

The Riddle of Performance Attribution

Who's in Charge Here: Asset Allocation or Cost?

Remarks by

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“Investment policy dominates investment strategy, explaining on average 93.6% of the variation in total (pension) plan returns.” This statement may well be the seminal (and surely the most quoted) single citation on the subject of asset allocation.

In “Determinants of Portfolio Performance,” published in the *Financial Analysts Journal* in 1986, authors Brinson, Hood, and Beebower (BHB) went on to say: “although investment strategy (market timing and stock selection) can result in significant returns, these are dwarfed by the return contribution from investment policy—the selection of asset classes and their normal weights.”

This finding for the ten years through 1983, in turn, was reaffirmed for the ten years through 1987 by the authors in a follow-up article published in the *FAJ* in 1991. In that period, the impact of investment policy was calculated at 91.5%, an inconsequential change. (I understand that the authors are now updating the data.)

Properly understood, the conclusion is, I think, beyond challenge. Unfortunately, however, it has been subject to considerable misunderstanding. It is often cited as meaning that asset allocation accounts for the differences in the *annual rates of return* earned by pension funds, rather than the *quarterly variations of returns*. I must confess that in my book, *Bogle on Mutual Funds*, I made that error, saying that the allocation of assets among stocks, bonds, and cash “has accounted for an astonishing 94% of the differences in total returns achieved by institutionally managed pension funds.” Happily, I think I rectified that shorthand summary by coming up with the correct conclusion: “long-term fund investors might profit by concentrating more on the allocation of investments between stock and bond funds and less on the question of what particular stock and bond funds to hold.” I stand by that conclusion today.

But there are other matters that must concern those of us in the mutual fund industry. First and foremost among them is the question of costs. In the BHB studies, advisory fees and administrative and custody costs were not taken into account. Indeed, given the nature of the studies (focusing primarily on quarterly variations rather than cumulative annualized returns) and the nature of institutional pension plans (fairly moderate variations in advisory fees, probably ranging from 0.40% to 0.80%), costs would likely have had zero impact on the conclusions.

Costs in the mutual fund industry are a different matter. They are generally much higher than for pension funds, and they vary widely. Equity fund expense ratios average 1.5% annually, ranging from 0.2% to 2.2% or more. Balanced funds carry average expenses of 1.0%, and range from 0.3% to 1.9%. These wide variations in costs among mutual funds don't affect the variations in their quarterly returns, but they have a great impact on differences in long-term returns.

In the mutual fund industry, a mountain of data confront us that strongly affirm that the cost of investing goes hand in hand with asset allocation as the key determinant of long-term returns. In short, *costs matter*. I've been saying that for years, and it was with some delight that I read these words from Warren Buffett in the Berkshire Hathaway Annual Report for 1996:

“Seriously, costs matter. For example, equity mutual funds incur corporate expenses—largely payments to the funds' managers—that average about 100 basis points, a levy likely to cut the returns their investors earn by 10% or more over time.”

In analyzing these factors in the mutual fund industry, we chose balanced mutual funds, since their asset allocation patterns are similar to those of pension funds—usually about 60%-65% in common stocks. Our results, based on the ten years ended December 31, 1996, clearly reaffirmed the BHB studies, with 88.7% of the variation in the balanced fund quarterly returns explained by asset allocation.

The similarity was striking, as this comparison of the results shows:

Exhibit I: Source of Variations in Return*

<u>Factor</u>	<u>BHB Study</u>	<u>Vanguard Study</u>
Allocation Policy	92.5%	88.7%
Allocation Changes and Security Selection	<u>7.5</u>	<u>11.3</u>
Total	100.0%	100.0%

*Average of BHB's 1986 and 1991 studies; Vanguard study based on ten years ended December 31, 1996.

Turning from variations in return to total return, both the pension plans and the mutual funds displayed returns *before expenses* that fell slightly short of the returns of the market index benchmarks. For the balanced funds, we used the Standard & Poor's 500 Index for stocks, the Lehman Intermediate-Term Corporate Bond Index for bonds, and U.S. Treasury Bills for cash. (In neither the BHB study nor in our study did the results vary significantly if the all-market Wilshire 5000 Equity Index were used instead of the S&P 500.)

What we are witnessing, as has been reaffirmed over what seems like time immemorial, is the failure of active managers, *on average*, to outperform appropriate market indexes.

Exhibit II: Returns Before Costs

	<u>BHB Study</u>	<u>Vanguard Study</u>
Index Composite Return	11.8%	12.5%
Fund Composite Return (before costs)	<u>11.2</u>	<u>12.3</u>
Difference	-0.6%	-0.2%

It seems likely that portfolio transaction costs were a material factor in both the pension plan and the mutual fund shortfalls to the unmanaged index portfolio. Undistinguished individual stock selection (or, if you will, highly efficient markets) simply meant that the active manager failed to add value.

When we take operating expense ratios into account, however the fund failure becomes self-evident. (It would be even more apparent if we also adjusted for fund sales charges which would have consumed about 0.6% of total return for load funds and 0.4% for load and no-load funds combined.) This table presents the results of our study:

Exhibit III: Returns After Costs

	<u>BHB Study</u>	<u>Vanguard Study</u>
Index Composite Return	11.8%	12.5%
Average Fund Return (before costs)	11.2	12.3%
Average Expense Ratio	0.6	1.0
Average Fund Return (after costs)	<u>10.6%</u>	<u>11.3%</u>
Difference	-1.2%	-1.2%

The total shortfall was 1.2% annually, reducing the market index return by 10%. Expenses accounted for 83% of their shortfall, and consumed fully 9% of the funds' average return.

As it turns out, moreover, there is a fairly systematic relationship between the cost and net returns of the balanced funds in our sample. Indeed, the gross returns of the 2nd, 3rd, and 4th quartiles are virtually identical when costs are eliminated from consideration. The results are illustrated in the table below. Unsurprisingly, *lower costs lead to higher returns*.

Exhibit IV: Balanced Funds: Returns vs. Costs

<u>Costs Quartile</u>	<u>Net Return</u>	<u>Expense Ratio</u>	<u>Gross Return</u>
1st (lowest costs)	12.7%	0.5%	13.2%
2nd	11.3	0.9	12.2
3rd	10.9	1.0	11.9
4th (highest costs)	<u>10.7</u>	<u>1.4</u>	<u>12.1</u>
Average	11.3%	1.0%	12.3%

What is more, costs systematically magnified the gross return advantage earned—for whatever reason. Randomness seems an unlikely explanation; perhaps reaching for a higher income yield to offset expenses is traded off against capital return at a net cost. In any event, every 10 basis points of lower expenses accounted, on average, for 20 basis points of enhanced net return.

I should note that differences in asset allocation policy among these balanced funds accounted for some moderately significant differences in total return; i.e., four of the funds had significantly higher strategic equity exposures. However, when risk (measured by standard deviation) was taken into account, only the low-quartile expense group distinguished itself. Specifically, the risk-adjusted relative returns (using the Sharpe ratio) of the three quartiles with higher expenses were all 6% *below* average in risk-adjusted return, with the low-expense quartile 17% *above* average. (The average Sharpe ratio was .81; each

of the three higher-cost quartiles averaged about .76; the lower-cost quartile averaged .95.) This relationship drives home the “costs matter” thesis, with powerful force.

Our conclusion, then, adds a key *caveat* to the BHB phrase, modifying it as follows: “Although investment strategy can result in significant returns, these are dwarfed by the return contribution from investment policy, *and the total return is severely impacted by costs.*”

This conclusion is derived, not only from the limited evidence provided by our study of balanced mutual funds, but in an exhaustive study of the returns of all 741 domestic equity mutual funds in operation over the past five years. The analysis separated the equity funds into nine “style box” objective categories—large, medium, and small capitalization stocks on one axis, growth, value, and a blend of the two on the other. In each style box, without exception, funds in the low-cost quartile consistently outpaced funds in the high-cost quartile. What is more, each 10 basis points of expense ratio advantage was accompanied by a 21-basis-point advantage in net return.

That is to say, a 10% return on a high-cost fund would translate, not merely into an 11.1% return for a fund with a 1.1% expense ratio advantage (high-cost balanced funds 1.6%, low-cost funds 0.5%), but a 2.3% total return advantage. *That is a 23% enhancement of annual return.* When compounded over 10 years, the advantage is huge; over 25 years it soars; and over 50 years the advantage is truly stratospheric. I should note that 50 years is not an unrealistic period to consider; indeed it is no more than a “working lifetime” for an investor who begins to invest in a 401(k) tax-deferred savings plan at age 25 and is living off of the fruits of his accumulation at age 75. The figures speak for themselves:

Exhibit V: Cumulative Impact of Costs on a \$10,000 Investment

	<u>(High Cost)</u>	<u>(Low Cost)</u>
	<u>10.0%</u>	<u>12.3%</u>
10 Years	\$25,900	\$31,900
25 Years	\$108,300	\$181,800
50 Years	\$1,173,900	\$3,303,600

Now, I’d like to turn to the implications of costs for asset allocation policy, focusing on the relationship of long-term stock returns and bond returns.

We are accustomed to thinking of fund expenses as a percentage of assets—in the mutual fund field ranging from 0.2% of assets annually for the lowest-cost equity funds (often, as it happens, market index funds) to 1.5% for the average fund, to 2.2% for high-cost funds (those in the top expense ratio quartile). Too rarely—although I’ve urged the SEC to mandate this concept in prospectus disclosure—expenses are thought of as the percentage of an initial investment consumed over ten years. Here, the range would be 2.8% for the lowest-cost funds, 19.8% for the average, and 28.1% for the high-cost funds. That is to say, a 0.2% annual cost on an investment of \$10,000 costs \$280 over ten years compared with \$2,810 for a fund with annual costs of 2.2%. (As you can imagine, our industry is not particularly smitten by this concept, for it brings the cost issue into sharp relief.)

Costs can also be thought of in a third way—as a percentage of annual return on equities. Using the same examples and assuming a long-term market return of 10%, costs would consume 2%, 15% and 22% of annual returns, reducing the net return earned by investors to 9.8%, 8.5%, and 7.8%. This substantial drain is all too obvious, even as it is all too infrequently referenced. But it is a stark fact of investment experience.

And now is the time to introduce a fourth concept of costs, a new concept (at least one I have not seen before): *cost as a percentage of the equity risk premium*. It would seem clear, to take an extreme example, that if equities were to carry a risk premium of 2.5% over long-term U.S. Treasury bonds, the choice between an equity fund with an expense ratio of 2.5% and a Treasury bond would be indifferent: *Theory would say that the long-term returns of the two investments over time would be identical*. Cost would have consumed 100% of the equity premium.

Viewed in this light, all of the costs of investing—advisory fees, other fund expenses, *and* transaction costs—bite into the risk premium. The difference is simply a matter of *degree*, although at the highest cost levels it is arguably a difference in *kind*. This table shows the percentage of the risk premium consumed by mutual fund expenses at various premium levels (for the purpose of simplicity, transaction costs, which could add another 0.1% to 1.0% of cost, are ignored):

Exhibit VI: Percentage of Risk Premium Consumed by Expenses

Fund Group	Expense Ratio	Equity Risk Premium		
		<u>2%</u>	<u>3%</u>	<u>4%</u>
Lowest Cost	0.2%	10%	7%	5%
Average Cost	1.5	75	50	38
Highest Quartile	2.2	110	73	55

Looking out over time, from the price levels in today's market, a 2% risk premium might be a reasonable guess for the coming decade. Indeed, many respected investment advisers might place the probable number at less than 2%.

Well, I'm often wrong (seldom in doubt), so first let's explore what a normal equity premium might be. I went to the acknowledged authority on the subject, best-selling author (*Stocks for the Long Run*) and Wharton School Professor Jeremy J. Siegel. He obligingly sent me a two-century history of equity premiums on U.S. stocks over long-term U.S. Treasury bonds. It is reproduced in the chart below.

The average equity premium over this long, long period is 3.5%. I will leave it to you to decide what is a fair number to use today, but, for the rest of my analysis, I'm going to rely on this average. So, let's imagine you are an investor confronting the real world of mutual funds today, and examine what happens when you

come to make your asset allocation decision. For the purpose of argument, let's assume you expect to maintain a stock-bond ratio of 65%/35%, and you determine to consider the implications of cost on your decision. Further, let's assume a long-term return of 10% on stocks and a risk premium of 3.5% over long-term Treasuries. You decide to hold a Treasury bond for the bond allocation. For the equity allocation your choice is between a fund in the lowest cost range of 0.20% and an equity fund in the highest cost quartile, with an expense ratio of 2.2%.

Here are the differences in the returns on the two programs:

	<u>Annualized Return</u>	
	<u>Low-Cost Fund</u>	<u>High-Cost Fund</u>
Equity Allocation	9.8%	7.8%
Bond Allocation	<u>6.5</u>	<u>6.5</u>
65/35 Composite	8.6%	7.3%

The resulting 1.3% spread in assumed return—with risk (the stock/bond ratio) held constant—it is safe to say, is a meaningful difference. The low-cost program would build your \$10,000 to \$22,800 in 10 years and \$78,700 in 25 years (taxes excluded). The respective results for the high-cost program would be \$20,200 and \$58,200.

But now let's look at the situation slightly differently, from the standpoint of risk premium. You accept my basic premises—a 10% return in stocks and a 3.5% equity risk premium—and are investing with the hope and objective of receiving a long-term return of 7.5%. Question: what allocation would you make, given a choice between a low-cost equity fund and a high-cost equity fund? Answer: If you select the low-cost program, your required ratio would be 30% stocks and 70% bonds. But if you select the high-cost program, your ratio would be 75% stocks and 25% bonds. To say the least, the difference in risk exposure is dramatic.

Put another way, you could reduce your exposure to the risk of the stock market by 45 percentage points—a reduction of 60%—by the simple expedient of choosing the low-cost fund. This example obviously assumes that other factors are held constant, in effect, that costs make the difference in long-term performance. (I have amply highlighted the basis for this thesis earlier in this paper.) And it also assumes

what we have learned from long years of experience: that a top-performing fund can not be selected *in advance*.

While we may know history's appraisal of the equity premium in the past, we *never* can be certain of what will be the equity premium that will prevail in the future. So, let's consider the implications of two future environments, one bearish, the other bullish: (1) an equity return of 7% and a risk premium of 1%; and (2) an equity return of 12% and a risk premium of 4%. In the former case, the low-cost stock fund consumes 20% of the 1% risk premium compared to 220%(!) for the high-cost fund—and please recall that fully 25% of funds in the industry have costs in that range. In the latter case, costs of the low-cost fund would consume 5% of the 4% risk premium, the high-cost fund would consume 55%. This example contrasts the returns achieved by the three portfolios at various asset allocations:

Exhibit IX

		Gross			Gross		
		<u>Annual Return</u>		Equity	<u>Annual Return</u>		Equity
		Stocks	Bonds	Premium	Stocks	Bonds	Premium
		7%	6%	1%	12%	8%	4%
<u>Allocation</u>		<u>Fund Return</u>			<u>Fund Return</u>		
Stocks	Bonds	High Cost	Avg. Cost	Low Cost	High Cost	Avg. Cost	Low Cost
80%	20%	5.0%	5.6%	6.6%	9.4%	10.0%	11.0%
70	30	5.2	5.7	6.6	9.3	9.8	10.7
60	40	5.3	5.7	6.5	9.1	9.5	10.3
50	50	5.4	5.8	6.4	8.9	9.3	9.9
40	60	5.5	5.8	6.3	8.7	9.0	9.5
30	70	5.6	5.9	6.2	8.5	8.8	9.1
20	80	5.8	5.9	6.2	8.4	8.5	8.8

Note: High-cost fund: 2.2%
Average-cost fund: 1.5%
Low-cost fund: 0.2%

In sum, if you accept my premises and my forecast ranges (That may be a lot to ask!), you have some choices that seem fairly obvious. For example: In the case of the low-market-return, low-equity-premium scenario, an investor could chose a 100% bond portfolio and expect a higher return (6%) than in a portfolio of 100% high-cost-stock funds (5%). Turning to exhibit IV in the case of the high-market-return, high-equity-premium portfolio—an investor could chose a low-cost 50/50 stock/bond portfolio and expect a higher return (9.9%) than in a high-cost 80/20 stock/bond portfolio (9.4%)—that is to say with the equity exposure reduced by fully 30 percentage points.

So, it would seem fair to reaffirm our earlier amendment of the BHB conclusion: “Although investment strategy can result in significant returns, these are dwarfed by the return contribution of investment policy, and the total return is severely impacted by costs.”

An even more extreme conclusion was reached by William W. Jahnke, like BHB, a winner of the Graham and Dodd Award for an outstanding article published each year by the *Financial Analysts Journal*. Writing in a recent issue of *Journal of Financial Planning*, Jahnke concludes: “For many individual investors, cost is the most important determinant of portfolio performance, not asset allocation policy, market timing, or security selection.”

Exhibit X: Equity Fund Expenses

	Lowest Cost	Average Cost	Highest Cost
1. Annual Percentage of Assets	0.2%	1.5%	2.2%
2. Annual Percentage of 10% Return	2.0	15.0	22.0
3. Ten-Year Percentage of Initial Investment	2.8	19.8	28.1
4. Percentage of Equity Premium of 3.5%	5.7%	42.9%	62.9%

In any event, investors will profit by focusing on the concepts I have presented today (as shown in exhibit X) and considering the range of choices available:

- Costs as an average annual percentage of assets managed (the conventional measure). You can pay 0.2% of assets to 2.2%. The choice is yours.
- Costs as a percentage of total equity return. You can relinquish 2% of your return or 22%. The choice is yours.
- Costs as a percentage of initial capital consumed over ten years. You can pay 2.8% of initial capital or 28.1%. The choice is yours.
- Costs as a percentage of percentage of equity risk premium, an important new concept. You can relinquish 5.7% of the historical premium norm or 63%. Again, the choice is yours.

In short, these key decisions will impact your investment performance, leading to the realization that *costs truly matter*. This concept must take its proper place as a high priority, not merely an afterthought, in an investor's decision-making process.

The solution, then, to the riddle of performance attribution that I posed at the outset—is performance determined by asset allocation or by cost—becomes very simple: realize that costs truly matter.

Both.