On the Benefits of Centralized Portfolio Management

PAUL BOUCHEY AND MAHESH PRITAMANI

PAUL BOUCHEY
is the chief investment officer at Parametric in Seattle, WA.
pbouchey@paraport.com

MAHESH PRITAMANI
is a senior researcher at Parametric in Seattle, WA.
mpritamani@paraport.com

Centralized portfolio management (CPM) is an implementation strategy that combines multiple managers into a single account in an efficient manner. In the CPM framework, managers create model portfolios that are aggregated into a multimanager target composite. The central manager trades the client account against this target and customizes the portfolio based on client guidelines. Security restrictions, socially responsible screens, and tax-management objectives are examples of client-level guidelines that can be honored within the CPM portfolio.

The benefits of this approach are many. First, clients can access specialist managers at lower account minimums and lower custodial costs. Second, turnover and trading costs can be reduced by having the CPM portfolio net out redundant trades and avoid de minimis trades. Finally, for taxable investors, the CPM strategy can use tax-management techniques to reduce the amount of taxes paid. This can be done by opportunistically realizing capital losses and deferring capital gains, subject to a modest tracking error risk budget. Managers must give up the trading control that is normally associated with an investment mandate. This can be problematic if the trades are time sensitive—the central manager may have difficulty implementing, given the latency involved with CPM. Also, for highly skilled managers, any deviations from the model may have a negative impact on performance.

In this article, we focus on quantifying the cost and tax efficiency benefits of CPM using historical U.S. stock data over the 10-year period from 2006 to 2015. We relate these benefits to manager skill as well as other characteristics of the target composite. We find that CPM portfolios can reduce turnover, thereby reducing trading costs and tax costs by a few basis points. CPM portfolios that are explicitly tax managed improve after-tax returns much more than our base case, between 20 to 120 bps depending on skill level and market environment. We also find the benefits of CPM are greater if the target composites are less tax efficient and if the CPM portfolios have greater latitude to deviate from their targets.

For our analysis, we simulate two types of CPM portfolios: standard and tax-managed CPM portfolios. The standard version tracks its target composite while avoiding de minimis trades to lower trading costs. The tax-managed version defers the realization of capital gains and accelerates the realization of capital losses to improve after-tax performance. For both types of CPM portfolios, we measure trading costs and after-tax performance relative to the target composite. The standard CPM portfolios should bear lower turnover and trading costs. Because lower turnover is generally

associated with improved tax efficiency, the standard CPM portfolio should also be relatively tax efficient compared to its target. The tax-managed CPM portfolio should be even more tax efficient given that it employs active tax-management techniques to lower taxes.

We also examine how the efficiencies associated with CPM are related to the skill (or stock-picking ability) of the managers in the target. This is an important issue because the CPM portfolio could face headwinds for deviating from a target composite comprising highly skilled managers, which it needs to do to generate the efficiencies associated with CPM. Whether these headwinds are more than offset by the efficiencies associated with CPM is an empirical question. Finally, we also look at how the efficiencies associated with CPM change as we increase the level of turnover and the level of diversification in the target.

Other researchers have examined tax management in a CPM portfolio. Stein and McIntire [2003] showed, using Monte Carlo simulations, that a central manager can use tax-management techniques to improve after-tax performance by 30 to 60 bps or more. Our article differs in that we use historical simulations based on U.S. equity data for our analysis. As such, our analysis incorporates the true empirical distribution of stock returns and the natural turnover that occurs in managers' portfolios as stocks migrate from one style universe to the other. Also, in our analysis, we objectively control the skill level of the managers to generate alpha, testing the efficiency of a CPM portfolio for different simulated skill levels.

Of course, in reality, a central portfolio manager will use more sophisticated risk management techniques to maximize the after-tax returns, which could result in lower turnover, tighter tracking error, and higher tax benefits than suggested by our model. Vadlamudi et al. [2015] presented a live composite performance track record for a CPM strategy. In that 11-year study, the strategy averaged a 0.98% improvement in after-tax performance across several thousand client accounts tracking a variety of multimanager portfolios.

SIMULATING ACTIVE PORTFOLIOS

We create simulated active managers for the following four U.S. equity style universes: large-cap growth, large-cap value, small-cap growth, and small-cap value. The managers pick stocks from their style index universe. We use monthly holdings data from 2006 to 2015 for the S&P BMI style indexes to define the stock universes.

Manager skill varies using the framework of Sorensen, Miller, and Samak [1998] and Bouchey and Pritamani [2017]. Specifically, *skill* is defined as the proportion of stocks in the portfolio that are winner stocks. For the purpose of our simulation, we determine this in advance. *Winner stocks* are defined as those in the top half of the universe based on next one-year returns. We simulate portfolios that hold a range from 40% winner stocks (poor skill) to 70% winner stocks (excellent skill) in increments of 2%. A skill level 50 portfolio holds 50% winner stocks, which is what one would expect from a manager with no skill. For each skill level, we simulate 100 manager portfolios for each of the style universes over the 10-year period from 2006 to 2015. Based on these manager universes, we simulate multimanager target portfolios by picking six managers of the same skill level: two from each of the large-cap style universes and one from each of the small-cap style universes. We simulate 100 such target composites for each level of skill. Details regarding the simulation methodology along with the performance of the simulated manager universes are provided in the Online Supplement. The range of skill that we simulate for the manager universes is quite high: The average excess return for the individual manager portfolios across skill levels varies from −5% to 9%, and the information ratio varies from −1 to 2.

MULTIMANAGER RESULTS

We report the average performance across the 100 simulated target composite portfolios and show the standard errors to illustrate the dispersion across our simulated results. We calculate the performance of the multimanager target composites both before and after taxes. The after-tax performance is based on the current highest marginal federal tax rates of 23.8% for qualified dividend and long-term capital gains and 43.4% for short-term capital gains. Also, when calculating after-tax performance, we assume that realized losses offset realized gains, with any excess losses carried forward and used to offset future capital gain realizations.[1]

We account for trading costs when calculating performance by assuming that trading U.S. equities costs

EXHIBIT 1
Performance of Multimanager Target Composites by Skill Level, 2006–2015

	Skill Level															
	40	**42**	**44**	**46**	**48**	**50**	**52**	**54**	**56**	**58**	**60**	**62**	**64**	**66**	**68**	**70**
Pre-tax excess return (%)	–3.83	–2.93	–2.42	–1.44	–0.85	–0.16	0.69	1.38	2.01	2.66	3.50	4.10	4.96	5.73	6.26	7.15
	(0.08)	*(0.07)*	*(0.07)*	*(0.07)*	*(0.07)*	*(0.08)*	*(0.07)*	*(0.07)*	*(0.08)*	*(0.07)*	*(0.07)*	*(0.06)*	*(0.07)*	*(0.07)*	*(0.07)*	*(0.08)*
Taxes (%)	–0.09	–0.17	–0.21	–0.34	–0.39	–0.49	–0.63	–0.72	–0.87	–1.00	–1.18	–1.37	–1.57	–1.76	–1.95	–2.20
	(0.01)	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.02)*	*(0.01)*	*(0.02)*	*(0.02)*	*(0.02)*	*(0.02)*
After-tax excess return (%)	–3.91	–3.10	–2.63	–1.78	–1.24	–0.65	0.06	0.66	1.14	1.66	2.32	2.73	3.39	3.97	4.31	4.95
	(0.07)	*(0.06)*	*(0.06)*	*(0.06)*	*(0.06)*	*(0.07)*	*(0.06)*	*(0.06)*	*(0.07)*	*(0.07)*	*(0.06)*	*(0.05)*	*(0.06)*	*(0.06)*	*(0.06)*	*(0.06)*
Tracking error (%)	2.31	2.32	2.34	2.26	2.25	2.27	2.28	2.24	2.23	2.24	2.28	2.38	2.47	2.46	2.44	2.52
Information ratio (pre-tax)	–1.68	–1.28	–1.04	–0.65	–0.39	–0.07	0.30	0.62	0.90	1.19	1.54	1.73	2.02	2.34	2.59	2.85
Information ratio (after tax)	–1.72	–1.36	–1.14	–0.80	–0.56	–0.29	0.02	0.30	0.51	0.74	1.02	1.15	1.38	1.62	1.78	1.97
Trading costs	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.08	0.08	0.08	0.09	0.09

Note: Standard errors are shown in parentheses.

10 bps per dollar traded.[2] We ignore management fees when calculating performance. Over the sample period, the benchmark earned an annualized pre-tax return of 7.51% and after-tax return of 6.82%. Exhibit 1 shows the excess returns relative to these benchmark returns for the multimanager target composites by skill level.

We see that the pre-tax excess return is –3.83% when the target composite comprises managers with the poorest skills (skill level 40), is –0.16% when it comprises managers with no skill (skill level 50), and increases steadily to 7.15% when it comprises managers with the highest level of skill (skill level 70). The standard errors are low, at around 7 bps, so the average excess returns are statistically significant except when they are close to zero. This is not surprising given that the managers across the 100 simulations have the same level of skill and display the same level of skill year after year. The impact of taxes on excess returns is calculated as

$$\textit{Taxes} = \textit{After-Tax Excess Returns} - \textit{Pre-Tax Excess Returns} \quad (1)$$

The after-tax excess returns are lower than the pre-tax excess returns, with the impact of taxes increasing as the skill level increases. For instance, composites comprising managers with the highest level of skill (skill level 70) see their excess returns fall from 7.15% on a pre-tax basis to 4.95% after-tax. For composites comprising managers with the lowest level of skill (skill level 40), after-tax excess returns are very close to the pre-tax numbers. This is expected because highly skilled managers have larger capital gains and face a larger tax bill than poorly skilled managers. Trading costs did not have a huge impact on performance and shaved off 6 to 9 bps from performance across all skill levels. Also, tracking error for the composite portfolios was similar at around 2.25% to 2.50% across all skill levels. This is much lower than the 5% tracking error for the individual managers in our sample and illustrates the diversification benefits associated with multimanager investing. We also show the information ratios (both pre-tax and after-tax), which is another measure of manager skill. The pre-tax information ratios of the target composites vary from –1.7 to 2.9.

The range of skills that we simulate is extremely wide. It is unlikely that investors will experience, over a 10-year period, multimanager portfolios that deliver the excess returns and information ratios associated with some of the extreme skill levels that we simulate (such as a skill level of 40 or 70). We simulate this wide range to help understand the relationship between skill level and the benefits of CPM.

CPM RESULTS

We next evaluate how CPM portfolios perform relative to their targets. As mentioned earlier, we simulate two types of CPM portfolios: a standard version and a tax-managed version. In our simulations, the standard CPM portfolios track their target composites and avoid small trades by allowing stock weights to deviate by ±5 bps from their target weights. The tax-managed

EXHIBIT 2
Annualized Performance of CPM Portfolios, 2006–2015

	Target Composite (Skill Level 56)	Standard CPM Portfolio	Difference from Target Composite	Tax-Managed CPM Portfolio	Difference from Target Composite
	(i)	(ii)	(ii) – (i)	(iii)	(iii) – (i)
Pre-tax excess return vs. benchmark (%)	2.01	2.03	0.02*	2.03	0.02
Taxes (%)	–0.87	–0.77	0.10*	–0.19	0.68*
After-tax excess return vs. benchmark (%)	1.14	1.26	0.12*	1.85	0.70*
Tracking error vs. benchmark (%)	2.23	2.24	0.00	2.36	0.12
Tracking error vs. target composite (%)		0.06		0.88	
Portfolio turnover (%)	32.74	27.80	–4.94	76.50	43.76
Trading costs (%)	0.07	0.06	–0.01	0.15	0.09

** denotes statistical significance at the 5% level based on a two-tailed test. Statistical significance is only indicated for differences in pre-tax excess returns, taxes, and after-tax excess returns.*

CPM portfolios use tax-management techniques to boost their after-tax returns with stock weights allowed to drift from their target weights by up to ±25 bps.

Exhibit 2 shows the performance of the CPM portfolios in which the target composite comprises managers with skill level 56.[3] We chose this level of skill for the initial analysis because it is representative of managers with good stock-picking skills, where the individual managers have pre-tax information ratios of around 0.35 that, given the tracking error reduction, translate to an information ratio of 0.90 at the multimanager composite level. This target portfolio can be thought of as a reasonable approximation of what an investor with the ability to pick outperforming managers will experience. Of course, consistently picking highly skilled managers is not always achieved. We will later examine the sensitivity of the results to changes in manager skill level.

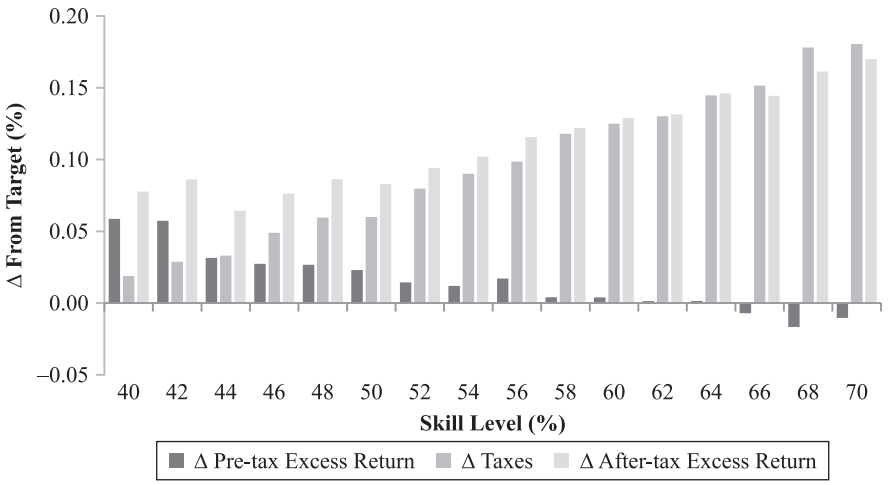
The target composite earned a pre-tax excess return of 2.01%, which dropped to 1.14% on an after-tax basis. The standard CPM portfolio tracked its target closely at a tracking error of only 6 bps. It had 5% lower turnover, resulting in a 1 bp saving in trading cost. It had a pre-tax excess return that was 2 bps higher, but it had similar tracking error versus the benchmark. In this period, the lower turnover also helped the standard CPM portfolio be more tax efficient by reducing the tax drag by 10 bps relative to the target. The net result is that the after-tax excess return was 12 bps higher for the CPM portfolio. This difference in after-tax performance between the standard CPM portfolio and its target is statistically significant. The reduction in tax drag represents the value added by being more tax efficient and can be thought of as *tax alpha* being generated by the CPM portfolio. We will frequently use the term tax alpha through the remainder of the article to represent the tax efficiency associated with CPM portfolios.

The cost and tax-efficiency benefits of standard CPM portfolios are driven by how much tracking error one is willing to bear to reduce turnover. If the active bets versus the target composite are allowed to increase by more than ±5 bps, the trading cost savings and tax alpha could increase.

Exhibit 2 also shows the performance of the tax-managed version of CPM. As the active bets are allowed to be as high as ±25 bps, we see that it has a much higher tracking error: 88 bps against its target. Benchmark-relative tracking error is similar at 2.36% versus 2.23% for the target. The tax-managed CPM portfolio has higher turnover than its target because it sells stocks to realize capital losses.[4] As a result, it had trading costs that were 9 bps higher.[5] Pre-tax excess return is within 2 bps of the target (11 bps before trading costs) and is not statistically significant. This suggests that the tracking differences canceled out over time. In other words, tax management did not introduce a material long-term performance difference in pre-tax returns.

The tax-managed CPM portfolio had a smaller tax drag and generated a tax alpha of 68 bps relative to the target, resulting in it outperforming its target by a statistically significant 70 bps on an after-tax basis. Clearly, using tax-management techniques helps improve after-tax performance at modest levels of tracking error. These quantifiable benefits, along with other intangible

EXHIBIT 3
Standard CPM Portfolios, 2006–2015



benefits associated with CPM, make a compelling case for using either version of the CPM strategy.

CPM RESULTS BY SKILL LEVEL

So far, we have seen that CPM portfolios are more tax efficient and lead to better after-tax excess returns either by reducing turnover or by aggressively harvesting losses and deferring gains. We next examine how changing the skill level of the managers influences these results.

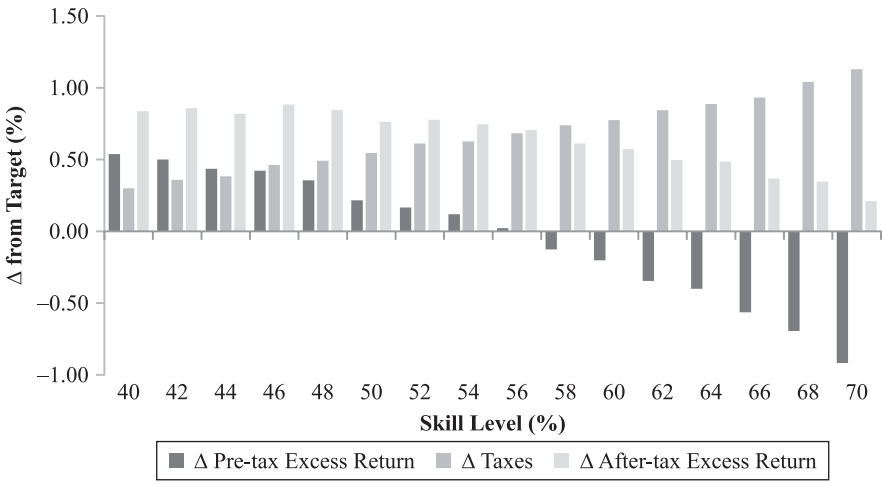
Exhibit 3 shows the performance of standard CPM portfolios relative to their targets by skill level. In each case, the bar shows the average result across the 100 simulations for the change (relative to the target) in pre-tax excess return, taxes, and after-tax excess return.[6] We see that the CPM portfolios track their targets closely. Across all skill levels, the CPM portfolios have a pre-tax excess return that is within ±6 bps of their target. There is a negative relationship between the skill level of the managers and the relative pre-tax performance of the CPM portfolios: The lower the skill level, the better the relative pre-tax performance of the CPM portfolios. This is an expected result. When managers have poor skill, deviating from the multimanager target composite should help performance. On the other hand, when managers have very good skill, deviating from the target should result in relative underperformance.[7] Based on this argument, the change in pre-tax excess returns should move from positive to negative at around skill level 50. However, it actually happens around skill level 64, with the change in pre-tax excess returns still positive at 2 bps for skill level 50. This shift in the distribution is driven by two factors: (1) the standard CPM portfolios save around 1 bp in trading costs across skill levels, which is reflected in the performance numbers and (2) noise drives realized performance to differ from expectations.

The standard CPM portfolios have better after-tax excess returns than their target. This improvement in after-tax performance is statistically significant across all skill levels. It is driven by the 5% to 6% lower turnover across all skill levels that the standard CPM portfolios experience relative to their targets. This reduction in turnover translates to tax alpha that increases monotonically with skill level because, as Exhibit 1 shows, managers with better skill face a larger tax drag. Reducing turnover helps reduce that tax drag by a greater amount when the target comprises managers with better skill for two reasons. First, stocks sold in the target composite are likely to have experienced a larger gain when managers have better skill, so reducing turnover helps reduce realized capital gains in the CPM portfolio by a larger amount. Second, tax savings associated with reduced capital gains earn a higher subsequent return in the CPM portfolio if it is tracking a target comprising managers with better skill.

Next, we look at the relative performance of CPM tax-managed portfolios in Exhibit 4, which tells a somewhat similar story to what we found earlier for the standard CPM portfolios—the only difference being the effects are generally larger in magnitude.[8] We see that the difference

EXHIBIT 4

CPM Tax-Managed Portfolios, 2006–2015



in pre-tax excess returns between the CPM tax-managed portfolios and their targets is positive when the managers in the target composite have poor skill; this difference falls and becomes negative as the skill level of the managers in the target composite improves. As the tax-managed versions of CPM take larger tracking error risk, the differences in pre-tax returns are larger and are between –0.9% and 0.5%. Because the tax-managed portfolios are aggressively pursuing tax-management strategies, they generate a tax alpha by reducing the tax drag relative to the target. This tax alpha increases monotonically from 30 to 113 bps as the skill level of the managers in the target composite improves.

This positive relationship between the skill level of the managers in the target and the tax alpha generated by the tax-managed CPM portfolios can be explained as follows. Managers with better skill generate larger realized capital gains that can be sheltered by harvesting losses. Furthermore, the associated tax savings earn a higher subsequent return. The increase in tax alpha as managers have better skill more than offsets the reduction in pre-tax excess returns, resulting in the CPM tax-managed portfolios having better after-tax returns across all skill levels. Again, this result is statistically significant across all skill levels. The after-tax excess returns range from 21 to 84 bps.

SENSITIVITY ANALYSIS

Having shown how the performance of a CPM strategy is related to manager skill, we next turn our attention to how performance is related to three other important characteristics of multimanager composites: turnover, level of diversification, and dispersion in manager skill. Exhibit 5 shows results for managers with skill level 56, comparing the results already shown in Exhibit 2 with three scenarios: (1) a CPM portfolio that has increased turnover in the target, (2) a CPM portfolio with greater diversification in the target, and (3) a CPM portfolio with increased dispersion in manager skill in the target. In the first scenario, we force additional turnover in the underlying manager portfolios during the annual reconstitution process. In the second scenario, we double the number of managers in the target. (The effect on the target would be similar if, instead of increasing the number of managers, the number of stocks held by each manager were increased.) In the third scenario, we pick a skill level 52 manager and a skill level 60 manager from each of the two large-cap style universes. We continue to pick a skill level 56 manager from each of the two small-cap style universes. The average skill level of the composite remains at 56, but it now comprises managers with different skill levels.

For the increased turnover scenario, we see that turnover in the target composite increased from 33% to 100%. The impact of taxes on performance increases from –0.87% to –2.52%, reflecting the fact that the target has become more tax inefficient. The standard CPM portfolios are able to reduce turnover by 13%, compared to 5% earlier. The tax alpha relative to the target accordingly increases from 10 to 18 bps. For the tax-managed CPM portfolios, the increase in tax alpha is much larger, from 68 to

EXHIBIT 5

Annualized Performance of CPM Portfolios vs. Target Composites, 2006–2015

	Target Composite (skill level 56)	Standard CPM Portfolio	Difference from Target Composite	Tax-managed CPM Portfolio	Difference from Target Composite
	(i)	(ii)	(ii) – (i)	(iii)	(iii) – (i)
Pre-Tax Excess Return vs. Benchmark (%)	**2.01**	**2.03**	**0.02***	**2.03**	**0.02**
Increased turnover	2.17	2.21	0.04*	1.87	–0.30*
Increased diversification	2.04	2.04	0.00	2.02	–0.02
Increased manager skill dispersion	2.11	2.12	0.01*	2.06	–0.05*
Taxes (%)	**–0.87**	**–0.77**	**0.10***	**–0.19**	**0.68***
Increased turnover	–2.52	–2.34	0.18*	–1.18	1.34*
Increased diversification	–0.86	–0.69	0.17*	–0.06	0.80*
Increased manager skill dispersion	–0.91	–0.80	0.11*	–0.21	0.70*
After-Tax Excess Return vs. Benchmark (%)	**1.14**	**1.26**	**0.12***	**1.85**	**0.70***
Increased turnover	–0.35	–0.13	0.22*	0.69	1.04*
Increased diversification	1.18	1.35	0.17*	1.96	0.78*
Increased manager skill dispersion	1.20	1.32	0.12*	1.85	0.65*
Tracking Error vs. Benchmark (%)	**2.23**	**2.24**	**0.00**	**2.36**	**0.12**
Increased turnover	2.25	2.25	0.00	2.46	0.21
Increased diversification	1.67	1.68	0.01	1.89	0.22
Increased manager skill dispersion	2.28	2.28	0.00	2.42	0.13
Tracking Error vs. Target Composite (%)		**0.06**		**0.88**	
Increased turnover		0.06		1.18	
Increased diversification		0.09		0.93	
Increased manager skill dispersion		0.06		0.87	
Portfolio Turnover (%)	**32.74**	**27.80**	**–4.94**	**76.50**	**43.76**
Increased turnover	100.26	87.33	–12.92	158.39	58.13
Increased diversification	32.75	24.69	–8.06	78.26	45.51
Increased manager skill dispersion	33.95	28.89	–5.06	78.20	44.25
Trading Costs (%)	**0.07**	**0.06**	**–0.01**	**0.15**	**0.09**
Increased turnover	0.20	0.17	–0.03	0.32	0.12
Increased diversification	0.07	0.05	–0.02	0.16	0.09
Increased manager skill dispersion	0.07	0.06	–0.01	0.16	0.09

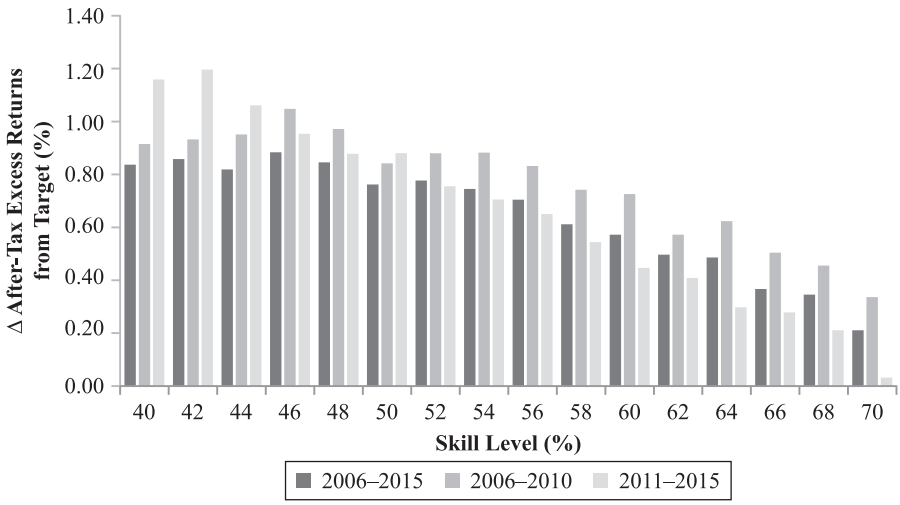
** denotes statistical significance at the 5% level based on a two-tailed test. Statistical significance is only indicated for differences in pre-tax excess returns, taxes, and after-tax excess returns.*

134 bps. Clearly, as the target becomes more tax inefficient due to the increase in turnover, the potential benefits associated with CPM increase.

Increasing the level of diversification causes the tracking error of the target to fall from 2.23% to 1.67%, while the impact of taxes on pre-tax excess returns remains the same. The standard CPM portfolios experience an 8% reduction in turnover, compared to 5% earlier. This is because, as the level of diversification of the target increases, the trades at the individual manager level translate to a smaller-sized trade at the target composite level. As the active bets allowed in the standard CPM portfolios remain at ±5 bps, a larger proportion of the manager trades fall within this range and hence are deemed de minimis and therefore not implemented in the CPM portfolio. This also results in the tracking error of the standard CPM portfolio against its target increasing from 6 to 9 bps. The tax alpha relative to the

EXHIBIT 6

CPM Tax-Managed Portfolios in Different Subperiods, 2006–2015



target increases from 10 to 17 bps. The tax-managed CPM portfolios also see an increase in tracking error against the composite, from 88 to 93 bps. The tax alpha relative to the target improves from 68 to 80 bps. For increased diversification, both versions of CPM have a higher tracking error against the composite. This illustrates that relaxing the tracking error budget improves the tax alpha that CPM can deliver. However, it comes at the cost of pre-tax excess returns facing some headwinds, especially if managers in the target have skill: The pre-tax excess returns are 2 to 4 bps lower.

Increasing dispersion in manager skill had no material impact on either the target composite or the CPM portfolios. The pre-tax excess returns of the target increased only slightly, from 2.01% to 2.11%, which reflects sampling error as we simulate only 100 portfolios. The after-tax returns of the target are also correspondingly higher by a few basis points. The standard CPM portfolio has similar pre-tax and after-tax performance relative to the target under the new scenario. The tax-managed CPM portfolio underperforms the target by 5 bps under the new scenario compared to outperforming by 2 bps earlier. As discussed earlier, the underperformance of the CPM portfolio relative to its target on a pre-tax basis is an expected result when managers in the target have skill. The tax alpha generated by the tax-managed CPM portfolio is similar at 70 bps under this new scenario compared to 68 bps earlier. Overall, the results suggest that average level of skill, as opposed to dispersion in manager skill, drives the performance of the CPM portfolios. This is not surprising given that CPM portfolios are generated only by looking at the target at the composite level. Whether the target composite was arrived at by aggregating managers of similar or diverse skills does not matter.

MARKET ENVIRONMENT

Taxes are naturally dependent on the market environment: A bull market creates capital gains and the potential for taxes, whereas a financial crisis creates capital losses and the potential for tax benefits to be realized. To test how sensitive our results are to the market environment, we break our data set into two five-year subperiods: 2006–2010 and 2011–2015. The 2006–2010 subperiod was a much lower return environment, earning a benchmark return of 3.1% versus the 12.1% of the more recent five-year period. It also encompasses the global financial crisis of 2008 and 2009 and the tremendous volatility of those years. Exhibit 6 shows the change in after-tax returns for the tax-managed CPM portfolios relative to their targets for the subperiods. We see that the CPM portfolios consistently outperform their targets in both subperiods across all skill levels, typically in the range of 20 to 120 bps. The incremental after-tax return earned by the CPM portfolios in the presence of skillful managers is slightly lower in the second subperiod. Further analysis

shows that this was due to the larger drag on pre-tax performance associated with deviating from the target in the second subperiod. The tax alpha generated by the CPM portfolios relative to the target is positive in both subperiods and is, in fact, slightly higher in the second subperiod.

CONCLUSION

In this article, we show that a central manager can improve the trading and tax efficiency of a multimanager portfolio. Standard CPM portfolios have lower turnover that is naturally a more tax-efficient strategy; lower turnover translates to fewer realized capital gains. Also, lower turnover translates to less trading costs, so standard CPM portfolios are also cost efficient. Tax-managed CPM portfolios use tax-management techniques to improve tax efficiency to create an after-tax return improvement that is much larger than standard CPM.

In our historical simulations, a tax-managed CPM portfolio created an annual tax benefit ranging from 30 to 110 bps, depending on the skill level of the manager. These results depend on a number of factors. Investors with lower tax rates will get less benefit; if the underlying managers have trading processes that incur significant tax drag, then there is more opportunity for the central manager to add value. The results hold even when the sample is divided into two separate five-year subperiods, one being the first time period, which included a major financial and stock market crisis in 2008. The CPM strategy consistently delivers in each subperiod.

A CPM structure is designed to improve the efficiencies in implementation and enhance the after-tax returns of the portfolio. There is a natural tension between tax management and the trading activity of skilled managers. If the central manager takes more risk versus the target portfolio, the tax benefit can be higher. However, the higher the skill of the manager, the more painful the deviations from the target portfolio will be. The net effect on after-tax returns to the investor is still positive in our simulations, typically in the range of 20 to 120 bps per year depending on the skill level and market environment.

ENDNOTES

[1]By carrying forward any losses that are not used to shelter gains in the CPM portfolio, we can highlight the dynamic interplay between investment skill and after-tax returns. If we assume, instead, that losses can be used to offset short-term gains outside of the portfolio, the tax benefits increase and are less sensitive to skill level.

[2]Trading costs in basis points = 10 bps per $ traded × One-way turnover × 2.

[3]We do not report standard errors for the CPM portfolios because they are similar in magnitude to the standard errors for the target in Exhibit 1. For differences between the CPM portfolios and their targets in pre-tax excess returns, taxes, and after-tax excess returns, we report whether these differences are statistically significantly different from zero based on a two-tailed test. For those interested, the standard errors (in basis points) for differences in these three metrics are as follows. In the case of standard CPM portfolios, they are 0.2 for all three metrics, whereas for tax-managed CPM portfolios, they are 2, 0.6, and 1.9, respectively.

[4]In the United States, positions can be sold for a tax loss if the wash sale rule is observed (i.e., the security is not bought within 30 days before or after the sale). In other jurisdictions (e.g., Australia), there is no wash sale rule. In these cases, a CPM portfolio can still be managed to improve after-tax returns—but care must be taken not to violate the tax-avoidance rules in that jurisdiction.

[5]In the management of live portfolios, our experience has been that turnover can be managed carefully by the portfolio manager to avoid an increase relative to the underlying manager model.

[6]Except for changes in pre-tax returns for skill levels 60 to 64, all other relative performance numbers are statistically significantly different from zero at the 5% level based on a two-tailed test.

[7]The CPM portfolio can be broken into two parts: the part held in common with the target and the part that differs from the target. For instance, if the CPM portfolio held a name at 1.1% weight while the target held the name at 1% weight, then 1% of CPM weight is held in common and 0.1% of CPM weight is different from the target. The part not held in common represents deviations from the target and is motivated by cost or tax efficiency concerns and not by information about future returns. As a result, this part not held in common is expected to earn an excess return of 0%. Therefore, the excess return of the CPM portfolio (before trading costs) will be between 0% and the excess return earned by the target. When the target earns a positive excess return, it results in the CPM portfolio underperforming the target and vice versa.

[8]As a result, except for a change in pre-tax returns for skill level 56, all other relative performance numbers are statistically significantly different from zero at the 1% level based on a two-tailed test.

REFERENCES

Bouchey, P., and M. Pritamani. "Core versus Satellite: How Much Should a Taxable Investor Allocate to the Core Equity Portfolio?" *The Journal of Wealth Management*, Vol. 19, No. 4 (2017), pp. 35-43.

Sorensen, E., K. Miller, and V. Samak. "Allocating between Active and Passive Management." *Financial Analysts Journal*, Vol. 54, No. 5 (1998), pp. 18-31.

Stein, D., and G. McIntire. "Overlay Portfolio Management in a Multi-Manager Account." *The Journal of Wealth Management*, Vol. 5, No. 4 (2003), pp. 72-81.

Vadlamudi, H., G. Longmeier, J. Gray, and T. Li. "Parametric Centralized Portfolio Management Strategy: A Study of 11-Year Performance." Working paper, Parametric, 2015.