

# Advanced Theory and Methodology of Tactical Asset Allocation

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January 19, 2000

# Chapter 1

## Introduction

Tactical asset allocation (TAA) plays an important role in investment management.

The exact amount of investment engaged in TAA strategies is not clear. Philips, Rogers, and Capaldi (1996) estimated that at the end of 1994, institutional investors had committed \$48 billion to domestic TAA strategies. Since then and until March 1999, S&P 500 and U.S. Treasury bond had cumulative returns of about 200% and 60%, respectively. Even with the conservative assumptions that the average holdings is 50%/50% on stock and bond and there is no new net cash flow into TAA strategies during this period, it can be estimated that currently more than \$100 billion is committed to TAA strategies. Although global TAA was not started until late 1980s and early 1990s, it has been growing much faster than domestic TAA because of its broad dimension and global nature, which are more consistent with the globalization of investment.

When determining portfolio performance attribution, asset allocation policy is shown to be the overwhelmingly dominating factor. Based on return performance data from large pension plans, Brinson, Hood, and Beebower (1986) and Brinson, Singer, and Beebower (1991) find that on average, the asset allocation investment policy decisions explain more than 90% of the variation in quarterly total plan returns. When asset allocation decisions are tactically managed, overall portfolio performance will be significantly affected by the performance of TAA.

## 1.1 Historical Background

Wells Fargo was considered to be the first firm to introduce tactical asset allocation product in the 1970s. After experiencing severe erosion of assets during the 1973-74 market decline, some institutional investors were searching for better asset allocation strategies rather than ad hoc shifts among different asset classes. William Fouse of Wells Fargo Investment Advisors then introduced a pioneer approach to implement asset allocation shifts between stock and bond. In his system, when the expected risk premium of stocks, calculated based on projected dividends from current earnings estimates, over bonds was higher than the predetermined figure, which was about 3.5%, allocation to stocks would be increased from the normal mix, and vice versa. This system was able to produce positive results on paper from 1973 to 1976, a period of severe recession with 45% stock market decline. Further catalyzed by the 27% market decline in 1981, TAA products became more popular among institutional investors, and more managers started to launch similar systems in the investment industry.<sup>1</sup> In addition, when the use of derivatives took off in the 1980s, futures contracts were used to implement asset shifts, thus further lowering implementation cost of tactical asset shifts by as much as 90%.

Since the early 1980s, portfolio insurance, which was developed based on the option pricing theory of Black and Scholes (1973) and Merton (1973), was widely implemented by many institutional investors in attempt to produce a floor or guaranteed minimum portfolio return. This dynamic asset allocation strategy became even more popular when its implementation was greatly simplified by the introduction of Constant Proportion Portfolio Insurance (CPPI) by Perold (1986) and Black and Jones (1987). At around the same time, there was a major concern about TAA strategies as most of them had substantial hedge against stock when the stock market was rising.

The global stock crash of October 1987 played an important role in shaping the future of TAA strategies and portfolio insurance. Before the crash, most valuation techniques viewed stock as significantly overvalued. However, the stock market continued to advance while bond yield was heading higher, leading to the first period of major underperformance for TAA managers. Since many of them were substantially underweighting stock before

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<sup>1</sup>In an unpublished version of Philips, Rogers, and Capaldi (1996), it was reported that six managers had real-time tactical asset allocation performance dating back to 1982.

the crash, and some were even hedged entirely out of stock into bond, these strategies had an excellent performance when stock underperformed bond by 30% in October 1987. About two weeks after the crash, many tactical managers restored their positions back to the normal mix. On the contrary, portfolio insurance strategies largely failed to deliver a guaranteed floor value. Since then, there was an explosive growth of interest in TAA strategies, while portfolio insurance gradually faded away in the investment industry.

The Federal funds rate was increased from 6.5% in April of 1988 to 10% in March of 1989. Most TAA strategies interpreted stock as relatively unattractive, thus leading to substantial hedging of stock exposure from mid-1988 until mid-1989. Partly due to the gradual manner of the Federal Reserve's interest rates policy and strong commitment to avoid a recession induced by high interest rates, together with corporate restructuring, leveraged buy-outs, and foreign capital inflow, the stock market continued to rise strongly throughout the whole period of higher interest rates. This led to the significant underperformance of many TAA managers. While those who joined the TAA strategies prior to October 1987 still had a net positive incremental return, the others who joined after the crash had realized substantially lower returns than they would have had they not joined the strategies.

After the recession in 1990, there was a secular decline of volatility of stock return in excess of bond. Since performance of TAA depends on volatility, it became more and more difficult for TAA managers to add value for their clients.<sup>2</sup> Since 1995, volatility appeared to return towards more normal levels. In August 1998, stock underperformed bond by 20%. Not only did volatility significantly bounce back, many TAA managers were said to have added value as many of them were underweighting stock.

Two decades of history suggest that returns of TAA strategies can be episodic. Unlike mutual funds, there is no formal performance evaluation agents for TAA managers. Nevertheless, some investment management consultants, such as BARRA RogersCasey and The Carmack Group, have collected data from TAA managers. Currently, The Carmack Group keeps track of about two dozen TAA managers.

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<sup>2</sup>Merton (1981) is the first one to link volatility to the performance of market timing strategies. Since then, the argument that high volatility is good for TAA strategies has been used at an intuitive level for long. See Philips, Rogers, and Capaldi (1996) and Arnott and Miller (1997), for example. The argument is formally proved in Lee (1998).

## 1.2 What Is Tactical Asset Allocation?

While TAA products have existed for more than two decades, its definition has never been made clear. One of the problems is that the same terms are often applied to different strategies for different purposes. For instance, the term “dynamic asset allocation” is general enough to be used for any asset allocation strategies that change portfolio mix over time.<sup>3</sup> As such, it can be used to describe tactical asset allocation, but it can be applied to portfolio insurance equally well. Since an option contract can be replicated by a dynamic trading rule, dynamic asset allocation is mostly used for portfolio insurance.

When TAA was first launched as an investment product, it was often marketed as a value-based type of investment strategy designed to realign the return and risk profile of the longer-term strategic benchmark portfolio. As a result, it gave the impression that a TAA strategy would buy cheap assets and sell expensive assets. The seminal study by Perold and Sharpe (1988) demonstrates that a constant-mix strategy requires purchase of assets as it falls in value, giving a concave payoff diagram. On the contrary, a portfolio insurance strategy would require purchase of assets as its price goes higher, thus giving a convex payoff diagram. Since then, it became more popular to interpret TAA strategies as issuers/sellers of portfolio insurance. This interpretation was further strengthened by the fact that TAA managers had great performance during the crash of 1987, while portfolio insurers turned in poor performance. The caveat of this interpretation is the fact that not all TAA strategies would purchase stock when, say, stock price falls. For instance, those managers who use momentum signals as part of their model are very likely to buy stock when price is going higher. Yet, we cannot rule them out from the TAA universe.

In Chapter 2, we discuss the theory behind the normative and positive versions of TAA. As articulated in details under the positive version in practice, the role of TAA steps in after strategic asset allocation decisions are made. In general, a benchmark portfolio is chosen based on long-term, equilibrium assumptions of return and risk profile of the investment universe, as well as the investor’s attitude towards risk. However, current state can be driven further away or towards equilibrium by different market and economic forces such that the implicit optimal balance between return and risk in the

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<sup>3</sup>For examples, see Arnott and Fabozzi (1988), and Trippi and Harriff (1991).

strategic benchmark is off. As a result, it is necessary to be able to change the portfolio compositions dynamically such that optimality is restored. Exactly how this is done will depend on the information set, or in practical terms, the “tactical asset allocation” model.

Arnott and Fabozzi (1988, p.4) defines TAA in this way:

“Tactical asset allocation broadly refers to active strategies which seek to enhance performance by opportunistically shifting the asset mix of a portfolio in response to the changing patterns of reward available in the capital markets. Notably, tactical asset allocation tends to refer to disciplined processes for evaluating prospective rates of return on various asset classes and establishing an asset allocation response intended to capture higher rewards. In the various implementations of tactical asset allocation, there are different investment horizons and different mechanisms for evaluating the asset allocation decision.”

This is indeed a very broad definition which covers most, if not all, tactical asset allocation strategies. However, it never clearly defines what “to enhance performance” and “rewards” really mean. Therefore, whether a particular strategy is a TAA strategy or not depends on how performance and rewards are measured, be it return, volatility, Sharpe ratio, or mean variance efficiency, and the like.

Recently, Philips, Rogers, and Capaldi (1996) put forth a more practical definition for TAA as follows:

“A TAA manager’s investment objective is to obtain better-than-benchmark returns with (possibly) lower-than-benchmark volatility by forecasting the returns of two or more asset classes, and varying asset class exposure accordingly, in a *systematic* manner.”

In practice, performance of TAA managers is always measured against their passive benchmark portfolios. If the manager outperforms the benchmark such that the return of the TAA portfolio is higher than the return of the benchmark portfolio, the manager is said to have delivered a positive “alpha.” Other than being able to outperform the benchmark, consistency of outperformance is also important. Generally speaking, a manager who is able to deliver more consistent outperformance, commonly measured by the

volatility of alpha and known as the “tracking error,” is considered to be more skillful. Similar to the Sharpe ratio, which takes both return and risk into account, one typical measure in comparing performance of different TAA managers is the information ratio, defined as the ratio of alpha to tracking error. The higher the information ratio, the better.

One may argue that the way Philips, Rogers, and Capaldi defines TAA appears to have over-emphasized return and the importance of risk has been understated. In addition, being able to outperform the benchmark may not be consistent with maximizing mean variance efficiency of the portfolio, as the TAA manager may deliver a better-than-benchmark return but also a higher-than-benchmark volatility.

It is fair to point out that the return and risk trade-off, or the mean-variance efficiency of the overall portfolio, is an important metric to evaluate performance. However, in practice, a TAA manager who consistently delivers negative alphas even when overall mean-variance efficiency may be improved will certainly go out of business. This is partly because most clients of TAA managers are institutional investors who have long enough investment horizon such that some additional volatility is not unacceptable. Moreover, measuring a portfolio’s mean-variance efficiency remains an extremely difficult task.<sup>4</sup> This high degree of measurement error needs to be mitigated before mean-variance efficiency can become a more important tool for portfolio performance measurement.

In this book, we use the following simple definition for TAA strategy:

“TAA strategies are strategies which attempt to deliver a positive information ratio by systematic asset allocation shifts.”

### 1.3 Implementing Tactical Asset Allocation

In practice, TAA is often offered as an overlay program to the underlying equity fund and bond fund. Consider an example of a 50%/50% stock/bond underlying benchmark portfolio, 20% of which is committed to a TAA program. The participant chooses the normal mix, 50%/50% in this example, typically with the help of the investment manager. With \$100 million total assets, \$50 million would be allocated into the equity fund and bond fund,

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<sup>4</sup>See Shanken (1987), and Gibbons, Ross, and Shanken (1989), for testing portfolio efficiency. Britten-Jones (1999) illustrates the large sampling error in estimates of mean-variance efficient portfolio weights.

respectively. \$10 million is then contributed from each fund into the 20% TAA program. If the manager is bullish on stock and bearish on bond, Treasury bond futures equivalent to part or all of the \$10 million in bond in the TAA program will be sold, and the proceeds will be used to purchase S&P futures, thus increasing exposure to stocks. The case of being bearish on stock and bullish on bond works in the opposite direction. If the manager is bearish on both stock and bond, S&P futures and Treasury bond futures will be sold to gain cash exposure. This structure allows a maximum exposure of 60%, 60%, and 20%, and a minimum exposure of 40%, 40%, and 0% to equity, bond, and cash, respectively. Thus, the normal mix portfolio becomes the corresponding benchmark in calculating the value added by the TAA program.

TAA programs can be run even when some asset classes are absent in the underlying portfolio. For example, consider an underlying physical portfolio of 100% stock, while the benchmark portfolio is chosen to be 60% in stock and 40% in bond. Instead of selling physical stocks in an amount equal to 40% of the portfolio and buying bond with the proceeds, the appropriate number of S&P futures contracts can be sold such that the proceeds will be used to buy Treasury bond futures to bring the exposures to stock and bond to the desired benchmark levels of 60% and 40%. Futures contracts for tactical shifts can then be traded. Similarly, a domestic portfolio with no exposure to foreign assets can also be used to run global TAA, when the appropriate number of futures contracts for domestic assets are sold to raise the proceeds to buy futures contracts for foreign assets.

## 1.4 Organization of the Book

The core of this book consists of three parts. Part I contains just Chapter 2, which offers a purely portfolio theory perspective in explaining the role and importance of TAA. While there are many writings in support of or against TAA, almost all are written from empirical perspectives,<sup>5</sup> or as marketing materials of investment managers. This chapter attempts to offer an objec-

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<sup>5</sup>See Breen, Glosten, and Jagannathan (1989), Clarke, FitzGerald, Berent, and Statman (1989, 1990), Sy (1990), Wiegel (1991), Shilling (1992), Wagner, Shellans, and Paul (1992), Chen, Chan, and Mohan (1993), MacBeth and Emanuel (1993), Boudoukh (1994), Brocato and Chandy (1994), Nam and Branch (1994), Philips, Rogers, and Capaldi (1996), Vergin (1996), Brennan, Schwartz, and Lagnado (1997), Lee (1997d), and Wagner (1997).