Tactical Asset Allocation

February 2003

Lionel Martellini
Assistant Professor of Finance, Marshall School of Business
Associate Researcher, EDHEC Graduate School of Business

Daphné Sfeir
Research Engineer, EDHEC Risk and Asset Management Research Centre
EDHEC is one of the top five business schools in France. Its reputation is built on the high quality of its faculty and the privileged relationship with professionals that the school has cultivated since its establishment in 1906. EDHEC Business School has decided to draw on its extensive knowledge of the professional environment and has therefore focused its research on themes that satisfy the needs of professionals.

EDHEC pursues an active research policy in the field of finance. EDHEC-Risk Institute carries out numerous research programmes in the areas of asset allocation and risk management in both the traditional and alternative investment universes.
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).

Exhibit 1: Market Timing and Stock Picking

- Stock returns can be decomposed into a systematic and a specific component (Sharpe's (1963) market model):
  \[ R_{i,t} - r_{f,t} = \beta_i [R_{M,t} - r_{f,t}] + \varepsilon_{i,t} \]

- 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

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), 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, 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 recognised 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 TAA 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 was dedicated to domestic TAA at the end of 1999.

TAA can be regarded as a 3-step 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 maximisation 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 optimiser, by investing in equal- or value-weighted portfolios with highest expected returns. On the other hand, one may instead use an optimiser, and typically maximise portfolio expected return with constraints on tracking error risk with respect to pre-defined benchmark.

Recent research has also emphasised 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 Hendriksson and Merton (1981). These models aim at testing the non-linearity of the relationship between portfolio and benchmarked returns: if a manager can time markets, 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).

This indicates 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 emphasise 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).

Exhibit 2: TAA versus TSA
- Extension of the market model to account for size and book-to-market factors (Fama and French (1992))
  \[ R_{f,t} - R_{f,t} = \beta_{1,M} [R_{M,t} - R_{f,t}] + \beta_{1,B/M} [R_{B/M,t} - R_{f,t}] + \beta_{1,\text{size}} [R_{\text{size},t} - R_{f,t}] + \epsilon_{f,t} \]
- 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

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

Exhibit 3: Classification of Active Investment Strategies

<table>
<thead>
<tr>
<th>Form of active strategy</th>
<th>Systematic - market</th>
<th>Systematic - style</th>
<th>Specific</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mutual fund – stock picking</td>
<td>X (discretionary)</td>
<td>X (discretionary)</td>
<td>X</td>
</tr>
<tr>
<td>Hedge fund – stock picking</td>
<td>0 (discretionary)</td>
<td>X (discretionary)</td>
<td>X</td>
</tr>
<tr>
<td>Mutual fund – market timing</td>
<td>X (discretionary or systematic)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>TSA – market neutral</td>
<td>0 (systematic)</td>
<td>X</td>
<td>0</td>
</tr>
</tbody>
</table>
References


• Case, D., and S., Cusimano, 1995, Historical tendencies of equity style returns and the prospects for tactical style allocation, chapter 12 from Equity Style Management, Irwin Publishing.


• Fan, S., 1995, Equity style timing and allocation, chapter 14 from Equity Style Management, Irwin Publishing.


• Fisher, K., J., Toms, and K., Blount, 1995, Driving factors behind stylebased investing, chapter 22 from Equity Style Management, Irwin Publishing.


• Lee, W., 2000, Advanced theory and methodology of tactical asset allocation, Fabozzi and Associates Publications.


• Lynch, A., 2000, Portfolio choice and equity characteristics: characterizing the hedging demands induced by return predictability, working paper, NYU.


• Samuelson, P., 1969. Lifetime portfolio selection by dynamic stochastic


Founded in 1906, EDHEC Business School offers management education at undergraduate, graduate, post-graduate and executive levels. Holding the AACSB, AMBA and EQUIS accreditations and regularly ranked among Europe’s leading institutions, EDHEC Business School delivers degree courses to over 6,000 students from the world over and trains 5,500 professionals yearly through executive courses and research events. The School’s ‘Research for Business’ policy focuses on issues that correspond to genuine industry and community expectations.

Established in 2001, EDHEC-Risk Institute has become the premier academic centre for industry-relevant financial research. In partnership with large financial institutions, its team of ninety permanent professors, engineers, and support staff, and forty-eight research associates and affiliate professors, implements six research programmes and sixteen research chairs and strategic research projects focusing on asset allocation and risk management. EDHEC-Risk Institute also has highly significant executive education activities for professionals. It has an original PhD in Finance programme which has an executive track for high level professionals. Complementing the core faculty, this unique PhD in Finance programme has highly prestigious affiliate faculty from universities such as Princeton, Wharton, Oxford, Chicago and CalTech.

In 2012, EDHEC-Risk Institute signed two strategic partnership agreements with the Operations Research and Financial Engineering department of Princeton University to set up a joint research programme in the area of risk and investment management, and with Yale School of Management to set up joint certified executive training courses in North America and Europe in the area of investment management.

Copyright © 2015 EDHEC-Risk Institute

For more information, please contact: Carolyn Essid on +33 493 187 824 or by e-mail to: carolyn.essid@edhec-risk.com

EDHEC-Risk Institute
393 promenade des Anglais
BP 3116 - 06202 Nice Cedex 3
France
Tel: +33 (0)4 93 18 78 24

ERI Scientific Beta—Japan
East Tower 4th Floor, Otemachi First Square
1-5-1 Otemachi, Chiyoda-ku
Tokyo 100-0004 — Japan
Tel: +81 352 191 418

EDHEC Risk Institute—Europe
10 Fleet Place, Ludgate
London EC4M 7RB
United Kingdom
Tel: +44 207 871 6740

ERI Scientific Beta—North America
One Boston Place, 201 Washington Street
Suite 2608/2640
Boston — MA 02108 — USA
Tel: +1 857 239 8891

EDHEC Risk Institute—Asia
1 George Street
#07-02
Singapore 049145
Tel: +65 6438 0030

EDHEC Risk Institute—France
16-18 rue du 4 septembre
75002 Paris
France
Tel: +33 (0)1 53 32 76 30

www.edhec-risk.com