Asset Allocation: The Art and Science

Asset allocation is the process of dividing wealth among different investments to achieve the highest possible rate of return while keeping risk within acceptable limits. It is based, in part, on the common sense risk management notion that it's better to not have all of your eggs in one basket. It goes considerably beyond this simple notion, however.

Asset allocation includes the science of modern portfolio theory. Harry Markowitz won a Nobel Prize for laying the foundations of modern portfolio theory. He demonstrated that it's the risk of an entire portfolio that matters in portfolio management and not the risk of individual securities. Since investments don't all move together in value, a collection of several risky assets can have less risk in aggregate than any of the individual assets. When one goes up, another one goes down, in the simplest case. What's more, it's possible to add a risky investment to a relatively low risk portfolio and actually reduce the overall risk of the portfolio while increasing its return.

The real work in asset management is figuring out how to divide up a portfolio to capture the maximum benefit from diversification. What assets do we invest in, and how much do we invest in each? Figuring this out involves three steps.

First, we formulate return and risk expectations for different asset categories. How much is the stock market likely to return? How will the bond market perform? What about real estate, or international equities and bonds? How variable are returns likely to be?

Second, we formulate how the different asset categories will perform relative to each other. If stocks go up, will bonds go down? If so, by how much? On the basis of these relative performances, we develop correlations among the returns on the various asset categories.

Third, based on our expectations for return, risk, and relative performance, we calculate how various combinations of the assets will perform and select the combination that provides the optimal return/risk tradeoff – the optimally risky portfolio, in modern portfolio theory jargon. Investment portfolios are then split between the optimally risky portfolio and a risk-free asset (U.S. Treasury bills), depending on an investor's risk tolerance.

The science and math behind this process of mean-variance portfolio optimization are well developed. The math is not rudimentary, but anyone who has taken a rigorous MBA investment class has had some experience with its theory and application.

All of this doesn't make the asset allocation process easy, however. First, even if the science of mean-variance optimization is well developed, the art of using it is not. Second, research in capital market pricing since the development of modern portfolio theory has challenged our understanding of risk and, with it, the conceptual underpinnings of mean-variance optimization.

On the first point, the asset allocation process is challenging because it requires us to make judgments about future performance; and to make well informed judgments requires a lot of data gathering and analysis and a lot of market watching.

At this point, the reader might throw up his or her hands and cry, "How can we make good asset allocation decisions if we have to predict the future? If I knew how the markets are going to perform, I'd be rich and retired!"

Understanding market valuations enables us to devise an asset allocation strategy that is better suited to our return and risk objectives.

The objection is a valid one, but, unfortunately, we have no choice. We have to make judgments about the future, because if we don't, someone else will do it for us. We can't avoid forecasting the future. Market valuations are based on future expectations, NOT past performance. If we have no independent judgment about future market prospects, we are a captive to the consensus. At the very least, we should understand the implication of the consensus forecast on the risk and return of our current portfolio. If we don't understand this, we are abdicating our most important duty as fiduciaries and managers.

We formulate our future expectations by asking three questions (or sets of questions).

First, what is the consensus view of the future: of economic growth, corporate earnings, interest rates, and exchange rates? These consensus views are available or can be derived from current market conditions. Portfolio fiduciaries need to be familiar with them, if for no other reason than to see if they agree with them!

Second, what is the historical trend or norm for the valuation of a particular investment category, and how do current valuation levels compare to that trend or norm? Are P/E multiples above or below average? Have they been increasing or decreasing? How do current bond yields and spreads compare with the average?

Third, what fundamental factors might account for the divergence of current valuations from historical norms? What is the trend line of these factors? How might they influence future valuations?

In the process of answering these questions, we arrive at a better understanding of where we are today and where we may be going. We understand how much room there is for equity valuations and interest rates to change. And this understanding enables us to devise an asset allocation strategy that is, hopefully, better suited to our return and risk objectives.

In the final analysis, it is not good enough to base asset allocation decisions or portfolio policy on the expectation that future performance will simply be like the near-term past or will just revert to historical norms. Both assumptions may be profoundly mistaken.

What about the second point, the challenges to modern portfolio theory and mean-variance optimization? The challenges must be taken seriously by any responsible portfolio manager, advisor, or fiduciary. As briefly discussed in the Risk section, research in capital market prices has found that returns are not normally distributed, not serially independent, and display properties typical of turbulent or chaotic natural systems best measured with fractal geometry. This research has discovered shortcomings in the standard characterization of investment risk by the variability of returns and has led to new, more sophisticated measures of risk such as the Hurst factor and the fractal dimension.

These findings point clearly to the need to expand modern portfolio theory and generalize mean-variance optimization as well as to develop a more comprehensive understanding of risk. Future issues of the *Asset Allocation Advisor* will explore more fully the development of alternatives to standard mean-variance optimization, but for the purposes of this issue, we focus on mean-variance optimization. It is the benchmark theory, the standard paradigm. We have to understand it before we do anything else, since no comprehensive alternative has been developed yet to take its place.

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"The little pig with the portfolio of straw and the little pig with the portfolio of sticks were swallowed up, but the little pig with the portfolio of bricks withstood the dip in the market."