



EXECUTIVE SUMMARY

The Evolution of Evidence-Based ETF Portfolio Strategy

We have entered an unprecedented time of innovation in new, cutting-edge technologies. This new age of enlightenment has led to the development of complex software algorithms, the growth of powerful investment platforms, and the evolution of unique liquid securities, such as Exchange Traded Funds (ETFs). The creation of ETFs has made it possible for investors to participate in highly diverse and specialized asset classes in ways that would have been unimaginable as late as the 1990s. With these innovations have come the potential for momentous change, bringing opportunities to make game-changing improvements in how we invest. The full benefits of new technology, however, will not be realized until after the development of equally sophisticated applications have had a chance to catch up. Just as personal computing devices heralded new opportunities, it was only in conjunction with applications, such as Google and mapping programs, that they really began to change our daily experience. The same is also true of the investment management industry.

We have at our disposal all of the investment tools necessary to manage any market environment – bull or bear. Unfortunately, as investment tools continue to advance, most portfolio management methods remain remarkably the same. Portfolio managers lack access to methodologies that are dynamic enough to respond to new opportunities and obstacles, resulting from the altered investing paradigms. Instead, they resort to the same approaches they’ve been using for years. Furthermore, not only do they depend upon outdated methodologies but also incorrect assumptions about how the markets work. The truth is that with or without the advanced tools available today, traditional portfolio management strategy is as out of place in the new investing paradigm as it was in the old one.

To begin with, traditional methods rely upon the assumption of a “risk/return relationship,” a phrase which has become as ubiquitous in finance as “supply and demand” has in introductory economics textbooks. The relationship hinges upon the acceptance of a tradeoff; invested money generates higher profits only if subjected to higher risk. Low levels of risk only entitle you to low potential returns. It is, in other words, a more formal articulation of the “no pain, no gain” principle. Under this assumption, investing simply becomes a function of risk preference and time, as it further presumes that more risk will in fact provide higher returns given enough time.

The risk/reward proposition is an assumption born from business. A potential business owner would first determine whether or not business ownership is worth considering. Before a decision to move forward is made, one would make an analysis of personal financial condition, as well as skills and aptitudes. In addition, one would assess capital and cash flow need, timeline, and risk tolerance to determine what type of business may be best suited (start up, turnaround, or established). For the most part, the answers to these questions would be the primary factors to determine the proper balance between the “risk and return” proposition required to enter into a business.

The problem with the risk/reward assumption is that it simply does not hold true for financial markets and traded securities. Risk is either defined as volatility or as the willingness to accept larger declines in portfolio value. Subjecting the portfolio to more risk of substantial declines offsets the benefit of higher gains because those gains could at any moment be wiped out. Substantial declines of 15%, 20%, or more could take years to recoup the losses. Portfolio growth is not merely about making money but the ability to keep it. The key then is to create a stable portfolio environment that will protect investors’ returns. Fixed percentage asset allocation methods, based on subjective risk tolerance labels and illustrated through multi-colored pie charts, fail to produce the necessary stability because their processes overlook a basic fact – markets are dynamic and pie charts are not. The mix of securities that maintained stability in a previous market environment will not necessarily

do so when the environment shifts. Portfolio management is about creating and maintaining the most efficient portfolio through variable market environments.

The weaknesses of the traditional methods support the conclusion that portfolio managers need to dispense with many traditional assumptions, as well as subjectivity, when moving forward for several reasons. Subjective methods not only fail to adequately control a portfolio's volatility but they also lack validity. Validity can only exist alongside testable results. A viable investment strategy, therefore, can only be an evidence-based scientific approach, for only models with complete software systems that determine specific actions can make measurable claims of potential predictive value.

Subjective methods are furthermore ill-advised because they are often developed under a mistaken conflation of a company's returns with the returns of a company's stock. The strong performance of a company does not necessarily translate into strong performance of its stock. The difference lies in a distinction of liquidity. Ownership of a non-liquid, privately-held company means that corporate profits can pass through to the owners. Shareholders of publically-traded corporations, on the other hand, do not directly participate in the underlying company's profits, other than to receive dividends. The value of the shares they hold fluctuate in price based on levels of supply and demand in the market, which tend to vary based on the rationality or irrationality of market participants. Unfortunately, this makes it extremely difficult to predict what the markets will do or how it will perform in the future. We only know what the market environment is now. How then do we manage risk and create a model with predictive value? Surprisingly, a strategy that satisfies all of the conditions we mentioned previously (evidence-based, systematic, dynamic, and capable of creating a stable environment) already exists and is widely used in creating a stable *physical* environment.

For example, when faced with fluctuations in outdoor temperatures, we level the extremes by using a thermostat to maintain a consistent indoor temperature. It responds to the vagaries of the weather by turning up the air conditioner when it becomes too hot or the heater when it gets too cold. The key to the thermostat is the thermometer, which measures the current indoor temperature so that the thermostat can adjust the air conditioner or heater accordingly. Effective risk and portfolio management calls for its own thermostat process to manage the correct combination of securities that will create a stable portfolio throughout changing market environments.

But just as a thermostat has a process for identifying the current weather condition, an essential capability of the portfolio thermostat needs to be the ability to distinguish between a bull and a bear market. The systematic risk typical of each environment differs radically, with a normal bull market correction falling within the 8% to 12% range and going upwards of 20% in a bear market environment. The portfolio, therefore, needs to first and foremost be able to statistically identify the current market environment and then be able to make proper adjustments accordingly.

Canterbury has developed an evidence-based portfolio management software system that does exactly that.

Overview of the Portfolio Thermostat Strategy

Step 1: Identify the Current Market Environment

Our studies show that changes in market volatility can be an effective leading indicator of future market behavior and direction. Low or decreasing volatility is typically associated with bull markets, while high and increasing volatility is characteristic of bear markets and bubbles. We use the Canterbury Volatility Index (CVI) as the market's "volatility" thermometer. The CVI flags an increase in volatility, which is a leading indication of a change in the market environment, most typically a negative change. Market environments are hardly black and white, though. Each macro environment – bull or bear – can be further categorized into separate Market States, identifiable by its own unique traits and tendencies. The Portfolio Thermostat identifies 5 Bullish (rational) Market States, 4 Bearish (irrational), and 3 Transitional.

Step 2: Classify the Universe of ETFs into Diverse Investment Classes

The Portfolio Thermostat typically invests in ETFs. Most equity asset classes perform best when the S&P 500 (the market portfolio) is in a low volatility market state. There are, however, alternative investment classes and securities that benefit

from high volatility or a bearish stock market. The model categorizes each ETF into one of two major classes: the Global Stock Market Universe or Bonds and Alternatives to the Global Stock Market.

Step 3: Construct an Efficient Portfolio to Match the Current Market Environment

All markets and securities will experience both bull and bear market environments. The Portfolio Thermostat's objective is to select the combination of securities that best fit the unique characteristics of the current market state. In other words, its goal is to create a consistently bullish portfolio, regardless of the macro market environment, so that the portfolio may benefit from long-term compounding. This requires a continual monitoring process wherein portfolio holdings are rotated in or out as the environment shifts in order to maintain the most optimal combination of securities.

The importance of the short term in the Portfolio Thermostat process cannot be overemphasized. There is nothing we can do about the past. Decisions are made on a real-time basis, so long-term growth and success depends heavily upon how the short term is managed. If the portfolio is not actively and continually optimized, it opens itself up to greater risk of substantial declines. A correction of 15%, 20%, or more may take years to recoup the losses.

On the other hand, noise is an inherent characteristic of the markets and of the short term, and decisions motivated by fear or greed in reaction to noise can do more harm than good. The key is knowing which short-term factors are important and which are not. A viable strategy, therefore, needs to be dynamic enough to shift as the markets shift but use an objective, systematic, and testable process that can distinguish between significant changes and meaningless noise.

Portfolio management is about optimization, and with variable market environments, portfolio optimization is a moving target. Your strategy should be moving as well to meet it, with daily monitoring that can produce statistical evidence of value-added results.

Conclusion

As technologies improve and the creation of new tools evolve, such as ETFs, we must be willing to take a hard look at many of our long held traditional beliefs and theories. With the identification of false assumptions, inefficiencies, and flaws, portfolio management methods must evolve to address them, as well as the changing landscape in which they operate. In the past, bullish market environments were required to produce profitable portfolios. Today, it is possible to produce the benefits of compounded returns through any market environment – bull or bear. In this white paper, we will discuss the development of the investment management industry and its prospects for the future. We will also further elaborate on the Portfolio Thermostat, a comprehensive evidence-based system, which not only addresses the weaknesses of the traditional models but also meets the challenges of the new paradigms and, more accurately, takes advantage of them.

Disclosure: All definitive statements and subjective opinions contained in this academic study represent the observations and conclusions of the author, Tom Hardin. The sole purpose of the production of this report is to make a contribution to the body of knowledge in the field of investment portfolio management. This report is to be used for educational purposes only and is not to be used or considered as solicitation for any investment management services offered by Tom Hardin, Canterbury Investment Management, or any Registered Investment Advisor receiving sub advisory services from Tom Hardin. Additional disclosures and disclaimers are contained throughout this report.