to minimize taxes, after considering the difference between long term and short term tax rates. Finally, we adopt a modest tilt away from dividends by downweighting the monthly forecast of each stock by one twelfth its annual dividend yield, multiplied by the tax rate, as we consider dividend taxes an additional transaction cost in the portfolio construction algorithm.

We used current federal maximum individual tax rates for

term capital gains and qualified dividends, and 35% for short term capital gains and nonqualified dividends. Our point is to illustrate how an extended strategy can benefit investors going forward; hence current tax rates are most relevant. Different investors may have different rates, for example due to corporate tax rates or state taxes, and we will discuss those effects later. We ignore the wash rule for harvesting losses on a monthly time scale, as this is quite close to the actual 30 day limit; however we do incorporate the 61 day holding period for qualifying dividends. Otherwise, we treat all dividends as qualifying, since there is no way to categorize dividends before the Jobs and Growth Tax Relief Reconciliation Act of 2003[6].

Any taxes that need to be paid are taken out of the portfolios on a monthly basis. Similarly, any tax benefits are also treated as monthly cash events and are reinvested in the portfolios. As noted in Berkin and Ye (2003), these tax savings provide an almost immediate cash flow benefit to the investor, whether in the form of lower dividend taxes paid or using realized losses to offset gains realized inside or outside the portfolio.

We ran four series of simulations: both tax-exempt and taxable for long-only and short-extension. The short extension strategies used 30% leverage, so that they are indeed

runs using the same 100 series of forecasts, allowing for direct comparison of the different strategies.

Backtest Results

A summary of our main results are given in Table 1. Panel A contains results for the median run, defined by pretax value added relative to the S&P 500 benchmark for the tax exempt cases and by after-tax value added for the cases run in a tax sensitive fashion. The after-tax component of value added comes from differences in dividend taxes paid relative to the benchmark and the impact of taxes from additional realized gains and losses beyond that of the underlying S&P 500 benchmark. Panels B and C have results for the 25th and 75th percentiles to show the typical range of outcomes. The results are qualitatively quite similar, and so we will concentrate on the median runs. We also calculated the mean results (not shown); they were very similar to the median results, with annualized returns typically better by 5 to 15 basis points (bp) depending on the case.

Focusing on the median results, the long-only tax exempt case has an annualized value added (the Active Return column) of 1.38% after transaction costs, with a realized tracking error of 3.38% for an information ratio of 0.41.

TABLE 1:

Panel A: Median Summary

Case	Transfer Coefficient	Turnover Long	Turnover Short	Trans. Cost	Active Return	Std. Dev.	IR	After-tax Active Return	Std. Dev.	IR
Long-Only	0.52	80.8	–	0.81	1.38	3.38	0.41	-0.29	3.65	-0.08
Long-Only Tax	0.06	27.6	–	0.28	0.38	2.73	0.14	0.95	2.75	0.35
Extended	0.71	97.3	32.4	1.32	1.88	3.31	0.57	0.54	3.47	0.16
Extended Tax	0.15	32.4	55.2	0.88	-0.05	3.73	-0.01	2.14	3.82	0.56

Panel B: 25th Percentile Summary

Case	Transfer Coefficient	Turnover Long	Turnover Short	Trans. Cost	Active Return	Std. Dev.	IR	After-tax Active Return	Std. Dev.	IR
Long-Only	0.53	39.8	–	0.40	1.20	3.19	0.38	-0.71	3.85	-0.18
Long-Only Tax	0.07	21.6	–	0.22	0.31	2.81	0.11	0.61	2.81	0.22
Extended	0.71	101.6	33.6	1.36	1.42	3.60	0.40	0.16	3.77	0.04
Extended Tax	0.15	30.0	57.6	0.88	-0.42	3.70	-0.11	1.65	3.79	0.44

Panel C: 75th Percentile Summary

Case	Transfer Coefficient	Turnover Long	Turnover Short	Trans. Cost	Active Return	Std. Dev.	IR	After-tax Active Return	Std. Dev.	IR
Long-Only	0.53	82.0	–	0.82	1.74	3.55	0.49	0.09	3.78	0.02
Long-Only Tax	0.09	27.7	–	0.28	0.75	2.80	0.27	1.22	2.80	0.43
Extended	0.71	98.6	32.4	1.33	2.43	3.59	0.68	0.64	4.21	0.15
Extended Tax	0.15	33.6	55.2	0.89	0.27	3.36	0.08	2.47	3.42	0.72

Notes: All values are annualized with the exception of Transfer Coefficient which does not involve a time scale. Turnover, Transaction Cost, Returns and Standard Deviations are all in percent.

tion, which targeted this level by specifying a modest level of correlation with actual returns. What are instructive are the relative changes as we consider both the addition of the short extension and the presence of taxes.

Consider the impact of taxes on the long-only portfolio. When run in a tax insensitive manner, the median annualized alpha becomes negative after taxes, at -0.29%. The annual turnover of about 81% simply generates too many taxes. This is consistent with prior research (Jeffrey and Arnott, 1993) that shows a significant amount of alpha is necessary to recover the tax costs of naively implementing a tax insensitive strategy. Here we actually provide a numerical estimate of how much pretax value added is needed for this specific scenario – about 165 bp of pretax alpha from looking at the 75th percentile case. But after-tax results can be improved significantly by running the portfolio in a tax-sensitive fashion. The effectiveness of the forecasts is reduced, with the transfer coefficient falling from over a half to just above zero while turnover drops to 28%. The active pretax return is likewise reduced by a full percent, even after saving almost 50 bp in transaction costs. On the metric that matters though, after-tax return, performance is notably stronger, improving from pretax by 0.57% to 0.95% annually. This is much closer to the tax exempt pretax value added of 1.38% and well above the negative results from running the strategy without regard to taxes[7]. The benefits of tax management, particularly loss harvesting, are indeed quite significant.

Next we consider the benefits of adding a short extension, starting again with the tax exempt case. Compared to a long-only strategy, short extension does indeed deliver as promised. The transfer coefficient increases notably, from 0.52 to 0.71, and with additional forecast power captured by the portfolio comes better performance. Value added improves by 0.50% annually with little change in risk, with IR increasing from 0.41 to 0.57. Trading and therefore transaction costs also increase due to the addition of short positions, but this is more than offset by the increase in performance.

These results are consistent with prior analytical and empirical work on extended strategies (Clarke, de Silva and Sapra 2004; Sorensen, Hua and Qian 2007; Clarke, de Silva, Sapra and Thorley 2008). Our results vary somewhat because of differing parameters and the fact we use actual S&P 500 returns. What is new and of particular interest are the after-tax results. Even when run in a tax insensitive fashion, after-tax performance is still positive by over 50 bp annually, compared to the negative results for long-only[8]. Part of this improvement is because of the higher pretax value added, but a major reason is that the drop in extension. Taxes still consume a hefty 1.34% annually, but this is less than the 1.67% drag from the more conventional long-only portfolio. Even before consideration of tax management, the natural loss realization that occurs from both long and short positions reduces the tax bite compared to the long-only case, where positions sold in a generally rising market will constitute a larger tax drag.

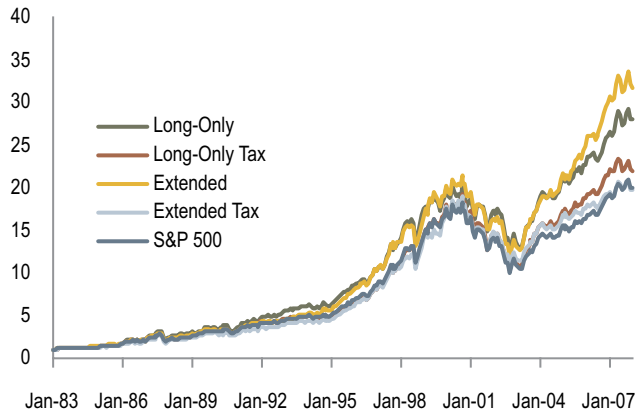
The real power of this strategy arises when it is run in a tax sensitive manner, as can be verified by the final row of Table 1, Panel A. Pretax performance is actually just negative, down 5 bp a year with respect to the S&P 500, the worst median pretax result of the four cases. However, the metric that matters for taxable investors is after-tax performance, and here there is a notable improvement. Annualized after-tax alpha is 2.14%, more than double the 95 bp of the tax aware long-only case, and even further above the after-tax results of the portfolios run without sensitivity to taxes. This value added to the taxable investor is even greater than the benefit the tax exempt investor receives, and shows how substantial tax management can be. Managing the portfolio for after-tax returns leads to a far greater level of loss harvesting on the short side in particular, with turnover on short positions increasing by over 20% annually from the tax exempt case. These extra trades lead to higher transaction costs and a lower pretax alpha. However, these costs are more than compensated for by the after-tax benefits. And unlike pretax alpha, these tax benefits are known with certainty when portfolios are rebalanced.

These results validate our hypotheses from the conceptual discussion section. The first hypothesis, that the extended mandates will have greater tax efficiency, is readily seen from the after-tax results, especially in comparison to the pretax values. Our second hypothesis of a more efficiently positioned extended portfolio from an alpha perspective is seen by the higher transfer coefficient. For the tax exempt cases, the addition of the short extension increases the transfer coefficient by 0.19, while for the taxable portfolios the boost is 0.09 despite the restrictions of taxable investing. The tax sensitive transfer coefficients are much lower, reflecting the focus on after-tax value added, resulting in lower pretax alpha. Indeed, the pretax alphas are 38 and -5 bp annually for the taxable long-only and short extension strategies, seeming to violate our third hypothesis of the latter portfolios keeping more of their pretax value added. However, the extended mandate also has higher turnover, as predicted by the fourth hypothesis, and this leads to higher transaction costs as well. These costs are well spent however, as they result from extra loss harvesting and the consequent superior after tax results. Looking at the alpha before transaction costs by adding these costs back in, the

66 bp for the long-only. For a manager who focuses only on pretax alpha, the after tax results are even more stark, as the long-only portfolio gives up 29 bp annually while the extended mandate is still positive by 54 bp.

We gain even greater insight into the dynamics of these strategies by examining their performance and characteristics over time. Figure 1 shows the growth of $1 invested in the various median portfolios and the benchmark S&P 500. Values are pretax for the tax exempt portfolios and after-tax for the tax sensitive ones, thus reflecting the goals of each. The huge run-up in the stock market over this time period is clearly seen. For a taxable portfolio which purchased shares in 1983, the cost basis becomes minor relative to the current price, and any sale carries an effective 15% additional cost from taxes. Compared to the value added of 1 or 2% a year, the tax component over time will dominate. One can either sell and suffer poor after-tax performance, or hold on and have a significant lock-in effect.

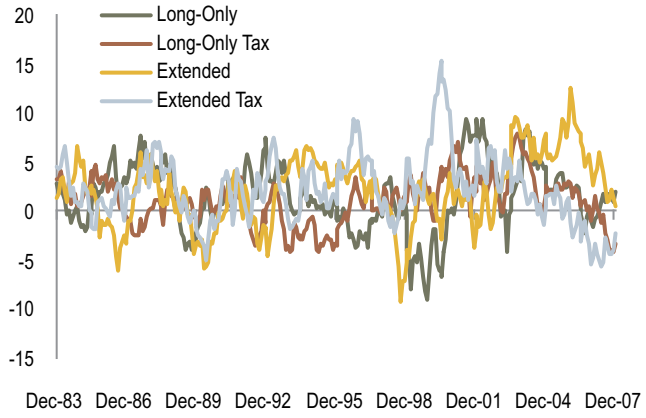
FIGURE 1: GROWTH OF $1 PRETAX



Source: First Quadrant, L.P.

Figure 2 plots rolling 12 month value added, again using pretax returns for the tax exempt portfolios and after-tax for those subject to taxes. Here the fluctuations in time become more apparent. Both tax exempt strategies have periods of positive and negative results, but generally outperform, as designed. The taxable long-only strategy initially tracks its tax exempt version, but after a few years the similarity begins to decrease markedly. The S&P 500 doubles after 3½ years and triples after 6½ years from inception of our portfolios in 1983. These large absolute gains in the benchmark limit the ability of the taxable portfolio to trade its shares, reducing both pretax value added and loss harvesting opportunities, which reduces the ability to realize after-tax alpha. With the crash of the technology bubble in early 2000, loss harvesting opportunities reemerge, and after-tax value added increases again, tapering off after the market resumes its rally in 2002. In contrast, the two extended portfolios generally track each other quite well over the initial 15 years. The increased tax efficiency keeps the taxable strategy more aligned with its forecasts, as reflected in the higher transfer coefficients of Table 1, and means it does not suffer the reduction in performance seen in the taxable long-only mandate. The two extended portfolios diverge as the technology bubble grows in the late 1990s and continue to diverge with the bubble bursting. In contrast to the long-only case, the taxable strategy consistently outperforms by a notable amount. The large moves in stock prices of this period increase the magnitude of the loss harvesting benefits, with opportunities first on the short side and then on the long side of the portfolio. This ability to enhance after-tax alpha in both bull and bear markets is what makes the performance of the taxable short extension mandates so strong.

FIGURE 2: ROLLING 12 MONTH VALUE ADDED (%)



Source: First Quadrant, L.P.

To further demonstrate the impact of taxes, we present the components of after-tax value added in Table 2 for all the strategies. The sign for the tax portions are such that positive is a good thing (lowered taxes) while negative is bad (higher taxes), and all amounts are expressed in percentage of portfolio value. It is now easy to see how realization of gains drags down the after-tax performance of the portfolios run in a tax insensitive fashion, particularly for the long-only mandate. Trading without consideration of taxes results in almost a 3% tax hit from realized long and short term gains, far greater than the 1.29% benefit from realized losses. Yet looking at the extended mandate run in a tax insensitive fashion gives intimations of its ability to be after-tax efficient. The tax insensitive extended mandate does have higher realized short term and long terms gains than the long-only version, in line given the extra leverage and presence of shorts[9]. But the short term losses are much higher, more than triple that for long-only, reflecting the

covering of short positions in a rising stock market. The tax treatment of dividends on the short side also helps, as seen by the extra 13 bp after-tax advantage of the extended portfolio. These lead to the lower tax drag on the extended mandate even when run in a tax insensitive fashion. lios also captures a dividend tax advantage of an annual 26 bp boost relative to the long-only portfolio (35 bp compared to 9 bp), driven by the beneficial treatment of dividends on the short side. But the real advantage of the extended man-

TABLE 2

Composition of After-tax Value Added, Annualized in %

Case	Pretax	ST Gain	ST Loss	ST NetGL	LT Gain	LT Loss	LT NetGL	Div. Adv.	Total Tax	After-tax	After Liq
Long-Only	1.38	-1.70	0.77	-0.92	-1.29	0.52	-0.77	0.03	-1.66	-0.29	0.18
Long-Only Tax	0.38	-0.07	0.93	0.87	-0.44	0.05	-0.39	0.09	0.57	0.95	1.00
Extended	1.88	-2.77	2.47	-0.31	-1.74	0.55	-1.19	0.16	-1.34	0.54	1.27
Extended Tax	-0.05	-0.13	2.45	2.32	-0.52	0.04	-0.48	0.35	2.19	2.14	2.02

Notes: All columns indicate the benefit (positive) or drawdown (negative) relative to a passive S&P 500 benchmark. ST Gain and ST Loss give the relative tax impact from short term gains and losses; ST NetGL is their sum. Similarly, LT Gain, LT Loss and LT NetGL refer to the relative tax impact from long term gains, losses and their sum. Div. Adv. indicates the relative advantage from dividend taxes; that they are all positive shows that all four of these mandates pay less dividend taxes than the S&P 500. Total Tax gives the total tax impact, which is the sum of ST NetGL, LT NetGL and Div. Adv. The After-tax column is the sum of the pretax value added and the tax impact, namely the Pretax and Total Tax columns. The After Liq. column gives the performance after accounting for the tax impact of liquidation, again relative to liquidating the benchmark.

The true power of these strategies for taxable investors is seen when the mandates are run with consideration of taxes made paramount. The realization of gains is reduced significantly, a major way to achieve after-tax benefits. Those gains that are realized come from trimming positions for risk control reasons, stocks leaving the benchmark, or alpha trades where the underlying realized gain was minor. The tax advantage from a dividend tilt increases moderately, due to the tax advantaged strategies having a modestly lower dividend yield. Interestingly, at first it appears the tax sensitive strategies are less effective than their tax insensitive counterparts in benefiting from losses, especially those that are long term. The tax efficient strategies have contributions from long term losses of only about 5 bp a year, compared to over 50 bp a year for the mandates that ignore taxes. But appearances are not the full story. The tax insensitive strategies have high loss realization because they have much higher turnover, as noted in Table 1. This turnover arises as a result of the quest for pretax alpha and triggers large gains as well, whereas the turnover in the tax aware strategies is mainly driven by loss harvesting in the quest for after-tax value added. The tax aware strategies also have lower long term losses because they are far more likely to have realized those losses during the period when they qualify for the more beneficial short term treatment. Hence the tax sensitive strategies end up being far more tax efficient, as evidenced by both NetGL columns and the Total Tax column.

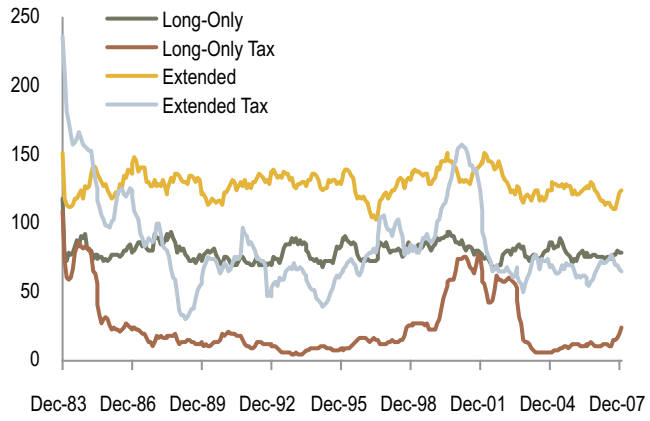
If we compare just the two tax sensitive strategies, the advantages of the short extension are apparent. Both strategies keep realized gains to a minimum. The extended portfodate comes from the ability to capture short term losses. The after-tax alpha from this component increases from 0.93% to 2.45% annually with the addition of the short side, as the portfolio avoids the lock-in issue and is able to harvest losses irrespective of the market environment.

Examining the history of turnover confirms this picture, as seen in Figures 3 and 4. Figure 3 shows rolling 12 month one-sided turnover, defined as the value of sells relative to the portfolio for long-only, and sells plus covers for the short extension[10]. By design, the tax exempt strategies have fairly consistent levels over time, with the 130/30 version having just over 60% more turnover, consistent with the short extension. The taxable long-only portfolio initially has comparable turnover to its tax exempt counterpart, but it quickly drops off as the market rallies, since most holdings have a low cost basis and hence high tax cost to sell. Turnover picks up at the end of the 1990's as risk control forces the trimming of positions that have enjoyed the run-up; we see a corresponding modest bump in turnover in the tax exempt long-only portfolio as well. As the bear market of 2000–2002 takes hold, turnover remains at this higher level, as the taxable portfolio finally has losses that can be realized. The turnover tapers off again with the subsequent bull market starting in 2003.

The taxable extended mandate also starts off with elevated turnover, higher even than the tax exempt case as losses are rigorously harvested. It also falls off significantly over the next few years relative to its tax exempt version. But in marked contrast to the long-only case, the extended portfolio turnover stabilizes at a much higher rate of around 60% annually, confirming our hypothesis that extended

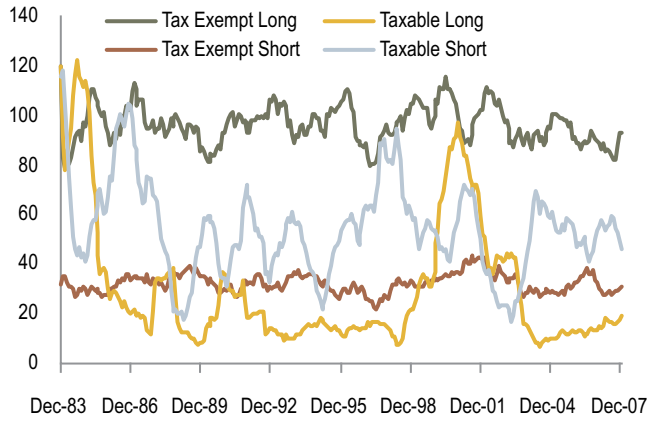
mandates will generate higher turnover. Figure 4 breaks down rolling 12 month turnover for the extended mandates into their long and short side components. As can be seen, the bull market of this period reduces turnover on the long side, but it is maintained on the short side as these positions can be harvested for losses. This creates a virtuous cycle, where the money from these losses is reinvested, and as the new positions start with no tax drag they are more likely to be candidates for further loss harvesting. Hence while the taxable long-only portfolio has turnover drop as low as the 5% range over the prior 12 months, the turnover from the long side of the 130/30 portfolio only briefly drops below 10%. Note as well that the long side turnover of the taxable portfolios is almost always less than that of the tax exempt portfolios. In contrast, the short side typically has notably higher turnover in the tax sensitive version as losses are rigorously realized in a bull market. Turnover that realizes losses is a powerful tool to reduce taxes, and the addition of a short extension dramatically increases that power.

FIGURE 3: ROLLING 12 MONTH TURNOVER (%)



Source: First Quadrant, L.P.

FIGURE 4: EXTENDED MANDATE ROLLING 12 MONTH TURNOVER, LONG AND SHORT (%)



Source: First Quadrant, L.P.

A tax sensitive strategy that realizes losses will have a lower cost basis and therefore higher taxes when the portfolio is liquidated. We therefore consider the effect of taxes after liquidating the full portfolio, with results shown in the last column of Table 2. Some of these results may seem surprising at first glance, but are readily understandable upon further contemplation.

Considering long-only first, the tax insensitive portfolio improves notably after liquidation, moving from lagging the S&P 500 to modest outperformance. Because of the higher turnover of the portfolio and the consequent realization of gains, the tax insensitive portfolio has a higher cost basis than the benchmark. It thus has less of a tax obligation upon liquidation compared to the low turnover S&P 500, which has higher unrealized gains. The portfolio thus gains back some of what it had given up over the years in taxes. One might naïvely expect that the tax sensitive long-only portfolio would hence give up some of its advantage after liquidation, but in fact it also improves against the S&P 500, albeit by a more modest amount. The reason is that it too has realized a decent amount of gains over the lifetime of the portfolio, mainly driven by risk control as it trims winning positions which have grown too large. One can see this by looking at the long and short term gains and losses columns for the tax sensitive long-only strategy in Table 2, which upon consideration of the 15% and 35% tax rates infer a slightly higher amount of net realized gains than losses[11]. Despite roughly equivalent realized gains and losses, the tax sensitive portfolio maintains its tax efficiency by essentially engaging in tax arbitrage, with gains overwhelmingly realized at the long term rate, while losses are realized at the short term rate. It thus is able to pass on losses at a significantly more beneficial tax rate, while effectively implementing risk control and keeping the tax basis in line with the benchmark.

Now consider the extended mandates. The tax insensitive portfolio again improves after liquidation, even more so than for long-only. Here liquidation results in a tremendous 73 bp annual improvement from pre-liquidation numbers relative to the S&P 500, compared to the long-only relative increase of 47 bp. Again, there is some recovery of the high taxes paid over the years, as the long side with 30% leverage has a lower cost basis. Also contributing to the tax improvement is the liquidation of the short side. Because stocks as a whole have risen dramatically over 25 years, these positions are held with a substantial loss, which upon liquidation benefits the portfolio at the preferential 35% short term rate. These benefits would be even larger except the short extension has had reasonable

turnover throughout time, raising the cost basis generally in line with the market.

In contrast, the short extension mandate run in a tax sensitive fashion actually gives back a few basis points annually with respect to the benchmark. The extra 30% leverage on the long side provides proportionately more loss harvesting opportunities during the life of the portfolio, but lowers the cost basis as well, thus increasing the tax liability after liquidation. Meanwhile, the portfolio is very efficient at producing realized losses on the short side as the market rises, and thus its cost basis is not too different from where it started. Among the short positions there are few unrealized losses because these have been realized, and there are few unrealized gains because the market has risen sharply over 25 years. The end result is a modest tax hit after liquidation. However, the realization of losses over the lifetime of the portfolio and their subsequent reinvestment and compounding, lead to a far greater return for this extended portfolio, even after liquidation.

Practical Considerations

In this section we discuss some practical considerations for those contemplating a short extension for their taxable portfolio. This includes an examination both of the effects of different tax rates and forecasting skill assumptions used in the simulations. We also discuss how such a mandate can be of utility within an investor's overall portfolio.

Our simulations utilize current maximum federal individual tax rates, but many portfolios are subject to different rates. Some individuals may be in lower tax brackets. Many others have additional state and local taxes. Similar to the results of Berkin and Ye (2003), we would expect that the after-tax benefits would scale roughly linearly with the tax rate.

The case of corporate tax rates is somewhat different, because there is no long term or short term effect, only a flat 35% rate. The absence of a lower long term gains rate means that all losses harvested on the long side will be beneficial at the higher rate, while realized long term gains will be more harmful. If we simply assume the same turnover as the cases we ran at individual tax rates, then scaling up the 48 bp tax cost from net long term gains and losses in Table 2 for the tax aware extended mandate results in an additional 64 bp of taxes. This still leaves the annual after-tax value added at about 150 bp before liquidation, well ahead of both the benchmark and the long-only active mandate. Additionally, dividends receive a 70% exclusion if held for at least 46 days around ex-dividend date which would reduce their after tax impact. Ultimately, one should manage the portfolio using the investor's exact tax rate, which would improve the after-tax return benefits.

Because extended mandates are by definition active, we needed forecasts as inputs, and our simulations assumed a respectable amount of skill. One may wonder what the results would be for less successful forecasts. Certainly the tax exempt value added would decrease; for zero forecasting ability the tax exempt alpha would just be a negative number reflecting the transaction costs. But the after-tax results become less dependent on skillful forecasting and more dependent on skillful tax management. Recall from Table 1 that for the median long-only portfolio, pretax alpha dropped a full percent to 38 bp annually when switching from a tax exempt to tax sensitive strategy. Meanwhile, tax management gave an additional 57 bp of value added, in line with earlier studies (Berkin and Ye 2003). These results reinforce the significance of tax management for long-only strategies.

For the extended mandates, the pretax value added was slightly negative for the tax sensitive strategy. This was in part due to the hindrance of taxes in setting optimal positions, but it also reflected trades made for their known tax benefit. Before transaction costs of 88 bp, there is still pretax alpha from forecasting skill of about 83 bp annually for the median case. But the value added from skillful tax management is far larger, at over 2% a year. In our simulations, the forecasting skill does help to offset much of the transaction costs. However, the far more certain tax benefits are far larger, and will remain significant even for the case of lower or no forecasting ability.

One practical advantage for extended taxable mandates is the ease of transitioning from a long-only mandate when legacy assets are received. The extra extension (30% long and 30% short, for example) can be used to better reposition the portfolio. For example, stocks in a particular industry might have paid off particularly well, leading to an overweight beyond the new manager's desired limits. Rather than selling these off and incurring a tax cost, the new manager can put on new short positions in unattractive companies, bringing the portfolio's industry exposure back into balance without the tax impact. Furthermore, the additional loss harvesting that ensues with an extended mandate makes it far easier to sell legacy assets with a low cost basis in a tax efficient manner. It is not uncommon for existing portfolios to contain large positions in a few assets bought so long ago or that have had significant runs in prices that they are at near zero cost basis. The constant loss harvesting of an extended mandate makes it ideal for gradually reducing these positions over time without tax impact.

Conclusion

Extended strategies have been shown to present significant opportunities for tax exempt investors. In this paper we have shown that they are even more advantageous to taxable investors. Not only do they retain some of the same pretax efficiencies, but they offer significant after-tax benefits because of greater loss harvesting opportunities and the presence of tax arbitrage between tax rates on long and short positions. We have argued these points conceptually and demonstrated them via a series of simulations over a 25 year period. As opposed to the less certain pretax alpha, these after-tax benefits are essentially known in advance and can be captured by a manager who approaches taxes in a systematic manner. Actively managed tax exempt extended mandates have grown dramatically in both acceptance and assets in recent years as investors realize their advantages. The case for extended mandates for taxable investors is even more compelling.

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Endnotes

[1] We use the terms tax advantaged, tax sensitive and tax aware interchangeably throughout this text to denote tactics that seek to minimize the impact of taxes and produce higher after-tax returns.

[2] The transfer coefficient is defined as the correlation between the investment signals and actual holdings.

[3] Nonqualified dividends, typically from REITs which are tax exempt at the corporate level, are taxed at 35%. These however are a very small portion of the dividends paid by S&P 500 companies.

[4] A 15% tax rate multiplied by 130% long investment minus a 35% tax rate multiplied by the 30% short investment.

[5] For example, we could not fully sell off a position in the largest cap stocks if that would lead to an underweight greater than the 1% bound for that asset.

[6] Generally, most dividends from REITs are considered nonqualifying, and most other dividends are qualifying, but this is not strictly guaranteed. Additionally, REITs were not allowed into the S&P 500 until 2001, so our simplifying assumption is minor.

[7] This is consistent with earlier work (Berkin and Ye 2003) that showed an annual after-tax alpha of 73 bp based on purely passive pretax portfolios in a simulated S&P 500.

[8] In contrast to long-only, in this case our alpha is big enough to cover our taxes, which is quite an accomplishment.

[9] The tax insensitive short extension realizes 36% more long term gains and 64% more short term gains than its long-only counterpart, closely matching the 30% extra leverage on the long side and an additional 30% from the short side which realizes only short term gains. The additional pretax alpha from the extended mandate should boost the realized gains slightly higher as well.

[10] This definition excludes transactions from the reinvestment of dividends, which show up on the buys only. A portfolio which trades out of each of its positions exactly once a year would have 100% turnover.

[11] The long-only tax sensitive portfolio has annual net short term gains and losses of 93 bp (an average realized loss), which dividing by the 35% tax rate gives annual realized losses of 2.48% of portfolio value. Annual net long term gains and losses are -39 bp (an average gain), which dividing by the lower 15% tax rate gives annual realized gains of 2.60% of portfolio value.

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