

# **PORTFOLIO MANAGEMENT**

## **CHOICE OF THE INVESTMENT MANAGER**

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\* final level



## 1. Choice of the investment manager\*

### 1.1 Assessing and choosing managers\*

The asset allocation decision is the heavy lifting in the investment process. Having decided on an appropriate asset allocation plan, the next question is to find the appropriate managers and/or funding vehicles to best represent each asset class.

Individuals and institutional investors seek investment managers in a different format, although their fundamental reasons should be the same: they want to trust the people they select and they expect efficiency. Too often, investment managers selection is based on improper assumptions, incomplete information, or the advice of people lacking proven investment credentials. Typically, some institutional investors hire the manager who gives the best presentation or whose salesperson is the most persistent. Others select the firm with the hottest track record or the lowest fees.

To be efficient, the manager selection process should consist of quantitative and qualitative analysis, both of which are equally important. The quantitative aspects are typically used in a screening process to identify possible candidates and focus on the historical performance record of the managers. The qualitative aspects aim at protecting the investor against making selection mistakes, because the quantitative evaluation of past performance may not guarantee future performance.

Let us consider the example of an institution looking for a new manager (directly or through a fund) for a specific mandate. A typical selection process should look as follows.

The first phase consists in **screening and evaluating** the investment universe. The screening begins with a broad screen to narrow the universe of managers down to those that could fit with the particular mandate. In the evaluation phase, one uses typically a mix of quantitative data analysis and interviews to determine whether a manager is a suitable candidate for investment. This stage should include an analysis of his investment process and philosophy, style, approach, risk controls, performance record against appropriate index, in various markets and against peers and the set-up of the manager's organisation. Several statistical measures can be used at this stage, such average annual returns, Sharpe ratios, maximum drawdown, standard deviation, alpha, beta, tracking errors and R-squared (coefficient of determination). They are computed over several time periods and cover the most recent full market cycle (bull & bear markets), bear market performance (how well they preserved capital relative to their index), and performance during an uninterrupted bull market.

Each of these elements typically enters in a scoring system, which allows the institution to grade managers and determine a set of optimal candidates, and so proceed to the next stage of the process.

The **recommendation** is typically a formal report, which builds on the initial information gleaned from the previous stage. This stage is more comprehensive and more thorough particularly in terms of the analysis of investment process and philosophy, style, approach, risk controls, performance record against appropriate index, in various markets and against peers, depth and quality of internal organisation, looking at the selected managers backgrounds and checking investment references. A visit to the managers' own offices is generally part of the process.

In conjunction with the preparation of the recommendation a **due diligence** review is also prepared by a due diligence team. This generally includes a review of the manager's fund's prospectus and any audited financials. A review of the manager's own internal administration and operational capabilities and a review of the capabilities of the third party service providers (e.g. the administrator and auditor in the case of a fund) is also generally conducted.

It should be noted that a substantial number of managers never pass this stage of the process. Some are unlikely ever to meet the suitability requirements; others are kept on hold, because at some future stage, they may become suitable candidates.

Finally, a committee or a group of senior investment professionals often performs the final **selection**. At this stage, the few remaining managers are often invited for a short presentation. Thanks to the previous steps, the decision to hire an individual manager will then reflect a clear understanding of its investment methods and a detailed analysis of its past performance record.

Last, but not least, the **ongoing monitoring** consists in monitoring and reviewing a manager's investment activities on a regular basis, by regular formal meetings (usually quarterly), by written communication or by phone. A common policy is to withdraw money from the account of investment managers that are ranked last quartile compared with other manager among the same investment style and to allocate new money into the account of investment managers that are ranked first quartile.

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## 1.2 Style analysis\*

Though more known for his works on the Nobel Prize winning Capital Asset Pricing Model and on portfolio performance measures, William Sharpe is also credited with developing style analysis, a powerful technique to analyze investment portfolios that has fundamentally changed the way many investment analysts and institutional investors assess the behavior of investment funds and their managers.

A money manager is said to adopt an investment style if he tends to pick up securities that share the same characteristics (e.g. low P/E, large caps, growth stocks, high dividend, etc.), or if he acts consistently the same way in particular market conditions (e.g. selling when the market declines and buying when the market rises).

The major reasons for focusing on style is that fund managers with similar investment philosophies (i.e. styles) will, on average, perform more like each other than like the overall market or managers with a different style. Similarities in performance are to be expected because these managers share similar portfolio characteristics and risk factor exposures. In addition, research indicates that over 90% of a fund's performance can be explained by its asset allocation rather than the manager's ability to pick stocks, it is therefore important to understand which asset classes influence the performance of a fund and to what extent.

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### 1.3 Means of style analysis\*

Let us now review the foundations for style analysis. To keep things simple, we will consider hereafter the case of a stock portfolio or mutual fund, although style analysis is perfectly applicable to any other asset class.

There are basically two major techniques for performing style analysis: the characteristics-based approach, and the returns-based style analysis.

The **characteristics-based approach** (also called **portfolio-based approach**) is the most powerful and comprehensive approach. Input requirements for this method are the portfolio's and benchmark's current and/or historical holdings and its security weights. The longer the period, the more effective the analysis will be. Knowledge of the holdings facilitates analysis of price-to-earnings ratios, price-to-book, yield, volatility, and other fundamental characteristics. Through a bottom-up approach, the various sources of risk can be identified and estimated at the individual security level, and later on aggregated at the global portfolio level.

Although simple, the technique suffers from two drawbacks. First, it is frequent that portfolio holdings are non-observable, or at least, non-observable on a sufficiently high frequency. Second, it is easy to reach misleading conclusions when observing individual securities. For example, Motorola is typically categorized as a hundred percent large cap equity, but that doesn't necessarily tell the whole story. Because of the company's heavy international exposure, its stock is likely to behave in many ways as though it were an international equity.

This is where **returns-based style analysis** can help. Returns-based style analysis is a statistical technique that was originally proposed by William F. Sharpe under the name of "effective asset mix" and "attribution analysis"<sup>1</sup>, and which is specifically targeted at investment funds.

Returns-base style analysis and factor analysis share the same underlying return generating process, namely, a multi-index model. A multi-index model says a portfolio return is related - typically linearly - to the return on a series of factors. A single index (market) model is the basic tool for assessing risky assets returns. It is easy to understand, as it lumps together an asset's sensitivity to all influences on the broad market into one single number (beta). However, for long, investors have recognized that a multitude of factors influenced asset returns. Some of these are significant to only a single firm and its close competitors, while others tend to affect almost all stocks, though each stock will be affected to a different degree. In this second category, we find for instance unforeseen recessions or sudden changes in interest rates or commodities prices. Therefore, it is hard to believe that a single number can express a stock's or a portfolio's sensitivity to several different kinds of economy-wide changes.

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1 See William F. Sharpe (1988), "Determining a Fund's Effective Asset Mix," *Investment Management Review*, December, pp. 59-69, or W.F. Sharpe (1992), "[Asset allocation: Management style and performance measurement](#)", *Journal of Portfolio Management*, Winter, pp. 7-19. Consultants also refer to the technique as "correlational analysis" or "return pattern analysis".

Under a multifactor model, each asset has not just one market beta coefficient but a series of beta coefficients. Each beta coefficient gives the asset's risk exposure to the corresponding risk factor. This constitutes the starting point of returns-based style analysis, which aims at identifying which combination of long positions in passive indexes would have most closely replicated the actual performance of a fund over a specified time period. The passive indexes selected typically represent distinct investment styles and/or particular asset classes.

The methodology relies on a constrained regression technique. Considering that fund returns are readily available while timely fund holdings can be difficult to obtain, the only data that is required to apply returns-based style analysis are therefore the total returns for the fund and that of a set of passive indexes. As an illustration, let us assume that we are applying returns-based style analysis on a portfolio P using N passive indices. The model to be estimated is:

$$R_{P,t} = \alpha_P + \beta_1 R_{1,t} + \dots + \beta_N R_{N,t} + \varepsilon_{P,t}$$

where  $R_{P,t}$  is the return on portfolio P at time t,  $R_{k,t}$  is the return on index k at time t ( $k=1, \dots, N$ ), and  $\varepsilon_{P,t}$  is an error term. So far, this model looks exactly like a traditional multi-factor model for stock returns. Now come the restrictions.

First, we request all beta coefficients to be positive. It implies that a fund can only be long or unexposed in the underlying index. This makes sense economically, given the "no short positions" requirement that applies to the majority of investment funds.

$$\beta_i \geq 0 \quad i = 1 \dots N$$

Second, we request all beta coefficients to sum to one. As a consequence of these two restrictions, a beta coefficient cannot exceed one.

$$\sum \beta_i = 1 \quad i = 1 \dots N$$

This allows us to interpret the beta coefficients as weights in a passive portfolio of indices (i.e. a benchmark). Consequently, the alpha can be interpreted as the difference between the return on the fund ( $R_{P,t}$ ) and that of a passive portfolio with the same style ( $\beta_1 R_{1,t} + \dots + \beta_N R_{N,t}$ ), that is, as a measure of style selection. It is the value added by a manager relative to its customized (style) benchmark. Finally, the volatility of the error term ( $\varepsilon_{P,t}$ ) can be termed the fund's "tracking error", which is to be minimized by the style analyst.

An essential statistical coefficient from style analysis is the  $R^2$ , which quantifies the degree to which the benchmark portfolio made of several asset classes can explain the long-term behavior of the evaluated fund. The higher the  $R^2$ , the better and more consistently the style analysis portfolio is able to capture the long-term return behavior of the evaluated fund.

However, a low  $R^2$  should not be seen as a model failure, but rather a warning signal that there is much that the analysis is not capturing. Further investigation into the fund's characteristics would be then recommended. In practice, a low  $R^2$  often results from one of the following:

- Inadequacy of style indices, which fails at capturing the investment universe or the particular style of a fund manager. In particular, a fund that invests in derivatives may have a behavior that will not be well explained by traditional (linear) indices.
- Very active rotation between style indices, which would lead to an inconsistency of style (this being said with no pejorative connotation, but with respect to the regression model).

Style analysis should be used in two ways: first, as a means of understanding the “true nature” of a portfolio, and seeing beyond the style labels that are attached to companies and mutual funds; second, together with strategic asset allocation, as a means of ensuring that an investment portfolio maintains the character that one desires. It is important to recall that returns-based style analysis’ role is not to replace traditional analysis, but rather to replace other estimates such as broad benchmarks or manager’s self-proclaimed style. Contrarily to fundamental or characteristics-based style analysis, returns-based style analysis is not directly tied to the actual holdings of a mutual fund, but rather to its overall behavior.

Although returns-based analysis has proven itself to be an effective means of analysing a portfolio, it has several limitations.

- Since the data used are historical returns, it is difficult to draw any conclusions about a future risk/return profile.
- The method tends to detect style changes slowly and at times may leave some style changes completely undetected.
- In some cases, the method indicates style changes that never occurred. This can arise because of the changing nature of the securities themselves (e.g. a convertible fund will often switch between bonds and equities asset classes, depending on market conditions), or because the indices are too highly correlated.

Portfolio-based analysis is widely considered to be a more powerful tool than return-based analysis. Fortunately, the two techniques do not oppose each other, but can be used in tandem to enhance the investment decision-making process. Return-based analysis is often a precursor to the more detailed analysis associated with portfolio-based analysis. That is, return-based analysis is employed to define a particular universe of funds that appear to exhibit the same style. Subsequently, portfolio-based analysis can help one to understand the strategies and exposures that make each of those funds distinctive. Also, while return-based analysis can indicate whether a portfolio is experiencing style drift, portfolio-based analysis can help to explain what securities within the portfolio or investment strategies have created that drift.

## 1.4 Style analysis: application to different asset classes\*

We now provide some illustrations of the style analysis technique for different asset classes and portfolios.

### 1.4.1 *The original model\**

In its article, Sharpe (1992) applies style analysis using a twelve-asset-classes model. The asset classes and their definitions are the following:

- Bills: Cash-equivalents with less than 3 months to maturity, represented by the Salomon Brothers' 90-day Treasury Bill Index
- Intermediate-term Government Bonds: Government bonds with less than 10 years to maturity, represented by the Lehman Brothers' Intermediate-term Government Bond Index
- Long-term Government Bonds: Government bonds with more than 10 years to maturity, represented by the Lehman Brothers' Long-term Government Bond Index
- Corporate Bonds: Corporate bonds with ratings of at least Baa by Moody's or BBB by Standard & Poor's, represented by the Lehman Brothers' Corporate Bond Index
- Mortgage-Related Securities: Mortgage-backed and related securities, represented by the Lehman Brothers' Mortgage-Backed Securities Index
- Large-Capitalization Value Stocks: Stocks in Standard and Poor's 500-stock index with high book-to-price ratios, represented by the Sharpe/BARRA Value Stock Index
- Large-Capitalization Growth Stocks: Stocks in Standard and Poor's 500-stock index with low book-to-price ratios, represented by the Sharpe/BARRA Growth Stock Index
- Medium-Capitalization Stocks: Stocks in the top 80% of capitalization in the U.S. equity universe after the exclusion of stocks in Standard and Poor's 500 stock index, represented by the Sharpe/BARRA Medium Capitalization Stock Index
- Small-Capitalization Stocks: Stocks in the bottom 20% of capitalization in the U.S. equity universe after the exclusion of stocks in Standard and Poor's 500 stock index, represented by the Sharpe/BARRA Small Capitalization Stock Index
- Non-U.S. Bonds: Bonds outside the U.S. and Canada, represented by the Salomon Brothers' Non-U.S. Government Bond Index
- European Stocks: European and non-Japanese Pacific Basin stocks, represented by the FTA Euro-Pacific Ex Japan Index
- Japanese Stocks: Japanese Stocks, represented by the FTA Japan Index

As one can see, each asset class is represented by a market capitalization weighted index containing a large number of securities. This choice is intentional. In the U.S., each of these indices is tracked by several low cost index funds, which implies that its returns are replicable through a passive (index-like) investment strategy.

Sharpe then applies and compares three regression models to the returns of a randomly selected fund, the Vanguard Group Trustees' Commingled U.S. Portfolio. The first model is a simple regression (unconstrained betas). The second model is a regression where the beta coefficients are constrained to sum to one, but can take any value. The third model is the style analysis regression, where the betas are constrained to be positive and sum to one. The results are displayed in Table 1-1. As one can see, constraining the regression does not influence much its explanatory power (slightly lower R-square, but still very high), but allows for a more intuitive interpretation of the results in terms of asset allocation, opening the door to the construction of realistic and natural benchmarks.

Although these results are spectacular, bear in mind that this form of style analysis does not actually look at what the fund owned. Rather, it reports how the fund behaved. In addition, when style analysis is used for exposure monitoring, the average exposure in the past is often confused with the current exposure, which is obviously wrong. This problem of exposure monitoring with style analysis is well known to experienced users and is often referred to as a "rear-view mirror" nature of the method.

	<b>Unconstrained Regression</b>	<b>Constrained Regression</b>	<b>Quadratic Programming</b>
Bills	14.69	42.65	
Intermediate Bonds	-69.51	-68.64	
Long-term Bonds	-2.54	-2.38	
Corporate Bonds	16.57	15.29	
Mortgages	5.19	4.58	
Value Stocks	109.52	110.35	69.81
Growth Stocks	-7.86	-8.02	
Medium Stocks	-41.83	-43.62	
Small Stocks	45.65	47.17	30.04
Foreign Bonds	-1.85	-1.38	
European Stocks	6.15	5.77	0.15
Japanese Stocks	-1.46	-1.79	
Total	72.71	100.00	100.00
R-squared	95.20	95.16	92.22

**Table 1-1: Sharpe's style analysis results on the Vanguard Group Trustees' Commingled U.S. Portfolio. All values are expressed in percentage terms.**

Recently researchers came up with several methods to alleviate the rear-view problem and to improve accuracy. The most popular technique is the use of local weighted regressions, where more importance – higher weights – should be assigned to more recent returns (relative to the point of estimate). The weighting of returns improves accuracy because it minimizes the delay between a change in a portfolio's exposure and the point in time when this change is sensed by style analysis.

### 1.4.2 Barra and Mutual funds\*

Barra – a leading U.S. company specialized in tools for investment management - has implemented its own style analyser for U.S. equity mutual funds.. It is based on a nine-asset class model. As an illustration, Table 1-2 shows the results obtained when considering a sample of Fidelity mutual funds using Barra's model.

Fund	Large Growth	Large Value	Med. Growth	Med. Value	Small Growth	Small Value	Intern.	Bonds	Cash
Fid. Adv Balanced T	26	19					12	37	6
Fid. Adv Eqty Grth T	49		42				5	5	
Fid. Adv Eqty Inc T	18	49		17			12	2	3
Fid. Adv Growth Opp T	31	42	5				3	15	4
Fid. Adv Strat Opp Init	8			33	39		5	15	
Fid. Adv Strat Opp T	7			32	39		6	15	
Fid. Asset Manager	20	19	4		2	3	7	36	8
Fid. Asset Manager: Grth	25	28	7			4	11	24	
Fid. Asset Manager: Inc	6	12	1		1		2	49	28
Fid. Balanced	14	16		6		6	13	39	5
Fid. Blue Chip Growth	41	16	23				17	2	
Fid. Congress Street	70	10					8	3	9
Fid. Contrafund	7	28	30			11	18	7	
Fid. Convertible Secs	18	13	6		15	14	13		22
Fid. Destiny I	29	43	5				4	18	
Fid. Destiny II	31	40	6				4	18	1
Fid. Disciplined Equity	31	26	28				11	4	
Fid. Emerging Growth	10		90						
Fid. Equity-Income	9	61		13		2	9	2	4
Fid. Equity-Income II	17	57		9		1	12		5
Fid. Exchange	60	30					2	2	8
Fid. Growth & Income	37	28		15			12	8	
Fid. Growth Company	42	3	47				7	2	
Fid. Low-Priced Stock		1		28	25	7	16	1	23
Fid. Magellan	21	26	29				16	7	
Fid. New Millennium	2	6	89				2		
Fid. OTC	26		69		4		1		
Fid. Puritan	18	39					10	20	12
Fid. Retirement Growth	37	16	27		5		15		
Fid. Sel Environmental		33		10	47	11			
Fid. Sel Financial Svcs	2	98							
Fid. Sel Leisure	12		23	30	29		1	5	
Fid. Sel Multimedia	13		51	1	15	1	8	10	
Fid. Spartan Market Idx	50	50							
Fid. Spartan U.S. Eq Idx	50	50							
Fid. Stock Selector	30	20	32			2	15		
Fid. Trend	5	12	52		20		11		
Fid. Value		42	4	15	11		21		7
Fid. Worldwide	5	19			17		52		7

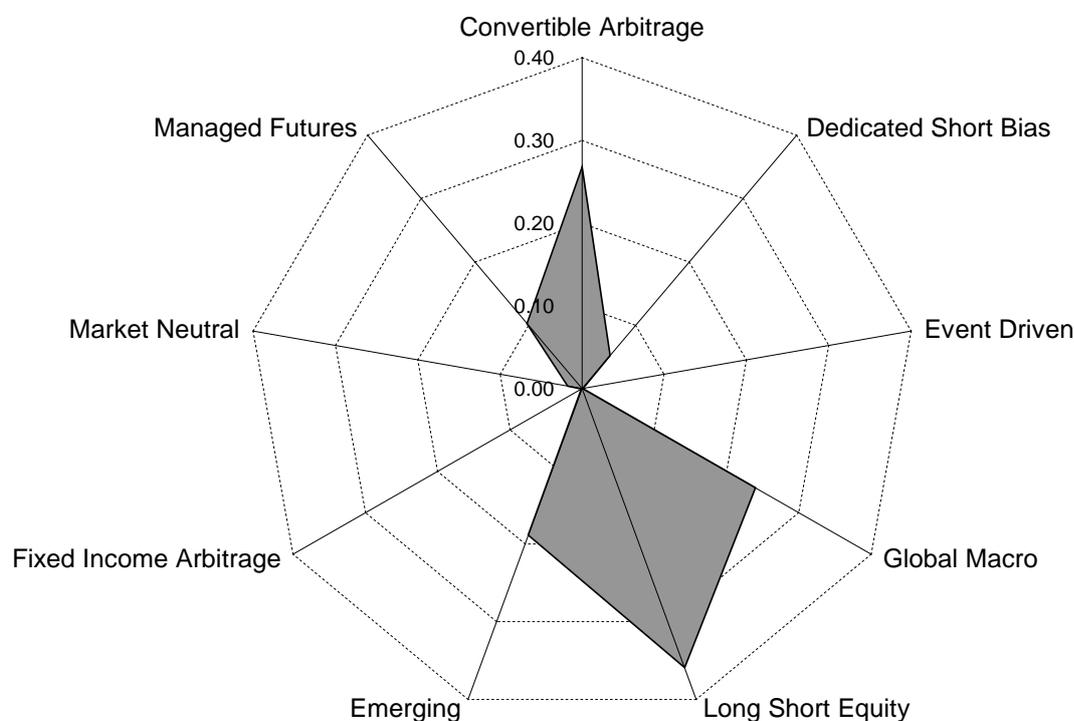
**Table 1-2: Style analysis applied to several Fidelity mutual funds. The asset classes are represented by BARRA indices (small companies have a stock market capitalization of USD 220 million or less, large companies have a market capitalization exceeding USD 3 billion, and medium-sized companies occupy middle ground).**

### 1.4.3 The case of hedge funds\*

In addition to traditional asset classes, returns-based style analysis has also been successfully applied to the domain of hedge funds<sup>2</sup>. The technique is even more useful here, since most hedge funds do not disclose at all their positions.

For instance, Lhabitant (2000) suggests using three year of historical monthly data and nine investment styles for the analysis of hedge funds: Convertible Arbitrage, Dedicated Short Bias, Event Driven, Global Macro, Long Short Equity, Emerging, Fixed Income Arbitrage, Market Neutral and Managed Futures. Each style is mapped on a Credit Suisse/Tremont capitalization weighted hedge fund index.

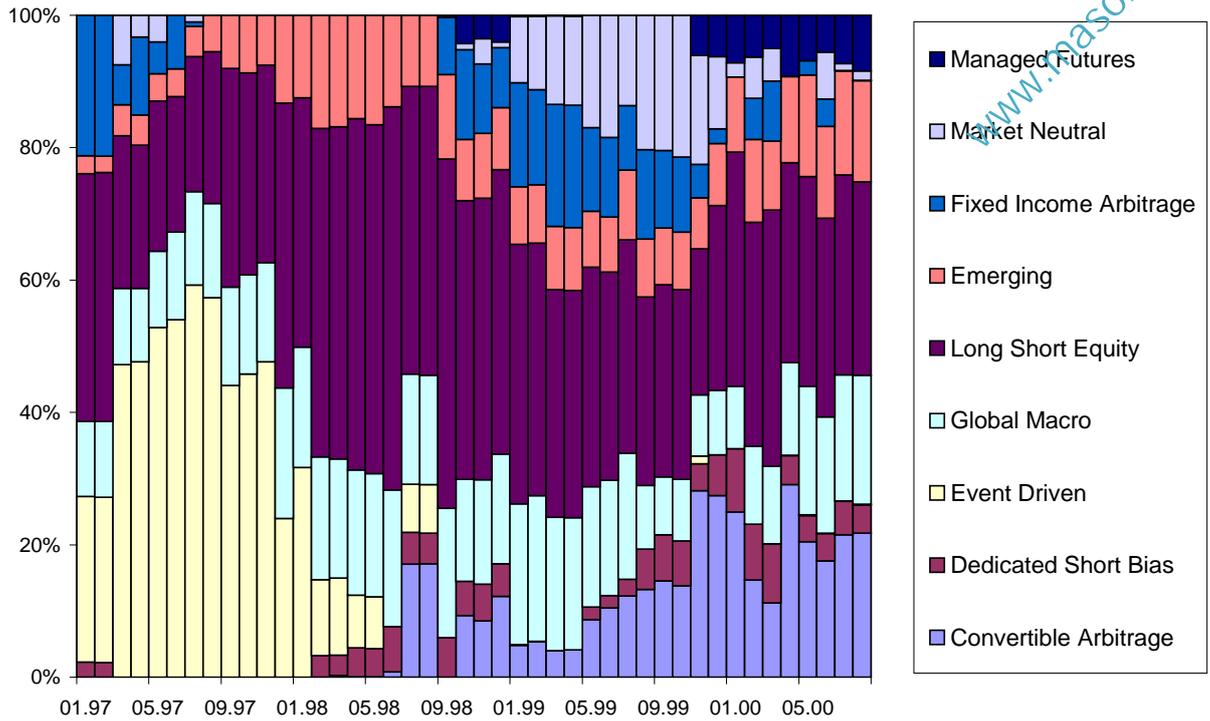
Figure 1-1 shows the outcome for GAM Diversity, a fund of hedge fund. As one can see, the fund behaves as if it was mostly invested in convertible arbitrage, global macro, long-short equity and emerging markets styles. There is almost no exposure to dedicated short bias, event driven, fixed income arbitrage or market neutral styles. The R-square of the model is 91.49%, a surprisingly good result.



**Figure 1-1: Style analysis on GAM Diversity at the end of August 2000**

An easy procedure to determine how stable a hedge fund or its exposures have been is to create a rolling style graph. This graph shows the changes in the mutual fund's style by graphing the output from a series of rolling period regressions. An active exposure distribution area graph could indicate market timing or sector rotation. The fund manager may be switching in and out of asset classes or sectors, with the result that the customized benchmark that best explains the fund's returns constantly changes.

<sup>2</sup> The technique is slightly modified to account for the possibility of leverage. See F.S.Lhabitant (2000), "Assessing Market Risk for Hedge Funds and Hedge Funds Portfolios", working paper, Thunderbird, the American Graduate School of International Management.



**Figure 1-2: Rolling style graph for GAM Diversity**

Figure 1-2 shows the outcome for GAM Diversity. As expected for a hedge fund, there are important variations for some styles over time. For instance, the event-driven category was very active in 1997, but disappeared progressively during 1998 to be replaced by convertible arbitrage.

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## 1.5 Risks, controls and prudential issues: organizational issues\*

Investment companies pool the money of many investors and invest it in a wide range of assets, in accordance with their investment objectives. Investors own shares of the investment company, each of which is a security representing a proportionate ownership in all of its underlying securities. Dividends, interest and capital gains produced by these securities are paid out to investors in proportion to the number of shares owned. Thus, before fees, investors who invest a few hundred dollars get the same investment return per dollar as those who invest hundreds of thousands.

There are essentially three major types of investment companies open to the public:

- **Mutual funds** are by far the most popular and well-known type. They offer redeemable securities, i.e. an investor can sell his shares back to the fund at any time at their current net asset value<sup>3</sup>.
- **Closed-end funds** are investment companies whose shares are publicly traded like stocks. The number of shares is fixed, and as a result, the price of a closed-end fund share fluctuates based on supply and demand. When the share price is more than the value of its assets, the fund is trading at a premium; if the share price is less than the value of its assets, it is trading at a discount.
- **Unit investment trusts** are investment companies that buy a fixed portfolio of securities and hold them until the trust's termination date. When a trust is dissolved, proceeds from the securities are paid to shareholders. The number of shares ("units") is fixed, and shares are sold to investors in an initial public offering. If some shareholders redeem units, the trust may purchase them and sell them back to the public.

In the following, we will essentially focus on the first category, namely, mutual funds. Although their legal structure varies from one country to another, mutual funds are most of the time articulated around the same organizational structure. Virtually all mutual funds are externally managed; they do not have employees of their own. Instead, several affiliated organizations and/or independent contractors conduct their operations.

The **board of directors** has the authority to manage the affairs of the fund, with fiduciary duties to shareholders. It oversees the fund's activities, including approval of the contract with the management company and certain other service providers whose contracts are important in terms of fees paid by fund shareholders. Generally, a large part of the board of directors has to be entirely independent of the fund's investment adviser or principal underwriter.

Like shareholders of other companies, mutual fund shareholders have the right to elect the board of directors, to vote on changes to investment adviser contract or on fundamental policy changes.

The **management company** manages the fund's portfolio according to the objectives described in the fund's prospectus. It also places portfolio orders with broker-dealers and is responsible for obtaining the best overall execution of those orders. If necessary, the management company can hire an external **investment adviser**.

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<sup>3</sup> The net asset value (NAV) of a mutual fund is simply the total market value of its assets divided by the number of shares.

**Trustees** are responsible for safeguarding investors' assets. They monitor the performance of the asset management company and ensure that all its acts are carried out in sync with the investors' interests

The **custodian** - typically a commercial bank or a trust company - is responsible for safekeeping of assets held by the mutual fund. He receives and delivers securities in exchange for payment, follows up on corporate benefits (dividends, bonus etc), and provides an independent means of control.

The **transfer agent** maintains records of shareholder accounts, which reflect daily investor purchases, redemptions, and account balances. He issues transfer certificates and account statements to investors for their investments, arranges payment to investors when they redeem (in open ended funds) and transfer when they buy/sell units in a stock exchange (in a close-end funds). He also takes care of change of address, replacement of lost certificates or account statements, mails to shareholders periodic account statements, etc.

**Independent public accountants and auditors** certify the fund's financial reports.

Finally, fund shares are distributed to investors primarily in two ways: though a **principal underwriter** – generally with no advice - or through **external distributors** - with advice, marketing brochures, etc., but with higher fees.

## 1.6 Risks, controls and prudential issues: fee structures\*

The highly competitive investment fund marketplace involves a wide array of pricing alternatives and fees. As a general rule, mutual funds fees can be split in two categories:

- **Shareholder fees** are paid **directly by the shareholder** when he buys or sell units of the fund. They do not affect the net asset value, nor the other shareholders in the fund. Therefore, they will not impact the published performance of the fund, although they will affect the individual investor's return.
- **Annual operating expenses** are paid **by the fund on behalf of its shareholders**. They reduce the net asset value, therefore impacting the published fund performance.

Hereafter, we review the most common policies related to fees.

### 1.6.1 Mutual Fund Fee Structure\*

The **initial fees and expenses** incurred through the incorporation of the fund, the preparation and publication of the prospectus, the initial printing of units certificates and the listing of those units on a stock exchange are borne by the fund and generally written off linearly within the first five financial years.

Most funds charge a commission when the investor purchases shares. It is called **front-end load, issuing commission, or sales charge**. It is expressed as a percentage of the amount of the initial investment and it is deducted from the initial investment. Therefore, it does not affect the fund's performance, but it affects the investor's performance. In the US, by law, this charge may not exceed 8.5% of the initial investment. Most funds fix a maximum front-load in their prospectus, but charge in reality far less than the maximum. The exact rate charged can change over time, and is generally shown in the annual and semi annual reports.

When the fund is sold by registered representatives or a financial advisor, the front-load charge is generally repaid to them as a sale commission for the advice they provided in helping the investor selecting a fund to meet his investment goals. In some rare cases, the front-load fee goes to the fund managers to cover the costs incurred in printing certificates and placing units.

The front-load charge may be reduced in some particular situations:

- when distributions (dividends) from the fund are reinvested into the same fund, the charge is often cancelled;
- when the amount invested is large. Breakpoints are often established where sales charges are reduced as the amount of money invested increases. In some cases, investors may reach these levels through rights of accumulation (amounts already invested in other funds in the same family can be counted toward the breakpoint) or a letter of intent (e.g. the investor pledges to reach the breakpoint with subsequent investments before the end the year);
- some load-fund groups allow investors to repurchase the same dollar amount of a fund they have redeemed within six months without a sales charge;
- the fund is purchased through a discount broker;
- the investor switches from one fund to another.

Several funds charge an exit commission when the investor redeems fund shares. It is called **back-end load, redemption commission** or **deferred sales charge**. This commission is expressed as a percentage of the proceeds of the sales and it is deducted from the proceeds of the sales. Therefore, it does not affect the fund's performance, but it affects the investor's performance. When applicable, the back-end load is often contingent on the investor's holding period of the fund shares. The fee runs on a sliding scale with a higher charge for the early years. Once a shareholder has been in the fund for a certain amount of time - usually several years - the charge disappears<sup>4</sup>.

The back-end load is generally used to compensate sales forces when not charging a front-load charge. It is often combined with 12b-1 expenses (see hereafter). The distributor pays in advance the initial sales commission on back-end loaded funds. The additional 12b-1, which lasts until shares are converted, repays his financing costs.

This **12b-1 fee** exists only in the U.S. It is named for a rule under the Investment Company Act of 1940 that authorizes mutual funds to pay for marketing and distribution expenses (including compensating sales professionals) directly from a fund's assets. The 12b-1 fee is expressed as a fixed percentage of the assets under management and affects the fund performance. The 12b-1 fees are partially or entirely repaid to the registered representative who sold the fund to an investor for as long as the latter remains in the fund. In effect, the fee gives the registered representative or financial advisor a kind of "annuity" for the assets the fund company retains. It encourages the representative not to move a client out of the fund.

By law, 12b-1 fees used to pay for marketing and distribution expenses cannot exceed 0.75% of the fund's average net assets per year. In addition, a fund may also pay a service fee up to 0.25% of average assets each year to compensate sales professionals for providing ongoing services the investor's account. A fund appearing as "no-load" can therefore in reality have a fee of up to one percent.

The **management fee** is an ongoing fee charged by the fund's manager to manage the fund and select its portfolio of securities. The **advisory fee** is an ongoing fee charged by the fund's advisor to advise the fund and recommend securities. Both fees are generally charged at regular time intervals (quarterly or annually) and are expressed as a percentage of the assets under management. They are directly debited from the fund's assets, which affects the performance. When the advisory and the management are assumed by a single entity, both fees are regrouped under the name "management fee".

A fund custodian debits the fund with an annual **custody fee** for safekeeping of the fund's assets, handling payment transactions and other duties. In addition, a fund may be charged with fees charged by external depositaries in the case of securities deposited elsewhere.

Finally, the Fund manager and the custodian are often entitled to reimbursement of the following expenses incurred by them:

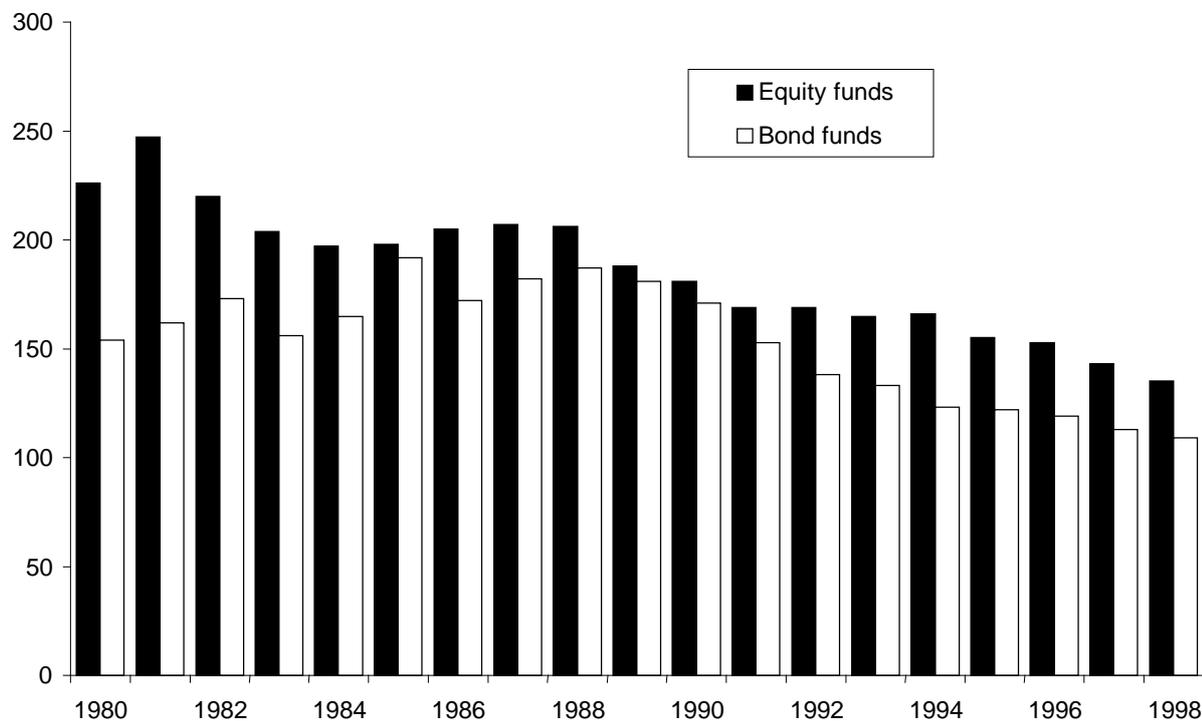
- cost of printing the annual and semi-annual reports and publishing the announcements addressed by the mutual fund to investors (including publishing fund's prices in media);
- fees related to maintaining and obtaining any listing of the mutual fund. For instance, in Luxembourg, fund management companies are liable of a tax of 0.06% p.a. on its total net assets, payable quarterly;

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4 If several types of shares are issued for the fund, the share with a back-end load is converted into a share without back-end load on a one-to-one dollar basis.

- cost related to distributing licenses for the mutual fund;
- auditors' fees for annual and/or semi-annual audits;
- brokerage fees;
- custodian's coupon collection commission (on the gross amount of coupons cashed) and commission on fiduciary deposits.

In the US, an advantage of mutual funds is the complete disclosure of all fees, since they are subject to strict regulatory standards and disclosure requirements. Elsewhere, the precise list of fund charges is difficult to find, particularly for the second category. Helpful information may be obtained from the prospectus or by visiting the fund's web site, but this is not always the case. In particular, if one want a summary of all the fees, it is necessary to request the **expense ratio** figure, which is precisely defined as a fund's total annual operating costs divided by its net assets.



**Figure 1-3: Evolution of the average total shareholder cost in the U.S. for equity and bond mutual funds. The costs are expressed in basis points.**

Another interesting figure is the **total shareholder cost**, which is the value of all expenses and loads incurred during a given year by buyers of a fund, expressed as a percentage of the amount invested in the fund. For a no-load fund, the total shareholder cost equals the expense ratio. For a load fund, the sales load must be added.

### ***1.6.2 Illustration: UBS funds\****

As an illustration, we now provide an overview of the fund pricing structure applied at UBS Fund Management, one of the leading fund management institution in Europe, which has recently restructured its pricing model for mutual funds, going from a management fee to an all-in-fee system, arguing that the all-in-fee was more transparent for the investor. Three cases have to be distinguished.

When a UBS client buys a UBS mutual fund, an issuing commission is charged and credited **to the internal client advisor. The latter is free to give client a discount on the issuing commission.** The issuing commission can theoretically be avoided if the client goes directly to the order desk in Luxembourg. Quarterly, an all-in-fee is charged directly to the fund's assets. The larger part of the all-in-fee is credited internally to the client advisor as distributor remuneration. The rest of the all-in-fee is used to repay the administration compensation (based on expenses, plus an adequate return), the portfolio management compensation, the operational costs (legal, revision, etc.) and the ticket fees for settlement, the custody and the marketing charges. Brokerage and fees from third parties and brokers, taxes and duties are not included in the all-in-fee and are directly charged to the fund, in addition to the all-in-fee. Finally, as a general rule, UBS has no redemption fee, so that a client selling a mutual fund pays no commissions. It follows from the above procedure that the only "visible" charge on the client's account is the issuing commission, which reduces the initial amount invested. The all-in-fee amount is public information, but as it is taken directly at the fund level, it simply decreases the net asset value and does not appear explicitly on the investor's statement.

When a non-UBS client purchases a UBS fund through an external distributor, the standard procedure is modified as follows:

- 1) The fund is sold to the external distributor at or slightly above the net asset value. The external distributor then sells the fund to the client at any price (but not cheaper than UBS).
- 2) From the all-in-fee, UBS repays to the distributor a regular stock commission, as long as the client stays in the fund. The amount of this commission is specified in the distribution agreement, and represents between 20% and 50% of the internal UBS commission. It is calculated on a quarterly basis (with no pro-rata temporis).

Finally, when a UBS client purchases a non-UBS fund on a secondary market, if UBS benefits from a reduced issuing commission, it will pass it to the client. However, UBS will charge full brokerage costs.

### ***1.6.3 A framework for fee structures in the US\****

Let us now provide a quantitative framework for the analysis and comparison of different system of management fees. To simplify the notation, returns are stated in gross terms, i.e., as one plus the net return. We describe the total fees, stated as fees per dollar invested in the fund and payable at the end of the observation period, as a function  $F$  depending on the return of the portfolio ( $R_P$ ) and the return of a benchmark ( $R_B$ ). Thus, if the amount invested in the fund is  $x$ , the dollar fees received by the fund are  $x \cdot F(R_P, R_B)$ , and the dollar amount received by the investor is  $x \cdot [R_P - F(R_P, R_B)]$ . We now apply this framework to US investment funds.

In the US, the Investment Advisers Act of 1940 lays out compensation structures that are permissible for fund managers. The original act prohibited registered fund managers from being compensated on the basis of a share of the capital appreciation of the fund's net asset value, unless the chosen basis of compensation was adequately disclosed to the clients.

Although there was no actual evidence of abuse, the SEC requested from Congress and obtained in 1970 an absolute prohibition for all investment companies, including mutual funds. Performance-based compensation structures such as those paying a flat fee plus a bonus for outperforming an index were therefore disallowed<sup>5</sup>. This explains the overwhelming popularity of “fraction of funds” management fees, in which the fund manager receives as compensation a fixed fraction of the total funds under management. In 1997, the New York Times estimated that out of 5,400 stock and bond funds, only 75 used a different fee system<sup>6</sup>. In our framework, this flat fee structure can be written as:

$$F(R_P; R_B) = b_1 \cdot R_P$$

where  $b_1$  is a non-negative constant denoting the base fee.

The only exception in the Act and authorized performance-based compensation is the “fulcrum” fee variety, that is, ones in which the fees charged by the fund may depend on the realized returns  $R_P$  on the fund portfolio as well as on the realized returns  $R_B$  on a “target” or “benchmark” portfolio, but have to be symmetric (decreasing for under-performing the index in the same way it increases for outperforming it). Linear fulcrum fees are by far the most common types used in practice. In this framework, the total fees can be expressed as follows:

$$F(R_P; R_B) = b_1 \cdot R_P + b_2 (R_P - R_B)$$

where  $b_1$  and  $b_2$  are non-negative constants denoting, respectively, the base fee and the performance adjustment component.

In most cases, a floor and by the symmetry requirement a corresponding cap are placed on the fulcrum fee. That is, the performance adjustment component of the total fee is limited to some maximum amount. If, for instance, we adopt zero as a floor for the total fee, the cap will be  $2 \cdot b_1 \cdot R_P$ , so that the final fee will be:

$$F(R_P; R_B) = \max [0, \min [b_1 R_P + b_2 (R_P - R_B), 2 \cdot b_1 \cdot R_P]]$$

Several variants around this model exist. Some funds will accept a lower minimum fee, including the possibility of negative fees. Others use a fulcrum fee based on a longer observation period (two or three years).

The second class of fees of importance are (asymmetric) incentive fees. For instance, hedge funds are not subject to the fulcrum fee requirement, because they are not subject to the Investment Act. Their most popular fee structure is an incentive fee with a large performance component ( $b_2$  large,  $b_1$  small).

$$F(R_P; R_B) = b_1 \cdot R_P + \text{Max} [b_2 (R_P - R_B), 0]$$

It is easy to see the option-like payoff structure. In a sense, the fund manager is long  $b_2$  options to exchange the benchmark return against the portfolio return. This is similar to a traditional call option on the fund’s return, except that the strike price would not be fixed, but moving with the benchmark.

5 In 1985, the SEC allowed the unlimited use of performance-based fees if the client had either (i) at least USD 500,000 under the adviser's management, or (ii) a net worth of at least USD 1,000,000. This amendment does not affect mutual funds, since for a fund to qualify for the exemption, every single shareholder in the fund would have to meet one of the two specified criteria.

6 See Carole Gould, “Paying Fund Managers with Carrots and Sticks”, New York Times, February 9, 1997.

The option analogy tells us that managers are long a call option while they control the volatility of the underlying asset through controlling the fund. This can lead to several perverse side effects. It can encourage investment advisers to take excessive amounts of risk, because they are protected from the negative consequences of their actions. It can also encourage managers with a good annual track record to stop taking risks and lock in their gains until the fees are paid (i.e. until they exercise their option and are granted a new option).

#### ***1.6.4 Recent trends\****

A recent trend in the fund management industry consists in offering investors different classes of shares for the same mutual fund. The fund structure then takes the form of a master/feeder structure: several different funds are offered, each of which has a fee structure and other attributes appropriate to its particular market. Each of these "feeder" funds invests its assets in another mutual fund, termed the "master" fund. The master fund, in turn, invests those assets in the securities markets.

Typically,

- Class A shares charge a front-end load.
- Class B shares charge a back-end load that declines over the years that you're invested. The load might decrease by 1% a year, until it drops to zero. Usually, funds with class B shares boost their 12b-1 fees to compensate the broker who sold the fund to the investor.
- Class C shares carry no back-end load and often no front-end load. Instead, the fund company charges about 1% (a 12b-1 fee, to be exact) every year the investor stays invested in the fund.

Fees and expenses not attributable to any particular class of units are defrayed among the different classes pro rata of their respective net assets. Fees and expenses are charged initially to the investment income of the class or classes concerned. Fees and expenses attributable to a specific class are charged directly to that class.

In addition, there can also be institutional and private clients classes. They differ mostly by their minimum amounts (higher for institutional) and front-end loads (higher for private clients).