

Executive Summary

WHAT IS THE OPTIMAL NUMBER OF EQUITY MANAGERS? A CIO TOOLKIT FOR MANAGER ALLOCATION

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Many institutional investors have adopted a multi-manager structure to harvest alpha from various sources efficiently with diversified active risk. However, CIOs must decide the number of managers to hire and the corresponding allocation across different kinds of managers and strategies.

Recent research challenges traditional multi-manager portfolio construction by showing that a combination of randomly picked active managers will lead to a portfolio where generic ideas (e.g., market and other systematic risk factors) dominate the portfolio's risk budget while exposure to uncorrelated idiosyncratic and manager-specific ideas shrinks. The diversification benefit vanishes when correlations among generic ideas increase during periods of significant market declines.

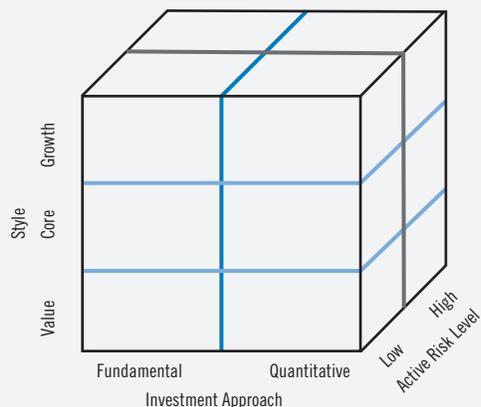
How can a CIO efficiently combine managers of different strategies to construct a diversified portfolio while limiting the danger of overdiversification? We develop a manager allocation methodology to solve the problem of achieving an efficient trade-off between portfolio active risk and return. The methodology solves for the optimal number of managers that balances the diversification benefit and cost.

We focus on US large-cap equity investment mandates and identify three persistent manager attributes: *style, investment approach and active risk level* (Figure 1). Manager characteristics over these three dimensions identify distinct investment philosophies and strategies, thereby partitioning the manager universe. Based on this classification, we develop an allocation tool, **Manager Allocation Programming (MAP)**, to help CIOs make manager allocation decisions. MAP guides CIOs to optimally allocate capital across managers while also incorporating their preferences for different manager characteristics.

We decompose the problem of finding the optimal number of managers into two parts: First, given a total number of managers, *what is the set of possible manager allocations, from the universe of managers, that best fits a CIO's preferences* (Figure 2)? This question is addressed by MAP. Then, *what is that total number of managers achieving the best risk-adjusted active performance?* We use simulation to determine the optimal number of managers to hire, given the CIO's cost function, manager preferences and manager selection skill.

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Figure 1: US Large-cap Equity Manager Universe Partition



Source: PGIM IAS. Provided for illustrative purposes only.

We discuss an example where the CIO has Neutral preferences (*i.e.*, no explicit preference to any manager type and comfortable with a portfolio balanced across various manager characteristics) and compare this MAP solution with Core-only allocation (*i.e.*, selecting managers only from the core group). We also analyze the solutions for CIOs of Risk-seeking preferences.

Figure 3 summarizes the results. The MAP allocation method dominates Core-only, regardless of the CIO’s manager selection skill level. MAP allocates across managers while maintaining portfolio net exposure close to, if not exactly, neutral over all three dimensions. While the portfolio tracking error volatility rises moderately by 0.3% - 0.5% annually, the portfolio IR is always better. This result implies that MAP solutions guide CIOs to allocate across managers more efficiently and take on more “good” volatility. Compared to the Core-only allocation, MAP solutions optimize risk allocations and therefore drive up both annual IR and net alpha, by 0.05 – 0.15 and 20 – 30bp/y, respectively, in the case of “No Skill”, depending on the total number of managers.

Considering both the net alpha and information ratio, all else equal, we find that a CIO with Neutral preferences and following MAP allocations benefits from an increasing number of managers as their manager selection skill improves: 3-4 managers assuming no skill and 8-9 managers assuming moderate to strong skill.

To address the concern of low risk illusion, we examine how MAP allocations perform during stressful market environments. The MAP method, though not immune from the problem of correlation spikes, improves the portfolio’s performance in high volatility regimes from its more effective manager diversification compared to the alternative Core-only method in the example of Neutral preferences.

We also incorporate passive strategies into the discussion. We consider combination of passive strategies with active MAP solutions to meet a CIO’s overall portfolio active risk budget.

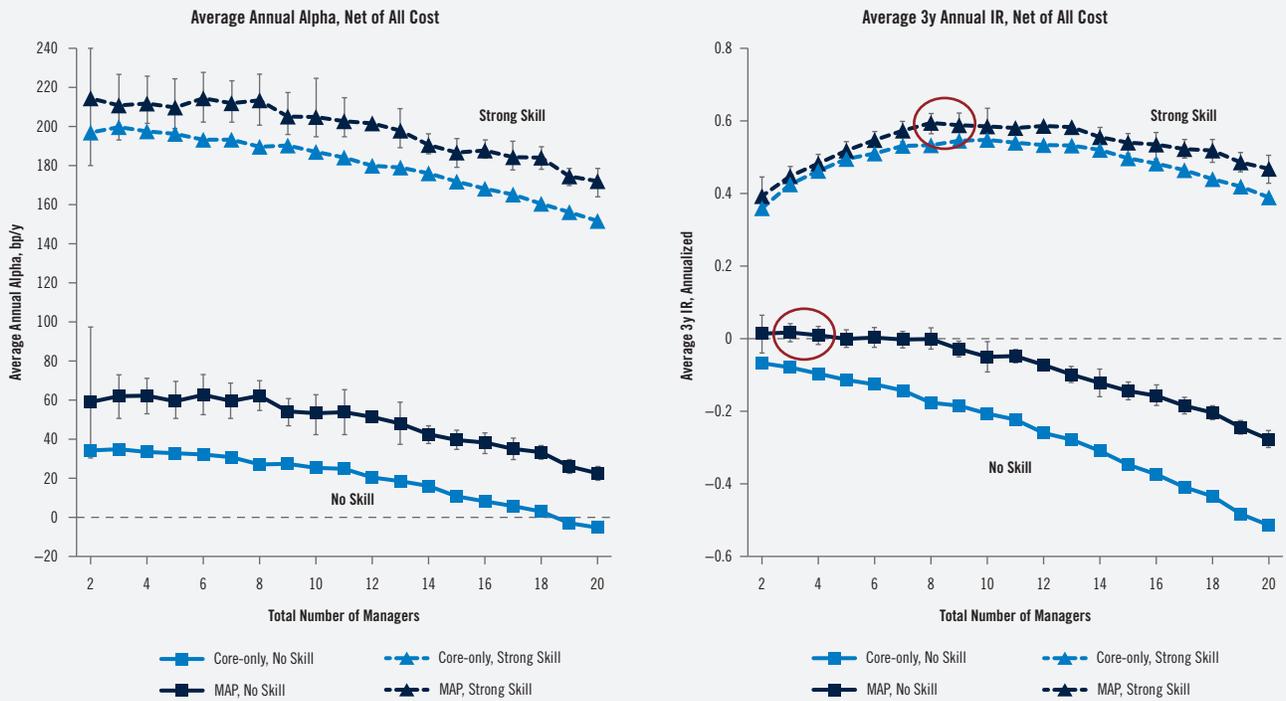
In summary, we approach portfolio construction from a diversification perspective instead of using traditional mean-variance optimization. We build a CIO toolkit, taking into consideration a CIO’s specific preferences, ability to distinguish outperforming managers from peers, and their cost of implementing such a multi-manager portfolio.

Figure 2: CIO’s Manager Preferences – Two Examples



Source: PGIM IAS. Provided for illustrative purposes only.

Figure 3: Simulated Portfolio Alpha and IR (Neutral Preferences)



Note: The simulation is based on historical manager performance data from January 1997 to December 2017. The error bar of MAP solutions represents 95% confidence interval of the average over all solutions. A narrow confidence interval indicates similar performance across MAP solutions. The information ratios, achieved by the optimal number of managers following the MAP method with each level of manager selection skill, are marked by red circles. Provided for illustrative purposes only. Source: eVestment, PGIM IAS.

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