

Parametric Portfolio Associates

Research Brief

Equity Portfolio Structure and Design in the Presence of Taxes

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Duas tantum res anxius optat, panem et circenses.

-Juvenal, Satires X.80

(Two things the people of Rome anxiously desired: bread and circus games.)

1. Introduction

In discussing the main decisions that an investor faces, Ellis [2000] identifies the following:

1. Long-Term Strategy, Asset Allocation
2. Policy Normal Mix
3. Active/Passive
4. Manager Selection
5. Portfolio Management and Implementation

Although the first and second decisions are the most important, they typically receive less attention and are relatively inexpensive when compared to the fourth and fifth decisions.

In this paper we focus on *Equity Structure* – that is, on the second and third decisions –

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those of selecting the policy normal equity mix (the proportions in various types of stocks, growth, value, small and large cap, etc.), and the method of implementing this (active or passive).

We address the taxable investor and argue that *Equity Portfolio Structure* is a particularly important subject in this case. In this discussion, we restrict ourselves to the class of publicly traded equities, and assume that the investments are for the long term.¹

There are well-developed approaches to equity portfolio structure that are accepted by much of the investment advisory and consultative world, approaches that have typically evolved for tax-exempt institutions. But the differences between institutional tax-exempt investing and private investing are clear: private investors have a more limited lifespan, have higher borrowing costs, and need to pay advisory costs that are a greater proportion of their assets. In addition, they pay taxes, and this changes the investment management landscape.

In previous work we have shown how taxes necessarily alter one's investment philosophy (Stein and Narasimhan [1999]). It is key to think in terms of a passive buy-and-hold portfolio which delays the realization of capital gains, to understand the value of active tax management, and to choose the right investment vehicle. However, although such a portfolio approach is necessary for tax efficiency, it is not sufficient. Taxable investors also need to rethink their equity *structure*.

We will argue that the typical equity structure in common use imposes numerous tax costs. It should be replaced by an alternative design based on an understanding of after-tax performance that seeks balance, simplicity, and transparency.

Ennis [2001] focuses on this same topic for institutional tax-exempt investors, and interestingly comes to similar conclusions to ours, arguing from the point of view of

¹ If the investment is for the short term, taxation is at a high rate and a tax-sensitive focus is not as key.

performance, opportunities and fees. As we will see, taxes are a yet stronger reason to consider this.

2. Equity Portfolio Structure: The Tax-Exempt Approach

FIGURE 1: TYPICAL TAX-EXEMPT EQUITY STRUCTURE		
Large 80%	Large Growth 40%	Large Value 40%
Small 20%	Small Growth 10%	Small Value 10%
	Growth 50%	Value 50%

Figure 1 shows the spirit in which many equity portfolios are partitioned. In partitioning a portfolio into Large Growth, Large Value and Small-Cap segments, the investor is expressing a number of implicit ideas. First, he believes that style and size are major dimensions of risk. This belief is reasonable: academics (Fama and French [1993]) have justified what many have observed in practice, that there is a difference in philosophy, personality, and risk-taking between the staid value managers and the more trendy growth ones.

Second, the investor believes that investment management skill requires specialization, that specialist managers have the ability to outperform generalists. Third, he believes he is able to control his risks cleanly by selecting managers who remain true to their beliefs, by evaluating their performance and rebalancing them regularly. If he is passive in some sectors and active in others, he is expressing a belief that some sectors of the market are more efficient than others, or that he has more skill in selecting managers in these sectors.

This approach has been found to be very useful for tax-exempt institutions. The beliefs seem often to be true in practice. In implementing such a structure, the investor or his advisor will classify the universe of managers, for example, by their investment philosophy (active or passive), by their discipline (quantitative or fundamental), by their specialization (style or size), by their particular skill (stock selection, sector rotation,

hedging, technical analysis, or trading), by their risk control (diversified or concentrated), by their sensitivity to taxes, or by other attributes. The investor will then select a set of managers and monitor their performance, replacing them as necessary, rebalancing the assets of each, and ensuring the aggregated risks are aligned to his requirements. He may then observe that he is lacking some sector of the market (many managers underweight utilities, for example) and install a completion portfolio, or he may observe that the structure inhibits a manager from rotating between Growth and Value, and he will seek a tactical style rotator.

While a complex equity structure has its benefits, one should not over-do it. A structure that is too complex can lead to difficulties. For example, it can result in high implementation, advisory, and rebalancing costs. It can lead to even more complexity, e.g., the seeking of specialist managers for tactical sector allocations, completeness funds, or hedging. And, it can lead to a focus on the wrong issues: those of pre-tax performance evaluation, a search for the best manager rather than a better structure, and to overpriced entertainment. In the end, by over-diversifying, many investors obtain neutral pre-tax performance at active fees, and inferior after-tax performance.

3. Issues for Taxable Investors

For the taxable investor particularly, the typical tax-exempt equity structure has hidden tax costs. Consider the case of Figure 1, where the investor has 80% of his equity divided evenly between Large Growth and Large Value, and the remaining 20% divided evenly between Small Growth and Small Value. The following are flavors of capital gain taxation:

1. The portfolio manager's alpha tax
2. The rebalancing tax (e.g. to maintain sector targets)
3. The manager selection/de-selection tax, and the multi manager tax
4. The benchmark reconstitution tax

A portfolio manager who seeks alpha typically must realize capital gains as he rotates securities in search of this alpha. While we are not directly focused on manager taxation

here, a key structural tax is affected by the choice to be active rather than passive. This tax can be extremely high, often more than the alpha expected. A very simple model justifies this assertion. Consider an investor with a 20-year investment horizon holding a security A at 50% cost basis. If the manager expects a security B to outperform A over the coming three years, in order to justify the trade he needs a pre-tax alpha of 3.5% for each of the three years. (See Appendix 1 for more detail.) In general, the required annual alpha per year as a function of the holding period and initial cost basis is shown in Table 1.

TABLE 1: ALPHA TAX -- ALPHA REQUIRED (PER YEAR FOR HOLDING TIME) TO JUSTIFY A SALE AT GIVEN COST BASIS

	Cost Basis										
	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
1 Yr	24.4	21.5	18.6	15.9	13.3	10.9	8.5	6.2	4.1	2.0	0.0
2 Yrs	11.6	10.2	8.9	7.7	6.5	5.3	4.2	3.1	2.0	1.0	0.0
3 Yrs	7.6	6.7	5.9	5.1	4.3	3.5	2.8	2.0	1.3	0.7	0.0
4 Yrs	5.7	5.0	4.4	3.8	3.2	2.6	2.1	1.5	1.0	0.5	0.0
5 Yrs	4.5	4.0	3.5	3.0	2.5	2.1	1.6	1.2	0.8	0.4	0.0

A common portfolio recommendation is to rebalance frequently to reduce its risks or to exploit price reversals. So, for example, if Growth increases more than Value, a rebalancing decision sells Growth and buys Value to reset their targets. A similar tax is incurred if an attempt is made to tactically time between the styles (see Brunel [2000]).

By the manager selection tax, we mean the tax cost an investor incurs each time a portfolio manager is hired or fired. If the new manager is likely to liquidate the previous manager's holdings, or if the investment vehicle is a mutual fund, this is an extreme or exaggerated form of the alpha tax. So, the very act of manager selection and reevaluation imposes taxes. Another tax friction is incurred when managers trade independently of one another. We have seen many cases where one manager buys what another is selling, or when one manager incurs a large tax cost on an appreciated security while there exists another tax lot at higher cost basis. A tax-quarterback who is aware of the managers' actions, identifies the best tax lots, and avoids wash sales can do much to improve after-tax performance.

Finally, what happens when the benchmark is reconstituted? A style-sensitive manager is aware of this change, and adjusts the portfolio accordingly. In Table 1 we estimate this benchmark tax with a mathematical model of investments held over a 20-year period. We assume each manager in each sector achieves the same 10% pretax return per year as the market. The model details are described in Appendix 2 and the results in Table 2.

The after-tax structural performance of Value is weaker than that of Growth, and Small is weaker than that of Large². The underperformance of Value comes in part from a higher dividend yield, but the main effect is due to a higher rate of realization of capital gains at benchmark reconstitution. Value stocks that migrate to Growth have become more expensive, and the gain to be realized is higher than those that migrate in the opposite direction. Similarly, the Small stocks that become Large are assessed tax on larger gains than those that migrate from the Large to the Small sectors. Comparing the total market portfolio to the partitioned structure, we see that this structural tax cost is between 80 and 100 bp. per year.

TABLE 2: BENCHMARK RECONSTITUTION TAX -- COMPARISON OF LIQUIDATION AND NON-LIQUIDATION AFTER-TAX RETURNS FOR EACH SECTOR AND THE PARTITIONED STRUCTURE

	Non-Liquidation Returns	Liquidation Returns
Total Market	9.03%	8.38%
Large Growth	8.56%	8.17%
Large Value	7.79%	7.58%
Small Growth	8.12%	7.88%
Small Value	7.36%	7.23%
Partitioned Structure	8.09%	7.81%

² We are referring here just to the benchmark re-constitution tax. Many Growth managers focus on short-term earnings-related signals and incur larger alpha taxes than Value managers. Table 1 assumes these alpha taxes are zero.

In thinking about tax costs in this way, note that the investor does not typically pay all of the four taxes independently. In the extreme case with very high turnover active managers, all appreciation would be taxed at the short-term rate each year. Avoiding the alpha tax by selecting tax-sensitive managers will improve this situation, but unless the investor also focuses on the structural taxes, he will be assessed some of the other forms of taxation. Investors in certain mutual funds who change their minds or rebalance frequently pay dearly. It is easy to be tax inefficient; to be tax efficient requires a focus on the issues at all times.

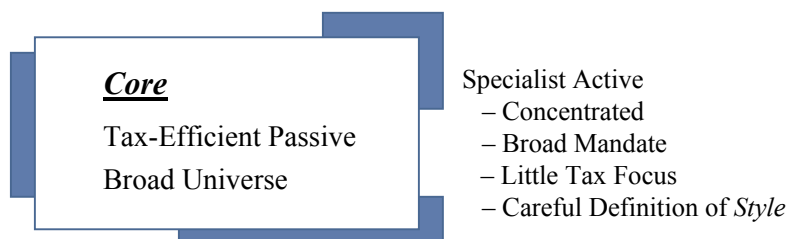
4. Equity Portfolio Structure: Recommendations

So, what are you, as a taxable investor, to do? Here are some recommendations.

(1) Simplify Portfolio Structure by seeking a centralized broad core exposure.

Instead of the standard partitioned equity structure of Figure 1, seek core exposure to a broad cap-weighted universe of stocks index, such as RU3000 or Wilshire 5000. The management of this should be centralized in a single portfolio. This avoids the large tax on benchmark reconstitution, the style and size rebalancing.

FIGURE 2: RECOMMENDED EQUITY STRUCTURE FOR TAXABLE INVESTORS



(2) Focus on tax management by implementing a passive, tax-managed core.

A passively managed core provides inexpensive diversification and avoids the alpha tax. It requires very low realization of capital gains. If this core portfolio is actively tax-managed (Stein [1999]), it provides additional after-tax benefits through loss management and careful cash flow transitions. The passive core

allows for low taxation on manager selection and de-selection. Finally, with a single core manager, you centralize the tax management and enhance its oversight.

(3) Choose a small number of satellite active and focused managers.

If you wish to make active bets, use satellite managers around the central core. This structure provides cost-effective risk management, tax management, and the possibility of an alpha.

Paying active fees for risk control (diversification) is expensive and unnecessary if the core portfolio provides this. Active approaches that are diversified, that make numerous small bets each with a small alpha expectation, are more suited to tax-exempt portfolios. With *concentrated* high-risk managers, you can manage their risks by allocating the size of their portfolios.

We have shown that most active managers necessarily jeopardize their alpha in managing taxes.

As with risk-management, the central core provides expert tax management. It can be shown that this structure also requires less rebalancing turnover than the partitioned design of Figure 1. This holds even if there is no benchmark reconstitution tax.

With a central core controlling risks and taxes, satellite managers need not focus undue attention on either of these issues, and they can concentrate their attention on what they do best. You should set the managers' mandates broadly since skill requires scope (Ennis [2001], Kahn [2001], Thomas [2000]), and let them take aggressive bets. Hedged or market-neutral long-short approaches are suitable: Kahn [2001] shows that long-short portfolios can enhance the manager's alpha by allowing him to underweight smaller stocks he dislikes. These are also likely to distribute capital gains, which can be offset by loss-management in the core portfolio.

However, as an investor, you need to measure your managers' performance on an after-tax basis so that you – and they – know what they are actually doing for you; in particular, you should be very sensitive to realizing short-term gains.

If you have both a taxable and tax-deferred investment account, the tax-deferred account is an ideal location for the satellite active managers.

In choosing the active managers the following are the main questions: how large the portfolios, how aggressive, and how many? The answers will depend on your confidence in their out-performance after taxes. With greater confidence in their skills you would increase the size of their portfolios and allow them to take larger bets; but with too many managers you increase the burden of manager evaluation and the chance of over-diversification.

If you desire pizzazz and entertainment, the high-risk active managers can provide you with this.

(4) If you want a style or size tilt, do it with a tax-efficient definition of the sector.

Note that by *passive* in (2) above, we mean *buy-and-hold*. Passive is not necessarily *indexed*. Many investors prefer a long-term structural tilt to their portfolio, for example by over- or under-weighting a sector or a theme. Many tilts can be implemented in a low-turnover passive fashion that does not depend on short-term signals or price movements³.

(5) Keep the portfolio in place over the long haul.

The portfolio should be kept in place over a long investment horizon. Each time you change your mind, you expose yourself to taxation. The broad diversification

³ It is even possible to propose a tax-efficient definition of style. This relies on very slowly moving signals and only very weakly on price movements. One can obtain return sequences that are highly correlated with those of the common style definitions, but it becomes necessary to give up on the 50/50 partition of the universe of stocks into the two styles.

is suitable for this extended horizon, and will still be diversified in a generation's time. A good tax-efficient core manager will maintain this diversification and for example, will buy into new technology companies at lowest tax cost as they evolve.

5. Conclusions

For efficient tax management, the investor needs to focus on more than the selection of a tax-efficient manager – he must design his equity structure well. This requires forethought and attention to detail. A poor design requires expensive maintenance and undermines other attempts at tax-efficiency.

We have identified four types of capital gain taxation lurking to trap the unwary taxable investor: the portfolio manager's alpha tax; the rebalancing tax; the manager selection tax, and the benchmark reconstitution tax.

To avoid these, we need to reject the conventional wisdom and embrace a new structure. This simpler approach makes the regular review, decision-making, and rebalancing much easier. It features a broad core equity investment that is passive and tax managed, and allows for concentrated active managers with relatively small portfolios that are unconstrained with respect to risk and are not too focused on taxes.

The balanced and structured tax-efficient investor views the equity design *sub specie aeternitatis*⁴. He avoids the circus games and instead heads out to spend time with his grandchildren.

⁴ From the long-term perspective [Spinoza].

Appendix 1

Consider the following example. As an investment manager, suppose you hold Security A, which has market value \$100 and cost basis \$50, and suppose you are indifferent to A. You expect it (and the market) to appreciate by 8% per year (no dividends) for 20 years. As an alternative, you like Security B, which you expect it appreciate by 10% per year for the next three years, and thereafter to behave indifferently, and appreciate like the market.

The pre-liquidation value:

$$\text{If you hold: } V_1 = 100 \times (1.08^{20})$$

$$\text{If you trade: } V_2 = 90 \times (1.1^3) \times (1.08^{17})$$

The post-liquidation value:

$$\text{If you hold: } W_1 = V_1 - (V_1 - 50) \times .2$$

$$\text{If you trade: } W_2 = V_2 - (V_2 - 90) \times .2$$

Compare the numerical values; the final values after 20 years are:

	<i>Pre-liq</i>	<i>Post-liq</i>	<i>Average</i>
<i>1. If you do nothing:</i>	\$466	\$383	\$424
<i>2. If you trade:</i>	\$443	\$372	\$408

This does not look like a good trade to make. Using the average of pre- and post-liquidation values, you would need an alpha of 3.5% per year for 3 years to justify the trade. This is a relatively large alpha that most managers find it difficult to achieve.

Table 1 in the paper generalizes this example by varying the holding period and cost basis.

Appendix 2

In working with the notions of style, note that there are no standard industry definitions. Perhaps the two most common are those of the Frank Russell Company and of the S&P/Barra indexes. Both of these formally partition the universe of stocks into two equal capitalization halves by Book/Price or other measures of relative valuation. Each period (one year or six months) the index purveyor re-constitutes the index based on the recent price movements, and a number of stocks move from one style to the other. In our model, we set the market pre-tax returns to be 10% per year for 20 years. All sectors have the same average pre-tax total return of 10%. Rates of dividend yield and gain realization vary for the sectors. The values chosen are based on recent experience in the equity markets, but are rounded, approximate numbers. Similarly, the dividend yields of the sectors are current values (mid 2001). Management and trading costs are assumed here to be zero.

	Yield	Gain Realization Rate
Total Market	1.2%	5%
Large Growth	0.5%	15%
Large Value	1.8%	25%
Small Growth	0.3%	25%
Small Value	2.4%	35%

We use tax rates of 20% on both long and short-term capital gains, 40% on income. The after-tax returns after a 10-year investment period are shown in Table 2. After-tax return computations are as those described in detail in Stein [1998]. We show both the liquidation and non-liquidation returns for each sector and for a "total market portfolio." The partitioned structure is a weighting of the sectors in proportions .4, .4, .1, .1 respectively.

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