

COMPASS CLIENT PORTFOLIO PROCESSING

We know from experience that the composition of client portfolios and manager composites can vary widely as a result of client-specific investment guidelines and/or different portfolio funding dates. Furthermore, these differences in portfolio composition often result in client and manager composite portfolios with considerably different risk and return characteristics. In these situations, having the ability to analyze actual portfolio holdings and their impact on asset class and total fund risk and return can dramatically

improve the fund's portfolio analysis and investment decision-making.

The Wilshire Compass now offers an additional service known as *Portfolio Processing* that allows clients to track and evaluate their *actual* manager portfolios in addition to manager composites. As part of the service, Wilshire contacts the client's investment managers each quarter and collects client-specific holdings and returns. The manager's

portfolio returns and characteristics are then loaded into Compass and clients can apply all of the Compass analytical tools to their individual portfolios. Wilshire can also collect and load *historical* portfolio holdings and returns into the Compass databases.

For more information regarding the *Portfolio Processing* service, please feel free to call any of the Compass team members.

BENCHMARK FIT

The *Benchmark Fit* analytic in Compass is an excellent tool for identifying an index or group of indexes to use in evaluating manager performance. This analytic calculates and plots the annualized excess return and excess risk of a single manager relative to a group of indexes. The objective of this analytic is to determine which index "best fits" the manager's return patterns, which we define as exhibiting the lowest excess risk or tracking error with the manager's returns. Ostensibly, the index with the lowest tracking error is the best representation of the manager's normal style over time, and therefore is a suitable performance benchmark.

mance benchmarks. To load the pre-saved file, select *File* then *Load* from the command menu and choose the file "bestfit.ind". Click *Open* to finish.)

3. Select a risk measure under the *Risk Type* heading.

4. Click on the OK button to produce the graph. The underlying data can be viewed by selecting *Report* then *Default* from the command menu.

The resulting scatter graph displays the annualized excess return and risk of Dodge & Cox's returns relative to forty-two different indexes (see figure 4). Users can quickly identify the "best fit" benchmark by retrieving the underlying data report, clicking once on the gray bar above the column heading "Excess Risk", and then selecting the *Actions, Sort, Ascending* options from the command menu.

FIGURE 4



Constructing the Benchmark Fit Graph

1. From the *Performance Analysis* window, select the *Benchmark Fit* graph option and click OK.

2. Choose the manager, a group of indexes to be analyzed, and the date range for the benchmark fit analysis. (Multiple indexes can be entered individually under the *Select Indices* tab, or by loading a pre-saved file containing many of the most popular perfor-



WILSHIRE

C O M P A S S

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Setting New Standards in Fund Sponsor Information Systems and Investment Technology

News:

"You don't get to Mars by luck. It's like threading a needle 10 miles away to get there. In dealing with the stock market, you could just throw darts and end up with a portfolio that might luck out and beat the market, but you don't get to Mars that way."

-Dennis Tito
 Founder and President, Wilshire Associates Incorporated
 Quoted from "Wall Street's Rocket Scientist", published in the Los Angeles Times, June 20, 1999

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Value at Risk and the Institutional Investor

The series of financial debacles that have plagued institutions in recent years have raised serious questions regarding the effectiveness of risk management systems. While proponents of VAR analysis have suggested that VAR models might have forewarned and possibly even prevented many of these catastrophes, critics are skeptical and, for the most part, remain unconvinced that a single tool such as VAR can capture and predict something as capricious and multi-dimensional as financial market risk.

Simply put, a portfolio's VAR is an estimate of the largest expected loss over a given period of time, under normal market conditions, at a given level of confidence. VAR is commonly reported as a single dollar value accompanied by a description of the time horizon and confidence interval used in the calculation (i.e. daily with 95% confidence).

VAR analysis to measure capital charges). However, Wilshire questions whether VAR analysis alone is an appropriate risk management tool for pension and endowment funds with investment horizons that are measured in terms of years rather than days or weeks.

The simplicity in VAR presentation is, in fact, the basis of its popularity. VAR was first introduced in the late 1970's by banks and other financial institutions with core trading and investment businesses that exposed them to large financial market risks. VAR was developed to provide a single number that summarized portfolio risk, could be calculated quickly, and communicated effectively to different audiences. Today, VAR concepts and tools are used by hundreds of financial institutions for a broad array of purposes including risk measurement and reporting, setting regulatory capital guidelines, and allocating internal capital.

The peril of VAR analysis for long-term investors is undue focus on the "lower tail" of portfolio outcomes which unavoidably favors lower risk portfolios. By ignoring the *full* range of potential outcomes, long-term investors may be discouraged from accepting long-term systematic market risk which is precisely the type of risk they are best-suited to bear. Funds who fail to take adequate systematic market risk may someday find themselves facing a different, but far more ominous type of event - the inability to fund liabilities as they come due.

Few doubt the value of VAR analysis for banking and trading firms that wish to control short-term financial market risk (in fact, regulators today require international banks to use

For years, institutional funds have worked to balance the benefits of lower short-term return volatility which provides more stable pension surpluses and spending levels, with the increased financing costs associated with investing



VALUE AT RISK (continued from page 1)

in less risky, lower returning assets. Wilshire believes that the VAR Analysis model now available in Compass is an excellent tool for managing this critical process, as it allows funds to analyze the impact short-term risk management decisions have on the potential long-term value of the fund. In addition, the VAR Analysis model can be an effective tool for managing the near-term expectations of investment committee members. Disclosing short-term risks to committee members in advance can "soften the blow" when markets correct and can help to avoid ad hoc and reactionary decision-making that may prove harmful to the portfolio over longer time horizons.

Value at Risk Analysis

The June 14, 1999 Compass update included a new analytic tool in the Total Fund module known as VAR Analysis. As discussed above, VAR models are short-term risk management tools that may be used to forecast a fund's potential portfolio losses over specific time horizons with a certain degree of confidence. The VAR model in Compass has a variety of useful applications including:

- Calculate VAR for a single portfolio over five different time periods
- Calculate VAR for up to six different portfolios over a single time interval
- Construct efficient manager portfolios in a total fund framework using mean variance optimization techniques

The VAR analysis model allows users to combine managers from each of the manager databases in a single module in order to replicate their total portfolio. The VAR model calculates a final VAR amount based on the initial portfolio value (absolute VAR) and rela-

Continued on page 3

FIGURE 1

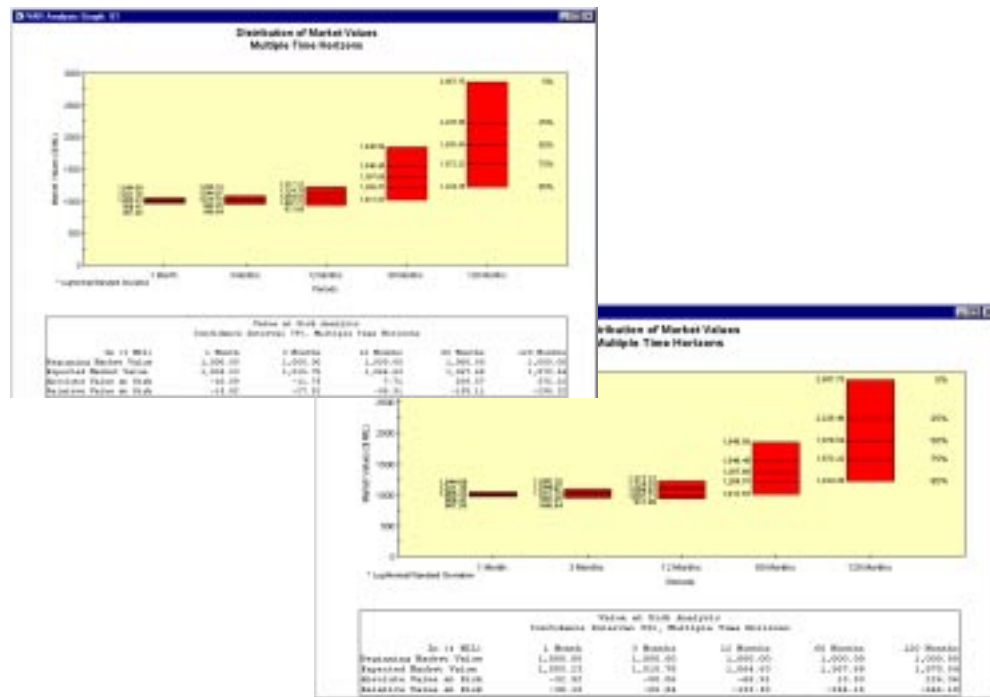
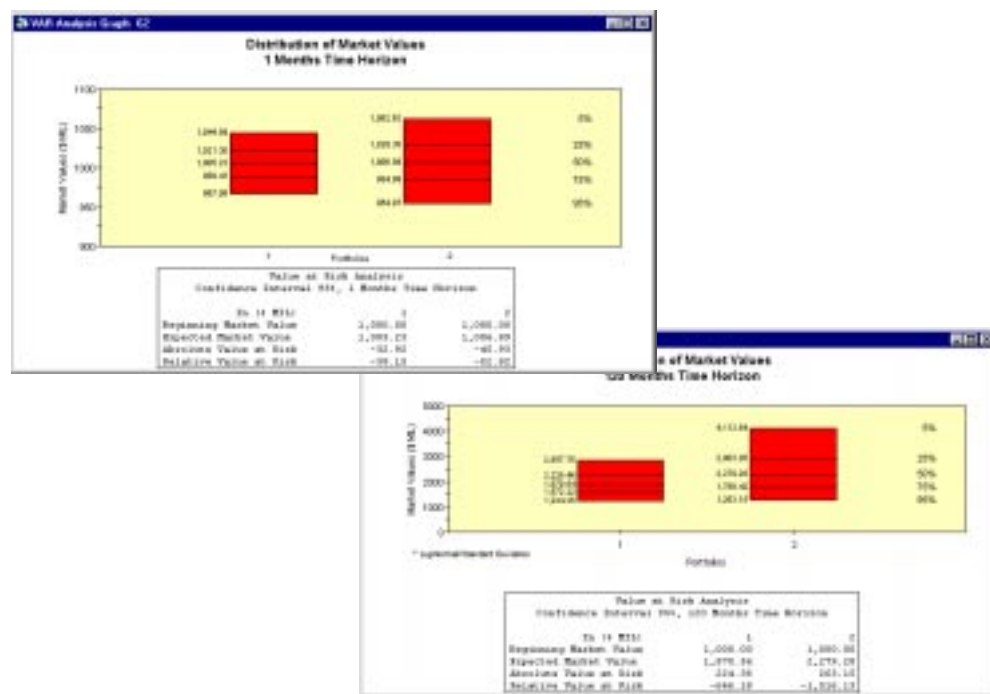


FIGURE 2



VALUE AT RISK (continued from page 2)

tive to an expected portfolio value (relative VAR). In addition, the model can be used to analyze VAR in absolute or excess terms (i.e. VAR relative to a policy benchmark or liability stream).

VAR – Single Portfolio over Multiple Time Periods

The first option within the VAR Analysis module calculates the VAR for a single portfolio over multiple time periods given the fund's manager weights and forecasted returns, risk and correlation. Figure 1 displays the absolute and relative VARs for a \$1 billion portfolio over varying time intervals at 75% and 95% confidence levels.

As expected, confidence level and portfolio VAR are directly related. For example, if the fund wished to increase the level of surety or confidence in the forecast from 75% to 95% over a one month period, the absolute portfolio VAR increases from approximately \$10 million to \$33 million, and the relative portfolio VAR increases from approximately \$16 million to \$38 million.

VAR – Multiple Portfolios over a Single Time Period

The VAR Analysis model in Compass is an excellent tool for measuring the impact of short-term risk management decisions on the long-term value of the fund. In Figure 2 below, we contrast the short- and long-term risk and return characteristics of two different portfolio mixes.

The charts in Figure 2 indicate that Portfolio 1 is less risky than Portfolio 2 over a short time horizon such as one month. For example, at a 95% confidence level, the absolute VAR for Portfolio 1 is approximately (\$32.9) million versus (\$45.9) million for Portfolio 2.

However, an altogether different conclusion emerges when the time period for the analysis is extended to ten years, a common investment horizon for institutional funds. Because of the different rates at which risk and return increase over time, the absolute VAR for Portfolio 2 over ten years is actually superior to the absolute VAR for Portfolio 1 (\$263 M versus \$224 M). More importantly, when we expand the analysis to consider the entire distribution of potential market values, the dominance of Portfolio 2 is even more apparent. Notice that the market values in the lower percentiles of each distribution are roughly the same, but Portfolio 2 has an expected or mean value that is \$400 million greater than Portfolio 1, and the difference in the 5th percentile is approximately \$1.2 billion over ten years. In other words, while the potential loss or "downside" for both portfolios is comparable, the "upside" or potential reward is dramatically different!

Efficient Manager Portfolios

The VAR Analysis module in Compass also includes a mean/variance optimization tool that can be used to build and analyze efficient manager teams across the entire fund. Users have the ability to replicate their total fund utilizing the U.S. Equity, Non-U.S. Equity, Fixed Income and Mutual Fund manager databases. Forward-looking risk, return and correlation forecasts can be developed for each manager, in absolute or excess space, in the same way they are developed in a strategic asset allocation or manager team optimization exercise. Basic and advanced constraints can also be applied to the analysis to insure that the efficient manager mixes are consistent with the fund's long-term asset allocation policy. (Please see Figure 3).

FIGURE 3

