PORTFOLIO

Time to Update a Classic

Modern Portfolio Theory relies in part on the efficient frontier. But investors can now do better.

By Craig L. Israelsen

One of the classic underpinnings of Modern Portfolio Theory needs an update.

In the early 1950s, Harry Markowitz's work on mean-variance optimization blazed a new investing paradigm. His Efficient Frontier produced a variety of insights, not the least of which is the value of portfolio diversification. His classic graph shows various combinations of a simple two-asset portfolio — the typical pairing being U.S. Treasuries and large-cap U.S. stocks. The characteristic upward slope illustrates the risk/return trade-off when moving to an increasingly stock-based portfolio from a cash-based portfolio.

But there's a problem with Markowitz's chart. Advisors now have dozens and dozens of asset classes to choose from — far more than were available in the 1950s. It's reasonable to consider an updated version of the chart — let's call it the Effective Frontier.

START WITH 2 ASSETS

The Classic Efficient Frontier chart at right shows a 15-year two-asset map from 1998 through 2012. Cash is represented by three-month Treasury bills; stocks are defined as the S&P 500. The various points on the line show the different asset mixes.

As you can see, a 100% investment in cash had a 15-year average annualized return of 2.71% and a standard deviation of 2.25% over the period. The next dot represents a 90% allocation to cash and a 10% allocation to the S&P 500. The 15-year return of the 90/10 portfolio was 3.05% with a standard deviation of 2.60%. A 50% cash/50% stock portfolio

Classic Efficient Frontier

Risk and return for various combinations of cash and large–cap U.S. stocks, shown from 1998–2012.
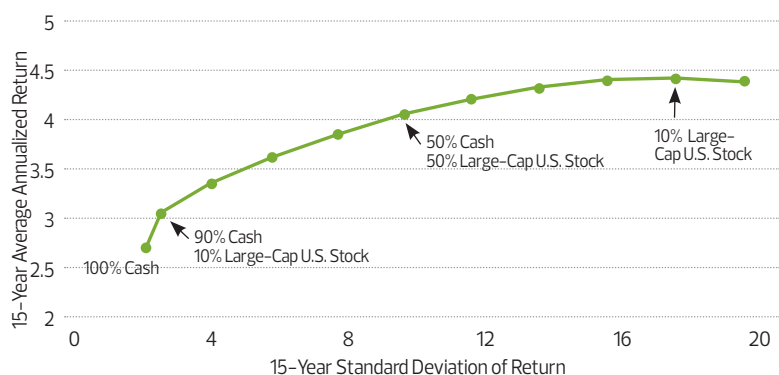
Source: Lipper; calculations by author

12 ASSETS OF A HIGHLY EFFECTIVE PORTFOLIO

Risk and return from adding asset classes to a portfolio. Time frame is from 1998–2012, with annual rebalancing.

Asset Class (assets added to portfolio in order of individual standard deviation, from lowest to highest)	Number of Asset Classes in Portfolio	Allocation to Each Asset Class	15–Yr. Average Annualized Return of Portfolio	15–Yr. Standard Deviation of Return of Portfolio
Cash	1	100%	2.71	2.25
Add U.S. Aggregate Bonds	2	50%	4.32	2.15
Add TIPS	3	33.3%	5.27	2.48
Add International Bonds	4	25%	5.34	3.32
Add U.S. Small–Cap Value Stock	5	20%	6.19	4.32
Add U.S. Mid–Cap Stock	6	16.7%	6.81	6.21
Add U.S. Large–Cap Stock	7	14.3%	6.61	7.57
Add Real Estate	8	12.5%	7.04	8.75
Add Commodities	9	11.1%	7.62	9.13
Add Non–U.S. Developed Stock	10	10%	7.41	10.12
Add Natural Resources	11	9.1%	7.52	11.12
Add Non–U.S. Emerging Stock	12	8.33%	7.95	12.76

Source: Lipper, calculations by author

Effective Frontier

Risk and return of an increasingly diversified portfolio, from 1998–2012.

Source: Lipper, calculations by author

had a return of 4.05% with a standard deviation of 9.46%. A 100% U.S. stock portfolio had a 15-year annualized return of 4.39% and a standard deviation of 19.07%.
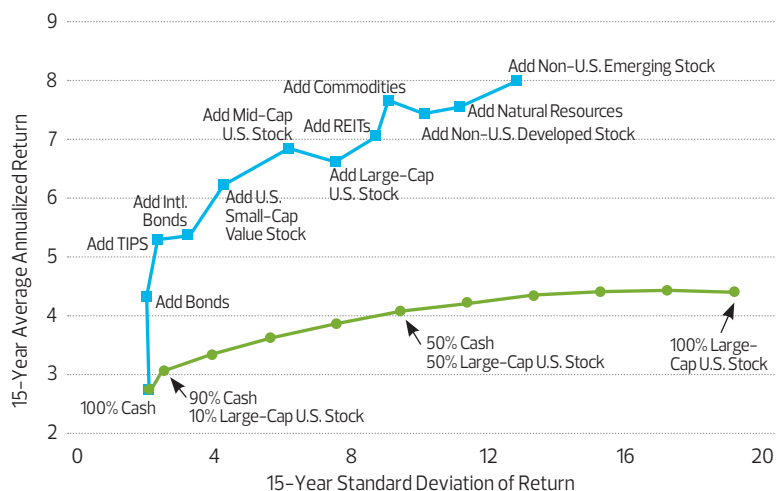
Clearly, over the past 15 years there was a very limited reward for taking on more risk. Over longer time frames, the risk premium is typically larger. Over this particular 15-year period, the S&P 500 had four years in which it had negative returns: 2000, 2001, 2002 and 2008. The cumulative effect of those four losses had a "flattening" effect on the slope of the frontier.

In the current investing environment, however, it makes more sense to consider a wide variety of asset classes, rather than simply a trade-off between two. The Efficient Frontier takes on an entirely new shape when an advisor uses multiple asset classes to create an increasingly more diversified portfolio.

This new chart — the Effective Frontier — also starts out as a 100% cash portfolio. Then, one at a time, 11 assets are added. The sequence of the successive asset classes is based upon their standard deviation of return — from lowest to highest.

ADDING ASSETS

The table on this page, 12 Assets of a Highly Effective Portfolio, shows the impact on risk and return when creating an increasingly diversified investment portfolio.

Of the 12 asset classes, cash had the lowest standard deviation of annual returns, thus it was the base asset class. Then, U.S. bonds were added to cash — because they had the second-lowest standard deviation of annual returns over the 15-year period — creating a 50% cash/50% bond portfolio (rebalanced

3–Year Rolling Returns

Performance of 2– and 12–asset portfolios. The year shown on the horizontal axis is the ending year of each three–year period.
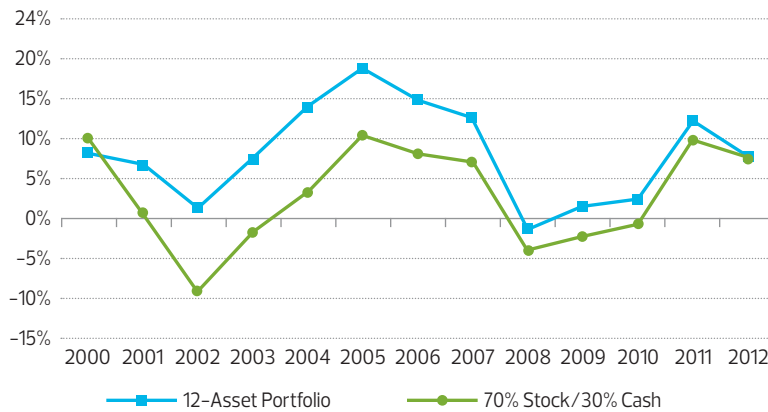
Source: Lipper, calculations by author

at the end of each year back to a 50/50 mix). With the addition of bonds, the 15-year average annualized return increased from 2.71% to 4.32%, with a standard deviation of 2.15% — which was slightly lower than the 100% cash portfolio.

Next TIPS were added, creating a one-third cash, one-third bond and one-third TIPS portfolio. With annual rebalancing, the annualized return moved to 5.27% with only a slight increase in standard deviation. International bonds were the next asset class, slightly improving the return (to 5.34%) and increasing standard deviation (to 3.32% from 2.48%).

Ultimately, the portfolio contained all 12 asset classes. As the Effective Frontier chart on the preceding page shows, the 12-asset portfolio (shown in blue squares) does not create the same textbook-smooth risk/return arc as does the two-asset portfolio (green dots). Yet despite its inelegant shape,

the diversified portfolio does what every investor wants it to do— produce more return with less risk.

The blue square at far right represents the return and risk level of the fully diversified 12-asset portfolio: a 15-year return of 7.95% with a standard deviation of 12.76%. By comparison, a 70% stock/30% cashportfolio had a comparable risk level (with a standard deviation of 13.3%) but only produced a 15-year annualized return of 4.32%.

The shape and slope of the Effective Frontier could have looked slightly different based upon the sequence in which assets were added to the portfolio. However — and this is key — the ending point (that's the far-right blue square) would be in the same spot, regardless of the asset class sequencing.

What this means: Over this 15-year time frame, a broadly diversified 12-asset portfolio nearly doubled the

return of a cash/stock portfolio with comparable risk.

SHORTER HORIZONS

Understandably, the performance of any portfolio is measured over time periods far shorter than 15-years. The adjacent 3-Year Rolling Returns chart compares returns of the 12-asset portfolio with those of a 70% stock/30% cash portfolio.

Over this particular 15-year period there were 13 three-year rolling returns, with the first running from Jan. 1, 1998, to Dec. 31, 2000. The 70% stock/30% cash portfolio outperformed the 12-asset portfolio only once, during that first three-year period. The 12-asset portfolio outperformed the 70/30 portfolio by an average of 520 basis points.

Moreover, the 70/30 portfolio had a negative three-year annualized return five times, whereas the 12-asset portfolio went negative only once, during the 2006-2008 period. Even then, the three-year annualized return was barely negative, at just -1.1%.

Half a century after Markowitz introduced the Efficient Frontier, the Effective Frontier illustrates the virtues of building more broadly diversified portfolios: better risk-adjusted long-run performance as well as superior performance over shorter time frames.   **FP**

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