

New Frontiers in Compliance

For better evaluation of trades.

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Harry Markowitz introduced optimization to the financial community in the 1950s. Optimizers allow us to travel to and along an efficient frontier. The efficient frontier is composed of that set of securities giving the greatest return for a given level of risk or, for those who consider the glass half empty, the least risk for a given level of return.

One can imagine drawing the efficient frontier by finding the security with the highest expected return. Next combine that "portfolio" with a small amount of a high-return security that has little correlation with the "portfolio." The result should be quite a sharp drop in the volatility of the portfolio, with little reduction in expected return.

As the process continues, however, there is a vanishing pool of high-return securities that is uncorrelated with the now more diversified portfolio. Ultimately, additions to the portfolio will have little if any risk-reducing effect—their main effect is to reduce the expected return of the portfolio.¹

To perform such an optimization, we need to have a set of expected returns and a model of how securities are related to each other. That is the point of our article:

1. Optimization becomes the plumbing of investment shops.
2. Expected returns, restrictions, and how securities are related are the content.
3. Capturing this information as orders are generated allows compliance officers and fiduciaries to

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view the process exactly as the fund manager sees it when the buy/sell decision is made.

Compliance officers should ensure that the plumbing properly exploits the information available to it. After that, they should concentrate on the information quality of the content, and ensure that the fund management team takes full advantage of both the plumbing and the content. They now have forward-looking tools to implement quality control for the portfolios they supervise.

BEFORE OPTIMIZATION

Once upon a time, investment fiduciaries or board members of mutual funds had lots of detailed historical data but little forward-looking information with which they could perform their supervisory duties. They were given snapshots of the holdings (or the top ten holdings) of the portfolios in question, the percentage of the portfolio allocated to particular asset classes, industries, or sectors, and perhaps a list of significant trades. For mutual funds, the compliance officer or fund manager would report compliance violations to the audit committee of the board; for other portfolios, the manager reported violations

directly to the fiduciaries along with a statement (presumably) that the portfolios were now in compliance with all relevant restrictions.

There would also be performance reports, attributing over- or underperformance to differences in weightings of the fund versus benchmarks with regard to asset, industry, or market sector, and individual securities. Managers might even include transaction cost reports using one or more of several different measurement methodologies. All of this would be accompanied by the portfolio manager's (self-serving) commentary.

Fiduciaries might have been swamped with historical detail, but it was difficult to get an appropriate overview or a characterization of the manager's *process*, or a perspective as to the investment themes driving the trades.² Compliance reports shed no light on how the portfolio manager viewed and was implementing the fund's investment mandate, and challenging a portfolio manager's representations was unlikely to lead to a meaningful investment discussion.

Finally, all the performance data analyzed were historical. For fiduciaries, this was like driving using the rear-view mirror.

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EXHIBIT 1

Trade Audit: Order Descriptions

Symbol	Category	Combd Rank	Alpha Rank	Risk Rank	Tax Rank
C	Purchase	Very Strong	Satisfactory	Very Strong	Weak
INTC	Purchase	Very Strong	Strong	Very Strong	Satisfactory
MWD	Purchase	Very Strong	Strong	Very Strong	Satisfactory
AMGN	Purchase	Very Strong	Strong	Very Strong	Satisfactory
MO	Purchase	Very Strong	Very Strong	Very Strong	Weak
DIS	Purchase	Very Strong	Very Strong	Very Strong	Satisfactory
BLL	Purchase	Very Strong	Very Strong	Very Strong	Satisfactory
PX	Purchase	Very Strong	Very Strong	Very Strong	Satisfactory
JNJ	Purchase	Very Strong	Satisfactory	Very Strong	Satisfactory
SBC	Purchase	Very Strong	Satisfactory	Very Strong	Weak
UNP	Purchase	Very Strong	Very Strong	Very Strong	Satisfactory
MRK	Purchase	Very Strong	Satisfactory	Very Strong	Weak
PPG	Purchase	Very Strong	Strong	Very Strong	Satisfactory
WMT	Purchase	Very Strong	Satisfactory	Very Strong	Satisfactory
TGT	Purchase	Very Strong	Strong	Very Strong	Satisfactory
WY	Purchase	Very Strong	Very Strong	Very Strong	Weak
GE	Purchase	Very Strong	Weak	Very Strong	Weak
UCL	Purchase	Very Strong	Very Strong	Very Strong	Weak
FITB	Purchase	Very Strong	Very Strong	Very Strong	Satisfactory
AIG	Purchase	Very Strong	Satisfactory	Very Strong	Satisfactory
TBB	Purchase	Very Strong	Very Strong	Very Strong	Satisfactory
SLM	Purchase	Very Strong	Very Strong	Very Strong	Satisfactory
BBT	Purchase	Very Strong	Very Strong	Very Strong	Weak
PEP	Purchase	Very Strong	Satisfactory	Very Strong	Satisfactory
SYK	Purchase	Very Strong	Strong	Very Strong	Satisfactory
EXC	Purchase	Very Strong	Very Strong	Very Strong	Weak
FINM	Purchase	Very Strong	Strong	Very Strong	Weak
FG	Purchase	Very Strong	Strong	Very Strong	Satisfactory
FDC	Purchase	Very Strong	Strong	Strong	Satisfactory
DVN	Purchase	Very Strong	Strong	Strong	Satisfactory
LEG	Purchase	Very Strong	Strong	Very Strong	Satisfactory
KO	Purchase	Very Strong	Satisfactory	Very Strong	Satisfactory
WYE	Purchase	Very Strong	Strong	Very Strong	Satisfactory
PFG	Purchase	Very Strong	Very Strong	Strong	Satisfactory
BMV	Purchase	Very Strong	Very Strong	Strong	Weak
HAL	Purchase	Very Strong	Very Strong	Strong	Satisfactory
BAC	Purchase	Very Strong	Satisfactory	Very Strong	Weak
XOM	Purchase	Very Strong	Satisfactory	Very Strong	Weak
MEDI	Purchase	Very Strong	Strong	Strong	Satisfactory
SWY	Purchase	Very Strong	Very Strong	Satisfactory	Satisfactory
AHC	Purchase	Very Strong	Very Strong	Strong	Weak

Category indicates the reason for trade, such as liquidity, tax harvest, optimization, compliance, or directed order.

WITH OPTIMIZERS

All this has changed with the advent of optimizers. Optimizers can capture, and users can archive, the portfolio's overall risk and return statistics, not just the top ten holdings, at the beginning and the end of every run or period. These statistics can be used to characterize the portfolio's position in risk-return space, relative to a benchmark or to peer groups, as the portfolio is *expected to behave*, given its current set of holdings and any suggested trades.

This information and its implications can be provided to fiduciaries in relatively simple reports. For instance, fiduciaries should be aware of the forward-looking tracking error and how it and the portfolio's value-weighted stock ranking (buy/hold/sell or alpha ranking) compare to the

benchmark and to other portfolios under management. The forward-looking value at risk can be reported for comparison across accounts and to benchmarks or peer groups.

Optimizers can also capture the reasons for each trade. The optimizer:

1. Knows the expected return that was supplied to it at a decision time.
2. Calculates the marginal contribution to risk of each potential trade, given the holdings in that specific portfolio, based on the risk model used by the manager.
3. Determines the effect of taxes on the portfolio's performance, using tax rules supplied by the management team.

Estimated transaction costs can also be included, and all these data can be retrieved for board meetings, reports to clients, and use in quarterly letters. For the numerically challenged, the numbers can be converted into words or phrases, and put into chart form or expressed in a narrative. Exhibits 1 and 2 provide two examples.

Fiduciaries and compliance officers can now have a discussion with the portfolio management team as to where the fund is positioned and, more important, where it should be positioned. Leaks in performance, whether because of not imbedding the firm's investment insights (security rankings, allocation strategies) in all portfolios, or because of exposing portfolios to undue volatility, can be identified and stopped.³

Optimizers can track benchmarks or model portfolios by crafting portfolios to meet portfolio investment restrictions, whether through a mandate of the fund or because of securities that cannot be traded due to liquidity or client restrictions.

While trades can be generated using other processes—replication, tax-harvesting, or trades directed by the management team—an optimizer that evaluates each trade gives fiduciaries a consistent and relevant view of all trades and their impact on the portfolio.

TECHNOLOGY

Since the early days of portfolio optimization in the 1960s, there have been significant advances in both hardware and software. Commercially available code is capable of optimizing portfolios at the rate of one or two per second using high-end personal computer hardware. There is no reason not to evaluate all proposed trades as we have discussed.

EXHIBIT 2

Sample Account Detail Report (excerpt)

Mr Harry Hitech TIK

January 19, 2005

1 Account Summary

The account held 6 positions before trading with a value of \$500,005.75 and 47 positions after trading. With a 2.00% cash target, the account held 75.00% before trading and 2.01% after trading. Based on Upstream rankings, the account had a target Forecast Rank of 1.8. It started with a Weak Forecast Rank (alpha) of 0.75 and had a Satisfactory Forecast Rank of 2.82 after trading. The account had a Target Tracking Error (or range of performance) of 2.00% versus its comparison portfolio, the sma_SP500. Before trading it had a Very Unfavorable Tracking Error of 12.65% and a Satisfactory Tracking Error of 2.53% after trading. The Value at Risk target (expressed as an annual percent return) was 28.00%. The account had a Very Favorable Value at Risk of 11.30% before trading and a Satisfactory Value at Risk of 27.98% after trading.

The account follows a model portfolio, the sma_SP500, which in turn tracks a third party benchmark, the SP500. The benchmark had a forecast rank of 0.03, and Value at Risk of 28.52%. The account had a Tracking Error versus the benchmark of 13.00% before trading and a Tracking Error of 4.40% after trading.

2 Summary of Orders

The account had 41 Liquidity Purchases with a value of \$364,963.24 representing 72.99% of the portfolio value. These trades had a Strong Forecast Rank of 2.66, a Satisfactory Tax Rank of -0.87, a Very Strong Risk Rank of 5.63, a Satisfactory Transaction Cost Rank of 0.00, resulting in a Very Strong Combined Rank of 7.42.

3 Details of Individual Orders

C The account made a Liquidity Purchase of 386.00 shares of CITIGROUP (C) at a price of \$45.44 with a value of \$17,539.84, representing 3.51% of the portfolio value. The trade had a Satisfactory Forecast Rank of 1.00, a Weak Tax Rank of -1.42, a Very Strong Risk Rank of 12.76, a Satisfactory Transaction Cost Rank of 0.00, resulting in a Very Strong Combined Rank of 12.35.

INTC The account made a Liquidity Purchase of 302.00 shares of INTEL (INTC) at a price of \$24.90, with a value of \$7,519.80, representing 1.50% of the portfolio value. The trade had a Strong Forecast Rank of 2.00, a Satisfactory Tax Rank of -0.15, a Very Strong Risk Rank of 9.09, a Satisfactory Transaction Cost Rank of 0.00, resulting in a Very Strong Combined Rank of 10.94.

Indeed, programs should be run in real time, allowing portfolio managers to carry out what-if analysis with proposed trades on "high-touch" accounts. Fiduciaries recognize that the markets are event-driven and that their portfolios should be evaluated daily rather than monthly or quarterly. This is now commercially feasible.

SUMMARY

Those who manage money and want to communicate better with their clients may wish to substitute the word *client* for *fiduciary*. Those whose money is managed by others may want to substitute the word *I* instead. In either case, we should recognize that technology can let us view the process exactly as the fund manager sees it when the buy/sell decision is made.

ENDNOTES

¹Sharpe notes that if we combine riskless securities, Treasury bills, with portfolios on the efficient frontier, we develop a set of portfolios that dominate the efficient frontier as outlined above. The largest set of such dominating portfolios lies on a line between the risk-return point represented by the risk-free security and the point of tangency of that line with Markowitz's efficient frontier. If the market is efficient, then that point of tangency is the market portfolio, and the straight line joining it and the risk-free rate is called the market line; it consists of differing proportions of the market portfolio and the risk-free security.

²Beyond the fact that purchases are good stocks, and sales are stocks that have disappointed.

³Compound return can be forecast as a function of the portfolio's expected return less half the variance of that return. The implication of this

arithmetic is that volatility can be a serious drag on performance over time.

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