DIAMOND HILL® investments

OF MODELS AND MEN

By: Thomas P. Schindler, CFA

June 30, 2004

Of Models and Men

> *Financial models are often used to quantify return and risk expectations. The purpose of these models is to capture complex realities in a form useful for decision-making. At Diamond Hill, the principal model we employ for evaluating equities was first proposed by Benjamin Graham- independently appraising the value of a business, and only committing capital at a market price below that value in order to obtain a margin of safety. The value of a business, in theory, is the present value of the company's future cash flows. We believe other models, such as trading rules involving monetary policy, provide interesting historical information, but do not capture accurately enough the complex reality. We believe conclusions reached with other models, such as those that believe that the standard deviation of returns necessarily captures the risk that was actually taken, can be faulty.*

While the title of this article may sound like an episode of *Sex & the City* or a book review of a John Steinbeck novel with a typo, the impetus came while reflecting upon some recent professional and leisure reading. The 2003 book *In An Uncertain World: Tough Choices from Wall Street to Washington* by Robert E. Rubin and Jacob Weisberg served as both. Rubin left his position as Co-Chairman at Goldman Sachs to serve in the Clinton administration, first as head of the newly created National Economic Council and later as the Secretary of the Treasury, and now is an executive at Citigroup. The book provides an insider's perspective on decision-making in wide-ranging matters, mostly concerning financial markets, politics, and management. Much further down on the best-seller list, I also recently re-read *The Role of Monetary Policy in Investment Management*, coauthored by Gerald R. Jensen, Robert R. Johnson, CFA, and Jeffrey M. Mercer and published in 2000 by The Research Foundation of the Association for Investment Management & Research (AIMR), which recently became CFA Institute. Passages in each of these brought additional thoughts about certain models.

Einstein once said, "All models are wrong, but some are useful." Rubin, who first worked in Goldman Sachs' risk arbitrage department, had this to say in his book when commenting on Goldman's initial foray into options trading, "The now famous Black-Scholes formula was my first experience with the application of mathematical models to trading, and I formed both an appreciation for and a skepticism about models that I have to this day. Financial models are useful tools. But they can also be dangerous because reality is always more complex than models. Models necessarily make assumptions… but a trader could easily lose sight of the limitations. Entranced by the model, a trader could easily forget that assumptions are involved and treat it as definitive." Yet, as financial analysts, we are continually using models, whose basic purpose is to quantify, even if in a limited way, forecasts about returns and risks that form the basis for our investment decisions.

"Trite is right" only some of the time

Wall Street produces an abundance of clichés, many of which can be summarized by the saying, "Conventional wisdom is often long on convention and short on wisdom." Consider a particular favorite - "You can't go broke taking a profit." True enough, but it doesn't speak to the possibility of becoming much poorer by doing something stupid with the proceeds of said sale or whether the investment, even at a substantial profit, remains an attractive use of funds. A basic idea in finance is that sunk costs, in this case the prices paid for investments, are irrelevant. What matters is the expected value today based on forecasts about the future. Rubin addresses this idea indirectly when he writes, "Looking back at that episode [trading losses during the 1973-74 slump], I realized that we hadn't really been reevaluating our positions as the economic and market outlook changed. Holding an existing investment is the same as making it again. When markets turn sour, you have to forget your losses to date and do a fresh expected-value analysis based on the changed facts." At Diamond Hill, we are always comparing price (the current market quote) and value (our independent appraisal of business worth).

Should We Ever Fight the Fed?

A more substantive aphorism on Wall Street is "Don't fight the Fed." The authors of *The Role of Monetary Policy in Investment Management* researched and presented a rigorous statistical analysis of the validity of this adage. The authors investigated the difference in returns between expansive and restrictive monetary periods. A monetary period was defined as either expansive or restrictive according to the most recent Fed discount rate change, and remained classified as such until the discount rate change in the opposite direction. For example, in December 1974, the Fed lowered the discount rate from 8.00% to 7.75%, marking the beginning of an expansive monetary policy period. This initial decrease was followed by six more rate decreases to a 5.25% in November 1976. In August 1977, the discount rate was increased from 5.25% to 5.75% signaling the end of the expansive and the beginning of a restrictive monetary policy period. Additional tests verified that these classifications coincided with growth of the money supply, measured in various ways, that was significantly higher in expansive periods than in restrictive periods. Months in which the direction changed contain both expansive and restrictive periods, so returns in those months were excluded. Real stock returns were found by subtracting the monthly change in CPI from the monthly mean return for the CRSP value-weighted NYSE, Amex, and NASDAQ index including dividends. The findings for monthly mean (presumably the arithmetic mean of the monthly returns in that period) stock returns for each period are presented as follows:

Real Stock Returns by Monetary Environment, 1960-1998

Expansive Monetary Periods			Restrictive Monetary Periods		
Number of Months	Mean Real Return	Start of Series	Number of Months	Mean Real Return	Start of Series
36	0.7800%	Jun-60	44	0.8157%	Jul-63
6	0.3223%	Apr-67	8	0.5929%	Nov-67
3	3.3538%	Aug-68	22	-1.3505%	Dec-68
7	2.1357%	Nov-70	3	-0.2698%	Jul-71
13	1.6615%	Nov-71	22	-2.8478%	Jan-73
31	1.2747%	Dec-74	32	0.1902%	Aug-77
3	3.7471%	May-80	13	-0.5009%	Sep-80
28	0.9203%	Nov-81	6	0.7136%	Apr-84
33	2.1098%	Nov-84	38	-0.0762%	Sep-87
40	0.9454%	Dec-90	19	1.5189%	May-94
35	1.7725%	Jan-96			

The authors noted, "the evidence presented throughout this analysis is necessarily derived by examining historical returns. Thus, its relevance for future security returns should be interpreted with some caution." Still, the implications are clear. Historically, stocks have provided very attractive real returns when the Fed has been lowering rates, with every expansive period in the study providing a positive real return. When the Fed has been raising rates, real returns have been subdued, providing positive real returns in only half of the periods under study. When analyzing bonds, they found that the 5, 10, and 30-year Treasury bonds have provided slightly higher returns during expansive periods than restrictive periods, while 1-year Treasury bonds and 30 and 90-day Treasury bills have had higher returns during restrictive periods. None of the differences for bonds were statistically significant, however. The finding that stocks provide such superior returns (and the authors contend the returns are even better on a risk-adjusted basis based on a lower standard deviation of returns during expansive periods), when following a trading rule based on a readily available variable such as the directional change in the Fed discount rate is an *anomaly* so far as the efficient market hypothesis is concerned. An anomaly is something that is inconsistent with a model or theory that cannot be, or at least has not yet been, explained.

On June 30, the Fed raised the Fed Funds target and the primary credit rate, signaling a change in the direction of Fed monetary policy (the discount rate series was discontinued in January 2003). I went back and updated where the authors left off at the end of 1998. Instead of the CRSP value-weighted index, the mean real monthly return is the arithmetic return of the S&P 500, which should not provide materially different results. Again, the return in the month in which the directional change occurred was excluded. The following table summarizes the findings:

Expansive Monetary Periods			Restrictive Monetary Periods		
Number of Months	Mean Real Return	Start of Series	Number of Months	Mean Real Return	Start of Series
42	1.8412%	Jan-96	16	-0.0521%	Aug-99
40	-0.4152%	Jan-01	?	?	Jun-04

The results seem to show a certain law at work: Murphy's Law. The first post-study restrictive period followed form in that mean returns were subpar, but in the first full expansive monetary period since the study ended, stocks provided a negative real return during Fed easing. Buying stocks when the Fed began lowering rates in January 2001 would have failed.

What caused the failure? First, in fairness, the main purpose of the monograph was to present evidence and quantification on the role monetary policy has played on historic returns, not to present a tool for forecasting future returns. Additionally, one can argue the overall record is still quite strong and that no forecasting tool in the social sciences is likely to have a perfect record. The failure could simply be due to random chance. Second, academicians seem to reflexively explain outcomes that differ from discovered anomalies by guessing that the opportunity has now been recognized and competed away. I have not seen an update of this study by the authors, but my own view is that neither of these explanations is convincing. Rather, when forecasting something as multi-factor and complex as future stock market returns, you have to do your best to identify and consider all the important variables. Interest rates are certainly an important variable, but not the only one. Thus, research such as that presented in *The Role of Monetary Policy in Investment Management* may serve as interesting tidbits, but are not major investment decision-making tools.

Risk Models

Henry Kaufman, formerly vice chairman of Salomon Brothers and in the early 1980s the most prominent Wall Street economist and market strategist, commented in a speech that "The trouble with this phrase, 'risk management'- which is very fashionable in modern business parlance – is that it creates the impression that the risk is actually being managed." Risk, of course, is of great importance in making investment decisions and evaluating performance. Academic models of risk focus on forecasts of the standard deviation of returns. The models frequently review historic standard deviations of returns in the belief that they provide an indication of the future risk, acknowledging that future volatility might differ from historic volatility. For instance, in my college textbook *Principles of Corporate Finance*, Richard Brealey and Stewart Myers present this table of standard deviations based on Ibbotson Associates' data for common stocks (as measured by the S&P Composite which is currently the S&P 500 and prior to March 1957, the S&P 90) for successive 10-year periods starting in 1926:

Period	Market Standard Deviation σ_m
1926-1939	31.9
1940-1949	16.5
1950-1959	19.8
1960-1969	14.4
1970-1979	19.2
1980-1988	12.5

Brealey & Myers write the following: "We should be cautious about reading too much into standard deviations calculated from 10 or so annual returns. However, these figures do not support the widespread impression of especially volatile stock prices during the 1980s. Overall the 1980s were below average on the volatility front.

However, there were brief episodes of extremely high volatility. On Black Monday, October 19, 1987, the market index fell by 23% *on a single day*. The standard deviation of the index for the week surrounding Black Monday was equivalent to 89 percent per year. Fortunately, volatility dropped back to normal levels within a few weeks after the crash."

For clarification, Brealey & Myers base their statements on the *annual* standard deviation of common stock returns. Ibbotson also provides monthly return information for common stocks. What if instead of measuring the *annual* standard deviations, the *monthly* standard deviations for these exact time periods are examined? The results are summarized in the following table:

Period	**Monthly** Market Standard Deviation σ_m	**Annualized Monthly** Market Standard Deviation _m Monthly σ_m X (SQRT 12)
1926-1939	9.7	33.7
1940-1949	4.6	15.9
1950-1959	3.4	11.8
1960-1969	3.5	12.1
1970-1979	4.6	15.9
1980-1988	4.9	16.8

Thus, when looking at the standard deviation of *monthly* returns, Brealey and Myers statements are no longer valid. Market returns in the 1980s were slightly *more* volatile than any period since the 1920-30s. Conclusions drawn from models that quantify risk based on historic standard deviations can change depending on the frequency with which the returns, which are the only data manipulated to find the variance and thus standard deviation of those returns, are measured. I encountered similar circumstances upon examining the returns for the Diamond Hill Small Cap Fund. The standard deviation of monthly returns has been higher compared to the Russell 2000, but lower than the Russell 2000 when each is calculated on a daily basis. The potential volatility of returns is likely an important factor to consider when specific near-term liabilities must be met. However, when analyzing long-term returns, I do not believe that standard deviation risk models necessarily capture the risk that was actually taken.

Diamond Hill Models

So what are some models Diamond Hill does frequently use? In his book, Rubin commented on his early interest in the stock market, spurred on by his father, who analyzed stocks based on methods laid out by Benjamin Graham in *Security Analysis*, who believed in investing only when an independent appraisal of business value produced a worth significantly above the current price. Rubin writes, "Today I believe even more strongly that this is the only sensible approach to investing in stocks. You should analyze the economic value of a share of stock the same way you would think about the economic value of the whole business. A stock, whether in a steel plant or in a high-tech firm, is worth the present value of the company's expected future earnings, adjusted for risk and for other fundamental factors such as hidden assets on the balance sheet. Over the long run, the price of a stock will reflect this economic value, although the price can deviate dramatically from it for an extended period." This model is both simple in concept and difficult in practice. Obviously, the model requires estimates of future earnings, and thus will be governed by GIGO (Garbage In – Garbage Out). Still, Graham's value investing methods have been practiced quite successfully over the years. Like Rubin, we believe it is the only sensible approach.

Tom

Thomas P. Schindler, CFA