

## Tactical Asset Allocation

Lionel Martellini and Daphne Sfeir

Tactical Asset Allocation (TAA) broadly refers to active strategies that seek to enhance portfolio performance by opportunistically shifting the asset mix in a portfolio in response to the changing patterns of return and risk (see exhibit 1 for a classification of active investment strategies).<sup>1</sup>

### Market Timing and Stock Picking

- Stock returns can be decomposed into a systematic and a specific component (Sharpe's (1963) market model)

$$R_{i,t} - r_{f,t} = \underbrace{\mathbf{b}_i [R_{M,t} - r_{f,t}]}_{\text{systematic}} + \underbrace{\mathbf{e}_{i,t}}_{\text{specific}}$$

- Two forms of active strategies
  - *Market timing*: aims at exploiting predictability in systematic return
  - *Stock picking*: aims at exploiting predictability in specific return
- Academic evidence
  - There is ample evidence of predictability in systematic component (Keim and Stambaugh (1986), Campbell (1987), Campbell and Shiller (1988), Fama and French (1989), Ferson and Harvey (1991), etc.)
  - There is little evidence of predictability in specific component (more noisy) in the absence of private information

Exhibit 1

There is now a consensus in empirical finance that expected asset returns, and also variances and covariances, are, to some extent, predictable. Pioneering work on the predictability of asset class returns in the U.S. market was carried out by Keim and Stambaugh (1986), Campbell (1987), Campbell and Shiller (1988), Fama and French (1989), and Ferson and Harvey (1991). More recently, some authors started to investigate this phenomenon on an international basis by studying the predictability of asset class returns in various national markets (see,

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<sup>1</sup> This illustration is based on the implicit assumption of a constant beta. A potential improvement consists in using conditional (co)variances, i.e., predicting correlations to add the benefits of volatility timing to those of market timing (see for example Whitelaw (1997), Abhay and Davies (2002), Christofferson and Diebold (2002)). There is evidence, however, that predicting variances and covariances is of second order importance. Good prediction of expected returns and poor forecast of correlations can possibly lead to a good TAA model, but the converse is not true.

for example, Bekaert and Hodrick (1992), Ferson and Harvey (1993, 1995), Harvey (1995), and Harasty and Roulet (2000)).

The literature on optimal portfolio selection has recognized that these insights can be exploited to improve on existing policies based upon unconditional estimates.

While Samuelson (1969) and Merton (1969, 1971, 1973) have paved the way by showing that optimal portfolio strategies are significantly affected by the presence of a stochastic opportunity set, optimal portfolio decision rules have subsequently been extended to account for the presence of predictable returns (see in particular Barberis (2000), Campbell and Viceira (1998), Campbell et al. (2000), Brennan, Schwartz and Lagnado (1997), Lynch and Balduzzi (1999), Lynch (2000), Brandt (1999) and Ait-Sahalia and Brandt (2001)). Roughly speaking, the prescriptions of these models are that investors should increase their allocation to risky assets in periods of high expected returns (market timing) and decrease their allocation in periods of high volatility (volatility timing). Kandel and Stambaugh (1996) argue that even a low level of statistical predictability can generate economic significance and abnormal returns may be attained even if the market is successfully timed only 1 out of 100 times.

Practitioners have started to engage in tactical asset allocation strategies as early as the 1970s. The exact amount of investment currently engaged in tactical asset allocation is not clear, but it is certainly growing very rapidly. For example, Philip, Rogers and Capaldi (1996) estimated that around \$48 billion was allocated to domestic TAA in 1994, while Lee (2000) estimates that more than \$100 billion dollars was dedicated to domestic TAA at the end of 1999.

TAA can be regarded as a 3 steps process:

- Step 1: forecast asset returns by asset classes
- Step 2: build portfolios based on forecasts (i.e., turn signals into bets)
- Step 3: conduct out-of-sample performance tests

## **Forecast Asset Returns by Class**

One needs to distinguish between *discretionary TAA*, where predictions about asset returns are based upon an expert's forecast ability and *systematic TAA*, where predictions about asset returns are based upon a model's forecast ability. In turn, one should distinguish, within the class of systematic TAA, between parametric and non parametric models.

Typical parametric models are linear regression models, where a set of predictor variables are used in a lagged regression analysis (see Bossaerts and Hillion (1999) for the use of statistical criteria to select return forecasting models). In the

interest of robustness, the rule of thumb in that approach is to select a small number of predictive variables (say 2 or 3), based on economic analysis, as opposed to data mining (screening a large set of candidate variables and selecting the model via maximization of the in-sample R-squared).

A variety of non-parametric models have also been tested in the context of TAA strategies. Harvey et al. (2000) investigate the predictability of emerging market returns based on neural networks. Another example of non-parametric predictive models can be found in Blair (2002), who considers a kernel regression approach, where forecasts are obtained from non-linear filtering of previous returns based on exogenous variables.

## **Build Portfolios Based on Forecasts**

Once predictions of expected returns are available, one needs to turn these active best on portfolio decisions.

This can be done without an optimizer, by investing in equal- or value-weighted portfolios with highest expected returns. On the other hand, one may instead use an optimizer, and typically maximize portfolio expected return with constraints on tracking error risk with respect to pre-defined benchmark.

Recent research has also emphasized the need to account for model and parameter uncertainty (see for example Kandel and Stambaugh (1996), Barberis (2000), Avramov (2002), and Cvitanic et al. (2002)).

## **Conduct Out-of-Sample Performance Tests**

Two popular tests have been devised to assess timing ability, one is the *quadratic model* of Treynor and Mazuy (1966), the other is the *switch-point regression model* of Hendrikson and Merton (1981). These models aim at testing the non-linearity of the relationship between portfolio and benchmarked returns: if a manager can time market, the sensitivity of portfolio returns to market returns should be higher (lower) during up (down) markets.

At the econometric level, the performance of a forecast model can be measured in terms of the ex-post correlation between forecast and actual return, as well as the correlation between ex-post class rank and predicted rank. Also a hit ratio can be computed as a measure of the quality of directional forecast (percentage of time predicted direction is valid).

the average (ex-post) excess return over the benchmark, as well as the best and the worst timing performance (taking into account transaction costs and possibly including price impact). One may also compute a hit ratio as the percentage of times the TAA active portfolio beat the passive benchmark.

A relevant measure of relative risk is the tracking error, i.e., the volatility of excess return over the benchmark. A composite ratio, the equivalent of the Sharpe ratio for relative performance evaluation, is the information ratio, computed as average excess return divided by tracking error.

## From TAA to TSA

TAA strategies were traditionally concerned with allocating wealth between two asset classes, typically shifting between stocks and bonds. More recently, more complex *style* timing strategies have been successfully tested and implemented (see exhibit 2). In particular, Kao and Shumaker (1999) and Amenc, El Bied and Martellini (2002) have built upon the seminal work by Fama and French (1992), who emphasize the relevance of size and book/market factors, to address the concept of *tactical style allocation* that involves dynamic trading in various investment styles within a given asset class (see also Fan (1995), Sorensen and Lazzara (1995), and Avramov (2000) for evidence of predictability in equity style returns).<sup>2</sup>

### TAA versus TSA

- Extension of the market model to account for size and book-to-market factors (Fama and French (1992))

$$R_{i,t} - r_{f,t} = \underbrace{\mathbf{b}_{i,M} [R_{M,t} - r_{f,t}]}_{\text{systematic - market}} + \underbrace{\mathbf{b}_{i,B/M} [R_{B/M,t} - r_{f,t}] + \mathbf{b}_{i,size} [R_{size,t} - r_{f,t}]}_{\text{systematic - style}} + \underbrace{\mathbf{e}_{i,t}}_{\text{specific}}$$

- Three forms of active strategies
  - *Tactical Asset Allocation*: exploits evidence of predictability in market factor
  - *Tactical Style Allocation*: exploits evidence of predictability in style factors
  - *Stock picking*: exploits evidence of predictability in specific risk

#### Exhibit 2

For example, a market neutral strategy can be implemented that generates abnormal return from timing between growth, value, mid-cap and small-cap equity indexes, while maintaining a zero exposure with respect to a global stock index (see exhibit 3, as well as Amenc, Martellini and Sfeir (2002) for more details). Futures contract on S&P style indices, which have recently been

<sup>2</sup> Related papers include Gerber (1994), Case and Cusimano (1995), Fisher, Toms and Blount (1995), Mott and Condon (1995), Levis and Liodakis (1999), Oertmann (1999), Reiganum (1999), Amenc and Martellini (2001), Amenc, Martellini, Malaise and Sfeir (2002) or Ahmed, Lockwood and Nanda (2002).

launched at the Chicago Mercantile Exchange, can be used to implement the strategy.

### Classification of Active Investment Strategies

	<u>Systematic - market</u>	<u>Systematic - style</u>	<u>Specific</u>
<i>Form of active strategy</i>	<i>Tactical Asset Allocation</i>	<i>Tactical Style Allocation</i>	<i>Stock picking</i>
Mutual fund – stock picking	X (discretionary)	X (discretionary)	X
Hedge fund – stock picking	0	X (discretionary)	X
Mutual fund – market timing	X (discretionary or systematic)	0	0
TSA – market neutral	0	X (systematic)	0

Exhibit 3

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