

UNDERSTANDING *REAL* VOLATILITY SPELLS OPPORTUNITY

The RLH Risk-Reduction/Return-Enhancement Trading-Indicator Model

Introduction and Statement of Philosophy:

“Real” Volatility vs. “Implied Risk”—Intuitive and Simple

This paper describes an innovative method for achieving extraordinary gains (as much as 300% over a 60-month test period) through disciplined, programmatic trading of a universe of 6,500 equities listed on U.S. stock exchanges. While results will, of course, vary with broad movements in the equity markets, the described method of investment consistently and substantially outperformed classical indexes and the market as a whole in comprehensive backtests.

Volatility measured as a function of extrinsic portions of derivatives premiums can only define “implied risk.” While this may be a very valid and useful risk-management and return-enhancement tool, it is not a measure of the extent of up and down movement of a particular equity or derivative instrument. Thus, “real” volatility—how much a stock or other instrument moves up and down over short time frames relative to its usual behavior—remains to be examined. Can “real” volatility measured in the prosaic sense of actual price fluctuation over short time-frames be a useful portfolio-management technique for reducing risk and enhancing returns? This question is the starting point for an iterative investigation of numerous ways to define “real” volatility to determine entry points of low risk and exit points of high risk. That investigation has been under way for more than ten years and is still in progress. In its current form, it is the backbone for a proprietary volatility measurement and, combined with other factors, including short-term volume patterns, a proprietary oscillator which, all other things being equal, is relatively low when a stock is undervalued and high when a stock is overvalued.

Efficient Market Theory, Consensus, Consensus Returns

Philosophically, a significant portion of this investigation has been dedicated to solving entry- and exit-point problems using mathematical and computer techniques. Over the course of my professional experience—which has been concentrated in the field of money-management and corporate finance only more recently—I have arrived at two conclusions. One, the best ideas and solutions are usually intuitively correct and simple. Two, many of the better methodologies so far devised surpass most others mainly by avoiding consensus wisdom—or even heading in the opposite direction. Coupled with this second philosophical observation is the concomitant observation that those who follow the consensus get, at best, consensus returns. My own career parallels this philosophy: a combination of “words” and “numbers” emphasis at various points in time. As with non-consensus philosophies, non-consensus career paths, as well, are believed to be essential to inventing “outside-the-box” approaches to money-management success.

What the RLH Risk-Reduction/Return-Enhancement Trading-Indicator Model Is:

Proprietary Volatility Calculation

The RLH model is founded upon the notion of “real volatility.” The model’s proprietary volatility calculation plays off of standard open, high, low, close and volume data on a daily basis. The model calculates a moving average of “real volatility” based upon the absolute value of changes in the range of the price of the stock measured from these data, “smoothed” to an extent by introducing a fairly short-term moving average. This proprietary volatility calculation is designed to measure short-term volatility as a function of price ranges and changes, rather than the Wall Street dogma of “implied risk.”

Proprietary Oscillator

In addition to the *de rigueur* price and volume data described above used in calculating the model’s proprietary volatility quantity, additional data for several moving price averages is calculated. Further measurements calculate price in relation to these moving averages expressed in +/- % terms. These data, combined with the volatility and weighted with volume, form the basis for the model’s proprietary oscillator measurement.

Subsequent Calculations

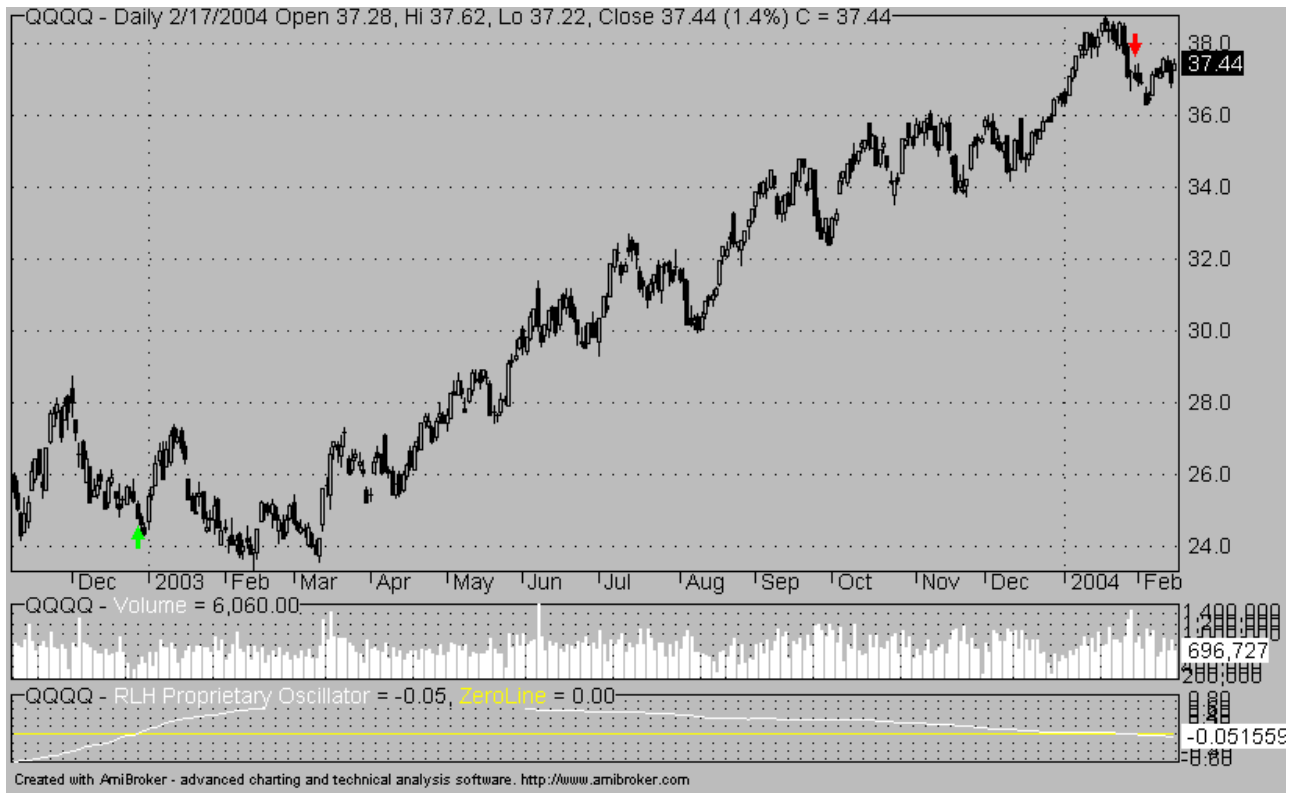
The model then goes on to calculate several moving averages of the oscillator itself. These moving averages are used as both absolute values and in relation to one another to determine inflection points of overbought and oversold conditions.

While the model relies upon the oscillator quantity itself—a high relative oscillator value relative to back-tested averages indicates an overbought condition, while a low relative oscillator value indicates an oversold condition—another set of calculations compares oscillator moving averages with one another and performs several other operations to determine specific entry and exit opportunities. These are literally expressed as “buys” and “sells” for specific trading days.

The RLH Risk-Reduction/Return-Enhancement Trading-Indicator Model as a Computerized Trading Program:

The model in its original form was largely conceptual; indeed, the entire model was captured in a single spreadsheet. Again, simplicity, intuitiveness and ease-of-use had been the guiding lights of its makeup throughout many years of development.

Numerous advantages have now been obtained by scaling this relatively primitive yet effective incarnation up. Having turned the model into a computerized trading program, real-time data can now be streamed in, thus making it possible to generate night-to-instantaneous trading signals intra-day. It is also possible to automate trading itself, and to run numerous stocks—or other financial securities, so long as both price and volume data are obtainable for each instrument employed—simultaneously. These advantages are critical to managing large capital pools.



The above graph is a screenshot of a real-time automated trade scenario showing generated buy and sell signals. At the green “up” arrow the RLH model generates a buy signal for the QQQQ on 12/27/2002 at a closing price of \$24.82 as the proprietary oscillator crosses above the zero line (subgraph). At the red “down” arrow, a sell signal is generated on 1/30/2004 at a closing price of \$37.07—a profit of 49% over the course of approximately one year.

Buy and sell orders can be placed either manually at a brokerage of choice as they are generated, or automatically at brokerages with native automatic execution capability or the infrastructure to connect their execution software to our application(s).

Backtesting:

Having turned the model into a computerized trading program, it is now possible to simulate and backtest historical trading performance accurately. We initially chose to do a comprehensive simulation backtest analyzing the model’s performance on a broad universe of 6,500 US securities. This large universe has enabled us to get a wide-ranging view on both the model’s robustness and its tradability using both large and small capitalization stocks.

Our backtest is presented in two permutations. The first permutation maintains approximately full market exposure at all times. The goal of this model is significant outperformance of benchmark indexes. The second permutation uses a proprietary filter to determine when the model is likely to underperform its own historical performance based on market risk. The purpose of the second permutation is to isolate the periods of time during which a cash position would present a more prudent risk posture than a full exposure in stocks. This technique significantly reduces long-term portfolio risk by restricting buys and building cash.

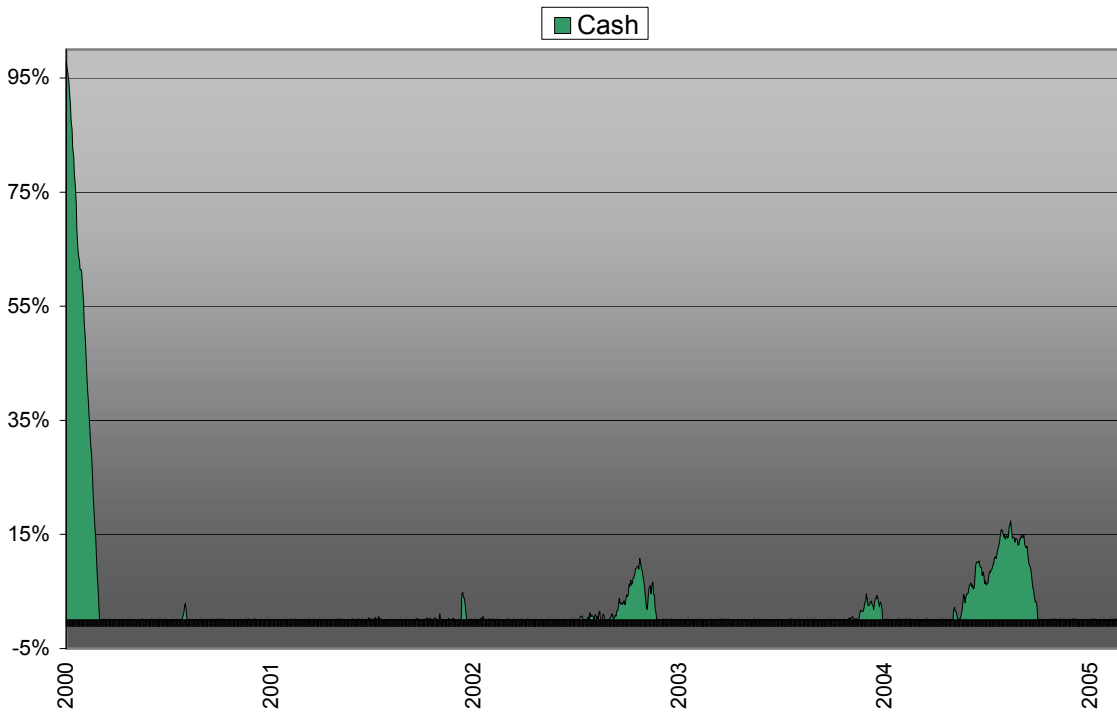
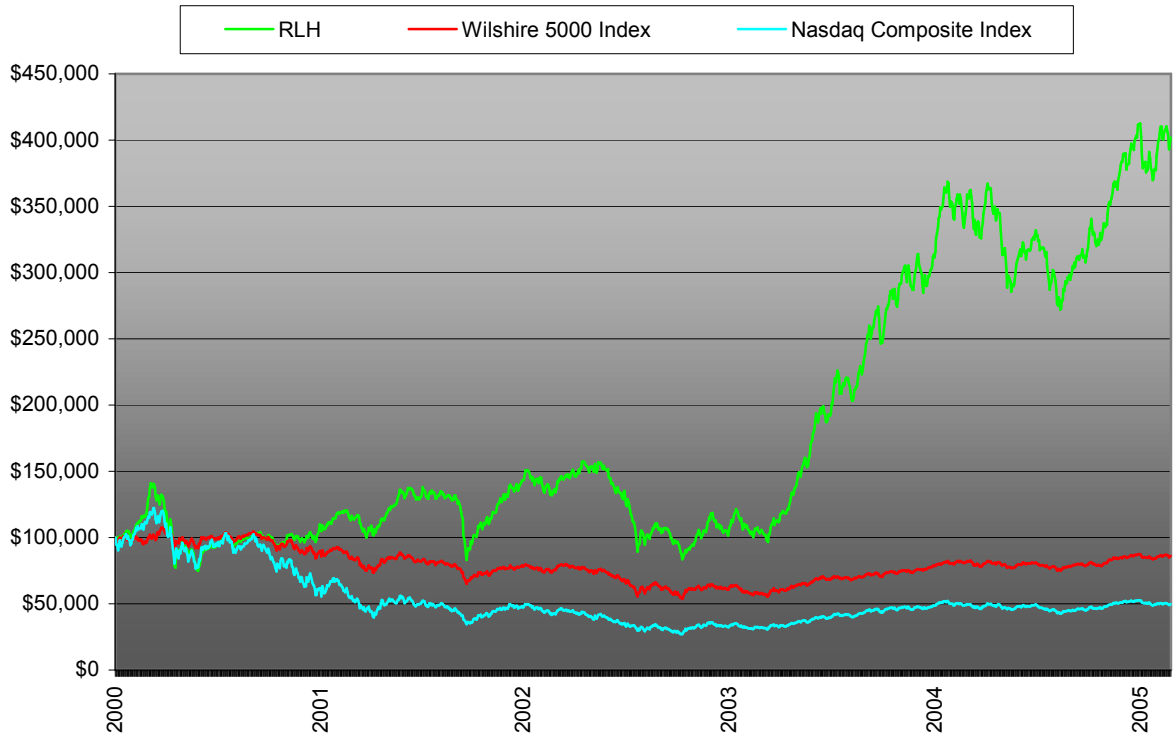
Backtest Parameters

The backtest evaluates the model's entry and exit signals with built-in but adjustable assumptions regarding position sizing, margin, commissions, slippage, and maximum allowable volume per execution. The backtest shown starts with a hypothetical portfolio of \$100,000. Any time a trade is triggered, the model buys 0.33% (1/300th) of the portfolio value worth of the stock, not to exceed one percent of that security's trading volume on that day. Thirty-three one-hundredths percent was chosen because it allowed the model to make the maximum number of simultaneous trades while at the same time approaching full exposure, marginable to 200%. No commission costs or adjustments for slippage are included.

Important Note on Limitation of Test

While this backtest covers 6,500 stocks currently traded on the U.S. exchanges, it does not include stocks which were delisted during the test period. It is possible that this omission introduces a survivorship bias into the results. An analysis of the model including delisted securities could be commissioned and performed by us.

Graphics



RLH Model Backtest Summary	
Date Range	1/1/2000 – 2/24/2005
Net Profit %	302%
Net Risk Adjusted Return %	311%
Compound Annual Return	31%
Risk Adjusted Annual Return	32%
Average Trade*	16%
Winning Trades %	48%
Losing Trades %	52%
Average Win*	54%
Average Loss*	18%
Max System % Drawdown	47%
Profit Factor**	2.23

**Average Trade =
16%/135 Days*

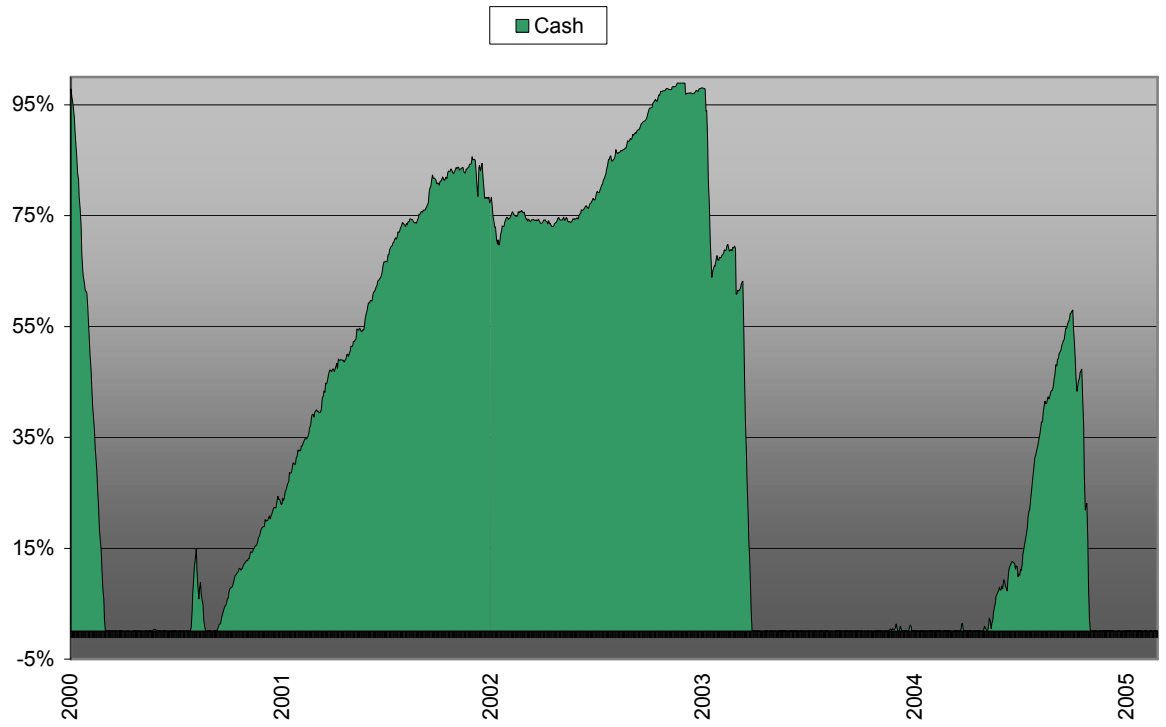
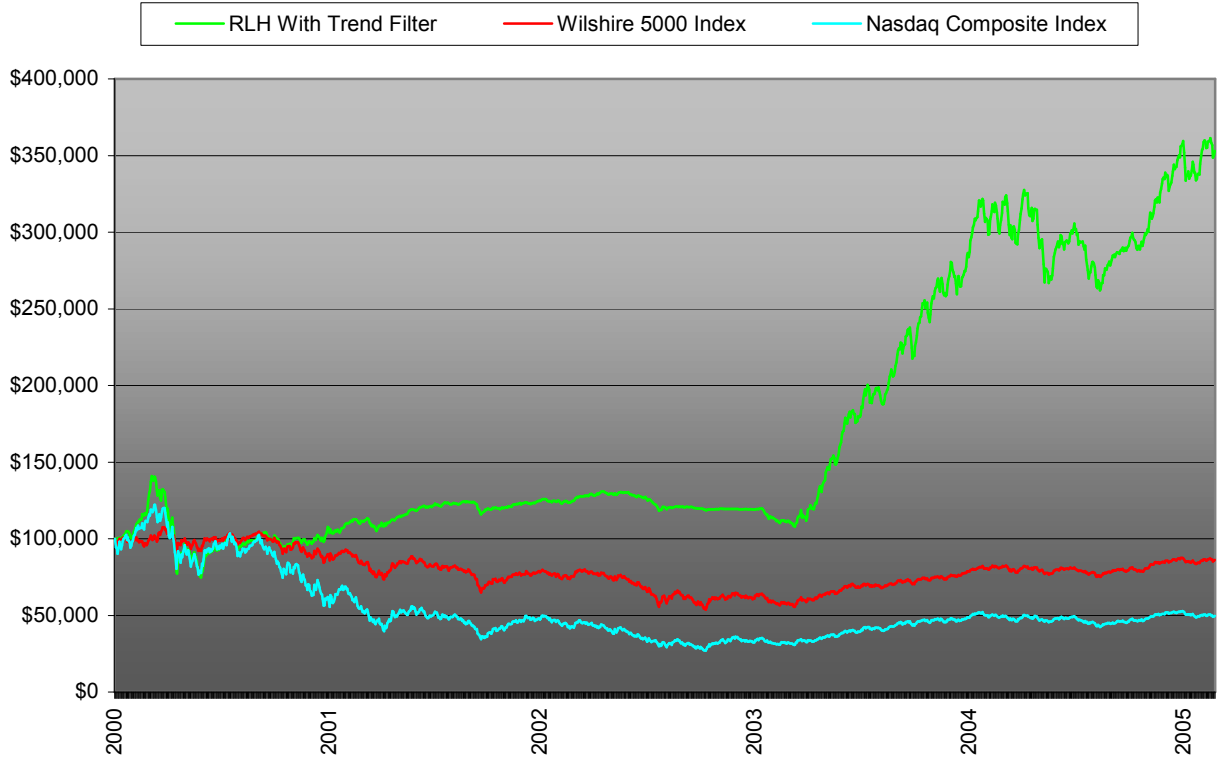
*(Average Winning Trade =
54%/173 days; Average
Losing Trade = -18%/101
days)*

***Profit Factor is the total
profit of the winning
trades divided by the total
loss of the losing trades.*

Consistent Outperformance

The performance graphic illustrates that the model meets its goal of significantly outperforming benchmark indices in dramatic fashion. Although the RLH model does experience drawdown phases, a not unexpected phenomenon given the risk to which the model is exposed when essentially operating fully invested at all times, long-term returns are nonetheless excellent, thus the drawdowns can be viewed as a natural result of a model seeking and achieving excellent returns for a risk-tolerant profile.

The cash graph confirms that the model achieves its goal of maintaining approximately full exposure at all times.



RLH Model Backtest Summary With Trend Filter	
Date Range	1/1/2000 – 2/24/2005
Net Profit %	253%
Net Risk Adjusted Return %	398%
Compound Annual Return	28%
Risk Adjusted Annual Return	44%
Average Trade*	22%
Winning Trades %	56%
Losing Trades %	44%
Average Win*	53%
Average Loss*	16%
Max System % Drawdown	47%
Profit Factor**	2.93

**Average Trade =
22%/139 Days*

*(Average Winning Trade
= 53%/176 days; Average
Losing Trade = -16%/92
days)*

***Profit Factor is the
total profit of the winning
trades divided by the total
loss of the losing trades.*

Risk-Managed Outperformance with Trend Filter

The performance graph illustrates that the RLH Model with Trend Filter meets its goal of isolating and avoiding risk periods during which equity exposure should be significantly reduced. Net Profit % is lower but is accompanied by a smoother performance curve (reduced drawdowns) and significant durations of dramatically reduced exposure to stocks. The most notable period of exposure reduction spanned the period from 2001 to early 2003, a time when benchmark indexes were exceptionally weak.

Employment Options:

At any point in time chosen as a starting time-frame for employing the programmatic version of the model, the current central philosophy is trading a large universe of stocks, thus enabling a thoroughly diversified, fully invested portfolio.

The system thus gets to its fully invested point after an initial entry point, maintaining that book-entry level by selling off issues that become overbought and acquiring additional securities as new candidates of oversold issues become evident in the original universe.

This process can be further refined. By selecting quality issues screened by a variety of fundamental factors during oversold conditions, the model can function to improve the timing of a portfolio otherwise managed using only fundamental criteria.

Furthermore, the model can be traded on a pre-defined universe of stocks, using capitalization or other criteria such as industry/segmentation. This scenario might apply in the case of funds with self imposed/regulatory restrictions.

Suggested Hedge Fund Structure

We believe the RLH model represents an excellent means for managing “mid-sized” capital pools and that the flexibility of a hedge-fund structure best accommodates that task. Bracketing respective capital pools around the \$10-million level should present prime opportunities to operate the model program at its most flexible capabilities with or without full exposure, as well as enabling opportune but not unwieldy positions in smaller capitalization stocks with relatively superior potential for capital appreciation.

Further Application

While the model has a wide range of applications in addition to a hedge fund structure, we believe the two most promising and immediate are:

- (1) Utilization of the model by an already existing fund or managed account, either as a timing method to improve entry and exit, or as a separately traded entity to generate returns and improve diversification.
- (2) Development of the model into a black box for retail sale (*e.g.*, web site).

Curriculum Vitae:

Reid Holloway is an independent practitioner in corporate finance, specializing in strategic, market-identification and operating strategies for the telecommunications and technology industries. He is a licensed Realtor, associated with The Cohen Agency of Torrington, Connecticut, and a member of the Litchfield County Board of Realtors, the Connecticut Association of Realtors and the National Association of Realtors (NAR).

Mr. Holloway began his career as an editor with Harcourt Brace Jovanovich Publications in 1976. In 1978 he joined Sanford C. Bernstein & Co., Inc. (now a unit of Alliance Capital), an investment research and management firm now handling \$498 billion in client assets, where he instituted and managed the company's communications department.

In 1980 he joined specialty-chemicals giant W.R. Grace & Co., and, for seven years, as senior corporate writer and deputy director of public affairs, handled as many as 100 speaking engagements per year for then chairman Peter Grace.

He served on the presidentially appointed Grace Commission on government waste, which Mr. Grace headed at Ronald Reagan's request, and which developed many of the cost savings adopted in every federal budget since the completion of its findings in 1985.

In 1987 Mr. Holloway joined Edward S. Gordon Company, Inc. (now C.B. Richard Ellis), then the world's largest independent commercial Realtor, and directed the firm's marketing and communications activities related to large leasing and investment transactions, such as the sale of 2.5-million-square-foot One New York Plaza to Chase Manhattan Bank. ESG became a Holloway client after his consulting practice was formed, and he was responsible for writing the firm's quarterly Gordon Office Market Report, distributed to clients and the news media, tracking the entire 400-million-square-foot office leasing market comprising Midtown and Downtown Manhattan.

From 1992 through 1996 Mr. Holloway served as managing director of SGC Advisory Services Inc., a corporate-finance and money-management firm specializing in telecommunications and technology, which he co-founded.

Since 1988 Mr. Holloway has operated an independent consulting practice concentrating in corporate and financial strategies and communications. His client roster has included Young & Rubicam, Inc., Philip Morris Management Corp., Philip Morris U.S.A., Pfizer Pharmaceuticals, Browning-Ferris Industries and The Trump Organization.

Mr. Holloway was graduated from Colgate University in 1975, where he earned distinctions as a George Cobb Fellow, and as editor of *The Colgate Maroon*, America's oldest college weekly. He pursued additional studies in finance and accounting at New York University's Graduate Business Administration Program in 1980.

In 1994 the Commissioner of the Department for the Aging (Herb Stupp) and the Mayor of the City of New York (Rudy Giuliani) appointed Mr. Holloway to the Board of Directors of the Fund for Aging Services, Inc., a private foundation which finances much of the City's aging services activities, and the largest fund of its kind. He served in that capacity for four years.

Mr. Holloway is a published commentator on political and financial affairs, widely quoted in the news media and an intermittent guest on a variety of talk shows. Holloway is one of a select group of "professors" from the financial community whose articles are regularly published on Minyanville.com, which logs some 25,000 visitors daily. He has been published by *The Christian Science Monitor* and *The New York Times* and is a regular guest on four ClearChannel radio stations based in Monterey, California. He is an occasional contributor to the *Waterbury (Connecticut) Republican-American*.

Using his quantitative and other techniques developed professionally, Mr. Holloway published studies in 1996, 2000, 2004 and 2008 forecasting the outcome of the Electoral College and popular vote totals.

His 2004 model accurately forecasted not only the Electoral College outcome for that election, but also the popular vote totals for each of the candidates in all 50 states and D.C. During the two-week period leading up to the 2004 election, he was a nightly guest on the nationally broadcast ABC Radio Network discussing his findings with John Batchelor. In 2008, the Holloway forecast was remarkably close some four months ahead of the actual election. He called the turnout within fewer than 4 million votes (out of more than 121 million total votes cast). His forecast for Obama's vote count was off by about a million votes. Looked at on the basis of percentage measures, the Holloway call was, in both candidates' cases, wide of the mark by a scant 0.72 percentage points.

The technologies Holloway applies to his Electoral College forecasts are based on The RLH Volatility Model, a proprietary mathematical model he has developed over the past 15 years, which is designed to assess and manage equity portfolio risk.

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