



Beat the Market

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I recently received comments to an article that I wrote asking if my statements about a specific portfolio allocation and its performance were in violation of the efficient market hypothesis. These questions suggested to me that it would be worthwhile to clarify the best current thinking about equity markets and the performance that investors can realistically expect. If you read an article about a portfolio that seems to provide market-beating performance, what questions should you ask? Is matching the S&P500 index the best that investors can hope for? If not, then what is the benchmark?

The Idea of Efficient Markets

One of the best-known (yet unproven) concepts in financial theory is that markets are *efficient*. An efficient market is one that quickly adjusts prices to reflect all available public information about the future prospects of an investment. The potential buyers and sellers buy or sell a stock, for example, using the best available information available to them. In aggregate, the market price of a stock would thereby equilibrate to the ‘fair’ price. If this is correct, it makes no sense for investors to research stocks or to try to time the market. The efficient markets hypothesis (EMH) is often used to convince investors that they cannot possibly outperform the broad market indices. An extension of the EMH known as the Capital Assets Pricing Model (CAPM) states that because the market is efficient, the only way that an investor can get higher returns than the overall market is by building a portfolio with Beta greater than 1 (which means that you are increasing your exposure to swings in the broader market). Both of these theories have a long history that is clearly explained in *A Random Walk Down Wall Street* by Burton Malkiel. Both EMH and CAPM are based on the idea that individuals act as rational decision makers, at least in aggregate. These ideas may be considered as *classical* financial theory. While both of these theories have been researched and discussed extensively, they are challenged by a series of more modern concepts.

Why Markets Are Not Efficient in Real Life

Let's cover some of the problems with the idea that markets are efficient. One of my favorites is the Grossman-Stiglitz paradox. One of the 2001 Nobel laureates in economics, Joseph Stiglitz, in collaboration with Sanford Grossman, identified that the very idea of efficient financial markets is inherently paradoxical:

“if a market were informationally efficient, i.e., all relevant information is reflected in market prices, then no single agent would have sufficient incentive to acquire the information on which prices are based.”

http://nobelprize.org/nobel_prizes/economics/laureates/2001/public.html

This is a crucially important concept that supports the rejection of ideas of ‘efficient markets.’

There is another (related) nail in the coffin of the efficient market hypothesis. While the core of the efficient market hypothesis and CAPM is the notion of ‘rational investors,’ there is a field of study that focuses on how people really make decisions. The rational decision maker who is the underpinning of efficient markets collects a range of available information and then makes the decision that provides his or her highest expected return, given a risk profile. In the real world, people do not work that way—even in the aggregate sense of markets. The field that studies how people make decisions and how this, in turn, drives markets is called ***Behavioral Finance***. For an interesting overview, readers may be interested in this article by University of Florida professor Jay Ritter:

http://bear.cba.ufl.edu/ritter/publ_papers/Behavioral%20Finance.pdf

If markets were efficient, we would not see massive speculative bubbles or the consequent crashes---events that altered the cool-headed valuation of investments would be priced-in very quickly. One of the key themes in behavioral finance is the study of ***heuristics***. Heuristics are simplified decision making mechanisms that people (and animals, actually) use to make decisions. Dr. Ritter's article discusses financial themes associated with heuristics. Studies of heuristics in investing behavior are fascinating.

One of the most basic heuristics, for example, is what is called the *availability heuristic*, which suggests that people assess the relative probability of something happening based on how recently it has happened. This is one of the drivers of market bubbles. People tend to think that the probability of substantial gains is high if they have been high recently and discount the possibility of loss if there have been no losses for some period of time.

Another common heuristic is investment in assets that have properties that are exciting, interesting, or have other features that the investor wishes to associate himself or herself with. Hormel (HRL) has rather famously out-performed Motorola (MOT) with considerably less volatility since Hormel went public at the start of January, 1990. Consider this fact, given that the cell phone business exploded in the ensuing period. I believe that at least part of this result is due to the fact that investors found cell phones to be cool, modern, fashionable, etc. and thus wanted to invest in order to be associated with such a cool business. How many investors will feel the same way about meat products? This is an important heuristic in understanding why investors behave as they do. This effect is discussed at some length in Bernstein's *The Intelligent Asset Allocator* (p. 111-120). Bernstein summarizes the tendency to buy 'exciting' stocks and ignore 'boring' ones:

Good companies are generally bad stocks and bad companies are generally good stocks

This statement is not about the underlying quality of the companies but their perceived attractiveness.

Modern financial theory rejects the idea of efficient financial markets. All investors would like to get higher returns with less risk, and thus investors will seek to exploit the advantages that inefficient markets can provide. The question that investors must consider is how to go about choosing investments so as to get the most return for the risk that they bear. There are two avenues to beating the market. The first, and simplest, is to build a portfolio that takes effective advantage of diversification using reasonable

projections of future performance and accounting for correlations between assets. The second is to develop the ability to analyze the future prospects for a given asset or asset class better than the broader market.

Value in Diversification

Let’s start with the simplest case of an investor who wants to invest in a small number of funds. Financial advisors tell investors that they need to ‘diversify,’ by which they mean that investors need to spread their bets. In portfolio theory, it is well known that an investor who just buys an S&P500 index fund (such as SPY or VFINX) will not get the best available return for the risk that he or she bears. If you add assets to SPY that are less than perfectly correlated to the S&P500, such as REIT’s (e.g. ICF), utilities (e.g. IDU), bonds (e.g. TIP) or emerging markets (e.g. EEM), you can increase the average return of the portfolio without increasing risk. This is the foundation of portfolio theory. What this means is that ***any investor, knowing nothing about analyzing stocks, should be able to get more return than the S&P500 for the same level of risk as the S&P500 simply by combining index funds.*** The process requires some basic understanding of portfolio management principles, and these are elucidated below.

Let’s imagine that you have a portfolio that you have invested equally in five ETF’s: SPY, IDU, EEM, TIP, and ICF (many people actually diversify this way—see the discussion of the ‘1/N heuristic’ in Ritter’s paper). You want to compare this portfolio to the performance of the S&P500:

	Annualized Average Return	Annualized Standard Deviation in Return
100% in SPY	9.6%	7.2%
20% each in SPY, IDU, EEM, ICF, and TIP	16.2%	9.0%

Table 1: Trailing 3-years through 12/31/2006 for SPY and ‘Equal Weight’ portfolio

The table above shows that the portfolio equally allocated into each of the five ETF's (let's call it the *equal weight* portfolio) has crushed the S&P500 over the past three years with an average annual return of 16.2% per year vs. 9.6% per year. These results include fees and reinvestment of dividends, with annual re-balancing to maintain equal allocations. Do these results show that we have used diversification to beat the market?

In analyzing the performance of the *equal weight*, we first have to look at risk—the standard deviation in annual return (shown in Table 1). Standard deviation in annual return is a basic measure of risk. The portfolio that is equally allocated into the five asset classes (the equal weight portfolio) has more risk (9% vs. 7.2% for SPY). The higher return more than makes up for the higher risk. As a general rule, a 1% gain in average return easily offsets a 1% increase in standard deviation. These initial results look fine, but they are not yet enough to show that this portfolio is a good choice.

The chart below shows the trailing three year performance of each of the ETF's included in the portfolio (through 12/31/2006) along with the performance of the 'equal weight' portfolio. The chart also shows one more portfolio which has been allocated to match the historical risk of the S&P500—as measured by the standard deviation in return. This is called the *S&P equal risk* portfolio.

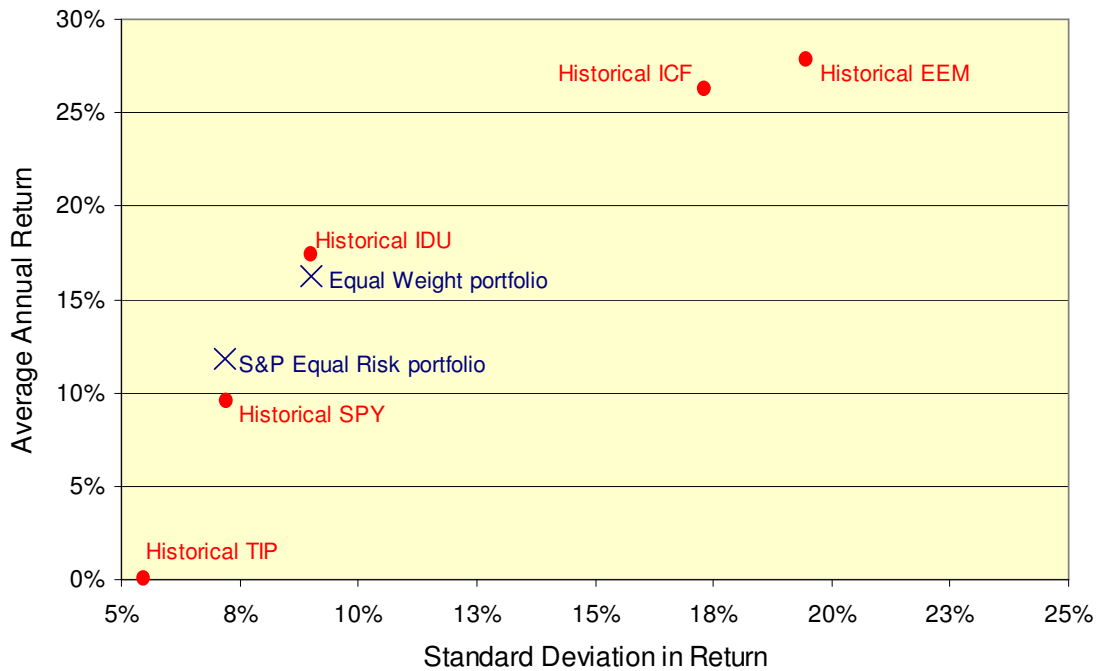


Chart 1: Trailing 3-year historical performance for each asset and for two portfolios

The chart above is a standard way to look at risk vs. return for assets and for portfolios. There are several features of the chart above that are important to pay attention to. First is to note that while the *equal weight* portfolio has generated a higher return with moderately higher risk than SPY, a portfolio allocated 100% to IDU would have generated even higher return for the same amount of risk—compare the Historical IDU in the chart to the *equal weight* portfolio. If your portfolio is generating less return for the same level of risk than any of the assets that comprise it, you do not have an optimally allocated portfolio. By way of contrast, consider the *equal risk* portfolio above. This portfolio has generated a higher return than SPY for the same level of risk. This portfolio is doing a better job of exploiting diversification effects.

The *S&P equal risk* portfolio has substantial allocations to all five assets, but the weightings are far from equal:

Fund Name	Percentage of Funds
SPY	27.0%
ICF	15.0%
IDU	11.0%
EEM	12.0%
TIP	35.0%

Table 2: Allocations of the S&P Equal Risk portfolio

This portfolio has 35% in bonds and 27% in SPY, with smaller allocations to ICF, IDU, and EEM.

Note that all of our discussion has focused on *historical* performance. This is important. There is a population of people who use statistical tools to find a portfolio weighting that generates the highest average historical return for each level of risk (i.e. standard deviation). This is called mean-variance optimization (or MVO). There is, however, one major problem with using MVO or any type of analysis that simply shifts allocations to maximize *historical* return relative to risk: this strategy performs really badly when you use it as the basis of asset allocation. One of the nicest discussions of this problem is provided by William Bernstein in *The Intelligent Asset Allocator*. In this book, Dr. Bernstein shows that using MVO for asset allocation using historical data yielded a portfolio with half the average annual return as a simple static allocation with annual re-balancing (p. 70-71).

The key point here is that while portfolio theory states that an investor can beat the market by diversifying your portfolio among assets that have less-than-total correlation to each other, you have to be careful in diagnosing whether you are using this effect to really gain advantage. **The big risk is that you can end up being over-weight in the assets that have been out-performing over some historical period and thus end up always getting in at the end of a bull run---not what you want to do**, as Bernstein's results show. How, then, can investors use asset allocation on a forward-looking basis?

Looking Forward Rather Than Backwards

The first challenge in looking forward is to get a handle on reasonable estimates for the average return and standard deviation that can be expected for broad asset classes. The most recent years have seen impressive bull runs in several asset classes. Emerging markets, real estate, and energy commodities have seen tremendous gains. Importantly, these gains are far above a sustainable long-term risk/return balance for these asset classes. Bridgewater Associates, an institutional fund manager with \$165 billion under management, provides a set of reasonable forward-looking estimates for major asset classes in the following article—see their Chart 1:

http://www.bwater.com/PDFs/engineering_targeted_returns_and_risks_pmpt_060215.pdf

They project, for example, that emerging market equities will return an average of about 16% per year, with a standard deviation of around 30%. If you look at our Chart 1, you will see that EEM, an index ETF that tracks emerging market equities, has generated an average return of 28% per year, with a standard deviation of 19%. In other words, EEM has generated far more return with far less risk in the last few years than Bridgewater Associates is projecting for the future.

Projections of future values must combine recent market developments such as globalization with long-term data on the equity risk premium. The Quantext Portfolio Planner (QPP), a Monte Carlo planning tool, performs this function automatically. QPP, using default settings, projects that EEM will generate an average return of 16% with a standard deviation of 31%, remarkably close to the Bridgewater projected values. Similarly, QPP projects that TIP will generate an average return of 6.7% per year and Bridgewater projects that inflation-linked bonds will generate returns a bit below 6%. QPP projects that IWV, an ETF that tracks the Russell 3000, will generate 9.1% per year with a standard deviation of 17%. The Bridgewater projection has U.S. equities returning about 9.5% with a standard deviation of around 17%, very close to the baseline QPP projections.

QPP’s estimates for the future performance of real estate (ICF), utilities (IDU) and emerging markets (EEM) are for lower returns and higher risk than we have seen over the trailing three years. By contrast, TIP is projected to perform considerably better in the long-term than we have seen over the past several years. John Bogle refers to the tendency of asset classes to revert to long-term averages as ‘mean reversion.’ Using QPP’s projections for asset allocation, you will tend to allocate funds under the assumption that the market is rational on long time horizons and that return and risk will ultimately balance out. This type of analysis is even more important after a period in which the observed average returns are negative.

A meaningful asset allocation to exploit diversification effects should use reasonable projected performance numbers to measure diversification. Let’s look at our various portfolios using the QPP projections.

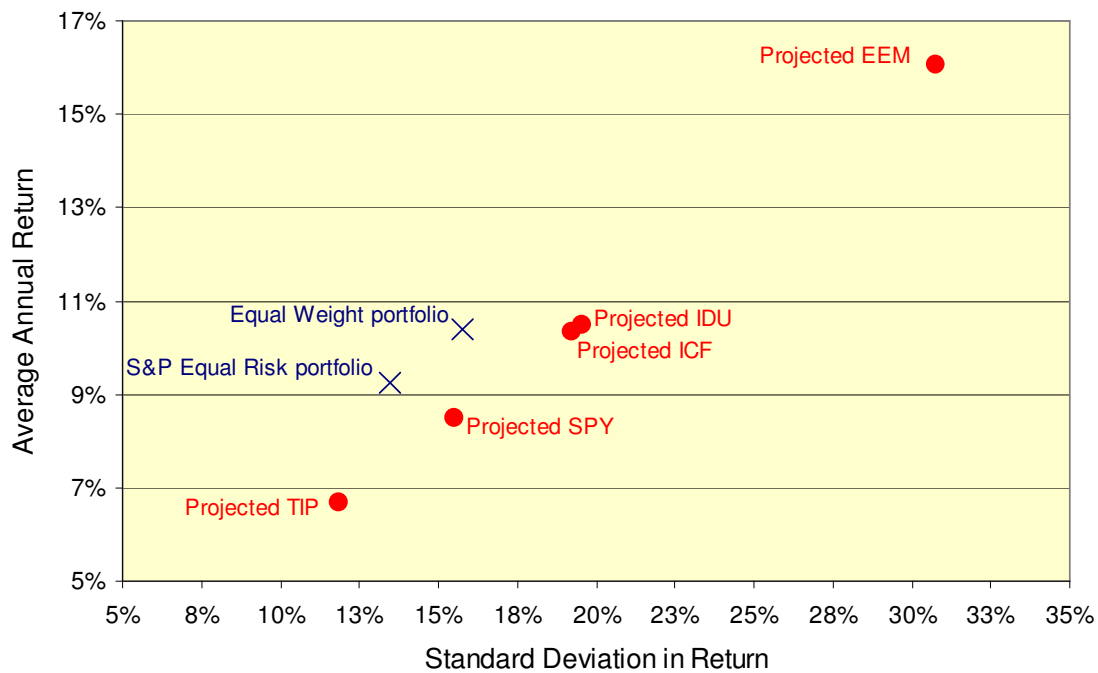


Chart 2: QPP-projected future performance for each asset and for two portfolios

When we use QPP to project the future performance of the two portfolios shown in Chart 1, QPP is accounting for the correlation between the ETF's. The equal weight portfolio is projected to generate 10.4% per year, with a standard deviation of 15.7%. The portfolio that matches the trailing historical standard deviation of the S&P500 (the S&P Equal Risk portfolio) has a projected average annual return of 9.2% with a standard deviation of 13.5%. These are reasonable projections for the two portfolios---but they are considerably less impressive in terms of the returns generated for a given level of risk than we have seen over the past several years. The benefits of diversification are easily seen in the projections from QPP, and they match with what intuition and financial theory suggest. Combining asset classes which are not totally correlated will increase the average return than you can expect relative to risk in the portfolio.

It is quite simple to use diversification effects to increase your return relative to the risk that you bear. This is the only 'free lunch' of the investing world. The challenge, however, is to make sure that you end up with a portfolio that has a risk/return balance that meets your needs. I believe that there are many investors who have portfolio allocations that are appropriate to the very low market volatilities that we have seen over recent years. When market volatility re-asserts itself, these investors may find that they have far more volatility in their holdings than they can live with—and I mean this quite literally. This is an especially critical issue as people approach retirement because big losses near the start of retirement can have a major negative impact on the ability of a portfolio to sustain long-term income.

The Hard Way to Beat the Market

When most investors hear the term 'beating the market' they think about the ability to find the next E-Bay or Google or some other stock with phenomenal prospects that the market does not yet recognize. The idea here is that a motivated investor can analyze stocks and project future performance better than the market as a whole. While I do not believe in 'efficient markets,' I do believe that it will be difficult and risky for an investor to consistently beat the market by doing a better job of projecting future performance of

assets. This does not mean that I don't try. Most individual investors lose money by attempting to time the market, with an estimate that this activity costs the average mutual fund investor about 2% per year. Most of my portfolio is invested in individual stocks. Along with analyzing individual stocks and asset classes, I spend considerable time managing my aggregate portfolio using QPP to make sure that the statistics are also on my side. I have positions in companies like JNJ, DUK, and EXC because they look like good businesses AND because they have low correlation to the broader market and to many other assets that I hold. The vast majority of commentary that investors read has to do with analyzing the properties of individual assets and projecting future value is not yet priced in. This type of analysis has value and I spend my share of time with this type of research. There is evidence that there is value in market timing and in fundamental analysis, even though the majority of investors are not able to exploit this value. It is crucial, however, to consider each asset in terms of the overall portfolio impact, and this is something that most stock pickers don't do. *For a stock- or fund- picking investor to beat the broader market on a risk-adjusted basis, I believe that he or she must manage the overall portfolio, along with have superior skills in analyzing individual stocks or funds.* I don't know of any way to do this really effectively without a portfolio management tool like QPP that can show both historical performance and provide reasonable projections of future performance.

The Final Word on Beating the Market

There are five ultimate lessons in what we have discussed here. These are consistent with the broad academic and practitioner understanding of portfolio management:

- 1) The evidence for efficient markets is dubious
- 2) Simply generating a higher return than the S&P500 over some historical period is not evidence of asset management skill
- 3) **Any investor should be able to beat the S&P500 on an absolute and risk-adjusted basis by combining low-correlation assets**

- 4) You can manage a portfolio better if you have reasonable projections of risk and return for its components
- 5) Stock picking will work better if asset choices are made in the context of the broader portfolio

While items (1) through (3) are true, care is required in the execution. Financial markets are predicated on investors' abilities (a) to compare the risks and returns that various assets can provide, and (b) to choose between them. Portfolio theory demonstrates that investors can and should consider each new investment opportunity in light of their overall portfolios (i.e. accounting for correlations). It is odd then that most investors do not have access to reasonable risk projections for the assets that they invest in, nor do they have the tools to account for diversification effects of combining assets. This is where items (4) and (5) come in. By exploiting points (4) and (5), investors can build portfolios with much better odds of beating the market, whether they choose to analyze individual issues, time the market, or simply develop a standard allocation.

Quantext Portfolio Planner is a Monte Carlo portfolio management tool. Extensive case studies, as well as access to a free extended trial, are available at <http://www.quantext.com/gpage3.html>