

The Reality Linking Investment Selection, Dynamic Asset Allocation, and Risk Management

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Throughout history, investors have sought a better picture of realistic risk and return potential in order to establish portfolios that can meet objectives and avoid catastrophic loss of capital. Yet it has been difficult to capture reality in any sort of analytical motion picture of investments exhibiting their natural behavior.

Sadly, however, excellent concepts—such as diversification—have been mired in dangerous assumptions masquerading as appropriate reflections of reality. Assuming that investment returns are distributed normally, that volatility is symmetric and stable, and that correlations are static brings to mind physicist Stephen Hawking’s brilliant observation: “The greatest enemy of knowledge is not ignorance, it is the illusion of knowledge.” The convenient assumptions central to modern portfolio theory (MPT) (Markowitz 1952) and its many offshoots have generated portfolios whose optimal diversifications have been tantamount to rearranging deck chairs on the Titanic. Lacking knowledge and access to viable alternatives, practitioners continue to cling to the decades-long MPT era in a macabre triumph of failure.

In contrast, it is the mission of this article to help clarify the evolution and future direction of the manager selection, asset allocation, and risk management process, and to provide some practical first steps for the practitioner to more accurately illustrate and manage the real world of investment potential and risk.

A Short History of the Evolution of Institutional Trends in Manager Selection and Asset Allocation

In December 2012, Mark Evans, director of Goldman Sachs Asset Management and head of the firm’s Global Portfolio Solutions group, declared that MPT is dead (Evans 2012). Given the portfolio-allocation modeling of Goldman’s pre-eminent alumni team of Fischer Black and Bob Litterman (1992), this is a profound announcement.

Alexander Ineichen (2012), in his robust treatise, “Diversification? What Diversification?” observed that Harry Markowitz popularized diversification but pointed out that the concept of diversification as a risk budget is at least as old as the Babylonian Talmud, which declares, “Let every man divide his money into three parts, and invest a third in land, a third in business, and a third let him keep in reserve.”

So, more than 2,500 years ago, the writers of the Talmud understood the implicit, sustainable value of dynamically uncorrelated real estate and equity, coupled with reserve cash as a strategic call option on opportunity. MPT merely reintroduced the concept of risk and diversification. However, this theory rested on several assumptions: that the markets behave as a random walk; that asset-class returns are independent; and that correlations among, and volatility within, asset classes is constant. But those assumptions are untrue, and the resulting optimal portfolio is very sensitive to small tweaks in the inputs. Subsequent efforts have focused on

shoring up mean-variance optimization, usually by more sophisticated data inputs (e.g., Black-Litterman, factor-based risk premia, and covariance shrinkage), but the basic assumptions of markets in equilibrium and the existence of an optimal portfolio remain.

Certainly no one argues the free-lunch value of diversification. However, we believe that institutional recognition and standards are evolving toward better defining diversification, realistically measuring it, and deploying it in a durable manner over time. Or perhaps institutional practice is cycling back to wise and ancient precepts—with the help of some modern, rigorous, and practical analytical tools.

Evans (2012) emphasized that it is time to move beyond conventional wisdom, our favorite oxymoron. Instead of seeking the elusive optimal portfolio, Evans urges us to dispense with the assumptions in MPT and focus on the approach du jour—risk budgeting. Risk parity, which puts the focus on the allocation of risk rather than capital, is one implementation of this approach. It has emerged as the “new normal” for manager selection and asset allocation.

Why Risk Parity Does Not Get Us There

The appeal of risk parity is in its comfortable alliteration and its simplistic MPT-like concept. MPT promised an expected return for a given level of risk or an expected level of risk for a specific targeted return—all neatly displayed over the comforting two-dimensional iconic display of “the efficient frontier.”



TABLE 1: CORRELATION WITH U.S. EQUITIES (S&P 500)

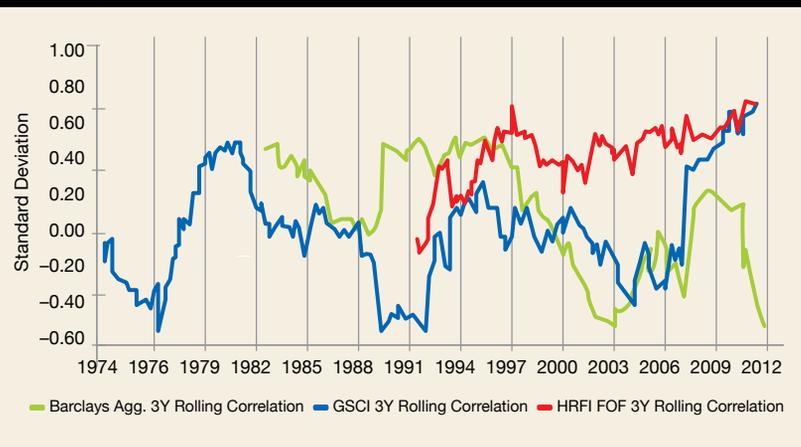
	1981–85	1986–90	1991–95	1996–00	2001–05	2006–10	Jan 08–Mar 09	2011–12
Russell 2000	0.86	0.90	0.72	0.62	0.84	0.93	0.96	0.96
MSCI EAFE	0.48	0.45	0.44	0.73	0.87	0.91	0.91	0.92
MSCI Emerging Markets	N/A	N/A	N/A	N/A	0.81	0.83	0.84	0.84
JPM-EMBI	N/A	N/A	0.37	0.65	0.40	0.63	0.72	0.65
Gold	0.35	-0.35	-0.24	0.00	-0.04	0.07	-0.03	0.33
HFRI Fund of Funds Comp	N/A	N/A	0.30	0.56	0.58	0.68	0.53	0.81
Barclays Aggregate Bond	0.52	0.28	0.52	0.21	-0.34	0.15	0.42	-0.38

MPT’s static assumptions did not interfere with the appearance of viability in a long-term secular bull market in both stocks and bonds, where the cliché of “rising tides raising all boats” substituted for true success. It seemed to work until, well, it didn’t.

In recognition of how tough it is to robustly predict returns with any accuracy, risk parity acknowledges the prudence of allocating risk instead of returns. Risk parity therefore spreads risk based on the incremental risk added to a portfolio with the inclusion of a new asset class. The rigor in this approach comes from identifying a set of relatively uncorrelated risks, representing them by quantifiable and measurable factors, and then estimating how a particular investment is allocated across this factor-risk spectrum.

There are some very strong applications of risk parity, notably in the very liquid world of managed futures and traditional asset classes. As a practical matter, however, truly diversified portfolios necessarily may need potential exposure to alternatives that are less liquid or hedge funds with both long and short positions, and risk parity assumptions have been challenged in this broader world. The roots of risk parity, like MPT, cannot deal with fluctuating risks and correlations and the very non-normal, nonlinear reality of fat tails, skew, and kurtosis—the very real things that practitioners are seeking to understand better and incorporate into their allocation and risk management disciplines.

FIGURE 1: THREE-YEAR ROLLING CORRELATION WITH U.S. EQUITIES (S&P 500)



Let us consider a typical diversified institutional portfolio made up of major asset classes represented by respective broad benchmarks. Table 1 illustrates the changing correlations between asset classes that constitute a typical diversifier bucket. As investors continue to seek diversification, alpha eventually gets arbitrated away and changes to beta over time. The diversifier bucket needs constant monitoring and updating.

While diversification based on capitalization or geography worked in the 1980s and '90s, the primary diversifiers in the 2008 crisis were Treasuries, gold, and cash. Investors have realized that traditional diversifiers such as small caps, international and emerging equity/debt, hedge funds, and commodities have gone from being good portfolio diversifiers to becoming less

so because they have gotten extremely correlated during times of market stress and failed exactly when investors hoped for diversification to pay off (see figure 1).

Static, Top-Down, Benchmark-Based Asset Allocation is Under Review

Portfolio and risk managers have painfully begun to realize that the real advantage/disaster tradeoff is not reflected in normally distributed returns—especially in times of market stress. As a partial consequence, traditional top-down asset allocation is under review.

Typical asset allocation models focus on top-down allocation analysis using benchmarks as proxies for asset classes and strategies. Portfolio professionals then proceed to screen for managers to be assigned to each asset class.



Benchmarks are either a blend of securities (for traditional asset classes) or a weighted summation of money managers (for non-traditional asset classes). Such “averaging” of experience, in many cases, tends to exhibit return distributions that look normally distributed. Benchmarks, however, mask the much more interesting and valuable idiosyncrasies of individual managers whose talents reflect a departure from the norm, such as beneficial right-tailed return distributions reflective of much preferred alpha.

Lines separating asset classes become even more blurred during stress periods, making the logic of top-down allocation based on these benchmarks questionable. Separately, alternative strategy benchmarks, especially for hedge fund strategies, also reflect a more problematic characteristic due to survivorship bias: unrealistic risk-return characteristics that few individual managers still within the benchmark can likely achieve. Such benchmark bias could easily overpopulate an asset class at a point in time when downside risk could be much more likely than the top-down benchmark asset allocation can highlight as a warning to a risk manager.

The real world, and its attendant risks, are much more gritty, variable, and interesting than can be appreciated by the artificial top-down asset allocation approach that has deluded so many for so long.

Even so, top-down analytics still can play an important role in asset allocation so long as assumptions are well understood, accounted for, and fully disclosed. In the natural evolution of the industry, attempts are being made to do just that and build bottom-up analytics alongside them. Whatever approach one uses, it is imperative to really delve into the underlying assumptions, their past validity under various conditions and time periods, their future validity, and the inherent risks in any and all assumptions.

Framing the Evolving Future of Manager Selection, Allocation, and Risk Management

Markets are awash with liquidity, risk assets are getting more correlated, and investors are not always getting paid sufficiently for locking up capital. Increased cross correlations have made efficient diversification between managers tougher to achieve. What was once perceived as the only free lunch in investing has proven to be one of the toughest challenges in asset management.

Improving upside potential while containing downside beyond what can be achieved by simple manager diversification will require an embedded risk management and manager selection discipline. This discipline must be integrated into a dynamic asset allocation framework that can nimbly target opportunities and hedge risks across the entire portfolio—well in advance of severe market stress.

Let’s frame this evolution with the questions that are driving institutional investment committee dialogue:

- To what extent should asset allocation lead expectations (relative future value vs. relative value)?
- How can we navigate the risks of moving too soon or too late?
- Where do we have the most conviction?
- What information or signal would we need to increase our conviction?
- If we decide to change allocation, how should we size up exposures?
- And over what period of time?
- What structures would be appropriate for further allocation?

These questions come from the playbook of a prominent, successful multi-billion dollar endowment. The key lesson we extract as investment management practitioners is the inextricable linkage of manager selection, dynamic allocation, and risk management—eloquently translated into a sensible outline for ongoing review and action.

Time Matters and the Quest for Reality

The importance of time may be the most critical concept now evolving in our industry. If we are to capture more of the reality of investment behavior and relationships, don’t we have to address every facet of our work by incorporating a sense of all things changing over time? Suddenly, over the past year or so, the word “dynamic” has become part of the management process (Dieschbourg 2012). While this new dynamism is part of the language, it is not yet fully part of the practice.

In the quest for more reliable indicators of relative value versus relative risk in manager selection and durable, asymmetric portfolio construction, the following are the precepts of reality we believe the industry is gravitating toward:

Investments do not follow convenient bell-shaped return curves. In fact, extreme outcomes are much more likely than can be tolerated. Kurtosis or fat tails can be accompanied with negative skew (e.g., equities crash down) or positive skew (e.g., commodities melt up).

Volatility is not a good proxy for risk. Just like good cholesterol and bad cholesterol, volatility has two personalities—the good of upside potential and the bad of downside peril. A better proxy for risk is worst peak-to-trough drawdown (WPTD).

Volatility is not constant. Times of stress often lead to clustering (high volatilities across asset classes). The volatility of volatility and its relation to rising correlations is acutely important in such times.

Correlations are not static. Periods of market downside can result in a material increase in correlations beyond historical ranges and erode diversification benefits exactly when they are needed most.

Therefore, any effective investment selection/allocation/risk management discipline must use a practical, dynamic



framework that can assimilate an asymmetric risk-return profile and prescribe a reliable portfolio of uncorrelated (yet compatible) investments. Many traditional investments and most alternatives are short volatility and locally optimized, so it's necessary to consider adding convex volatility exposure via investments that gain from crisis, volatility, and correlation spikes, thereby adding some degree of protection against correlated downside.

The reality-based institutional objective may be summarized as a quest for a continuous, risk-managed asset allocation generating persistent upside and dispersed downside. Clearly this is easier said than done. The broader solutions that may be available are beyond the scope of this paper. However, we will address the evidence of the power of these evolving concepts and provide a practical tool to start applying these ideas to client portfolios.

Building on Existing Practice to Add Dynamic Realism—The Reliability Ratio™

Common sense dictates an understanding of committee comfort zones. Be it in short-term trading or long-term investing, the Sharpe ratio (SR) is one of the best-known representations of risk-adjusted performance. However, it is static, incorporates normality assumptions, and masks interesting short-term behavior when time periods get longer. Yet committees are familiar with it, and its theoretical construct of risk-return tradeoff is philosophically, if not realistically, a sound starting point.

So, we suggest building upon this familiarity. For more than 12 years, our practice has used a dynamic statistic that incorporates SR. We call it the reliability ratio (RR) (Hunter 2009).

Our first question is this: Is the standard deviation of returns an appropriate measure of risk?

Two assets or portfolios can exhibit the same traditional return/standard deviation profile while having dramatically

different return distributions. In contrast, return distributions exhibiting skew (asymmetries) and kurtosis (tails) are better described by the more-dynamic RR:

$$RR_k = \mu_i \left\{ SR_{i,i+k-1} \right\} \times \frac{(Upside\ Deviation\ of\ Returns)_n}{(Standard\ Deviation\ of\ Returns)_n} \quad i \in \{1, (n - k + 1)\}$$

For an investment with n return periods, the k -month reliability ratio is the mean of the k -month rolling Sharpe ratios ($SR_{i,i+k-1}$) adjusted for skew based on the ratio of upside deviation to standard deviation of returns.

Most practitioners are aware of a multitude of risks (market, economic, counterparty, model, key-man risk, etc.). However, the real risk—the dark side of kurtosis and negative skew—ultimately distills into realized loss. In our view, worst peak-to-trough drawdown (WPTD) captures at least a meaningful level of this real risk of ultimate loss; moreover, WPTD could be mathematically handicapped to reflect more or less risk, depending upon forensic due diligence.

RR in conjunction with WPTD for an investment illustrates how much and how consistently, over time, a manager or portfolio has delivered asymmetric value. RR can be used immediately by any practitioner to assist in screening investment managers and portfolio construction—both top down and bottom up. It can help one dynamically pinpoint relative value versus relative risk and add considerable conviction to the selection/allocation/risk management process.

In the Markowitz framework, assets with the highest ratio of return to volatility (i.e., standard deviation) traditionally have been considered good candidates for a potential allocation. But when one considers positive asymmetries and tails, the graph of RR vs. WPTD allows for more-informed investment decisions. As an example, figure 2 shows nine potential multi-strategy hedge fund managers. Figure 2A shows the traditional, static Markowitz graph of return vs.

FIGURE 2: A) MANAGER RETURN VS. VOLATILITY; B) RELIABILITY RATIO VS. WPTD



volatility; figure 2B shows the dynamic graph of RR vs. WPTD. Managers 2 and 3 are meaningful standouts in figure 2B and reflect clear, relative dynamic behavior benefits; figure 2A is unable to identify with the same level of confidence. The RR vs. WPTD analysis clearly differentiates managers 2 and 3 from managers 4 and 8, respectively. This helps develop conviction that managers 2 and 3 reflect reliable value added over time with persistent risk containment, thereby allowing one to focus due diligence on these two managers.

A Glimpse of the Dynamic Future and the Call for More Innovation

In a time-sensitive, dynamic discipline, manager selection is interwoven, iteratively, with portfolio allocation and embedded risk management. The managers in the above example could be inserted into a dynamic algorithm to determine which manager would be a best fit; the dynamic algorithm also could designate the size and timing of the allocation. The same RR vs. WPTD

analysis also could be applied at the total portfolio level.

To illustrate the insights to be derived in a practical, day-to-day portfolio building process, figure 3 shows results of applying a selected dynamic algorithm (i.e., our firm’s patented Quatrain Resource Allocation Technique) to a broad array of investment strategy indexes. In this example, we are assessing the value of adding potential alternative investments to a traditional portfolio of stocks, bonds, and cash, constrained to 80-percent, 65-percent, and 50-percent traditional investments, respectively. The dynamic RR vs. WPTD graph in figure 3B provides a clear, progressive, risk-managed value to adding alternatives that the static Markowitz graph in figure 3A does not.

RR vs. WPTD analytics incorporate the dimension of time to realistically quantify dynamic relative value and relative risk. RR is a practical tool, immediately accessible to the practitioner, that adds a more complete picture of reality to the dynamic manager selection/allocation/risk

management toolbox. Through rolling SRs, RR captures at least some of the nonlinear and volatile correlations, asymmetric volatility, and non-normal fluctuating return streams.

While this process adds considerable value to the manager selection/allocation/risk management mandate, it is a first step toward a more robust discipline that can and should address elements such as:

- Upside optionality
- Drawdown and recovery analyses
- Correlation ranges and their elasticity
- Analysis of incremental risk/tail-loss versus enhanced potential of achieving target

This is just a partial roadmap for future development of dynamic portfolio analytic innovations. We are aware of at least one platform capable of assembling all these elements, but we expect and hope that more will be developed and made available to institutional investment management practitioners seeking a more realistic,

FIGURE 3: A) ASSET CLASS RETURN VS. VOLATILITY; B) RELIABILITY RATIO VS. WPTD





risk-managed path in fulfilling their fiduciary responsibilities. 

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