Optimizing Portfolio Transitions

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A good plan executed right now is far better than a perfect plan executed next week.

— General George S. Patton

A simple proposition: There exists no "perfect plan" to guide transitions from legacy (i.e., existing) portfolios to target portfolios. The "good plan" balances *art* and *science*, and requires significant resources if it is to be executed quickly and cost effectively.

Efficient and cost-effective portfolio transitions require three ingredients: First, sound judgment and extensive experience are needed to plan and execute each transition (the art). Second, proven portfolio-optimization techniques are required to reduce opportunity costs relative to the desired portfolio (the science). Third, access to multiple sources of liquidity—internally through crossing clients' trade requests, and externally through crossing networks, alternative trading systems and exchanges—is essential to minimize costs and enhance performance.

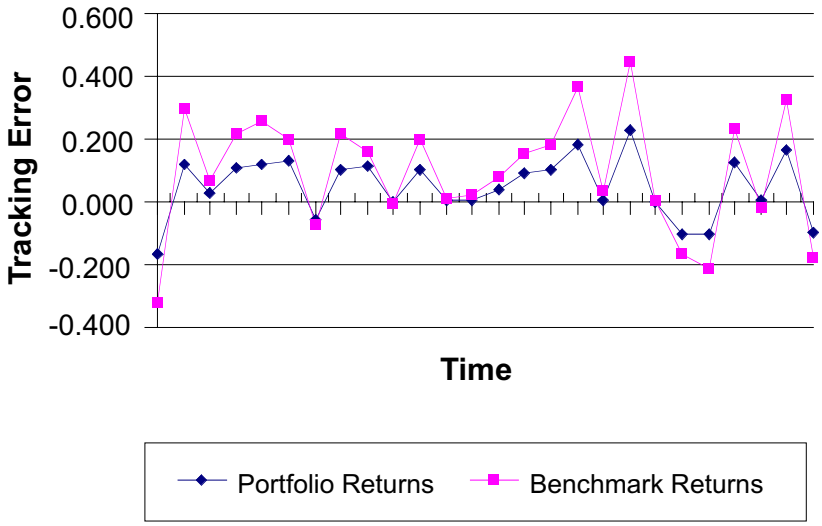
THE TRANSITION MANAGER AS A PORTFOLIO MANAGER

The challenges faced by portfolio managers and transition managers are remarkably similar. Both aim to reach a target portfolio in a smooth and speedy manner, while minimizing transactions costs and market impact. Transition managers, however, face additional complexities that are associated with managing multiple legacy and target portfolios with varying implementation periods, some of which may have overlapping securities.

Modern portfolio theory was the genesis for today's highly sophisticated portfolio management practices and, ultimately, the most effective transition processes. In particular, the theory emphasizes the rigorous analysis of expected risk and return as the basis for all investment decisions, and the inclusion of three elements in building portfolios: asset allocation, optimization of the risk/return tradeoff, and performance attribution. Because the objective for virtually all portfolio transitions is to minimize opportunity costs (also known as tracking error) and transaction costs, and to control the risk of market impact, a solid grounding in modern portfolio theory is the foundation for optimal transitions.

Since its introduction, modern portfolio theory has replaced subjective decision-making with a system for understanding market behavior, selecting securities, and managing portfolios. Later enhancements extended the theory to a multiperiod setting in which investment opportunities were seen to evolve dynamically, requiring the rebalancing of portfolios over time. Hypothetically, portfolio managers could use the theory to systematically determine their optimal asset allocation, and then create and dynamically rebalance their positions in a no-cost, friction-free environment.

EXHIBIT 1
Tracking the Tracking Error



Of course the originators of modern portfolio theory recognized that an ideal friction-free trading environment could not exist in the real world. However, the impact of transaction costs on the rate of return was considered insignificant for many years. Starting in the early 1980s, numerous academic and industry studies showed that actual return data did not support the presumed insignificance of transaction costs.[1] A direct implication of these findings was an expansion of the duties assigned to portfolio managers to include a mandate to reduce the costs of implementing a fund's optimal investment strategy.

But how can investors gauge their portfolio manager's effectiveness in achieving this objective? The answer is quite simple (see Exhibit 1). First, the portfolio returns must be calculated based on optimal asset weights ignoring all transaction costs (i.e., identify the benchmark). By comparing the actual annualized return with the return on this imaginary portfolio, one can see the potential *implementation shortfall* or opportunity costs.[2] But there is one caveat: The information provided by the implementation shortfall will only be reliable if the investor has chosen an appropriate benchmark.

THE BASICS OF EVERY TRANSITION

A number of events may necessitate major alterations in the composition of portfolios. Prominent among these are *changes in the optimal asset allocation* of a portfolio (e.g., changes in the neutral or target asset-class composition), *changes in the investment style* of a fund (e.g., shifts from value to growth), and *changes in fund management* (e.g., replacement of poorly performing managers) or manager consolidation. External forces, such as the quarterly or annual recalculation of indexes, may also trigger a transition.

Considering the circumstances that provide the impetus for transitions, the overlap in the objectives of portfolio and transition managers becomes more apparent. They also face similar hurdles, including liquidity constraints in legacy and target portfolios, and operational constraints due to the number of parties and portfolios involved and the particular characteristics of these entities. Such constraints can impede the speed and cost of a transition. Trading into the optimal portfolio may require numerous days to execute, and prolonged transitions carry higher risks due to the inability to forecast market activity with certainty.

Exhibit 2 represents a generic transition, and identifies the three distinct stages of the transition process. For each stage of the process, key steps are identified and potential tradeoffs are highlighted. While each transition is unique—requiring case-by-case analysis—common considerations include maintaining market exposure throughout the transition, maximizing crossing activity to lower required trading, minimizing costs of required trading, deciding the timing of the transition's implementation,

EXHIBIT 2

Inherent Risks in Moving from One Portfolio to Another

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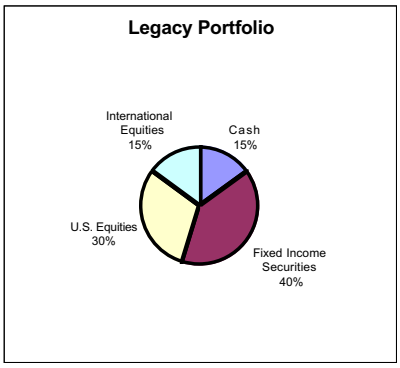
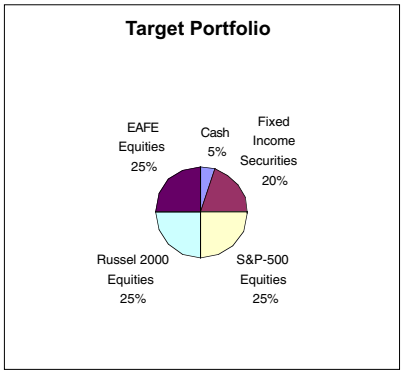
<tr>
<td> 
</td>
<td>Main considerations:

Overall objectives:
Speed of transition
Transaction costs
Market impact costs
Opportunity costs

Crossing:
In kind
Internal crosses

Market trades:
Volatility risk
Liquidity analysis
Trade size and timing block Trades
Dollar neutrality</td>
<td> 
</td>
</tr>
<tr>
<td>Pre-trade phase:
Assessment of existing portfolio
Formulation of transition strategy
Projection of transition costs</td>
<td>Implementation phase:
Manage portfolio risks
Monitor trading costs
Monitor tracking error</td>
<td>Post-trade phase:
Quality trading results</td>
</tr>
</table>

and establishing a benchmark by which implementations will be measured.

Moving a large number of assets from legacy to target portfolios encompasses at least three distinct challenges during the transition period. First, the portfolio's investment style, size, and composition may be such that the positions to be liquidated or purchased represent more of the average daily trading volume than is possible to trade in a day or even a week. Second, the microstructure of the markets in which legacy and target assets are to be traded can increase potential market impact costs in an unevenly distributed manner.[3] Third, random economic events during the transition can lead to unfavorable price movements, where the value of the legacy portfolio declines while that of the target portfolio rises, leading to high opportunity costs that inhibit performance.

PUTTING THEORY INTO PRACTICE

Managing a multiple-objective portfolio-optimization problem can be a daunting task. How can transition managers solve this dilemma in a systematic and coherent manner? Financial economists have created detailed mathematical models to address such questions as dynamic optimization problems.

These mathematical models seek the optimal balance between trading costs and exposure to market risks in a continuously evolving environment. Each solution depends upon the definition of an optimal transition and the associated execution costs. Bertsimas and Lo [1998] define "best execution" as a dynamic trading strategy that minimizes average costs of trading over a specified time period, and they show that under very stringent assumptions, an optimum trading strategy can be found by employing dynamic optimization procedures. Implementation of optimal strategies in a real-market setting, however, may be much more difficult, because the underlying assumptions of the model may be violated. For example, to develop a tractable model, it is assumed that securities prices evolve according to a random-walk process. However, one can find little empirical support for this assumption.

Almgren and Chriss [1999a and 1999b] extend this framework and devise strategy to manage and hedge the market risks inherent to the transition process. This research is about optimal liquidation of a position (i.e., the selling side). However, their model also applies to the buying side; it is a matter of replacing negative signs with positive ones. What is important about their article is that they have a model in which transactions occur over time while prices are moving randomly. Moreover, they explicitly deal with the matter of modeling market impact costs and managing multiple objectives. Again, while the dynamic optimization approach provides new insights, its assump-

tions regarding trading costs and the behavior of securities prices may be too simplistic. For example, it is assumed that securities prices evolve as a random walk, and that market impact cost is a linear function of traded volume. Both models, however, offer useful indications of what may be considered best execution, and lead to further theorizing of how to achieve such objectives. This limitation alone is a testament to the complexity of portfolio transitions, which require deep understanding of market mechanisms and extensive practical experience.

ENSURING A SUCCESSFUL TRANSITION

At its most basic level, transition management is akin to a multiple-objective, dynamic portfolio-optimization problem. But unlike mathematical optimization problems, actual transitions cannot be devoid of human judgment, as all risks associated with the transition process cannot be anticipated. Whether liquidating or restructuring a portfolio, success depends on controlling transaction costs, minimizing market impact, and maintaining market exposure. To meet these objectives, financial intermediaries that provide transition services must have extensive transition management experience, proven portfolio optimization processes, and access to reliable sources of liquidity. With any one of these elements missing, investors could relinquish significant, hard-won portfolio returns.

ENDNOTES

[1]For reference on the impact of transaction costs on portfolio performance, see Beebower and Priest [1980], Cueno and Wagner [1975], Leob [1983], Stoll [2000], and Treynor [1981]. For a survey of the same issues as pertains to institutional investors, see Keim and Madhavan [1998].

[2]Perold [1988] introduced the concept of implementation shortfall.

[3]O'Hara [1983 and 1999] discusses the importance of market microstructure on price formation and trading costs.

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