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Tracking Error and Tactical Asset Allocation

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Abstract

We report results from our investigation of the relationship between statistical measures of tracking error and asset allocation restrictions expressed as admissible weight ranges. Tracking errors are typically calculated as annualized second moments of return differentials between a portfolio and a benchmark. In practice, however, constraints on tactical deviations from benchmark weights are often imposed on the portfolio manager to ensure adequate tracking. Simulating various investment strategies subject to such constraints, we illustrate how the size of acceptable deviations from the benchmark relates to the statistical tracking error. An example based on actual market data indicates that imposing fairly large tactical asset allocation ranges produces surprisingly small tracking errors. We also found that TAA restrictions should restrict not only the tactical ranges of the individual asset classes but also, and perhaps even more importantly, the tracking of the individual asset classes.

We report our investigation of the relationship between measures of statistical tracking error and asset allocation restrictions expressed as admissible deviations from benchmark weights. This relationship is of significant practical relevance to analysts, investment strategists, and risk managers. The reason is that these practitioners often think in terms of tracking volatility or correlation whereas the actual allocation decisions by portfolio managers tend to be guided by recommendations and constraints on the weights of assets or asset classes in their portfolios.

Typically, tracking errors are calculated either as second moments of return differentials between the tracking portfolio and some benchmark or as correlation coefficients. In practice, however, constraints on tactical deviations from benchmark weights are usually imposed on a portfolio manager to ensure adequate tracking and limit the active part of portfolio risk. These bounds define the maximum percentages by which the actual portfolio weights may deviate from the corresponding weights in the benchmark. For example, for an equally weighted benchmark portfolio consisting of five asset classes with strategic weights of 20 percent for each class, an active management contract might allow the portfolio manager to deviate from the weights within a range of ±10 percent for each class. Such a range implies a certain tracking-error range, so the active manager has the chance to earn abnormal portfolio returns.

We took a simulation approach to quantifying the relationship between statistical tracking-error measures and constraints on weights: For given tactical asset allocation (TAA) ranges, we identified admissible tactical portfolio combinations and simulated for these portfolios return series based on historical data. We then calculated the correlations and tracking errors for the portfolios as though they had been managed according to various asset allocation strategies. The simplest allocation was static; the allocation remained unchanged for the entire observation period. We also studied three dynamic TAA strategies: random rebalancing each month, rebalancing based on return trends, and rebalancing so as to maximize tracking error while still remaining within the weight constraints. In addition, we investigated allocation strategies in which the individual asset classes were managed actively. In this case, the tracking error arose not only from the tactical asset-class allocation but also from the imperfect asset-class tracking.

The asset classes came from international stock and bond markets. The benchmark portfolio for the main study consisted of U.S. stocks, European stocks, Japanese stocks, U.S. bonds, and Canadian bonds. The reference currency is the U.S. dollar, and the full period is 1985 to mid-1998. To test the robustness of the results, we also applied the analysis to different time periods and an alternative benchmark portfolio. The robustness tests confirmed our main findings.

For given tactical ranges, we found that the lowest attainable correlation coefficients between the tactical portfolios and the benchmark are surprisingly high. Consequently, imposing a lower bound for admissible correlation between tracking portfolio and benchmark may not prevent portfolio managers from holding portfolios that differ greatly from their benchmarks in terms of asset-class weights. We also found that tracking errors and correlation coefficients are very sensitive to the tracking accuracy of the individual asset classes. Thus, restrictions imposed to control the deviation of TAA strategies from benchmarks should not only restrict the weighting of the individual asset classes (i.e., the determination of tactical ranges), as is often done in practice, but should also control the error arising from the tracking of the individual asset classes.

We also applied our tracking-error analysis to the valuation of performance fees. Allowing for a higher tracking error increases the value of a performance fee contract to a portfolio manager because of the greater flexibility for the implementation of active strategies and thus the higher potential rewards. For given tactical ranges, we identified the highest corresponding tracking error in our simulation results and then used a pricing model for exchange options to compute the value of the performance fee contract. We found that the value of the contract is roughly proportional to the width of the tactical allocation ranges.

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Source: Journal of Banking & Finance
Optimal Selection of Passive Portfolios

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