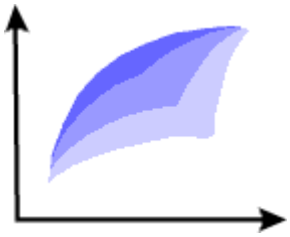
Efficient Frontier



An Online Journal of Practical Asset Allocation

Edited by William J. Bernstein

July 1999

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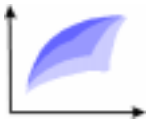


William J. Bernstein

The Grand Infatuation

Troll the latest reincarnation of the office water-cooler—investor internet chat rooms and discussion boards—and you'll find abundant evidence of romantic disaster in the making. No, I'm not suggesting that these forums are hotbeds of amorous intrigue, but rather are incubators of heartbreak of the financial sort.

Without putting too fine a point on it, fund investors have an alarming tendency to fall in love with their fund managers. There is an ever-growing body of data which suggests that superior fund manager performance simply does not persist. And, having paid the price myself, I speak from sad experience. Increasingly I find myself in the role of a maiden aunt observing the romantic follies of my nephews and nieces, knowing full well the heartache they will soon find.

First some data. I'll say it loud, and I'll say it clear. Human beings cannot pick stocks. Period. Yes, over any given time period some funds will perform better than others. But on the average, superior performance does not persist. There are now dozens of academic studies that all pretty much show the same thing. Namely, that if you take the top tier of money managers over a given period, they may or may not best their peers by a dozen or two basis points going forward, but they still underperform the market by 100-200 basis points. Remember that these managers had as a group outperformed their peers by several hundred basis points looking back, but only a tiny sliver of that superior performance translates forward. It's as if Babe Ruth were to hit only 7 home runs the season after he hit 60.

These studies do show one area of strong persistence, however—the worst performing managers—whose inferior performmace shows a remarkable tendency to continue.

Probably the best study of mutual fund performance persistency was done by Micropal. Their worldwide fund database extends back 3 decades, and provides a panoramic view of fund returns. Starting with 1970, they looked at the top 30 domestic diversified funds for a given 5 years and followed their performance out to June 1998. Here are the results:

1970-74

	Return 1970-74	Return 1975-98
Top 30 Funds 1970-74	0.78%	16.05%
All Funds	-6.12%	16.38%
S&P 500	-2.35%	17.04%

1975-79

	Return 1975-79	Return 1980-98
Top 30 Funds 1975-79	35.70%	15.78%
All Funds	20.44%	15.28%
S&P 500	14.76%	17.67%

1980-84

	Return 1980-84	Return 1985-98
Top 30 Funds 1980-84	22.51%	16.01%
All Funds	14.83%	15.59%
S&P 500	14.76%	18.76%

1985-89

	Return 1985-89	Return 1990-98
Top 30 Funds 1985-89	22.08%	16.24%
All Funds	16.40%	15.28%
S&P 500	20.41%	17.81%

1990-94

	Return 1990-94	Return 1995-98
Top 30 Funds 1990-94	18.94%	21.28%
All Funds	9.39%	24.60%
S&P 500	8.69%	32.18%

In each example the top funds for the first period underperformed the S&P 500 in the subsequent period, and in 2 of the above 5 examples actually underperformed their peers as well.

Does this look like the performance of highly skilled money managers? No. We are looking at the proverbial bunch of chimpanzees throwing darts at the stock page. Their "success" or "failure" is a purely random affair. The most successful chimps (who are all very well dressed, it seems) wind up being interviewed in ***Money***, ***The New York Times***, and by Uncle Lou. Their assets under management balloon, and their shareholders' admiration is vindicated by all of the media attention.

However, time passes, and the laws of chance eventually catch up with these folks. Hundreds of thousands of investors find that the handsome prince managing their funds turned out to be just another hairy simian. In fact, with the particularly perverse logic of fund flows, very few investors actually obtain the spectacular early returns of the "top" funds. These early high returns inevitably attract large numbers of later investors, who wind up with merely average performance, if they are lucky.

The ***Efficient Frontier*** Mutual Fund Acid Test

Just about every fund investor I come across thinks that they're the exception to this rule. Sure, everybody else's funds eventually go kerplunk, but my managers have a unique long-term investment outlook and discipline that will endure and flourish. Very well then, I suggest a simple exercise. Trek down to your basement, get out your old fund statements, and take a look at which funds you were invested in 10 years ago. I can guarantee you that the list will be for the most part an embarrassment. (Mine is so bad that I'm too ashamed to mention most of the names in print.) You say you weren't investing in funds 10 years ago? Oh. Then wait a few years, and join the crowd.

From Alpha Man to Ape Man

If you're not convinced with dry data or personal confessions, I'll provide a particularly powerful story, which is just now playing out in the financial

press, pointed out by friend and colleague Steve Dunn. Robert Sanborn, who runs Oakmark Fund, is an undisputed superstar manager. Since inception in 1991 to year-end 1998 its annualized return has been 24.91%, versus 19.56% for the S&P 500. In 1992 it beat the benchmark by an astonishing 41.28%. However, a different story emerges when we examine its performance and fund assets by individual year. The first row tracks the performance of Oakmark Fund relative to the S&P 500:

	1992	1993	1994	1995	1996	1997	1998
Return +/- S&P	+41.3%	+20.4%	+2.0%	-3.1%	-6.7%	-0.8%	-24.9%
Assets ($M)	328	1214	1626	3301	4194	7301	7667

What we see, then, is the all too familiar pattern of fund investors chasing performance, with more and more investors getting lower and lower returns. Lest the sharpies among you point out that S&P 500 tracking error is not a fair measure over the past few years for a value manager, I also did a formal Fama/French 3-factor regression for 3 different periods for the fund. The annualized "alphas" were +22.4% per year for the first 29 months, -0.2% for the second 29 months, and -7.3% for the last 30 months.

I'm not above using the odd buzz word, and "alpha" is a good one. This refers to the excess return added by a manager after taking into account such factors as market exposure, median company size, and value orientation. Unfortunately, in most cases it is a negative number. Oakmark's alpha for the first 29 months is truly spectacular, and quite statistically significant, with a p value of 0.0004. For those of you unfamiliar with the statistical measurement of fund performance, these numbers are exceptional, and are unlikely to be due to chance.

My interpretation of the above data is that Mr. Sanborn is modestly skilled. "Modestly skilled" is not at all derogatory in this context, since 99% of fund managers demonstrate no evidence of skill whatsoever. However, unfortunately even these skills were overwhelmed by the impact-cost drag of managing billions of dollars of new assets, chasing up stock prices and lowering ultimate returns.

Asset managers have been know to proudly refer to their shops as "alpha factories," and more than a few have been known to belt an off-key rendition of "I'm an Alpha Man" into the karaoke machine after downing a few too many.

But beware—Alpha Men usually turn into Ape Men. Remember, too, the iron law of manager performance:

Alpha always absconds.

Efficient Frontier

William J. Bernstein

Fund Expenses—A Very Slippery Slope

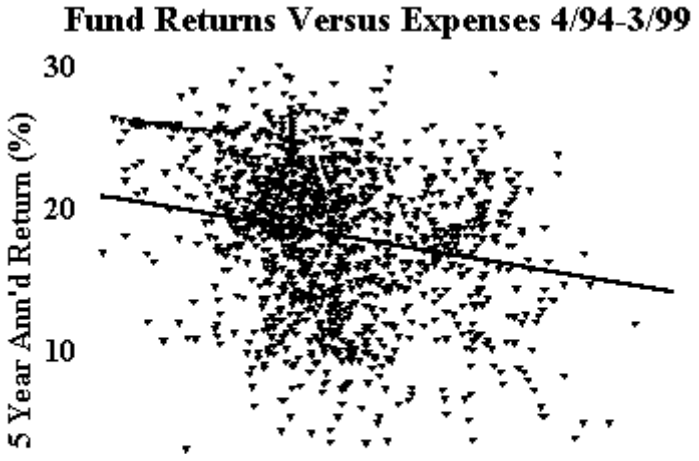
Investors not infrequently founder on the shoals of incorrect assumptions. Among the most prominent are the existence of money manager skill and a simple faith that past asset class returns are precisely predictive of future returns.

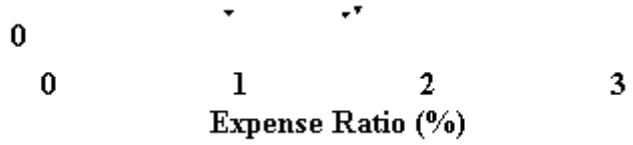
More subtle, but no less corrosive, is neglect of fund expenses. You say that the long term return your stock funds is about 11%? Dream on. 11% is the market return, and your odds of ever seeing it are not good. The market return is what you will get investing in a "frictionless" environment without fund expenses, commissions, spreads, and impact costs. As a first approximation, then,

Your Return = Market Return - Expenses.

Of course, a superior manager may earn a return in excess of the market return and offset her high expenses. There's only one problem—in the long run, there seem to be no superior managers. Even in the short term, superior performance seems to persist only weakly, and not nearly enough to negate expenses.

I'm fond of testable hypotheses, and the above formula presents a good one. If one plots fund performance against expense, one ought to see a correlation. Below is a graph of return versus expense for the 5-year period ending 3/99 for all diversified domestic stock funds:





If you look closely, you'll see that the fund cloud has a tendency to slope down and to the right—the higher the expense, the lower the return. The wonders of modern microprocessors and software allow us to rapidly calculate a "regression slope" (the straight line in the graph) which tells us how many dollars of return we lose for each dollar of expense. And here's the ghastly surprise; the slope is -2.22. In other words, every added dollar of expense actually deducts more than 2 dollars of return. This is not a fluke. The 95% confidence limits of this analysis are between -2.54 and -1.91, making it extremely unlikely that this result is a statistical aberration.

I performed the same analysis for the same period for each of the 9 Morningstar style boxes, and came up with the following results:

Fund Style Box	Return/Expense Slope
Large Blend	-2.61
Large Growth	-2.21
Large Value	-1.31
Midcap Blend	-1.36
Midcap Growth	-0.81
Midcap Value	-2.12
Small Blend	-1.51
Small Growth	-1.93
Small Value	-2.69

Note that the slope is >1.0 in 8 of 9 cases, and >2.0 in 4 of 9 cases. It is statistically different from 1.0 in 5 of the 9 cases with 95% confidence, in spite of the relatively small number of funds in many of the categories.

So things are even worse than they seem. For every dollar of added expense, we lose two dollars of return. How can this be? Jack Bogle, in "Common Sense on Mutual Funds," notices this same phenomenon. He found that the return/expense slope for large blend funds was -1.80. He noted:

> Our intuition might tell us that each point of cost should cost exactly one point of return, but something much more onerous is taking place. Although the causative factors are not exactly clear, one explanation seems to hold some extra merit: High-cost funds tend to have high turnover, and portfolio transactions

carry a substantial cost of their own.

My thoughts exactly. But unfortunately, this explanation does not carry the day. If one adds in turnover as a second variable in the regression, the return/turnover slope is negative, but with only 0.47% of return lost for each 100% of turnover. This is not nearly as impressive as one would expect. Further, superimposing turnover adds only a minimal amount of statistical power to the analysis, with an adjusted R-squared of 0.131, versus 0.129 for expense alone. Finally, doing two-factor expense/turnover regressions for the 9 Morningstar boxes shows no particular effect of turnover with small caps, where one would expect to see it most clearly. (In the interests of keeping most of you awake I've not included all the gory details, but those of you who have Excel 7 or higher and want to see the primary data may contact me.)

One possibility is that turnover is indeed important, but that the specific measure used—a "spot" figure in the Morningstar database, is too unstable. Turnover from year to year is a good deal less steady than expense ratio, and it is quite possible that analysis using turnover averaged over several years would show a more impressive relationship.

Alternate explanations are possible. One is moral turpitude. A fund organization which sees nothing particularly wrong charging its shareholders 200 basis points for a large cap fund is also likely quite comfortable with a wide range of other questionable activities. Such as front-running, a less than arms-length relationship with the organization's investment banking and bond-trading division, or perhaps simply a lax eye in general towards quality of execution. Readers even more evil-minded than this author will surely think of others.

Another possibility, suggested by Steve Dunn, is that the high expense funds, knowing that they are behind the eight ball, undertake high-risk strategies in a futile attempt to bridge the gap.

If in the overall sample turnover does not incur significant additional expenses, one then has to ask why. In fact, the negative effect of turnover is most clearly seen with the 3 value style boxes, and in 2 of the 3 blend boxes. All 3 growth boxes have a *positive* slope on turnover, indicating that turnover *improves* return. We'll talk about the precise reasons why in the September ***EF***, and in the process solve the small growth active management anomaly—i.e., why small growth indexing is a persistently losing strategy.

The other interesting piece of data to fall out of the analysis is the increasing importance of expense over time. When 1-year returns are examined, the R-squared for fund expenses is only 0.005. In other words, only 0.5% of 1-year returns can be explained by costs. However, at 5 years this rises to12.9%, and at 15 years fully 36% of fund return is explained by expenses.

What is happening here is that over time the variation of manager performance, which is random, "washes out," leaving expense as the single most important factor determining return.

Jack Bogle, Chairman Emeritus at Vanguard, finds it difficult to get through an essay or speech without repeating "costs matter." They most certainly do.

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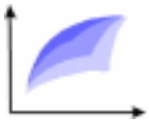

William J. Bernstein

To Hedge or not to Hedge

Get Over It

A foreign stock or bond contains two returns: its return in local currency, and the return of its currency component. What confuses the domestic investor is that when she purchases the security, the two components are intertwined. In order to separate out the local return it is necessary to sell the appropriate currency short, or "hedge." Consider a British stock that over a year's time appreciates 10% in price. This is the return an English investor, who deals in sterling, will receive. However, the American investor also receives the currency return as well. If the dollar appreciates (pound falls) during the holding period, the return will be less. If the dollar falls (pound rises) the return will be greater.

The amount of this currency to "hedge out" is a hotly debated point. On the one hand, there is no doubt that hedging reduces the risk of an individual stock or bond. Contrariwise, the currency component has an approximately zero correlation with almost all assets in local currency, and for this reason may be advantageous.

It is useful for the global investor to consider a foreign stock or bond in these terms. Assume for a moment that your portfolio contains 35% each domestic stocks and domestic bonds, as well as 15% each foreign stocks and foreign bonds. It makes no difference if the foreign stocks are hedged and the bonds are unhedged, or vice versa. Put another way, the portfolio can be considered to contain 35% domestic stocks, 35% domestic bonds, 15% hedged foreign stocks, 15% hedged foreign bonds, and 15% foreign currency. No matter that the total of all this is 115%—it's an extraordinarily useful device to start with foreign stock and bond returns in local currency ("hedged"), and then to add in the currency component as just another class.

In other words, the foreign currency in your portfolio doesn't know whether it is invested in stocks or bonds. Even the savviest investors occasionally fail to realize this.

Couched in these terms, the case for currency exposure (not hedging) seems tenuous. After all, currency is an asset which has a zero expected *nominal* return, which is not likely to be saved by its lack of correlation with other

assets.

The most efficient way to investigate this problem is to consider it in a mean variance framework using reasonable returns assumptions and historical standard deviations and correlations. Unfortunately, because of the peculiarities of MVOs, it is nearly impossible to include an asset which does not "count" as part of the portfolio composition, and when I did so, and erroneously concluded that all portfolio assets should be hedged, reader Dexter Chu pointed out the error of my ways.

So I reverted to a spreadsheet method which allowed me to segregate out the currency components. We proceed as follows:

1. Quarterly returns for multiple global assets were obtained, all in hedged, or "local" returns.
2. Two currency returns series were added: Japanese yen and an amalgam of European currencies (35% Sterling, 15% each French Franc and German Mark, 10% Swiss Franc, Lira, and Guilder, and 5% Peseta).

The correlation grid and SDs are as follows:

	Japan IL	PacxJ IL	Euro IL	S&P	USSM	HEDIB	T Bonds	T BILL	EUROS	YEN
Japan IL	1.00									
PacxJ IL	0.35	1.00								
Euro IL	0.49	0.66	1.00							
S&P	0.58	0.63	0.80	1.00						
USSM	0.54	0.59	0.76	0.79	1.00					
HEDIB	0.12	0.01	0.06	0.15	0.11	1.00				
T BONDS	0.01	-0.24	-0.14	0.05	-0.08	0.68	1.00			
T BILL	-0.06	-0.15	-0.08	0.04	-0.17	0.04	0.13	1.00		
EUROS	-0.19	-0.34	-0.62	-0.29	-0.53	0.14	0.25	0.15	1.00	
YEN	-0.07	-0.15	-0.39	-0.11	-0.26	0.07	0.15	-0.16	0.60	1.00
std (ann)	23.28	24.03	18.13	15.03	21.45	4.30	9.30	0.77	11.14	14.01

(Japan IL = MSCI Japan hedged, PacxJ IL = MSCI Pacific Rim hedged, Euro IL = MSCI-Europe hedged, S&P = S&P 500, USSM = US 9-10 Decile small stocks, HEDIB = Morgan Stanley International Bond Hedged, T BONDS = 20 year US Treasuries, EUROS = European currency return [see above], YEN = Japanese Yen)

Stock returns were assumed to be 10%, except for US small stocks which were assumed to return 11%. T bonds and hedged foreign bonds were assumed to return 6%, and t-bills 4.5%.

The expected return of both the yen and Euro is assumed to be zero, of course.

These inputs were fed into the spreadsheet optimizer, and after several system crashes, including one hair-raising DOS message reading "hard drive general failure," the following efficient frontier output was obtained (For the hard-core portfolio theorists among you, spreadsheet optimizations do not produce corner portfolios per se, just portfolios at given SDs or returns. They are considered to be rebalanced quarterly):

Japan	PacXJ	Euro	S&P	USSM	HedIB	T Bond	T Bill	Euros	Yen	Ret	SD
0.0%	16.7%	0.0%	0.0%	83.3%	0.0%	0.0%	0.0%	152.4%	0.0%	12.80%	18.44%
2.9%	18.1%	0.0%	0.0%	79.1%	0.0%	0.0%	0.0%	142.8%	0.0%	12.80%	18.00%
5.6%	13.8%	22.8%	0.0%	57.9%	0.0%	0.0%	0.0%	125.8%	0.0%	12.63%	16.00%
6.2%	7.9%	46.6%	0.0%	35.2%	0.0%	4.1%	0.0%	106.6%	0.0%	12.12%	14.00%
5.2%	8.1%	40.9%	0.0%	27.6%	0.0%	18.2%	0.0%	86.1%	0.0%	11.34%	12.00%
4.2%	7.3%	34.2%	0.0%	20.9%	14.0%	19.5%	0.0%	67.4%	0.0%	10.42%	10.00%
3.2%	5.6%	26.7%	0.0%	15.0%	38.3%	11.2%	0.0%	50.3%	0.0%	9.40%	8.00%
2.3%	3.6%	19.3%	0.0%	10.1%	54.2%	0.0%	10.4%	35.2%	0.0%	8.24%	6.00%
1.5%	2.8%	12.3%	0.0%	6.9%	32.5%	2.9%	41.0%	22.6%	0.0%	7.03%	4.00%
1.1%	2.2%	8.9%	0.0%	5.3%	25.2%	1.8%	55.5%	16.5%	0.0%	6.40%	3.00%
0.7%	1.5%	5.3%	0.0%	3.6%	18.7%	0.0%	70.2%	10.3%	0.0%	5.74%	2.00%
0.3%	0.9%	1.3%	0.0%	1.8%	8.4%	0.0%	87.4%	3.1%	0.0%	5.00%	1.00%
0.0%	0.3%	0.0%	0.0%	0.5%	2.1%	0.0%	97.2%	0.0%	0.0%	4.60%	0.74%

Like all optimizer outputs, these need to be taken with a bucket of salt, but our suspicions about currency are not confirmed. Clearly, European currency exposure seems to have great value, with ample representation in the high and medium risk portfolios—in fact, in amounts greater than that demanded by European stock and bond contributions. Not until the minimum variance portfolio (almost all t-bills) does the need for it disappear entirely. Not until the Euro annualized return is reduced below -2.8% does it disappear from the 10% SD portfolio. The reason why the Yen is less desirable is uncertain.

So hedging, at least for European stocks and bonds, is unnecessary. It also has real tax disadvantages—these are short-term contracts, which generate

lots of unwanted income taxable at the marginal rate from time to time.

Perhaps it is a good thing that passively managed international portfolios are available only in unhedged form. So when it comes to worrying about currency-induced portfolio volatility, get over it. If your foreign stock fund goes down the toilet with a fall in the Euro, take solace in the fact that:

1. In the long run, currency exposure reduces overall portfolio risk, and probably increases return, and
2. Your next visit to Tuscany just got a whole lot cheaper.

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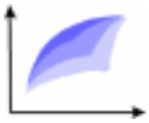


William J. Bernstein

The Incredible Shrinking January Effect

One of the most hallowed tenets of domestic asset class theory is the January small cap effect ("JE"). To wit:

1. Small company stocks, because of their higher risks, have a higher return than large company stocks.
2. For some bizarre reason all of this excess return occurs in January.

For example, if one divides domestic stocks into NYSE size deciles, and then measures the 1926-94 excess return over the largest (1st) decile, it turns out that the January excess is actually larger than for the entire year for the smallest stocks:

Return in Excess of 1st Decile

Decile	January	Whole Year
2	1.10%	1.49%
3	1.47%	2.04%
4	1.76%	2.33%
5	2.84%	3.14%
6	3.29%	3.06%
7	3.86%	3.24%
8	5.20%	3.86%
9	6.86%	4.54%
10	10.28%	7.82%

(Source: ***Stocks, Bonds, Bills, and Inflation***, 1995 Yearbook, Ibbotson)

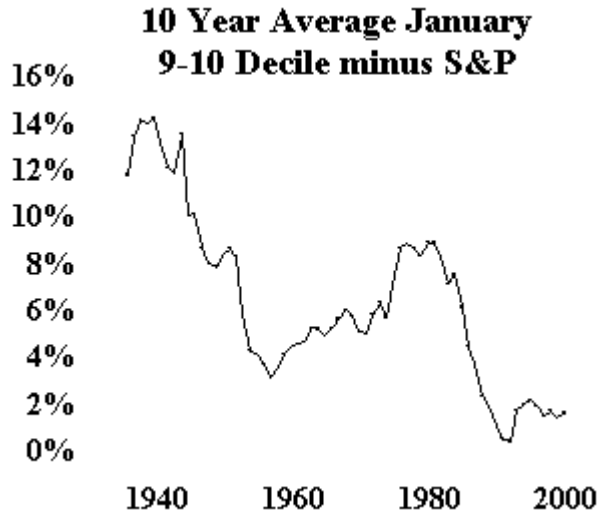
The precise reason for this anomaly is best left for another day, but there is no shortage of candidates. End-of-year tax loss selling is my favorite, but there are no easy answers.

Entire "how to" books have been devoted to the "Incredible January Effect,"

and it's also a perennial late-year topic for material-starved financial writers, the most recent being a piece in the ***New York Times*** by none other than Mark Hulbert.

Unfortunately, there are two fundamental problems with the JE. First, the astute reader will note that its magnitude is roughly equivalent to the bid-ask spread for each decile. In other words, the simple act of buying and selling small stocks eliminates the benefit.

Second, it no longer exists. Below is a graph of the 10 year rolling average of the small cap premium, calculated as the difference between the January return of the CRSP 9-10 index and the S&P 500:

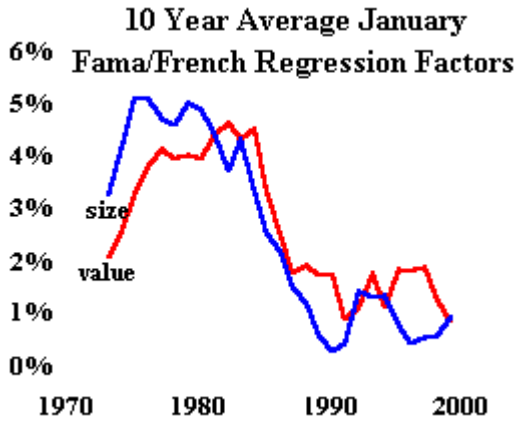


When I brought this to Mr. Hulbert's attention, an assistant, Mr. Paul Bolognese, replied:

> It is true that, at least by some measures, the January Effect has been smaller in recent years. Yet by other measures it is just as great. For example, among small-cap stocks with the highest book-to-market ratios, the JE seems to be just as robust.
>
> It may also be that the Ibbotson data for small-cap performance are guilty of survivorship bias for the years prior to the early 1980s, which is when their data started reporting the real-world performance of DFA's 9-10 Small Comparny fund.

In other words, not only might the January effect be an artifact of survivorship bias (which may also be true of the entire small cap premium), but it's really not a small-cap effect. It's a *value* effect.

OK, that's a testable hypothesis. Below is a graph of the 10 year rolling averages for the size ("SmB") and value ("HmL") Fama/French regression factors for January starting 1964:



You can approximate the January excess return for small value stocks simply by adding the two plots together. Again, bye-bye JE. (Note that the value excess return is still quite robust, it's just not all that prominent in January.)

If the JE has gone the way of disco and nonstop flights to your destination, then why do folks still write about it? I can't answer that one in polite fashion, so I won't. But one thing is clear. It's time that financial journalists let this one go.

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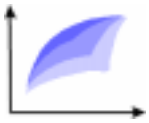


William J. Bernstein

The Needle and the Haystack

The Problem with Skill

One of the most difficult areas for small investors and professionals alike is the statistical definition of skill. Say a manager beats her peers by 5% for one year. Just what does that mean? How about over 5 years? 15 years?

The answer lies in the variation of manager returns. Consider the Morningstar large growth fund cohort. In 1998 it contained 558 funds, with an average return of 34.24% for that year. (Lest you you're too impressed with this, in 1998 the unmanaged Vanguard Growth Index Fund returned 42.21%.) Of course, not even one of the funds returned *exactly* 34.24%; there was fair amount of scatter about that figure. One can measure that degree of scatter, or variation, by calculating the *standard deviation* (SD), of the returns of all 558 funds. For 1998 the SD was 15.85%. In other words, by pure chance we might expect 16% of funds to perform at 1 SD above the mean, or 34.24% + 15.85% = 50.05%. In fact, only 7.5% of funds managed this. 415 large growth funds were extant in 1997, and in that year the SD of annual returns was 7.61%.

As you can see the SD for each category does bounce around, so it is best to average over many years. For the 1989-1998 10-year period, the average annual fund return SD for the large growth category was 8.33%. If the returns for each fund were due purely to skill, one would expect that the SD of annualized 10-year returns would also be about 8.33%, since the skill factor should not change from year to year. And if the returns were purely random, then the SD over longer periods would decrease over longer periods, since the variation from year to year would tend to cancel out. In that case the laws of statistics tell us that the 10 year SD should be 8.33%/sqrt(10), or 2.63%.

Let's see how things actually turned out for the large growth, large value, small growth, small value, and precious metals categories:

	Average	Predicted	Actual
	Annual SD	10 Yr. SD	10 Yr. SD
Large Growth	8.33%	2.63%	3.51%
Large Value	6.13%	1.94%	2.97%
Small Growth	10.27%	3.25%	2.28%
Small Value	14.63%	4.63%	4.12%
Precious Metals	13.63%	4.31%	4.08%

It turns out that the 10 year SDs are about what one would see with a random walk. But what if there are a few skilled managers hiding in this crowd? How might we find them?

In Sample

Let's say we are looking at 500 money managers, and spot one whose performance seems superlative. Just how extraordinary would this performance have to be to arouse our interest? What about 1 SD above the mean? Hardly. 16% of the managers, or 80 of them, would have done so purely by chance. Nor 2 SDs (2.3% by chance) or even 3 SDs (0.135% by chance, or 1 in 740) would get our attention in a group of 500. Not until we get to 4 SDs (1 in 32,000 by chance) should we suspect skill as the cause.

So, in the large cap category, where 7% of annual SD is expected, we might notice a fund whose performance is 28% above the mean in a given year. And over 15 years, we would want to see the fund beat the average by 28%/sqrt(15) = 7.2% per year. One can derive the general formula:

$$M = 4*S/\sqrt{N}$$

where M is the margin of superiority required, N is the number of years, and S is the average annual SD of the category. For a small cap fund, where the category SD is, say, 12%, one would have to see a 48% outperformance in one year, or 12% outperformance annualized over 15 years. Lotsa luck.

Or, rearranging the equation for N, the number of years, we get:

$$N = 16*S^2/M^2$$

Let's assume that you've got your eye on a small cap fund which over 15 years has beaten its peers by 3% pa. The above formula tells you that you'd need *256 years* of 3% outperformance before you can reasonably conclude that skill is involved.

Out of Sample

If the bar described above seems a bit high, there is another way out. You

might accept 3 or even 2 SDs of outperformance *if* you are willing to place your bet on a given fund and follow it out. Here, you will only have to wait $4s^2/m^2$ years to find out if you were right. But you only get to bet on one pony. If your fund/manager outperforms its peers by 5% pa, and the category has 8% annual SD returns scatter, you still have to wait 10 years to be reasonably certain that this could not be due to chance.

The Paradox

The laws of statistics are not kind to money managers. As can be seen above, it is essentially impossible to demonstrate skill for a particular manager, either in or out of sample. The best we can manage are indirect tests of the entire population, such as the examination of the persistence of performance for a large number of funds, or the expected/predicted multiperiod SD method described above.

Perhaps there are a few superior managers out there, but you won't find them before they retire (Lynch), bloat their assets to unmanageable size (Sanborn), or demand an absurd management premium (Buffett).

Home E-Mail

Efficient Frontier

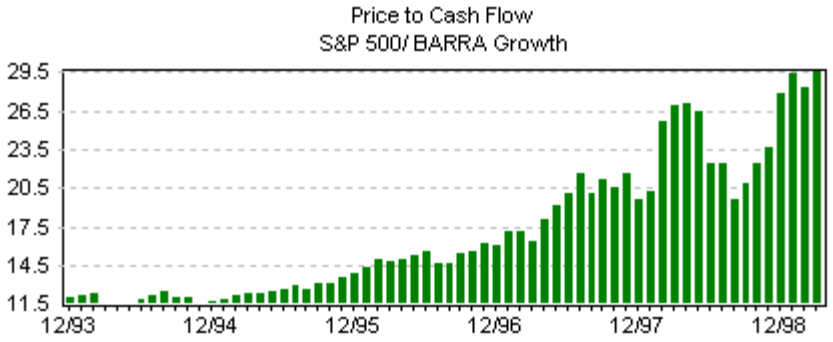
William J. Bernstein

Valuation/Returns History from Barra and Wilshire

Ben Graham postumously earned the wrath of feminists everwhere decades ago when he made the the sexist but wise recommendation that women should buy stocks in the same manner as groceries, and not perfume. Well, in order to intelligently pruchase the tomatoes and beef you have to know how much you're paying for them. Unfortunately, until recently historical valuation data for a wide variety of US equity style categories has not been freely available.

Barra Associates has now posted a wide variety of valuation data for large, midcap, and small stocks at www.barra.com/MktIndices/fundamental_charts.asp.

A sample chart (price/cash flow for large cap growth stocks) is shown below:



Also available is monthly returns data for their 9 style categories. Unfortunately, this is not as extensive as one might wish, with the large cap indexes going back to 1975, midcap to 1991, and small cap to 1994.

For the mathematically inclined there is an excellent discussion of multifactor regression techniques. Barra is one of the premier sources of institutional market data, and I'd check this site often for enhancements to their already superb site.

Nicely complementing the Barra data are the monthly returns series from

Wilshire Associates, with style-specific data going back more than 20 years, available in multiple formats. (The links are at the bottom-left of the page.)

Now, if only Morgan-Stanley would do the same for their country indexes . . . .