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Getting the Mix Right

Why the Recipe For Your Portfolio's Asset Allocation Is Reblended As You Age

by Craig L. Israelsen, Ph.D.

When assembling an investment portfolio, we must decide how much to invest in various asset classes, such as U.S. and non-U.S. stock, real estate, commodities and fixed income (bonds and cash). This decision is the essence of "asset allocation." And, of course, it's not a one-time decision. Our asset allocation likely changes over our life cycle.

This article examines several different portfolios and how they performed over the past 50 years (from 1973-2022). The portfolios included the following: 100% equity, 80% equity/20% fixed income, 60% equity/40% fixed income, 40% equity/60% fixed income, 20% equity/80% fixed income and 100% fixed income.

The historical annual returns of seven well known indexes were utilized in this analysis. Large-cap U.S. stock was represented by the annual returns of the S&P 500 index from 1973-2022. Small-cap U.S. stock was represented by the Ibbotson Small Stock Index from 1973-1978 and the Russell 2000 Index from 1979-2022. Non-U.S. stock was represented by the MSCI EAFE Index from 1973-2022, and real estate performance was measured by the NAREIT Equity REITs Index from 1973-1977 and the Dow Jones U.S. Select REIT Index from 1978-2022. The performance of commodities was measured by the annual returns of the S&P Goldman Sachs Commodity Index. Bond performance was measured by the Ibbotson Intermediate Term Government Bond Index from 1973-1975 and the Bloomberg Aggregate Bond Index from 1976-2022. Finally, the performance of cash was determined by the annual returns of the 90-day U.S. Treasury bill. (*See the first chart at the top of the next page*.)

Shown in the first table is the 50-year return (average annualized return or geometric mean) and the 50-year standard deviation of annual returns for the seven indexes in this analysis. For example, the half-century return of large U.S. stock (S&P 500 index) from Jan.1, 1973 to Dec. 31, 2022 was 10.32% with a standard deviation of annual returns of 17.69%. As a comparison, the 50-year standard deviation of "cash" (90-day T-Bills) was 3.64%. Thus, the year-to-year variation in annual returns for large U.S. stock is nearly five times more volatile than an investment in cash.

The "reward" for the higher volatility is a return that was 2.3x higher (10.32% versus 4.49%). Volatility of an investment is often measured by a standard deviation of return, or essentially the amount of variation in the monthly or annual returns above and below the "average" rate of return. Commodities had the highest standard deviation of return and cash had the lowest.

If $10,000 had been invested in the S&P 500 index (via a mutual fund that mimics the index) at the start of 1973 the ending balance would have been $1,359,860 at the end 2022. Of course, unlike an index, an actual mutual fund has an annual expense ratio so the ending balance would have been smaller. For example, if the mutual fund that mimicked the S&P 500 index had an annual expense ratio of 0.50% (or 50 basis points) the

Performance of Individual Asset Classes: 50 Years from 1973–2022

50-Year Returns of Various Asset Classes	Type of Asset Class	50-Year Average Annualized Return	Growth of $10,000 After 50 Years	50-Year Volatility (Standard Deviation of Annual Returns)
Large U.S. Stock	Equity	10.32%	$1,359,860	17.69%
Small U.S. Stock	Equity	11.07	1,904,243	21.34
Non-U.S. Stock	Equity	7.77	421,744	21.15
U.S. Bonds	Fixed Income	6.60	244,213	7.06
U.S. Cash	Fixed Income	4.49	89,692	3.64
U.S. Real Estate	Equity/ Diversifier	10.65	1,577,484	20.10
Commodities	Diversifier	5.90	176,096	25.13

ending balance would have been $1,079,679 — or over $280,000 lower over a 50-year holding period!

Big lesson here: Use mutual funds and exchange-traded funds that have reasonably low expense ratios. Remember that published returns for mutual funds and ETFs already have the expense ratio deducted. Secondly, some types of mutual funds and ETF's will naturally have higher expense ratios, such as international stock funds and commodity funds.

The purchasing power of the ending balance of $1,359,860 in the S&P 500 index would have been $193,514 after accounting for inflation, which averaged 3.98% per year over this particular 50-year period. The impact of inflation upon the purchasing power of our investments is staggering. Alas, it is what it is. Purchasing power over time would be worse if we didn't invest! Don't let the reality of inflation ever stop you from investing.

PORTFOLIO ANALYSIS

Let's now evaluate the performance of various investment portfolios that were built with these individual indexes. Remember, these indexes are representative of mutual funds and ETFs that would be used in our actual investing. The first portfolio (*see second chart, below*) is a 100% equity model that had a 40% allocation to large U.S. stock, 20% allocation to small U.S. stock, 15% allocation to non-U.S. stock, 15% allocation to U.S. real estate (which, by the way, focuses on commercial real estate, not residential real estate) and a 10% allocation to commodities. Each allocation was maintained by annual rebalancing at the end of each year.

This 100% equity portfolio produced a 10.48% average annualized return with a standard deviation of 15.29%. Impressive numbers, but this aggressive portfolio took quite a hit in 2008 as shown by the return of (38.59%). It was also hit hard last year (2022) posting a return of (14.79%).

An 80/20 portfolio demonstrated an odd outcome in 2022, posting a slightly worse return than a 100% equity portfolio. This is due to the negative return of (13.02%) posted by U.S. bonds in 2022.

The 60% equity/40% fixed income portfolio is a classic asset allocation that is often referred to as a "balanced" portfolio (despite a ratio of 60%/40% not technically representing an equal "balance" between the two broad asset categories of equity and fixed income). Over this 50-year period a 60/40 portfolio rebalanced annually produced a return of 9.09% with an associated standard deviation of 10.08% —nearly a one-to-one relationship between return and volatility of return. This one-to-one relationship is a desirable combination that is created by genuine asset allocation — or the process of blending various asset classes together in a portfolio.

This blend of assets is analogous to making salsa. Salsa is the result of blending very different ingredients together — some of which we would not necessarily want to consume just by themselves.

Think of an investment portfolio in the same way — we blend various mutual funds and/or ETFs together to create a symbiotic mix of return patterns that produce a result that can be better than any individual ingredient by itself. A very interesting observation is the relationship between return and volatility across the spectrum of portfolios that range from 100% equity to 100% fixed income. A 100% equity portfolio had a 50-year return of 10.48% and a 100% fixed income portfolio had a return

Performance of Various Portfolios: 50 Years from 1973–2022

Portfolio Asset Allocation Models	PERCENTAGE ALLOCATION TO EACH ASSET CLASS							50-Year Average Annualized Return	50-Year Volatility (Standard Deviation of Annual Returns)	Portfolio Return in 2008	Portfolio Return in 2022
	Large U.S. Stock	Small U.S. Stock	Non-U.S. Stock	U.S. Bonds	U.S. Cash	U.S. Real Estate	Commod-ities				
100% Equity	40%	20%	15%	0%	0%	15%	10%	10.48%	15.29%	(38.59)%	(14.79)%
80% Equity/ 20% Fixed Income	35	15	10	15	5	15	5	9.89	12.89	(29.70)	(15.29)
60% Equity/ 40% Fixed Income	30	10	5	30	10	10	5	9.09	10.08	(21.18)	(13.20)
40% Equity/ 60% Fixed Income	15	10	5	45	15	5	5	8.14	7.64	(12.82)	(11.04)
20% Equity/ 80% Fixed Income	10	5	2.5	65	15	2.5	0	7.32	6.58	(3.84)	(12.01)
100% Fixed Income	0	0	0	80	20	0	0	6.21	5.97	4.47	(10.02)

(Allocations to each individual asset class maintained by annual rebalancing)

of 6.21% — a difference approximating a two-to-one relationship. In other words, the all-equity portfolio had a return that was 1.7x higher than the all-fixed income portfolio. That is rather astonishing. If we move from an all-fixed income portfolio to an all-equity portfolio we can expect our return to basically double (at least, based on the performance of the past half century). I suspect that many would assume the difference in performance would have been much larger.

It's a different story when we consider the volatility of an all-bond portfolio versus an all-stock portfolio. The 100% equity portfolio had a standard deviation of return that was almost 3x higher than the 100% fixed income portfolio. As we consider the level of "control" we have through our chosen asset allocation it is clear that we have more influence over volatility than we do over return. Moreover, volatility (as measured by standard deviation of returns) is more predictable than performance. This is so because standard deviation of return can never be negative whereas returns can be negative. As a result, the variation of returns (measured by rolling three-year returns, rolling five-year returns, etc.) can be much larger than the variations in standard deviation.

PERFORMANCE IN 2022

The calendar year we've recently completed (2022) was not much fun for investors. It was an all-time horrible year for bonds. In fact, the return of the Bloomberg Aggregate Bond index had a return of (13.02%), which was far worse than ever experienced. The previous worst year return for U.S. bonds since 1970 was (2.92%). Bond performance in 2022 took us to new — not so good — territory.

While atypical for bonds, the performance of the U.S. bond index in 2022 serves as a reminder of the importance of being diversified across a wide variety of asset classes — especially for retirees and others who are withdrawing money from a portfolio. We simply need more "buckets"— not less — when a portfolio is in distribution mode. Said differently, if we had to pick a time in our investing life cycle to be the most broadly diversified it would be in retirement. Making big bets on individual asset classes (other than cash) simply isn't worth the risk.

When building a portfolio spread the allocations across a wide variety of mutual funds and/or ETFs. The third chart (*below*) is an example of a 7Twelve® Portfolio that uses Vanguard funds only. I designed the 7Twelve® model in 2008 and have continued to monitor it since. While this particular version of the 7Twelve® model uses only funds available at Vanguard, there are other versions that use mutual funds and ETFs from other companies also. The percentage allocation to each of the 12 funds is up to you — but if each fund is equally weighted at 8.33% the overall allocation of the model is roughly 65% equity/35% fixed income.

The eight asset classes highlighted in purple (large U.S. stock through commodities) can be thought of as the "engines" of the portfolio while the four asset classes highlighted in pink represent the "brakes" of the portfolio. Maintaining both types of portfolio ingredients is crucially important, even when the engines are outperforming the brakes and vice versa.

Maintaining a balanced portfolio requires a balanced perspective. This 50-year look back provides a sense of what we might expect from various types of asset allocations. The more compelling question is "what can we expect from ourselves?" The whole notion of "better investing" requires as much from us as from the portfolio we build. After building a well-designed portfolio will we have the courage to stay with it and rebalance it, year after year? The performance results in this article assume we did. Better investing is the result of better behavior and not because of a magically wonderful portfolio.

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A Broadly Diversified Portfolio for All Seasons

7Twelve® Portfolio Asset Class	Vanguard 7Twelve® Portfolio Model
Large U.S. Stock	Vanguard Growth & Income (VQNPX)
Mid-Cap U.S. Stock	Vanguard Mid-Cap Index Admiral (VIMAX)
Small-cap U.S. Stock	Vanguard Strategic Small-Cap Equity (VSTCX)
Non-U.S. Developed Stock	Vanguard Developed Markets Index Admiral (VTMGX)
Real Estate	Vanguard Global ex-U.S. Real Estate Index Admiral (VGRLX)
Natural Resources	Vanguard Materials Index ETF (VAW)
Commodities	Vanguard Global Capital Cycles (VGPMX)
U.S. Bonds	Vanguard LifeStrategy Income Fund (VASIX)
Inflation Protected Bonds	Vanguard Short-Term Inflation Protected Securities Index Admiral (VTAPX)
Non-U.S. Bonds	Vanguard Total International Bond Index Admiral (VTABX)
Cash	Vanguard Federal Money Market (VMFXX)