Investors who outsource the management of their portfolios often wrestle with determining the optimal number of external asset managers to employ. This issue is relevant for a wide variety of investors, from the largest retirement plans and sovereign wealth funds around the globe to foundations and high-net-worth individuals. To help investors address this question, we have established a simple framework that takes into consideration the benefits of manager diversification along with related costs.

**THE THEORETICAL APPROACH**

The theory of portfolio diversification teaches two things:

1. The risk/return trade-off of a given portfolio can generally be improved by considering a larger number of assets.
2. The composition of the portfolio with the least amount of risk for any particular level of expected return (the so-called minimum-variance portfolio) depends on the expected returns, the variances and correlations of those returns and the number of assets.

We can take a similar approach by applying the theory of portfolio diversification, with its factors of expected returns, risk and correlations to the question of how many managers to employ in a given portfolio.

Understanding how diversification affects active risk is a good start. Exhibit 1 presents the relationship between the number of managers and the total level of active risk within a portfolio. A portfolio’s active risk is defined as the annualized standard deviation of the monthly difference between the portfolio return and the benchmark return. Note that active risk arises from positions taken relative to the benchmark portfolio.

### EXHIBIT 1: Manager Diversification Reduces Active Risk

Source: Northern Trust

For illustrative purposes only. Not representative of any investment strategy or portfolio.
Exhibit 1 clearly shows the total level of active risk in the portfolio declines as more managers are added. However, the marginal active risk reduction declines as the number of managers increases.

The information ratio provides a useful way to assess the risk/return trade-off in the portfolio. The information ratio is defined as the excess return of the manager relative to the benchmark per unit of active risk. Exhibit 2 shows the effects on the portfolio’s information ratio of adding more managers. We have assumed all managers have an information ratio of 0.5, implying that no matter how many managers are included in a portfolio, the next addition is as good as the first one. We also assume that the manager’s results are uncorrelated, so that with each additional manager, the risk decreases. This explains the upward sloping line.

Next, we turn to expected returns. To calculate the expected return of an asset manager, analysts usually use the expected excess return, which is the extent to which the manager is expected to outperform the benchmark. The variance of that expected return can be calculated using historical time series of excess returns. The correlation of the excess returns is often assumed to be zero, since in theory there should be very little mutual relationship between the outperformance of various managers.

In recent years, the active share metric has emerged as a new way to assess active managers. Active share measures how individual stock weights in a portfolio differ from the weights in a benchmark, providing an enhancement over traditional measures such as tracking error. The investment industry has embraced active share as an important addition to the toolkit for evaluating actively managed portfolios. Exhibit 3 looks at the active share in relation to the number of managers in a portfolio. With the addition of each manager, the portfolio will look more like the benchmark, lowering the active share.

1 Empirical research has shown that, on balance, the correlation of excess returns appears to be close to zero across asset classes, but nonzero within an asset class. See, e.g., Bob Litterman (2003): Modern Investment Management, p. 177.

The theoretical analysis presented in Exhibits 1 and 2 indicates that adding more and more managers to the portfolio is unequivocally beneficial for the investor. Why, then, don’t investors use more than a handful of managers in a given portfolio?

PRACTICAL LIMITS
It stands to reason there are practical limits on the number of managers an investor can use in any asset class. These revolve primarily around fees. Employing more managers may result in higher fees incurred by the portfolio for two reasons:

1. Most managers offer a fee discount for larger mandates. As a simple example, a manager might charge 70 basis points to manage the first $50 million and 40 basis points for amounts above that threshold. Having more managers means the investor is less likely to achieve the investment threshold amount at which the discounted fee applies. The investor’s bargaining power over fees can also diminish if the investor has smaller mandates to award. Hence, on average, the investor will pay higher fees across the portfolio.

2. Many managers charge minimum fees to manage an account. Particularly for investors with smaller portfolios, using more managers might result in the minimum fee being applied more often.

Source: Northern Trust
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Exhibit 4 presents the effect on the total level of investment manager fees of adding more managers.

<table>
<thead>
<tr>
<th>Number of Managers</th>
<th>Total Investment Management Fee Across Portfolio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.43%</td>
</tr>
<tr>
<td>2</td>
<td>0.50%</td>
</tr>
<tr>
<td>3</td>
<td>0.58%</td>
</tr>
<tr>
<td>4</td>
<td>0.65%</td>
</tr>
<tr>
<td>5</td>
<td>0.69%</td>
</tr>
<tr>
<td>6</td>
<td>0.73%</td>
</tr>
<tr>
<td>7</td>
<td>0.74%</td>
</tr>
<tr>
<td>8</td>
<td>0.75%</td>
</tr>
<tr>
<td>9</td>
<td>0.76%</td>
</tr>
<tr>
<td>10</td>
<td>0.78%</td>
</tr>
</tbody>
</table>

Source: Northern Trust
The manager fees are calculated as follows: 0.80% on the first $25 million; 0.65% on the next $25 million; 0.50% on the next $25 million; 0.35% above $75 million.
For illustrative purposes only. Not representative of any investment strategy or portfolio.

An often overlooked consequence of adding more managers is the increased variable cost of custody, administration, performance measurement and manager monitoring.

- **Custody**: The custody costs usually depend on the number of accounts. Since each manager requires a new account line, having more managers increases the custody costs.

- **Administration**: Every manager incurs costs for a number of administrative tasks such as billing tasks and legal reviews. As an investor uses more managers, more of these services are required, implying higher administrative costs.

- **Performance measurement**: Performance measurement becomes more complicated (and hence costly) as more managers are added to the portfolio, especially if there are intra-month cash flows in and out of manager mandates.

- **Manager monitoring**: The cost of manager monitoring directly depends on the number of managers, as each manager requires separate monitoring. While the monitoring could be outsourced, that would also come at a cost.
Exhibit 5 shows how the total cost of custody, administration, performance measurement and manager monitoring can potentially increase depending upon the number of managers.

<table>
<thead>
<tr>
<th>Number of Managers</th>
<th>Custody/Administration/Performance Measurement/Monitoring Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.045%</td>
</tr>
<tr>
<td>2</td>
<td>0.070%</td>
</tr>
<tr>
<td>3</td>
<td>0.095%</td>
</tr>
<tr>
<td>4</td>
<td>0.120%</td>
</tr>
<tr>
<td>5</td>
<td>0.145%</td>
</tr>
<tr>
<td>6</td>
<td>0.170%</td>
</tr>
<tr>
<td>7</td>
<td>0.195%</td>
</tr>
<tr>
<td>8</td>
<td>0.220%</td>
</tr>
<tr>
<td>9</td>
<td>0.245%</td>
</tr>
<tr>
<td>10</td>
<td>0.270%</td>
</tr>
</tbody>
</table>

Source: Northern Trust

We assume a flat 0.02% custody/administration fee for the portfolio and a 0.025% performance measurement/monitoring fee for each manager.

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COMBINING THEORY AND PRACTICE: THE OPTIMAL NUMBER OF MANAGERS

If we combine the theoretical benefits of manager diversification (reduced active risk, increased information ratio and reduced active share) with the practical limits (cost) we have outlined, it is possible to determine a range for the optimal number of managers to use. Exhibit 6 presents the information ratio of a portfolio, both before and after costs, for various numbers of managers.

EXHIBIT 6: The Optimal Number of Managers

ILLUSTRATIVE EXAMPLE

Let’s consider a $300 million developed equity mandate. To simplify the analysis, we make the following assumptions:

- Benchmark is the MSCI World Developed Markets Index.
- The managers considered have the following characteristics:
  - Each fund has a 3% tracking error and a 0.5 information ratio.
  - Each holds 25 stocks equally weighted.
- Zero correlation between the outperformance of the managers.³
- No holdings overlap among the managers.
- Managers are equally weighted.
- Costs for custody, administration, performance measurement and monitoring of the mandate equal 0.02% plus 0.025% per manager.
- Managers are compensated according to the following commonly used tiered fee schedule:
  - 0.80% on the first $25 million;
  - 0.65% on the next $25 million;
  - 0.50% on the next $25 million;
  - 0.35% above $75 million.
- The investor does not want the active share of the portfolio to drop below 60%.

³ In manager research, the goal is usually to find managers with negative correlation. Combining positively correlated managers decreases the diversification benefits and results in a lower optimal number of managers. While negative correlation is optimal, we use zero correlation in this example for the sake of simplicity.
The accompanying figures present the results of the analysis when applying these assumptions. As depicted in Exhibit 7, adding more managers provides enhanced performance until costs are taken into account. In Exhibit 8, we show that in this highly simplified example for a $300 million developed equity mandate with a target active share of 60%, the optimal number of managers would be four or five.

**SUMMARY**

We maintain the belief that adding managers reduces active risk, provided managers can be found that have positive expected returns and low correlation to existing ones. In practice, however, adding managers comes at a cost. Custody, administration, performance measurement and manager monitoring all become more expensive as the number of managers increases. Depending on the investor’s circumstances, an optimal number of managers can be found by thoughtfully addressing this trade-off.

Yet for institutions and individuals with limited assets, implementing a portfolio with an optimal number of managers often is not feasible given the costs involved. In such a situation, an investment outsourcing (OCIO) provider can offer a practical solution. By negotiating with asset managers, custodians and other vendors, the OCIO provider can achieve economies of scale that contribute to a cost-effective implementation option, even for smaller asset pools.

**FOR MORE INFORMATION**

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