



Getting The Most Return For Your Risk

Geoff Considine, Ph.D.

A new user of Quantext Portfolio Planner (QPP) recently sent me a link to a very interesting article on asset allocation and how to get the most return from your portfolio relative to the risk that you must bear:

<http://web.mit.edu/charvak/www/Science/Bridgewater/pmpt040105.pdf>

In particular, this article looks at how to design a portfolio to hit specific risk/return targets using various strategies---a subject that I write about quite often. This user wanted to see if I could comment on the philosophies and strategies discussed in this paper, particularly with regard to how QPP works. This article was written by Ray Dalio, the President and Chief Investment Officer of *Bridgewater Associates*. Bridgewater, in case you have not heard of them, is an institutional money manager with a \$150 Billion global portfolio. This article was of considerable interest for a number of reasons, and I decided that it was worth writing a short article on themes that it raised.

A great deal of asset allocation and related portfolio strategy hinges on a set of assumptions that you make when you look at possible investments. The core of asset allocation is the idea that risk and return in assets and asset classes are, in aggregate, well correlated. This is perhaps the one assumption that everyone will agree on. Mr. Dalio's Chart 1 is a nice visualization of the parity in risk and return across asset classes. The second important and universally accepted idea is that you can combine assets which are (relatively) uncorrelated to one another (in terms of returns) and thereby increase the average return on your portfolio relative to the total risk (measured in standard deviation (SD) in return). These two assumptions or concepts are borne out by observation of markets over long periods of time and across asset classes.

The big question, obviously, is how you can exploit strategic diversification in real markets. What is the most return you can get per unit of risk? While this varies with your total risk appetite, QPP typically suggests that about the best you can possibly do in a real portfolio over the long haul is to get an average annual return that is about equal to the annualized standard deviation in return—a ratio of 1-to-1. I have conducted dozens of studies on a range of portfolios, and for the levels of risk that most retail investors are

likely to be willing to bear (SD = 10-20%), this ratio is a guide for reasonable projections. I have found this ratio to be fairly consistent, across a range of portfolio styles:

Article Link	Portfolio	Projected Average Annual Return / Standard Deviation
http://usmarket.seekingalpha.com/article/19903	Model Low-Beta	12.7% / 11.1%
http://financial.seekingalpha.com/article/17192	Berkshire Hathaway	13.2% / 15.8%
http://etf.seekingalpha.com/article/13877	ETF & Stock Portfolio	12.9% / 14.9%

QPP Portfolio Analysis Cases

My research suggests that you cannot realistically project that even a very well designed portfolio will generate a ratio of return of risk of much beyond one, even though it is easy to do so in hindsight. The sub-title to Mr. Dalio’s article (cited above) states that the article “explains how to achieve a 10% return with 10% to 12% risk.” He then goes on to show real results that support this level of 1-to-1 ratio between actual average return and standard deviation in return. Mr. Dalio shows the real case of Bridgewater’s *All Weather* portfolio strategy that achieved a ratio of slightly better than 1-to-1 over the trailing ten years through the end of 2005. Based on QPP’s analysis of a range of different portfolio strategies, this is about as good as it gets in this risk range.

The typical response that I get from people who want to challenge my ‘rule of thumb’ on the 1-to-1 ratio is that it is easy to find portfolios that *would have generated* a much higher ratio of return to risk in some trailing period—whether it is three years or five years, or longer. Being heavily over-weight emerging markets and real estate in recent years would have crushed this ratio. In fact, the recent years have seen very low market volatility and solid returns in a range of sectors, such that many asset allocations have exceeded this ratio. The model *Low Beta* portfolio (linked in the table above) had a trailing 3-year ratio of 2 (the average return was equal to twice the standard deviation), but the projected future value is 1.1 (i.e. 12.7% / 11.1%). The point here is that there is a great deal that we do not know about the future. In making projections, you must be realistic about what is known and what is not known. I believe that the best that you can expect in the future from a portfolio with a standard deviation of about 10% is an annual

standard deviation of about 10%, and this assumes that you have fully exploited available diversification opportunities.

So, let's say that we are going to be happy making projections in a world in which we hope to achieve an annual return of around 10% with a standard deviation of 10-12%. Mr. Dalio suggests that it will be very hard to achieve this level of return relative to risk simply by combining 'asset classes.' His argument is compelling and rational if you understand the long-term relationships in risk and return among asset classes. In the projections that he shows for average risk and return for a range of asset classes (his Chart 1), U.S. equities are projected to generate about 9%, with a standard deviation of 17% or so. To build a portfolio with an average return of 10%, you will need to add assets with projected annual returns greater than expected for U.S. equities and this will mean that you must invest in riskier classes—such as foreign and emerging equities. The problem with attempting to combine foreign and emerging equity funds with U.S. equities is that you will not, in fact, be very diversified because you are so highly concentrated in equities—and equities markets tend to be quite well correlated globally. Consider a portfolio with the following ETF's:

ETF	Name
IVV	iShares S&P 500 Index
IJJ	iShares S&P MidCap 400 Value Index
IWN	iShares Russell 2000 Value Index
EFA	iShares MSCI EAFE Index
EEM	iShares MSCI Emerg Mkts Index

Many investors think that they can diversify their portfolios by combining various market capitalization classes, value and growth, and by adding emerging and developed foreign markets to their portfolios. What is surprising is how high the correlation is between all of these asset classes:

	IVV	IJJ	IWN	EFA	EEM
IVV	100%				
IJJ	91%	100%			
IWN	87%	95%	100%		
EFA	72%	75%	68%	100%	
EEM	73%	80%	72%	86%	100%

Trailing 3-Year Correlations in Total Return

If you want to really exploit diversification against your U.S. equities, you are going to have a hard time managing risk with correlations as high as these. Foreign equities will boost your projected returns, but they really cannot bring risk down because they are high volatility asset classes. I note that Mr. Dalio’s article shows an expected annual standard deviation (SD) of emerging equities at about 30%. QPP’s baseline projection for EEM is 30%. This is in marked contrast to the trailing three-year value of SD for EEM, which is only 19%. ***Mr. Dalio’s point here regarding the limitations of simply combining asset classes has significant implications for investors who seek to build a portfolio out of index ETF’s.***

I cannot build a portfolio with a QPP-***projected*** 10% annual return and around 10% in standard deviation using these broad index ETF’s, even though it is trivial to find a portfolio that achieve or surpasses this level of performance over the past few years. A simple portfolio made up of 20% each of IVV, IJJ, IWN, EFA, and EEM generated an average annual return of 16.93% with a standard deviation of 11% for the three years through the end of November 2006. QPP projects that this portfolio will have a ***future*** average annual return of 11% with a standard deviation of 21%.

Mr. Dalio proposes to solve this problem using leverage with asset classes that have low correlation between them (think of the correlation matrix), but which have average returns that are too low to be of interest in meeting your 10% targeted average annual return without leverage. ***Leverage*** means the use of borrowed capital to increase your expected returns—such as buying on margin. His point is that with leverage, you can increase the average rate of return of even low-return asset classes to the point that you can profitably include them in a portfolio with a targeted average return of 10%. The

purpose of this is to be able to exploit the diversification benefits of the very low correlations available in some low-return asset classes. This is an important strategy, but it is largely academic to most individual investors.

So what is an individual investor to do? If you are not interested in employing leverage in the manner that Mr. Dalio proposes, you can still combine assets with very low correlations—but you will have to look beyond the broad stock indices. Following his point, you will need to find low-correlated assets with returns in the vicinity of 10% but with reasonable levels of volatility. In a recent article, I proposed a portfolio that makes effective use of low correlations between individual stocks and a couple of bond funds:

<http://usmarket.seekingalpha.com/article/19903>

This portfolio, as cited earlier, has a projected future average annual return of 12.7% per year, with a projected standard deviation of 11.1% (but had a trailing three-year average annual return of 10% with a standard deviation of 5%). By selecting a small number of individual stocks (eleven) and two bond funds, I was able to combine stocks with relatively high returns and low correlation. These individual stocks have far lower correlations among them than you can achieve with index ETF's, in general. What you are doing in this case is increasing your ability to find assets that have low correlation but good expected returns.

The cost to your portfolio in trying to exploit low correlations between companies is that you are bearing more company-specific risk. In the index ETF's, you have some risk associated with default by any single component of that index—but it is low. With ten percent of the *Low-Beta* portfolio mentioned above in Johnson and Johnson (JNJ), bankruptcy at JNJ would be costly. The flip side of this argument is that you are able to exploit that fact that these companies have generated returns that are uncorrelated to each other by nature of their unique properties—and this is where you benefit in diversification. You need to know more about these companies than if you simply invest in an index. You need less knowledge to simply buy an index – hence the famous quote that ‘diversification is protection against ignorance’ (variously attributed to John Maynard Keynes and Warren Buffett). If you are willing to learn enough about your

investments that you are willing to really invest in the future of a company, you can exploit these correlation effects.

In summary, the article by Mr. Dalio raises some important themes for all investors. I think that his chart of risk and return for individual asset classes (his Chart 1) is pretty reasonable but will be sobering for many investors. In particular, this chart may be worrisome for the large numbers of investors who see real estate, commodities, or emerging markets as the panacea for a U.S. equity market that has delivered fairly modest returns over the past decade. In designing a strategic portfolio allocation, investors need to understand that it is reasonable (but not trivial) to build a portfolio with a projected average annual return of around 10% with annualized standard deviation in return of around 10-12%. Mr. Dalio's article is the first that I have seen, outside of my own, to discuss this issue explicitly. Investors who believe that they can handily beat this ratio, simply because an asset allocation has done so over recent years, are likely to be disappointed.

Mr. Dalio discusses two strategies for gaining the diversification effects necessary to reach this one-to-one balance of return to risk (as measured by Standard Deviation). These are (1) use of leverage and (2) finding managers who have a track record of generating 'alpha' returns. I tend to focus on a third choice—which is far easier to exploit—strategic allocation into assets with low correlations. This third approach takes more work than investing in indices, and does carry higher levels of firm-specific risk. The perspective that Mr. Dalio and I share—that it is hard to achieve your maximum return relative to portfolio risk by investing solely in broad asset classes—has important implications for investors who seek to build their portfolio out of index ETF's or index mutual funds.

Before leaving this discussion, I want to clarify that nothing stated here changes the fact that many individual investors will be substantially better off if they sell their mutual funds and buy a well-allocated portfolio of ETF's or low-cost no-load mutual funds. The

types of strategies discussed here, in case this is not already clear, would only be appropriate for more experienced investors and their advisors.

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>