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A primer on tactical asset allocation strategy evaluation

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Executive summary. Tactical asset allocation (TAA) is a dynamic strategy that actively adjusts a portfolio's strategic asset allocation (SAA) based on short-term market forecasts. Its objective is to systematically exploit inefficiencies or temporary imbalances in equilibrium values among different asset or subasset classes. Over time, strategic long-term target allocations are the most important determinant of total return for a broadly diversified portfolio with limited market timing. TAA can add (or subtract) value, if designed with the appropriate rigor to overcome significant risk factors and obstacles unique to the strategy. Our results show that while some TAA strategies have added value, on average, TAA strategies have not consistently produced excess returns.

This raises several important questions for institutional investors: What tools and processes do they need to have in place to make optimal decisions regarding TAA strategies? What questions should they ask a prospective manager? What are the critical components of a good model if they choose to run a TAA strategy in-house? This paper provides answers to these questions.

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Many pension funds, endowment funds, and other institutional investors are concerned that equities—typically their largest asset allocation—will provide lower average returns over the next decade. In this environment, many investors have questioned the wisdom of thinking about asset allocation solely in strategic terms and have shown renewed interest in tactical approaches.

Tactical asset allocation (TAA) is a dynamic strategy that actively adjusts a portfolio's strategic asset allocation (SAA) based on short-term market forecasts. Its objective is to systematically exploit inefficiencies or temporary imbalances in equilibrium values among different asset or subasset classes. Although the successful implementation of a TAA strategy is often portrayed as simple, it is actually very difficult. Our results show that while some TAA strategies have added value, on average TAA strategies have not produced statistically significant excess returns over all time periods. However, TAA can add (or subtract) value, if designed, implemented, and evaluated appropriately.

This paper provides best practices for developing or selecting a TAA strategy. Specifically we review the components of a robust model, relevant qualitative and quantitative evaluation metrics, and the tools and processes needed to make optimal decisions regarding TAA strategies.

SAA, TAA, and traditional active strategies juxtaposed

The case for SAA

SAA, also known as policy asset allocation, is the establishment of a long-term target allocation in major asset classes such as stocks, bonds, and cash based on portfolio objective, risk tolerance, and time horizon. Over time, SAA is the most important determinant of the total return of a broadly diversified portfolio with limited market timing. Studies support empirically the dominance of SAA in determining total return and return variability.¹

The case for TAA

TAA attempts to add value to SAA by overweighting those asset classes or subasset classes that are expected to outperform on a relative basis and underweighting those expected to underperform. In a TAA model, financial and economic variables ("signals") are used to predict performance and assign relative short-term asset-class weightings. A traditional TAA model generally consists of stocks, bonds, and U.S. Treasury bills, but it can also include assets such as currencies, commodities, and other alternative investments. A TAA model can decompose to the subasset-class level to include growth and value stocks or corporate bonds and Treasury securities. The model may be implemented using only domestic asset classes, or it may be implemented on a global level. While TAA is an active strategy based on systematically timing the market, it can be carried out through security selection or indexed investments.²

Notes on risk: All investments are subject to risk. Past performance is not a guarantee of future results. Diversification does not ensure a profit or protect against a loss in a declining market. Investments in bonds are subject to interest rate, credit, and inflation risk. U.S. government backing of Treasury or agency securities applies only to the underlying securities and does not prevent share-price fluctuations.

1 For a more detailed discussion of SAA, see The Vanguard Group (2003) and Tokat (2005).

2 For example, a TAA model may dictate a 10% overweighting in emerging markets. This allocation can be implemented either with an index investment or through security selection.

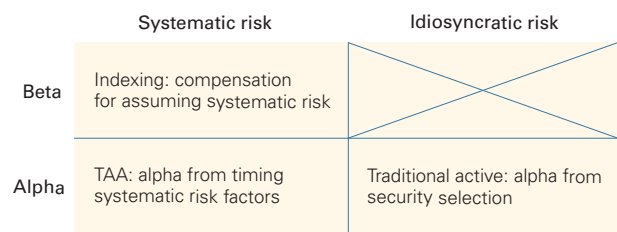
Economically, TAA is based on the assumption that relative returns among asset classes will diverge temporarily from equilibrium levels, allowing the opportunity for excess returns from systematic (generally contrarian) strategies. A well-designed TAA strategy will recognize an imbalance and suggest an underweight to an overpriced equity market, for example, resulting in value added for a portfolio.

TAA strategies are different from security-selection strategies in terms of both risks and benefits. It is helpful to understand these differences before implementing a strategy and choosing a manager.

Sources of return

The source of return for a TAA strategy can be illustrated through comparison with other strategies. TAA strategies attempt to add value by timing systematic (or market) risk factors and overweighting those asset classes that are expected to outperform. A passive indexed strategy also derives return from systematic risk factors. However, with a passive strategy, investors are simply compensated for assuming the market risk resulting from the variation in factors such as interest rates, term-structure shifts, specific business and industry shocks, and unexpected inflation shocks. In other words, passive returns result from beta, and TAA returns attempt to produce alpha through a bet on systematic risk. Like TAA, security-selection strategies attempt to produce alpha, but alpha is a bet on idiosyncratic or firm-specific risk, as opposed to systematic risk. These concepts are illustrated in **Figure 1**.

Figure 1. Sources of return



Source: Vanguard, 2009.

TAA versus security-selection strategies

Compared with security-selection strategies, the timing of systematic risk entails different risks and potential benefits. Understanding these differences is critical to the successful implementation of a TAA strategy. The biggest difference is the available opportunity set. Unlike active strategies based on security selection, there are a limited number of assets available for tactical strategies. The number of opportunities is limited by the number of asset or subasset classes that managers can over- or underweight. In contrast, active strategies based on security selection have the entire universe of public companies as potential opportunities to add value. There are typically between 3 and 20 assets in a TAA strategy, compared with 100 to several thousand in an active strategy based on security selection (Grinold and Kahn, 2000). Another difference is that single signal predictability is generally very low with TAA strategies, and it is questionable whether strategies are exploitable in out-of-sample periods. The combination of these two factors—low predictability and a limited number of possible bets—makes TAA particularly challenging.

On the other hand, there are two primary benefits to using TAA strategies versus traditional active strategies. One benefit relative to security-selection strategies is that a tactical strategy can, in some cases, be implemented with lower transaction costs. With other active strategies, trading individual securities typically involves significant transaction costs, while tactical shifts in major asset classes can be carried out with liquid futures contracts on an index, resulting in very low transaction costs. Note that tactical subasset allocation or global strategies may not share this benefit. Liquid futures contracts on an index may simply not be widely available for these styles, segments, or markets. The other primary benefit is that TAA strategies can result in more independent bets. Unlike the correlations among individual securities, correlations among asset classes are low, by definition. Low correlation facilitates independent bets and reduces the chance that two bets in one strategy will effectively cancel each other out. Note that tactical subasset allocation (among equity styles or bond segments) does not share this benefit because of the generally high correlation among subasset classes.

Real-world application: Evaluating a TAA strategy

Although the successful implementation of a TAA strategy is often portrayed as simple, it is actually very difficult. As mentioned earlier, predictability is low and opportunity sets are limited. As a result, investors must be careful in selecting managers or strategies. They should understand a strategy's information signals; for example, how a manager determines over- and underweightings and what makes the strategy durable. It is important to use appropriate qualitative and quantitative performance-measurement criteria and to identify strategies with relatively low costs. Some best practices for selecting or developing a TAA strategy follow.

- **Understand how a forecast is created.** Success with a TAA strategy is largely dependent on constructing a good model. The first step in

developing an overall TAA model is to forecast excess returns by constructing models that attempt to predict asset-class returns using a set of explanatory variables or signals. Running tests over a sample period will help to reveal the strength of the signals and the overall explanatory power of a model. Models may have varying predictive strengths during different periods. As a result, multiple predictive models are typically required to consistently add value. Models should also be dynamic; that is, they should change with structural changes or other factors that permanently affect signal strength. The text box on page 5 summarizes the commonly used TAA signals, their rationale, and the time periods over which they are expected to add value.

A good forecasting model must include multiple economically meaningful signals and have a verifiable research process that follows a reasonable method to identify meaningful signals:

- *Economically meaningful signals.* Economically meaningful signals are those with rational, intuitive explanations for their expected predictive power. For example, the term spread, as an indicator of the business cycle, is intuitive and rational. Typically, the yield curve is positively sloped, meaning that long-term interest rates are higher than short-term ones. According to the term structure of interest rates, a positively sloped yield curve is compensation for the higher risk of locking in longer-term bonds and the uncertainty of inflation (and therefore the direction of interest rates) in the future. Investor expectations about the future economic environment affect the amount of this risk compensation and, therefore, the shape of the yield curve. Since market risk premiums and firms' cash flows are linked with the future economic environment and the business cycle, a TAA strategy may benefit from systematically following a term-spread indicator.

Understanding the commonly used TAA signals

Investors should understand the rationale behind commonly used TAA signals and the time periods over which such signals are expected to add value so they can judge the skill of a manager and be comfortable with the types of bets made in their portfolios.

- **The “Fed model” signals:** This involves a model that compares earnings yields (the inverse of the price/earnings [P/E] ratio) to nominal bond yields to determine the relative attractiveness of equities over bonds. The underlying notion is that stocks and bonds compete for the same dollars and the higher-returning asset class should be overweighted in the portfolio. Clifford Asness (2003) detailed several drawbacks to this approach.
- **Business-cycle/macroeconomic signals:** These signals attempt to find value added by timing the business-cycle-related variation in market risk premiums and firms’ earnings. Widely used signals include the term spread (the yield differential between long- and short-term bonds), the credit spread (the yield differential between high- and low-credit-rated corporate bonds), “unexpected inflation,” and industrial production. Business-cycle variables are typically implemented over intermediate time horizons.
- **Fundamental-valuation signals:** One approach involves using fundamental firm-valuation metrics, such as dividend yield, book/market ratio, and P/E ratio, to determine relative valuation. Another approach is to use top-down or bottom-up cash-flow valuation methods (Damodaran, 2002). An example of the latter would be to use the dividend discount model to reverse engineer the required rate of return from market prices and projected dividend growth rates. Fundamental-valuation signals are typically implemented over intermediate time horizons.
- **Momentum signals:** These signals attempt to add value by following the short-term momentum in markets. Typical momentum signals include technical indicators, earnings growth, and changes in trading volumes. Momentum signals can be at odds with fundamental or business-cycle signals at times, such as during the technology stock bubble of the late 1990s. However, when momentum signals are appropriately combined with fundamental or business-cycle signals, they can produce complementary strategies.
- **Sentiment signals:** These signals attempt to add value through a contrarian strategy that looks for extreme levels of sentiment, such as consumer confidence and margin borrowing, to identify deviations from equilibrium returns. Sentiment signals tend to be implemented over intermediate time horizons.

— *Absence of data mining.* In addition, the manager should be able to confirm that he or she did not “mine the data,” the process of rerunning the model with modified signals until a desired result is reached and presenting only those results for the sample period. Data mining, while producing impressive results, runs the risk that the model will not work in real time. Out-of-sample tests of the strategy, such as in other time periods or countries, can help to confirm that the strategy’s success is not simply the result of fitting the model to explain one historical period.

— *Rational decision process.* Finally, like the signals themselves, the decision process for determining which signals are included and how they are combined should be economically reasonable. Consider a forecast that relies on a high R-squared to determine whether a signal is predictive and should be included. Despite a high R-squared, an economic rationale may suggest that the signal should not be used. A simple example of this is the “Super Bowl effect,” which predicts that the value of the Standard & Poor’s 500 Index will increase if an old National Football League team wins the Super Bowl or decline if an old American Football League team wins (example from Clifford Asness [1996]). The explanatory power of which team wins can be quite strong, but of course, there is no plausible rationale for a predictive relationship between football games and equity returns.

A good model will have a method for ensuring that the selection and testing process is economically reasonable. An example of this is the Bayesian method. Bayesian probability calculations involve assumptions based on economic theory or intuition, which are combined with what is learned from the data (Campbell and Thompson, 2005). For the model, the approach might be to assume that the prospective equity risk premium is

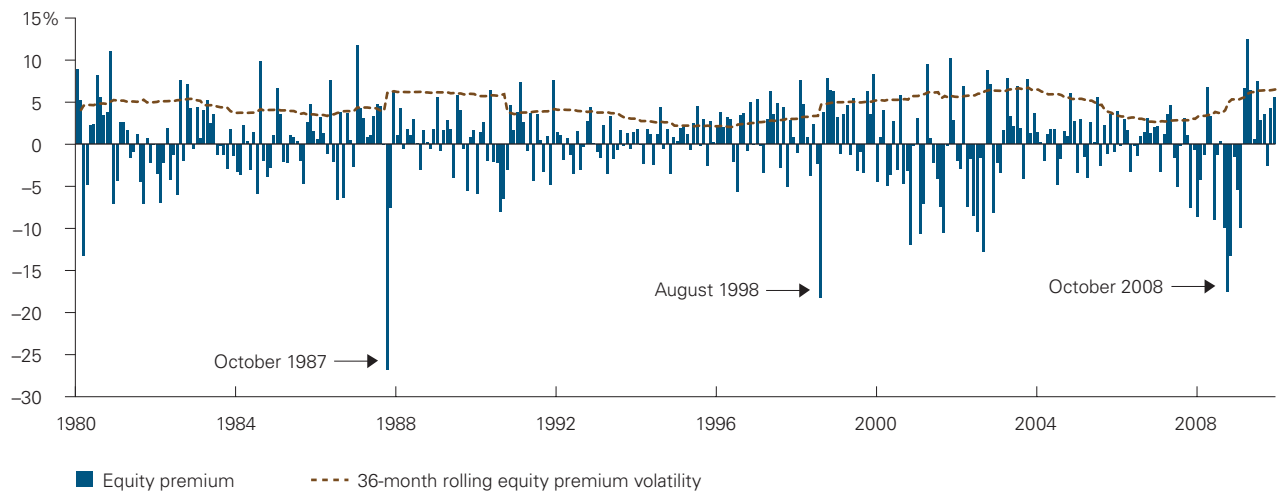
positively related to dividend yield, for example. This would mean constraining the forecast model to disregard any results where the relationship between the dividend yield and the equity risk premium was negative. This approach provides a qualitative, rational overlay to the statistical-measurement process. It allows the model to disregard those results that strongly conflict with economic intuition.

- **Understand how asset-class over- and underweightings are determined and controlled.**

Another factor to evaluate is a model’s asset-weighting optimization process. First, over- or underweightings should be proportional to the combined strength of the model’s information signals. If a strategy recommends a large overweighting in a particular asset class, the manager should be able to demonstrate the model’s strong predictive power in that regard. Investors should avoid a manager who makes big bets based on weak signals. Second, over- or underweightings should be made with the appropriate constraints on deviation. Constraints can be based on ad hoc decision rules. For example, a rule could state that if the projected equity risk premium is greater than 10%, then a manager should overweight equities by 15%. Or if optimization is used to determine asset-class weightings, constraints can be implemented with models that “tame” the optimizer.

Traditional mean-variance approaches are highly sensitive to expected returns and often result in very large weightings in particular asset classes. The Black-Litterman Model (Black and Litterman, 1992) is an example of a model that corrects for these extreme results. This model starts with equilibrium expected returns and then moves away from them based on the volatility and correlations of each asset class and the degree of confidence in each forecasting model. The results of the model tend to be less extreme than traditional mean-variance approaches.

Figure 2. Monthly equity premium (equity return – Treasury return) and rolling volatility



Note: Equities are represented by the MSCI US Broad Market Index; bonds are represented by the Barclays Capital U.S. Treasury Index.
 Source: Vanguard calculations based on data from Thomson Reuters Datastream and Barclays Capital Live.com.

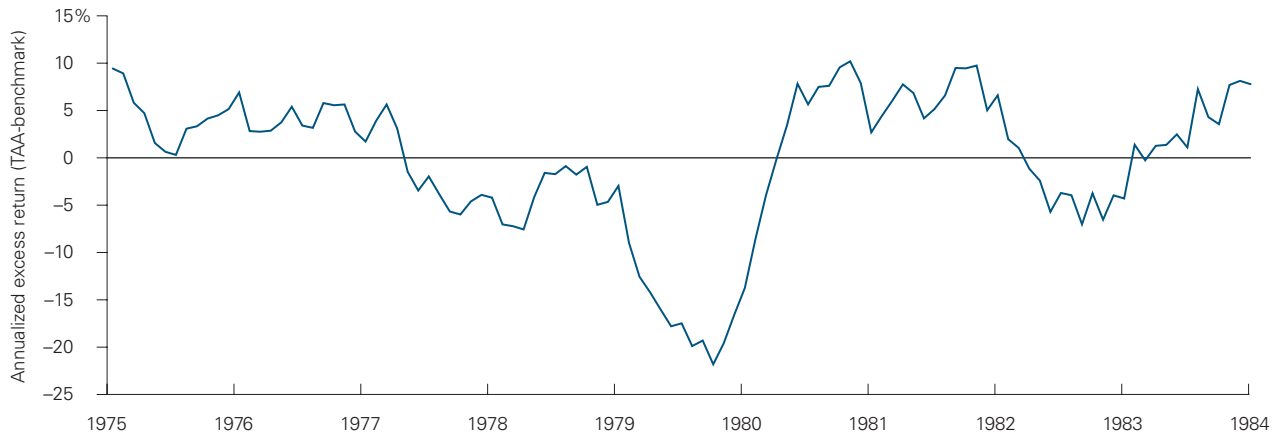
- **Consider the durability of value added.** Evaluate performance to determine what makes a strategy durable and how the back-tested performance compares with the real-time record. The following checks on a model help to determine this:

- *Review the manager’s historical asset allocation relative to the benchmark.* This process is critical to determine whether the model’s excess returns are simply a result of bias toward the historically higher-returning asset class, such as a strategic overweighting in equities, or of predictive power (Lee, 1998). The manager’s historical allocations should not be largely different from the benchmark’s allocations for long periods. TAA involves short-term over- or underweightings to capture price discrepancies. For instance, a longer-term overweighting in equities would likely produce an excess return relative to the benchmark, but the source of the return would simply be the equity risk premium.

- *Review significant events.* It is important to review a model’s test results during periods marked by significant events—those that cause large divergences among asset-class returns—such as the U.S. stock market crashes in October of 1987 and 2008 or the August 1998 Russian debt-default crisis. If stock and bond returns are very close, the relative benefit of an overweighting in either asset class is small.

If their returns diverge, there are greater opportunities for bets to pay off and, of course, greater opportunities for loss. As shown in **Figure 2**, historically very few events have caused returns to diverge significantly. However, these events highlighted the success or failure of a strategy. When the volatility of the equity risk premium is high, there are more opportunities to add (or subtract) value, which can result in higher (or lower) excess returns (Arnott and Miller, 1997; Lee, 1998).

Figure 3. Annualized TAA excess return 1975–1984 (12-month rolling average)



Benchmark: 60% stocks, represented by MSCI US Broad Market Index; and 40% bonds, represented by Barclays Capital U.S. Treasury Long Index (1975), and Barclays Capital Aggregate Bond Index (1976–1984).

Note: The forecast was generated by using one-month lagged values of term spread, credit spread, inflation, percentage change in gold prices, and equity return.

Sources: Vanguard calculations based on data from Thomson Reuters Datastream, Federal Reserve Bank of St. Louis FRED Database, and Barclays Capital Live.com.

In sample, 1975–1984	TAA strategy	60%/40% benchmark
Monthly mean return	1.01%	0.94%
Monthly standard deviation	3.81	3.04

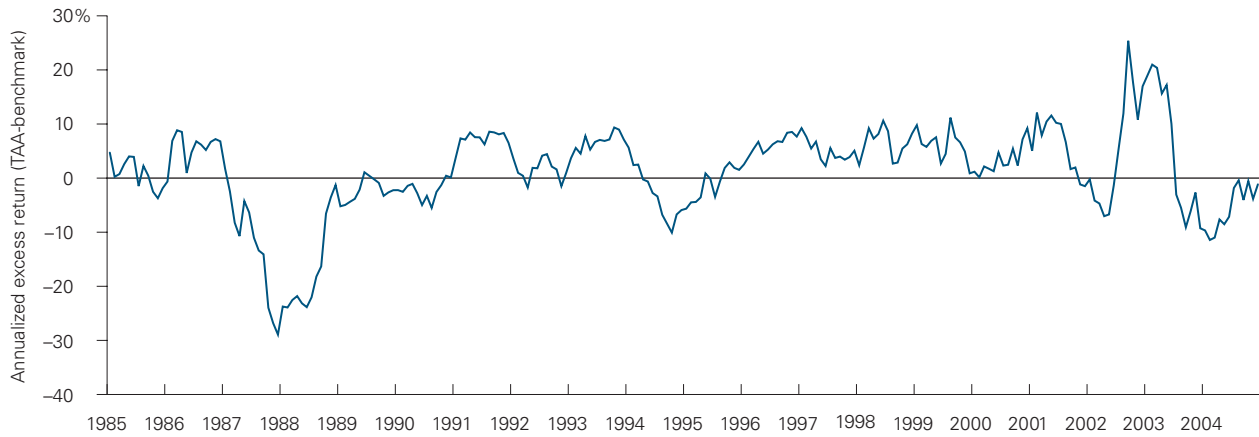
In sample, 1975–1984	
Monthly mean excess return	0.07%

— *Examine a model's results in different periods.* Reviewing a model's results in many different periods can help reveal whether the model is likely to be enduring. A manager's back testing may show excess returns, but these may be the result of data mining, that is, running tests again and again until excess returns emerge. Out-of-sample results, those not presented by the manager, highlight any signal degradation. Signals may weaken over time. Also, it is not uncommon for a signal to produce significant excess returns in one period but not another.

For example, **Figure 3** reports the monthly excess returns of a strategy based on one-month lagged values of the following business-cycle/macroeconomic variables: term spread, credit spread, inflation, percentage change in gold prices, and equity return.³ During the testing (in-sample) period from 1975 to 1984, the strategy generated an average monthly excess return, or alpha, of 7 basis points, indicating a good consistency of excess returns relative to a static SAA policy portfolio.

³ We first created a time-series regression model using economically meaningful standard signals that best characterized the historical equity returns over the previous rolling 60-month window. Based on this model, we forecasted the next month's expected equity return and calculated the expected equity risk premium, which is the expected equity return minus the 10-year Treasury bond's yield. Compared with a 60% stocks/40% bonds benchmark, the portfolio had over- or underweightings using ad hoc decision rules based on the standard error of the historical equity risk premium from 1926 to 1969. Then we moved the clock forward one month and repeated the regression analysis, forecasting, and portfolio reallocation.

Figure 4. Annualized TAA excess return 1985–2004 (12-month rolling average)



Benchmark: 60% MSCI US Broad Market Index, 40% Barclays Capital Aggregate Bond Index.

Note: The forecast was generated by using one-month lagged values of term spread, credit spread, inflation, percentage change in gold prices, and equity return.

Sources: Vanguard calculations based on data from Thomson Reuters Datastream, Federal Reserve Bank of St. Louis FRED Database, and Barclays Capital Live.com.

Out of sample, 1985–2004	TAA strategy	60%/40% benchmark
Monthly mean return	0.99%	0.93%
Monthly standard deviation	3.67	2.83

Out of sample	1985–1994	1995–2004	1985–2004
Monthly mean excess return	-0.19%	0.31%	0.06%

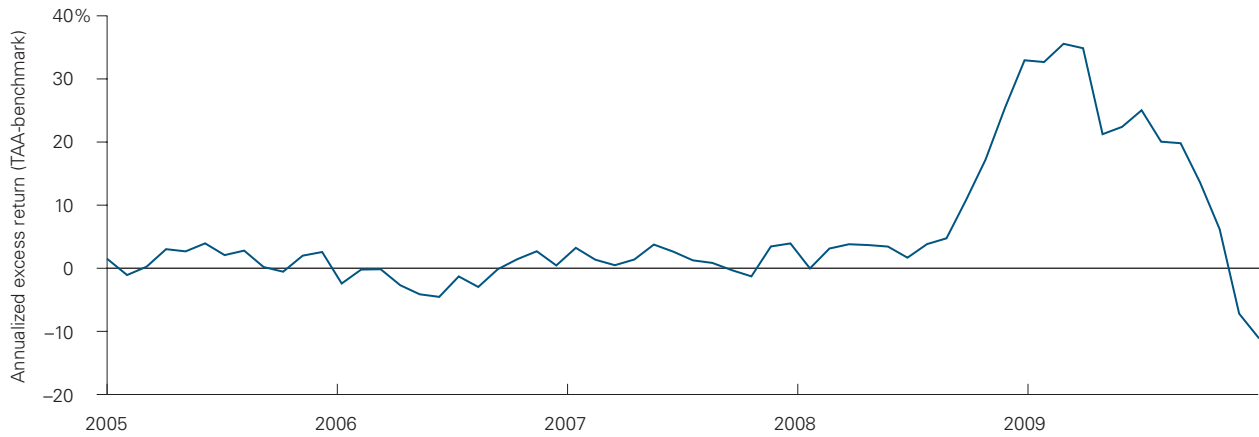
Despite this, the strategy’s successful historical performance was not durable in all subsequent periods. **Figure 4** shows that this strategy detracted an average of 19 basis points from the benchmark’s performance from 1985 through 1994, while it added 31 basis points from 1995 to 2004. Likewise, as shown in **Figure 5**, on page 10, excess returns for the strategy are positive for 2005–2009, with a big spike during this period’s significant event, the bear market of 2008. It is important to understand why the value added from the strategy was not consistently repeatable. The changes in the macroeconomic environment, weakening of the signals, or just bad luck are possible reasons that should be explored.

A robust strategy should produce significant excess returns whether it is applied to in-sample or out-of-sample periods.

A final metric to consider for TAA strategies over different periods is risk-adjusted return. TAA strategies can provide excess return at the expense of a disproportionate increase in volatility. Our results show that the Sharpe ratios⁴ for this strategy relative to the benchmark also varied with the period. For example, from 1985 to 1994, the Sharpe ratio for the strategy was 0.23, compared with 0.58 for the benchmark. However, from 1995 to 2004, the strategy Sharpe ratio was 0.79 compared with 0.64 for the benchmark. Yet, over the entire period, the Sharpe ratios of the strategy and the benchmark were nearly equal.

4 The Sharpe ratio is calculated by subtracting the risk-free rate from the rate of return for a portfolio and dividing the result by the standard deviation (also less the risk-free rate) of the portfolio returns.

Figure 5. Annualized TAA excess return 2005–2009 (12-month rolling average)



Benchmark: 60% MSCI US Broad Market Index, 40% Barclays Capital Aggregate Bond Index.

Note: The forecast was generated by using one-month lagged values of term spread, credit spread, inflation, percentage change in gold prices, and equity return.

Sources: Vanguard calculations based on data from Thomson Reuters Datastream, Federal Reserve Bank of St. Louis FRED Database, and Barclays Capital Live.com.

Out of sample, 2005–2009	TAA strategy	60%/40% benchmark
Monthly mean return	0.66%	0.23%
Monthly standard deviation	3.18	2.92

Out of sample, 2005–2009	
Monthly mean excess return	0.43%

—*Examine a model’s results over the intermediate term.* Finally, it is important to examine a model’s results over the appropriate time period. Short-term predictability requires very informative signals. There is simply too much noise around short-term returns to find a pattern to determine which asset class will outperform. TAA strategies cannot be expected to work day-to-day or month-to-month. Over the intermediate term (perhaps three-year periods), it is more likely that some pattern or cycle related to economic variables, momentum, or change in investor sentiment can be gleaned and exploited.

- **Use appropriate quantitative and qualitative performance-measurement criteria.** As with any strategy, when evaluating a TAA strategy, it is useful to combine qualitative and quantitative

performance-measurement criteria. In terms of quantitative measurement, the two metrics that deserve the most attention are the historical information ratio⁵ and the t-statistic associated with the historical average return. A historical information ratio calculated over five or more years can provide an indication of the risk/return trade-off that the strategy has offered and may continue to offer if the historical relationships hold. The t-statistic measures the consistency of the average historical excess return. A t-statistic greater than 2 indicates that the historical excess return has been and probably will continue to be very consistent—most likely because of the skill of the manager and the durability of the strategy—if the historical relationships hold (see the text box on page 12).

5 The information ratio is the ratio of alpha to tracking error, that is, the standard deviation of alpha.

In terms of qualitative criteria, we believe investors should evaluate any manager in terms of four principles—people, philosophy, process, and performance. Questions to ask include:

- How have all the manager’s strategies or funds performed, not just the ones being touted?
- Who is performing the work? How long has the team been in place?
- What is the manager’s approach to investments? Is it easily understood?
- How long has the strategy operated? Does it have at least a three-year track record?

Quantitative criteria help distinguish skill from luck in the historical performance of a TAA manager, while the qualitative criteria outlined above help improve the likelihood that historical relationships will continue to hold in the future. For example, the information ratio for all the manager’s strategies would provide more insight about manager skill than that for the one or two strategies being marketed. Likewise, information about the makeup and tenure of the team producing a particularly high information ratio would be important to determine whether the ratio is likely to be replicable.

- **Consider cost.** As with any investment, cost affects returns and should be evaluated. The higher the implementation and investment management costs, the higher the threshold for the success of a TAA strategy.

Costs are impacted by portfolio turnover, which can be high for TAA strategies. Turnover results in different periods are shown for the business-cycle/macro strategy discussed earlier. As shown in **Figure 6**, turnover, like signal strength, varies over time, and is not necessarily correlated with excess return.

Figure 6. Turnover varies over time

TAA strategy turnover

Time period	Turnover	Excess return
January 1975–December 1984	22%	0.07%
January 1985–December 1994	16%	–0.19%
January 1995–December 2004	22%	0.31%
January 2005–December 2009	29%	0.43%

Source: Vanguard calculations based on data from Thomson Reuters Datastream, Federal Reserve Bank of St. Louis FRED Database, and Barclays Capital Live.com.

The salient question is whether the excess returns cover the costs of the higher turnover. We estimated break-even cost for the hypothetical macro/fundamental strategy discussed earlier. Break-even cost is the estimated trading cost that will **eliminate** excess return. As shown in **Figure 7**, on page 13, for example, 0.7% is the annual break-even trading cost, given the turnover of the strategy from 1975 through 1984. Trading cost greater than 0.7% in this period will not only eliminate excess return, but also will generate loss against the benchmark.

TAA strategies are typically implemented with liquid futures contracts. This can be a benefit relative to security-selection strategies because transaction costs for futures trading in liquid markets are typically lower than those for trading individual securities. However, futures trading for TAA strategies requires expertise to be cost-efficient, particularly when a global TAA is implemented. For example, to maintain the benchmark position, hedging ratios must be accurately calculated. For equities, this is the process of measuring the sensitivity of changes in the futures index to changes in the benchmark. For fixed income securities, the process is more complex. In addition, global TAA and tactical subasset allocation strategies may require trading in illiquid futures markets, resulting in higher costs.

More on quantitative performance measurement criteria

It is essential to combine the use of qualitative criteria for investment management processes with quantitative performance-evaluation metrics, which can help distinguish skill from luck in historical performance (Molitor, 2004). Some widely used informative metrics are:⁶

- **Geometric average alpha.** This is the difference between the geometric average return of the strategy and the geometric average return of the benchmark. It is a CFA Institute standard measure of actual historical investment return, which incorporates the effects of compounding returns over time.
- **Arithmetic average alpha and the associated t-statistic.** While the geometric average alpha is a better measure of historical experience, the arithmetic average alpha is a better measure of what an investor can expect in any given period. The consistency of this periodic return expectation can be tested using a metric called the t-statistic.⁷ A t-statistic greater than 2 indicates that the historical alpha has been very consistent. Greater consistency of alpha is generally seen as an indication of the skill of the manager and the durability of the strategy if historical relationships continue to hold.
- **Information ratio.** This is the ratio of alpha to tracking error, that is, the standard deviation of alpha. It is used as an indication of the risk/return trade-off that the strategy has offered

and is likely to offer. It is important to note that historical information ratios are rarely predictive of future information ratios (Molitor, 2004). Although monthly average alpha and tracking error are typically annualized to generate an annualized information ratio, the standard scaling practice tends to be flawed for TAA strategies. There is evidence that most TAA alphas are serially correlated and that standard scaling underestimates tracking error and overestimates the information ratio (Lee, 2000). Monthly information ratios are better indicators of the historical risk/return trade-off of a given strategy.

- **Hit ratio.** Hit ratio is the proportion of times that the manager was able to add value. It is calculated as the number of periods with positive alphas divided by the total number of periods. It does not capture the magnitude of gains or losses, so it is not an ideal metric.
- **Skewness.** James D. MacBeth and David C. Emanuel (1993) have suggested that TAA managers produce returns that are more positively skewed than the benchmark return. A positively skewed return distribution will result in a large number of results just below the mean return and several results well above the mean. To the extent that investors prefer the opportunity for large gains, positive skewness of the strategy may be desirable even if the TAA portfolio has the same average return and volatility as the benchmark portfolio.

⁶ If the committee has access to the underlying return forecasts, the following two tests can also be used. The Hendriksson-Merton measure of market-timing ability, which tests the probability of correctly forecasting that one asset class will outperform the other (Weigel, 1991; Phillips et al., 1996). The main drawbacks of the Hendriksson-Merton test are that it only tests the sign and not the magnitude of outperformance and that it requires at least 100 monthly observations to have enough power to reject the null hypothesis of no market-timing skill. The Cumby-Modest test refines the Hendriksson-Merton test by taking the magnitude of outperformance into consideration, but it does not explicitly measure the variability of returns (Lee, 2000).

⁷ The t-statistic is used to test the hypothesis that the mean alpha is different from zero if the variable of interest follows normal distribution or the sample size is large, in accordance with the Central Limit Theorem. It is the arithmetic average return divided by the standard error of the arithmetic average. Standard error is volatility divided by the square root of the number of observations minus 1.

Figure 7. Estimated break-even cost

Time period	Break-even cost (at 100% portfolio trade)	Turnover	Break-even cost (annual)
January 1975–December 1984	0.3%	22%	0.7%
January 1985–December 1994	NA	16%	NA
January 1995–December 2004	1.3%	22%	3.3%
January 2005–December 2009	1.4%	29%	4.7%
Full Period	0.4%	22%	1.1%

Source: Vanguard calculations based on data from Thomson Reuters Datastream, Federal Reserve Bank of St. Louis FRED Database, and Barclays Capital Live.com.

Real-time performance: Setting reasonable expectations

The historical performance of TAA mutual funds helps set reasonable return expectations for these strategies. Have TAA strategies historically provided the value added that institutional investors are looking for? Have most managers implemented rigorous methodology and produced significant excess returns?

From January 1995 to December 2009, our sample of 24 U.S. stock/bond TAA mutual funds added 8 basis points a month of excess return, on average, before taking investment management fees into account (see **Figure 8**). However, because of the high tracking error⁸ of 2.24% a month, this value added was not statistically significant. A t-statistic of 0.16 suggests that the managers, on average, did not show consistent skill in identifying misvaluations. The average monthly information ratio⁹ of 0.02 is low compared with what can be achieved from the average security-selection strategy. Also, keep in mind that our results are based on a sample of TAA funds that survived the entire period. Such an approach can reduce some biases, but will also introduce survivorship bias, which can skew returns higher.

As explained, periods in which volatility of the equity risk premium is high highlight the success or failure of a TAA strategy. As an example, we compared the

Figure 8. Gross performance of U.S. TAA mutual funds

January 1995–December 2009	
Number of months	180
Average monthly alpha (%)	0.08%
Average monthly tracking error (%)	2.24%
T-statistic	0.16%
Average monthly information ratio	0.02

Note: Sample includes all funds that existed through the entire period. Fund returns are reported on a gross basis as reported by Morningstar. Benchmarks are as reported in each fund's prospectus.

Source: Vanguard calculations based on data from Morningstar, Inc.

excess returns of these 24 mutual funds in 2008 to the excess returns over the entire period 1995–2009. Not surprisingly, the excess returns in 2008 were much higher than the whole period simply because there were more opportunities to add value in 2008. Annual excess returns averaged 3.1% for 2008, versus an average annual excess return of 0.6% for 1995–2009. Also notable is the great dispersion in fund excess returns in 2008, with a range of 57 percentage points between the best- and worst-performing funds that year. Again, not surprising, given the high volatility. If a manager's signal were strong and predictive during this period, returns were very high, and the reverse was also true. Weak signals can lead to a very strong underperformance during the same period.

8 Tracking error is the standard deviation of excess return. It is a measure of the variability and uncertainty around the excess return.

9 The annualized information ratio is the monthly information ratio times the square root of 12.

Conclusion

Consistently predicting systematic risk is challenging at many levels. SAA is the critical decision, while a well-designed TAA strategy can add value at the margin. However, successful TAA requires rigorous methodology. Understanding the TAA investment process, using quantitative performance-evaluation metrics to distinguish luck from skill, and minimizing costs are essential to the success of TAA strategies.

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Key terms

Beta. A measure of the systematic risk of a security or a portfolio in comparison to the market.

R-squared (R²). Percentage of volatility in a dependent variable explained by an independent variable.



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