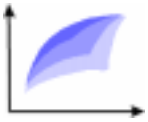
Efficient Frontier



An Online Journal of Practical Asset Allocation

Edited by William J. Bernstein
and Susan F. Sharin

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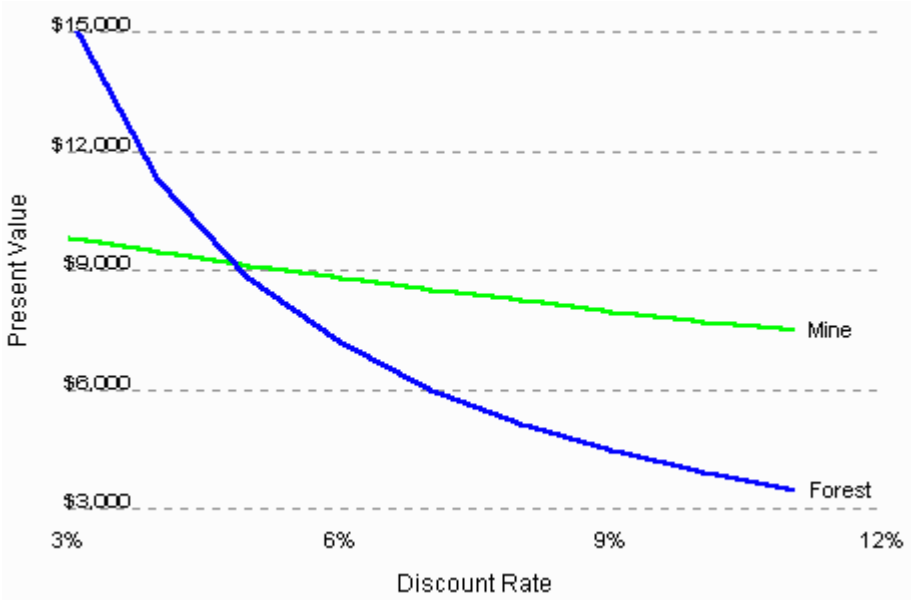
Who Killed Value?

Pity the poor value investors. Nurtured on the elegant prose of Benjamin Graham, the folksy humor of Warren Buffett, and the daunting statistical elegance of Fama and French, they've languished in the wilderness with fifteen years of excruciating underperformance. What went wrong?

Countless have taken no small pleasure in the misery of this unhappy band of brothers, for in many cases they constitute the sometimes less-than-humble Best and Brightest in finance. The cheap shot is all too tempting. Usually it doesn't go much beyond a gleeful dunning of pointy-headed academics who wouldn't know a stock ticket if one landed on their overhead projector.

Another explanation, perhaps closer to the mark, is Rekenthaler's Rule: "If the bozos know about it, it doesn't work anymore." In other words, as soon as an anomaly is uncovered, it is arbitraged out of existence.

The truth, I believe, is somewhat more complex and much more interesting. But first, if you haven't yet done so, do read the piece "Of Mines, Farms, Forests, and Impatience," in the Spring 2001 issue, before proceeding. To recap, Irving Fisher's mine is similar to a value stock—its cash flow is "front-loaded" and likely to slowly decrease over time. Fisher's newly-planted forest is, of course, a growth stock, with zero income up front and dividends gradually kicking in as the decades wear on. Since the value of both of these enterprises is their total stream of annual income *discounted to the present*, an increase in the discount rate hurts the mine (value stock) much, much less than the forest (growth stock). I've slightly modified the graph from the last article in order to display this phenomenon.

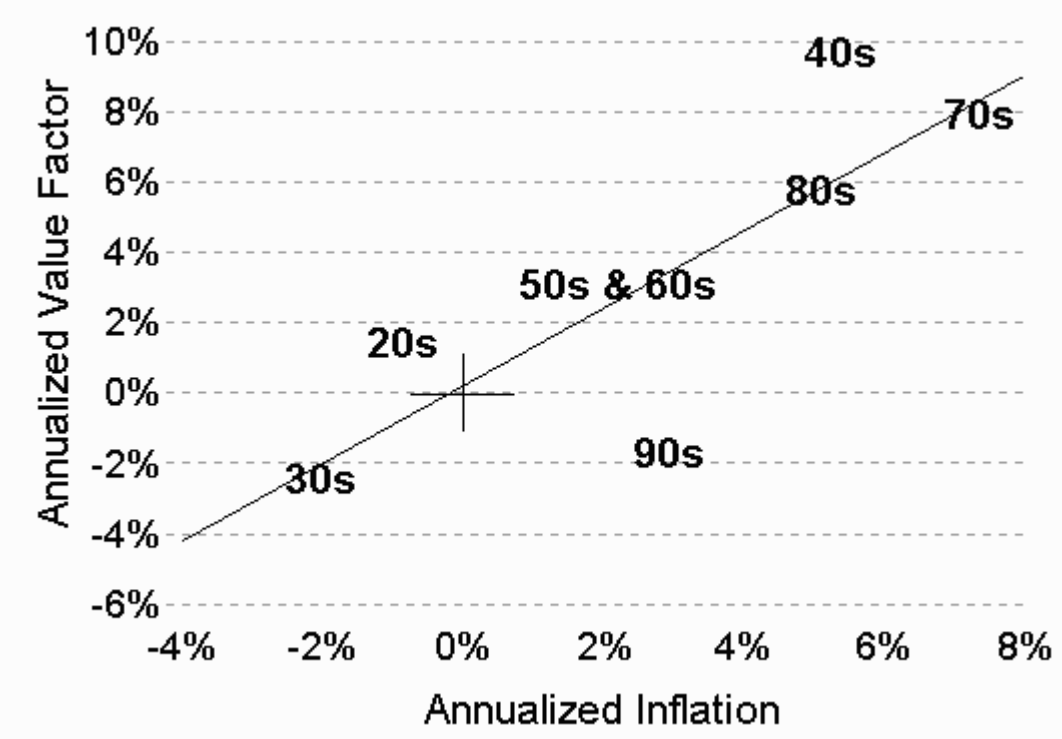


The observation that higher interest rates are more harmful to growth than value stocks is not new, but there has been surprisingly little attention devoted to this in the growth-versus-value

debate, particularly from a historical perspective.

In order to examine the problem, I took advantage of Ken French's wonderful Web site and downloaded the HmL series (a familiar Fama-French acronym for "high-minus-low" book value), which goes back to July 1926. This series basically represents the return of the top third of stocks sorted on book/price, minus the return of the bottom third. In other words, the value-minus-growth return difference. A positive number signifies higher returns for value stocks, and vice versa. The simple plot of monthly inflation versus HmL is an eye-crossing scattergram, but the slope of HmL on inflation is clearly positive, with a *t* stat of 2.91 and a *p* value of .0037. So there is indeed a significant positive correlation between inflation and value return, albeit a very noisy one.

A much more impressive picture emerges when we plot annualized HmL versus inflation by decade. (Note that the "20s" data point constitutes only a three-and-a-half-year period, beginning in July 1926).



The data using decade periods are also quite robust, with a *t* stat of 3.41. Because there are only eight data points, it is visually more impressive, but has a lower *p* value than the monthly analysis, though still highly significant at .014.

The original Fama-French paper covered a period of very high inflation, the years 1963-1990, and consequently showed a robust value effect. Towards the end of that period, interest rates and inflation commenced a long and powerful decline, which continues to this day—just the sort of environment expected to favor growth stocks. (There's also a weaker, secondary correlation here—the *rate of change* of inflation with HmL—which depressed the '90s HmL more than predicted by the inflation rate.) So while Fama and French's research was impeccable, their timing was unlucky, to say the least. Mystery solved: value's killers are two nefarious characters named Volcker and Greenspan. Do not attempt a citizen's arrest.

This formulation also explains why value investing was such a life-saver in the crunch of 1973-1974 with its raging inflation, and why growth investing dominated in the Great Depression, characterized by the worst period of *deflation* in American history.

What of the future? The fascinating thing about the decade plot is that its regression line passes almost exactly through the graph's origin (the cross in the lower-left part of the plot). In other words, in an investing state-of-nature—say a Grover Cleveland world of unfettered capitalism, gold standard, and zero inflation—growth and value stocks have equal returns. The slope of HmL on inflation is 1.1, so each one percent of inflation adds about one percent of HmL. Thus, if inflation stays at 2% to 3%, we can expect an HmL of similar size. And not coincidentally, the HmL for the full 74 years from July 1926 to June 2000 was 3.36%, while inflation was 3.12%. As long as there is fiat currency, there will be inflation; in the long-run, the value premium seems assured.

The most interesting feature of these data is that HmL is much more dependent on the absolute level of inflation than its rate of change. Why, in an efficient market, does a statically high (or low) rate of inflation produce high (or low) HmL? After all, one would assume that a static high or low inflation rate would be discounted into prices. This gets to the heart of the value premium. For if markets are truly efficient, this premium can only be compensation for some sort of *risk*. An alternative explanation is that markets are not efficient in the value dimension; that in fact, investors overestimate the magnitude and persistence of earnings increases for growth stocks, thereby overpricing them, and underpricing value stocks.

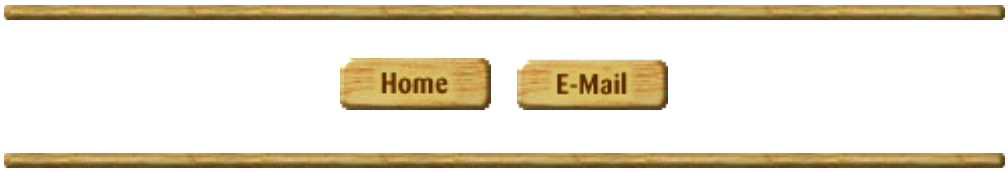
The evidence in favor of this "inefficiency" explanation is powerful. For example, in June 2000 the top 30% of all stocks sorted by PE, weighted by market cap, had a PE of 40, whereas the bottom 30% had a PE of 7. (These included only stocks with positive earnings. Source: Ken French's data library.) What kind of earnings increase can we expect from these top-30% growth companies? Actually, not very much. Empirical research shows that superior earnings growth has a half-life of about two to three years. So let's make some generous assumptions. Assume that the average company selling at a PE of 40 grows its earnings at 2.5% per month for the first year, then 2% per month, 1.5% per month, 1% per month, and 0.75% per month in succeeding years, before settling down to the 0.5% per month earnings growth of the rest of the market in the sixth year. (This annualizes out to 33.8%, 26.8%, 19.6%, 12.7%, 9.4%, and 6.4% growth per year for the six years.) Now contrast that with these assumptions for a typical value company: a PE of 14 and earnings growth at the market rate of 0.5% monthly (6.4% annual).

As you can see from the graph, the earnings of the growth company never overtakes that of the value company, in spite of its superior growth. This is because it starts out earning only 2.5 cents per dollar of equity, whereas the value company starts out earning 7 cents. The hare never catches up with the tortoise. So after a few years, the growth-stock investor wakes up to find his company's superior growth has largely disappeared, and he is unhappy. This translates into falling prices and lower returns. *And in a high-inflation environment, he will be even more disappointed, since his now slightly-higher earnings growth is worth much less because of*

higher inflation. In this case, the damage will be even worse. Hence the higher value-minus-growth returns gap with high inflation.

A warning: Fama and French's HmL is a long-short portfolio and unattainable in actual practice. Even the hardcore upper-third DFA portfolios obtain a value loading of only about 0.65 or so, for a projected total excess return of about 2% per year, before expenses. The Vanguard value portfolios have slightly lower HmL loadings (in the .55 range) but with lower expenses. Happily, both organizations seem to manage negative transactional costs with surprising regularity.

So, value enthusiasts, rejoice— investing in cheap stocks has not gone the way of John Cleese's parrot. Even as we speak, value investing is slowly rising from its coffin. The renaissance of the dull may have only just begun.



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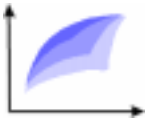


William J. Bernstein

A Limited Case for Variable Annuities

As most investment professionals know, annuities are sold, not bought. Show me an investor sitting on a large chunk of insurance-company product and I'll show you someone with an insurance salesman or brokerage registered rep in the food chain. If ever there were a case for tax-sheltered annuities, with their high expenses, sales fees, and miserable performance, surely it was nailed shut with the advent of tax-managed index funds. For starters, most investors have more than enough tax-sheltered assets in the form of IRAs, 401(k), 403(b), pension/profit-sharing plans, and other tax-deferred accounts. Not until you have "maxed out" these vehicles should annuities even begin to light up on your financial radar.

Let's assume that you have no tax-sheltered assets and are faced with placing $1,000 to invest in stocks in either: (1) a non-sheltered tax-efficient index fund or (2) a variable-annuity equity fund, each choice with an identical return of 10% annualized. Let's further assume that the tax-efficient fund divides its 10% return between 1.5% of dividends, 0.5% of realized long-term capital gains, and 8% unrealized capital gains, and that the investor is taxed at the 36% rate on ordinary income and 20% on capital gains. (For the sake of simplicity, state taxes are ignored.)

The annuity has the advantage of deferring all taxes as long as the investment stays in the annuity wrapper, but has the disadvantage of the entire return being penalized at the 36% ordinary income rate when money is withdrawn. In contrast, almost all of the taxable fund's return is taxed at just the 20% capital gains rate (when the fund is sold). Thus, the annuity starts out behind the eight ball relative to the tax-efficient unsheltered investment. But the annuity advantage increases with time, slowly catching up as the tax-deferred compounding accumulates. Adjusting for the cost basis of reinvested dividends and capital gains (and, of course, for the original annuity investment coming out tax-free), here's how things stack up on an after-tax basis:

Year	Taxable Tax-Efficient	Annuity
10	$2,199	$2,020
20	$5,134	$4,666
30	$12,314	$11,528
40	$29,883	$29,325
50	$72,867	$75,490

In this theoretical example, it takes fully 43 years for the annuity to overtake the taxable tax-efficient fund—not something that most investors would want to bet on. Even then, at 50 years, the margin is razor-thin. Furthermore, in the real world, annuities incur expenses in addition to normal fund fees. The cheapest indexed variable annuities are offered by TIAA-CREF, with insurance and administrative fees of just 0.08%. These tiny expenses still push the break-even point out another eight years. Vanguard's extra fees amount to 0.37%, at which rate the annuity *never* catches up with the taxable tax-efficient fund.

Tax-efficient funds are now available in most major asset classes. Vanguard offers tax-

managed U.S. large-cap, small-cap, and total-market funds as well as a tax-managed foreign fund. In addition, their three regional foreign funds (European, Pacific, and Emerging Markets), and combinations thereof, are quite tax-efficient too. Going further, DFA offers tax-managed *value* funds in the three major areas (U.S. large, U.S. small, and international large). What major asset classes are left out? Four areas, with somewhat different considerations—high-quality bonds, junk bonds, REITs, and foreign small cap stocks.

First, there is no reason why tax-efficient passively managed international small-cap portfolios cannot be designed; there just aren't any offered to date. On the other hand, bonds throw off all their expected return in the form of interest. Likewise for REITs, almost all of their expected return comes as dividends, which are taxed at the high ordinary rate. Both of these asset classes are extremely tax-inefficient.

Vanguard does offer high-quality bonds, junk bonds, and REITs in annuity form, with an extra 37 basis-point expense for insurance and administration, while DFA offers an international small-cap annuity with 60 basis points of extra expense. Are these worthwhile? It all depends on your asset structure, asset-class preferences, and returns assumptions. As we've already noted, if you have enough room in one of your retirement vehicles, there's no need to even consider an annuity.

Let's assume that you have no, or almost no, sheltered assets. Does it pay to establish an annuity? In certain circumstances, yes. Consider REITs, for example. As this is being written, they yield 7.0%. Since 1972 their dividends have grown at about 3% per year (during a period of 5.1% inflation). This parses out to a 4.9% real return. If inflation in the next 30 years is 3%, then we're looking at a nominal expected return of 7.9% for REITs. Junk bonds currently yield about 12.4%. If the single-B loss rate is 4% per year, that leaves an expected return of 8.4%. For industrial stocks, let's be generous and add 6% dividend and earnings growth to a 1.3% yield, for a nominal expected return of 7.3%.

Asset Class	Expected Return
REITs	7.9%
Junk Bonds	8.4%
Stocks	7.3%

Quite obviously, owning REITs in a taxable account is a bad deal, since the 7.0% yield will be taxed at the high marginal rate, reducing the return by 2.5% each year. And junk is even worse, with taxes reducing the yield by 4.5%. But put these assets in an annuity and allow them to compound tax-free until they're withdrawn at the ordinary income rate, and they should blow the doors off stocks held in a taxable, tax-efficient stock fund. In the following calculation, I've assumed that the taxable fund incurs expenses of 0.20%, for an expected return of 7.1% (of which 1.1% are dividends (after the 0.2% expense ratio), 0.5% are realized capital gains, and 5.5% unrealized capital gains). I assume that the REIT and junk-bond annuities incur total expenses of 0.60%, yielding expected returns of 7.3% and 7.8%. The final after-tax wealth is tabulated below.

Year	Taxable Stock 7.1% Return	REIT Annuity 7.3% Return	Junk Annuity 7.8% Return
5	$1,314	$1,270	$1,296
10	$1,746	$1,655	$1,729

20	$3,161	$2,979	$3,288
30	$5,843	$5,659	$6,624
40	$10,927	$11,079	$13,758

The REIT annuity, with its minimal return advantage, takes 38 years to beat the taxable stock fund, and the junk annuity beats it after 13 years.

What about high-quality bonds? Let's examine intermediate-term debt. As of this writing, the Vanguard Intermediate-Term Corporate Bond Fund yields 6.60%; after additional annuity expenses, it yields about 6.23%. On the taxable side, the Intermediate-Term Tax-Exempt Fund yields 4.23%. Here's how things stack up on an after-tax basis.

Year	Intermediate-Term Tax-Exempt Fund 4.23% Return	Intermediate-Term Corporate Annuity 6.23% Return
5	$1,230	$1,226
10	$1,513	$1,531
20	$2,290	$2,504
30	$3,466	$4,283
40	$5,245	$7,539

Again, the annuity beats the comparable taxable investment almost right out of the starting gate, and by a large amount over longer time periods.

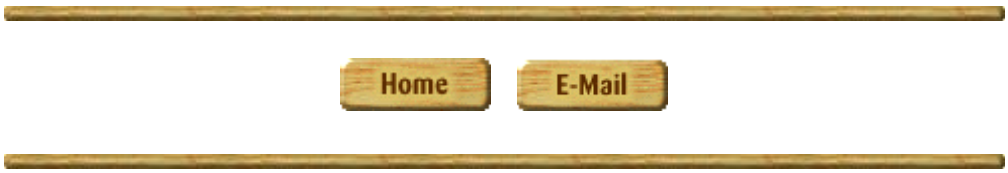
Finally, let's look at foreign small stocks, as always, a difficult issue. Recall, DFA offers the only passively managed funds in this area. And they do have a foreign small-cap annuity, but with total management, administrative, and insurance expenses of about 1.5%, it's probably not worth considering this option unless you have absolutely no room for this asset class in a retirement account.

Exactly the same analysis, by the way, applies to the age-old problem of whether to put stocks or bonds in the tax-sheltered portion of a mixed portfolio. As you can see, as long as the stock assets are reasonably tax-efficient, little is gained by sheltering them. On the other hand, the above analysis shows that much is gained by sheltering bonds. (In a nice bit of research for the NBER, James Poterba came to the opposite conclusion. But he was looking mainly at actively-managed stock funds, which are highly tax-inefficient, and historical bond returns, which were much lower than current expected bond returns.)

So, it's clear that an annuity makes sense *only* if all four of the following conditions are met:

- The asset class is highly tax-*in*efficient.
- The asset class's expected return is significantly higher than that of a comparable tax-efficient stock or bond expected return *after reducing it* by the higher expenses incurred in the annuity.
- The asset class is held for a long period of time, say for a child's trust.
- You have run out of retirement vehicles in which to put this investment.

It goes without saying that you have to accurately project security returns for these calculations to be meaningful. *This is a pretty heroic assumption.* But in the current environment, with relatively inexpensive high-yield debt and REITs, annuities deserve a look. If your accounts have no shelter and your time horizon is long enough, making your own deferral with a no-load, low-cost annuity just might make sense.



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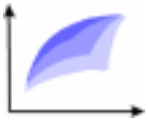


William J. Bernstein

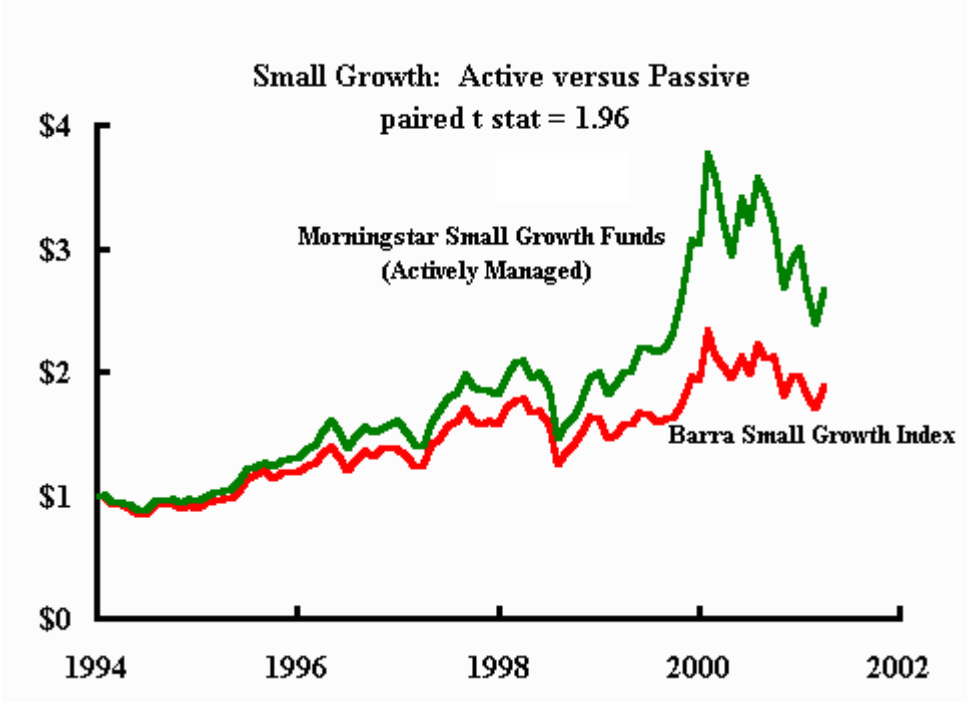
The Small-Growth Indexing Anomaly

Efficient Frontier regulars should be well acquainted by now with the futility of active management in almost all asset-class categories. As Jack Bogle points out, it's not higher math, but simple arithmetic: The gross return of the average fund manager must of necessity be the market return, since these folks are the market for all practical purposes. So the *net* return of the average manager must be the market return minus the average expenses. Because a low-expense index fund has about a 1% expense advantage over the average actively managed fund, it must of necessity beat it by about 1%. When transactional expenses (spreads and impact costs) are taken into account, the gap is even higher. Finally, since there is no evidence of persistence among the prior best performers, it is hopeless to seek managers who can beat the indexes in the long term.

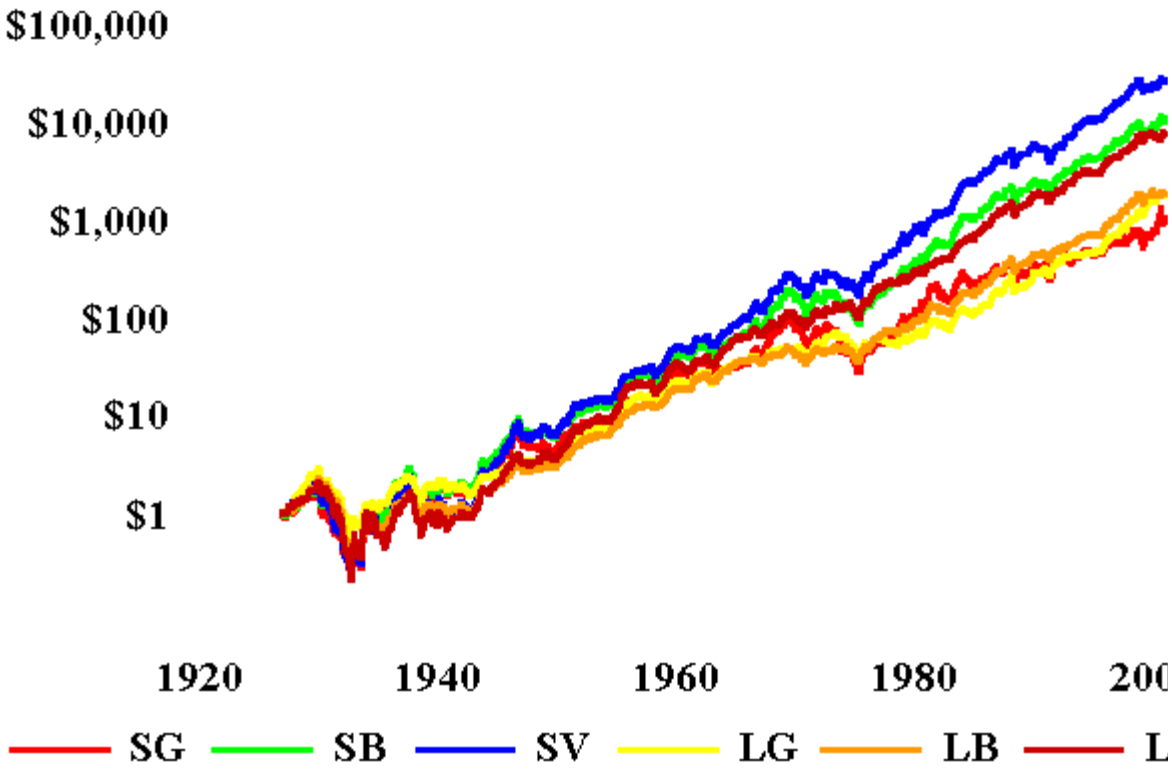
Active-fund proponents argue that certain areas are less efficient than others, particularly small- and mid-cap stocks. Let's take a look at some raw data. For the five years ending March 31, 2001, I calculated the percentile rankings of the appropriate Vanguard index fund or S&P/Barra index in its Morningstar category; note that 1 is the top percentile and 100 the worst.

Index Fund or S&P/Barra Index	Ranking
Vanguard Large-Cap Growth	28
Vanguard 500 Index Fund (Large Cap Blend)	20
Vanguard Large-Cap Value Fund	34
Barra Mid-Cap Growth Index	8
S&P 400 Mid-Cap Index (Mid-Cap Blend)	23
Barra Mid-Cap Value Index	24
Vanguard Small-Cap Growth Fund	73
S&P 600 Small-Cap Index (Small-Cap Blend)	63
Vanguard Small-Cap Value Fund	30

As you can see, these data do tend to support this notion, at least in the small-growth area, where 72% of actively managed funds beat the index. However, indexing retains its advantage in the small-value area. Focusing on the small-growth asset class, I've plotted the wealth of $1 invested in the Morningstar universe of small-growth funds versus the Barra Small Growth Index:



This is not an isolated bit of data mining—it shows up in multiple data samples using multiple techniques. There is no question that indexing small-growth stocks is a bad idea. As a practical matter, this is not of much importance to the individual investor, since small-growth stocks have the lowest long-term returns of any asset class, as can be seen from the following plot of the growth of $1 invested in each of the six Fama-French asset classes in the past several decades:

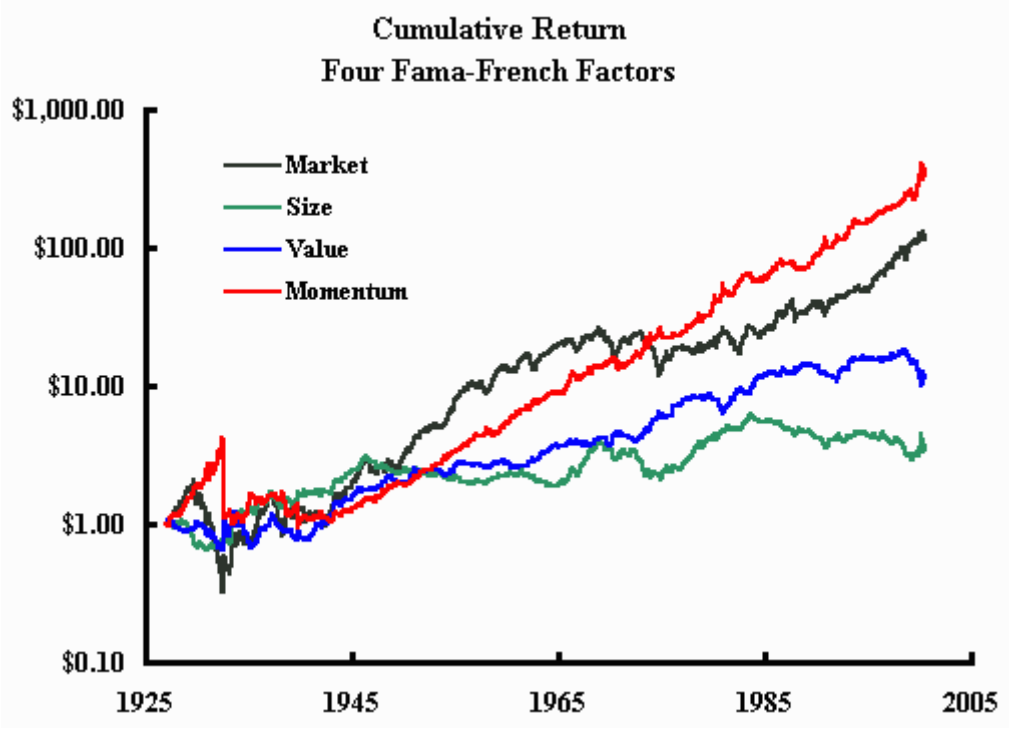


However, Mark Carhart, in his impressive study of fund persistence, found no evidence of persistence or superior performance even in the small-growth area. Of interest is the fact that he used *four*-factor analysis—the extra factor being momentum. Another Fama-French student, James Davis, in an

unpublished study, found much the same thing but with an interesting wrinkle. He used only the traditional three factors and found that active growth managers seemed to do better than value managers, with growth/value monthly alphas of 0.20%/-0.11% for large cap, 0.12%/-0.10% for mid cap, and 0.03%/-0.20% for small cap.

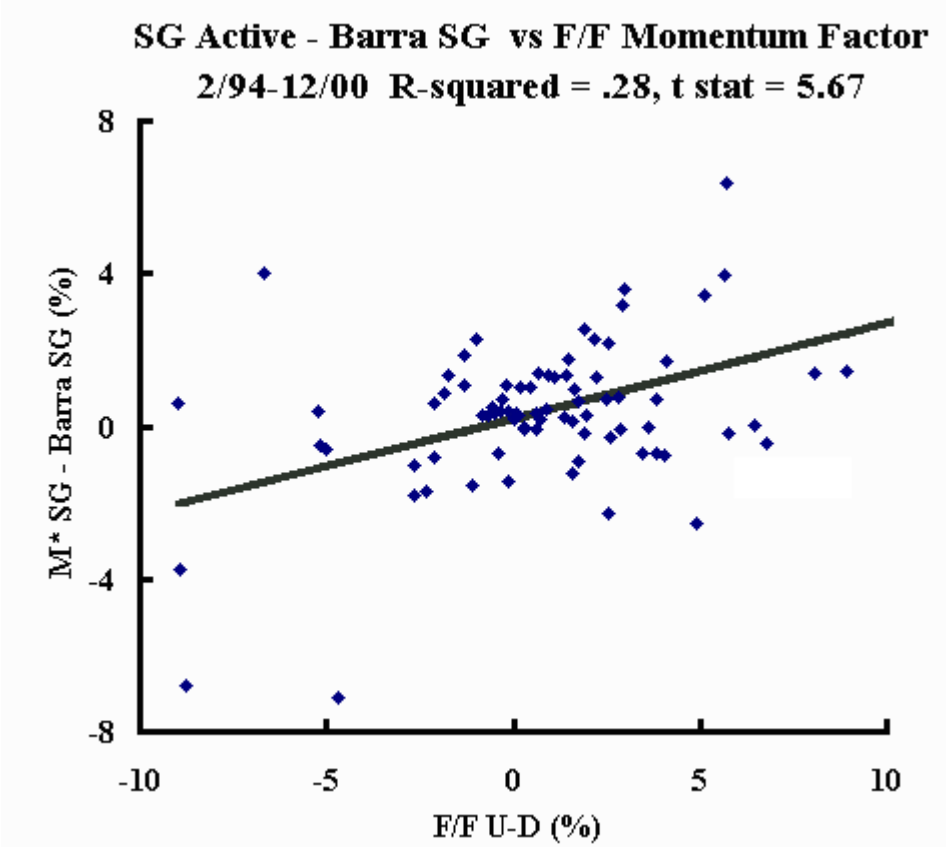
What's going on here? Why does small-growth active-manager outperformance show up in the raw data, growth active-manager outperformance in the three-factor analysis, but not in Carhart's four-factor analysis? Survivorship bias is one possible answer—Malkiel demonstrated that this was about 1.5% per year in general equity funds as a whole; it's certainly much larger with small-growth funds. But since January 1994, small-growth funds have beaten the index by 5.44% per year—surely the survivorship bias is not *that* large.

For some time, I've suspected that the answer to this riddle was momentum. Colleague Steve Dunn years ago pointed out to me the blistering performance of John Bogle (Junior!) at N/I Numeric Investors (he has since moved onto his own shop). At the time, Bogle *fils* was clearly a small-growth momentum investor. So I decided to look at how small-growth outperformance relates to the momentum factor. This factor is available, along with the other three, at Ken French's wonderful Web site. Here is a look at the cumulative returns of all four factors:



As you can see, the momentum factor is a powerful one, with returns about the same as the value factor. What's downright spooky about it, however, is how consistent it is after the great depression.

All this is prologue to the point of my whole exercise—the regression of the excess monthly returns of the active managers over the Barra Small Growth Index versus the momentum factor:



What this graph shows is that in months with high momentum returns (x-axis), the active managers tend to beat the index (y-axis). The data are quite clear, with a *t* stat of 5.67. What the small-growth managers are doing is holding onto their winners—"letting their profits ride."

There are a lot of unanswered questions about momentum as a returns factor. With its near zero SD, it seems to be almost a riskless play. But not a free one. These are monthly data points, formed by going long the best-performing 30% of stocks over the past 11 months and shorting the worst-performing 30% of stocks. So it's a very expensive strategy that cannot be completely captured in the real world. On the other hand, it is telling you that it's a bad idea to sell your winners in a small-cap portfolio. The slope of the regression plot is 0.25, suggesting that you get a quarter of the magnitude of the factor by playing it in a reasonable manner.

This is, of course, what a tax-managed small-cap strategy does. The above considerations would predict that a tax-managed index fund should beat a plain-vanilla one. And indeed this is the case: Since January 1999, DFA's Tax-Managed U.S. 6-10 Small Company Fund has beaten its older U.S. 6-10 Small Company Fund by almost 2% per year, and Vanguard's Tax-Managed Small Cap Fund has beaten the S&P 600 Index (on which it is based) by 0.69% per year (after expenses no less) over the past two years. This raises the interesting prospect that it may be worthwhile to hold a tax-managed fund in a retirement account.

Whether or not this turns out to be an historical curiosity is anybody's guess. Riskless excess-returns strategies tend to get arbitraged out of existence, and the momentum story is not exactly a secret. But if any investment behavior is hardwired into human nature, it is trend following. Students of the efficient-market-versus-behavioralist debate should be following future returns of the momentum factor with more than a little interest.

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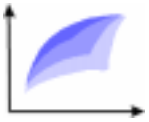


William J. Bernstein

What's Expected? What's Cheap?

If one characteristic separates the investment professional from the dilettante, it is the presence or absence of a cogent investment *strategy* and the type of information that informs this strategy. Even if you reject the Markowitz mean-variance analysis as the primary determinant of allocation policy (and we most emphatically do), you still need sensible estimates of the expected returns, volatilities, and correlations of a portfolio's component assets.

Of the three estimates, returns are the most difficult and critical. After all, one can be reasonably certain that over the next decade emerging markets equity will be more volatile than domestic equity, that equity in general will be more volatile than intermediate bonds and they in turn, more volatile than short bonds. One can also be fairly sure that the correlation between domestic large and small stocks will be greater than the correlation between foreign bonds and REITs. These statements are based on the fact that historical asset-class volatility and correlation are at least somewhat predictive of *relative* future values.

But no such qualitative statements can be made about asset-class returns. The fact that one asset class had returns far higher than another over many decades in no way implies that this will be true, or even have the same sign, going forward. My favorite example is the zero real return of long bonds for the 50 years ending 1984. In fact, simply looking at coupons in 1984 suggested that returns going forward were going to be much higher, as indeed was the case.

The best prediction of asset-class returns probably comes from simply adding the coupon or dividend rate to the dividend- or earnings-growth rate. (This is referred to, somewhat grandiosely, as the "Gordon equation" and falls out of the discounted dividend model.) John Bogle calls this simple sum the fundamental return. Unfortunately, in the short term this estimate often gets thrown for a loop by changes in asset-class multiple (or in Bogle's lexicon, by the speculative return). For example, if an asset valuation doubles in the space of a year, then that asset's return will be about 100%, since this will dwarf the contribution of the dividend and growth sum. But over long periods of time, the speculative return washes out, leaving only the fundamental return.

This article, then, is a *tour d'horizon* of our best estimates of the fundamental returns for the asset-class universe. Please, please, **do not take these estimates as short-term predictions**. (And by "short term" we mean anything less than 20 years.) As Newton famously said, "I can predict the motion of heavenly planets, but not the madness of human beings." Translated into Bogelese, all we can do is discuss expected *fundamental* returns. We'll leave speculative returns to Wall Street Week, CNBC, and the rest of the investment pornography industry.

The Big Picture

The traditional Chicago-New Haven-Santa Monica dogma is that one earns layers of risk premia on top of the return of the riskless asset, generally defined as Treasury bills. But in the past several years, things have gone seriously awry and it's worth looking at the scene through a wide lens. Over the past seven decades, the equity risk premium (the return difference between T-bills and stocks) has been 8%. Along the way, stocks have been a wild ride—with losses in real capital value greatly exceeding 50% on at least two occasions. But, consistent with classical theory, investors have been more than adequately compensated for bearing this

risk.

As we start the new millennium, things look "just a little" different. Stocks yield about 1.2%, and most serious observers would consider 5.5% to be a more-than-generous estimate of long-term earnings growth. Using the dividend discount model, that adds up to a fundamental return of 6.7% versus a 4.8% yield for short-term Treasuries: a risk premium of less than 2%. But it's even worse than it looks: with the burgeoning drought in the Treasury market, the "price of safety" has dramatically increased. One has only to climb a few short steps on the credit risk or duration ladders to get very near a 6.7% yield, equaling the expected stock return. So in 2001, any intelligent equity purchaser has to pretend that he's from Missouri: "Show me." In other words, "show me a reasonable argument for expected returns at least a few percent higher than my money market fund."

Class By Class

First, REITs. By law, real estate investment trusts must distribute almost all of their earnings as dividends, and thus have traditionally sported high yields. Currently, payouts average about 7%. Since REITs cannot accumulate substantial earnings, their growth tends to be at best sluggish, and they also tend to be at least moderately leveraged. What sort of growth can we expect? The NAREIT database shows that over the past 29 years, dividend growth has averaged about 3%. Unfortunately, this was about 2% *less* than inflation. So we can expect about a 5% real return. If inflation stays at about the historic 3% clip, we're looking at an 8% nominal return. This is only a tad higher than industrial stocks, and comes at the cost of higher risk. Further, it's worth noting that as recently as 18 months ago, yields were pushing 9%, following which REITs had the highest return of any asset class in 2000. So the "easy money" has already been made.

Next, junk. With B-rated bonds yielding about 12.2% and loss rates estimated at about 4.2%, we're also looking at about 8% nominal returns. (For more details about junk bonds, take a look at the "Credit Risk: How Much? When?" piece, in the Spring 2001 issue.)

For those who are risk-averse, it's tough to beat TIPS, which provide a 3.5% real yield. You can dial in the amount of inflation-protection you want by balancing maturities: the maximum comes with the 3.875s of April 2029, the cost of which is 28 years of "real interest rate risk." This is not the same thing (and certainly much less scary) than the inflation-driven bond horizon risk. After all, inflation is what you're protecting against. But if you prefer, maturities as short as nine months can now be purchased in the secondary market.

Last, and most definitely least, are garden-variety industrial stocks. Courtesy of Morningstar, I've listed below the price-to-earnings, price-to-cash flow, and price-to-book ratios of the various national and regional indexes by way of the appropriate Vanguard, iShares, and DFA funds.

	P/E Ratio	P/C Ratio	P/B Ratio
Domestic Indexes			
S&P 500	31.2	24.3	7.9
Wilshire 4500	30.5	26.5	6.4
Russell 2000	22.2	18.0	4.2
DFA U.S. 9-10 Small Company	21.2	15.2	3.4
Foreign Regional Indexes			

MSCI Emerging Markets	22.2	12.3	4.5
MSCI Europe	25.6	14.6	5.8
MSCI Pacific	33.1	14.0	2.8
Foreign Small Company			
Continental Small Company	17.7	9.9	2.7
Japanese Small Company	27.7	10.7	1.3
Pacific Rim Small Company	16.8	11.3	2.1
United Kingdom Small Company	19.9	13.7	4.5
Foreign Single Country			
MSCI Australia Index	22.8	13.8	3.4
MSCI Austria Index	17.4	6.2	2.0
MSCI Belgium Index	19.0	18.2	2.5
MSCI Brazil (Free) Index	14.9	N/A	3.1
MSCI Canada Index	24.3	20.2	3.4
MSCI France Index	28.1	14.5	5.4
MSCI Germany Index	23.3	7.5	3.4
MSCI Hong Kong Index	13.2	13.9	2.1
MSCI Italy Index	31.7	13.4	7.0
MSCI Japan Index	36.7	13.9	2.9
MSCI Malaysia (Free) Index	24.1	11.1	3.3
MSCI Mexico (Free) Index	15.4	9.6	2.0
MSCI Netherlands Index	22.8	13.9	5.2
MSCI Singapore (Free) Index	18.7	12.4	2.9
MSCI South Korea Index	23.2	5.7	2.0
MSCI Spain Index	20.5	8.6	3.6
MSCI Sweden Index	32.7	24.8	8.0
MSCI Switzerland Index	20.4	16.8	4.7
MSCI Taiwan Index	40.3	11.5	4.6
MSCI United Kingdom Index	23.5	15.5	5.1

Please remember that accounting methods in most foreign countries do not conform to GAAP (generally accepted accounting practices), so one should not conclude that the difference in ratios among individual nations and regions is reliably indicative of relative valuations.

Still, a few generalizations are possible. First, large-cap stocks are quite expensive in most of the developing world, with P/Es in the 25 to 30 range. The earnings yield of a market is a fair predictor of its future long-term real return: both the discounted dividend model and P/E predict a real return of about 3% for U.S. stocks. So at best, expect a 4% real return from large-cap foreign stocks.

Second, small stocks are somewhat cheaper than large stocks in most of the world, with P/Es in the 20 range. So expect perhaps a 5% real long-term return from them. The return of emerging

markets stocks may be even more: With dividend yields averaging 3% and earnings growth exceeding that of the developed world, real returns may reach 6% to 7%. But political and economic risks are high in this playground, and the notion of shareholder rights in most developing nations is a tenuous legal concept.

Finally, there's the value premium. This is almost impossible to estimate using the traditional methods discussed above, because most, if not all, of it arises from the slow improvement in valuations that occurs as doggy stocks become less doggy over time. This is a process impossible to model, but a general observation or two are in order. As recently as five years ago, if one had sorted the S&P 500 by P/E, one would have found that the top 20% of stocks typically sold at about twice the multiple of the bottom 80%—usually at about 20 and 10 times trailing earnings, respectively. As 2001 begins, the top 20% and bottom 80% of companies sell at 86 and 19 times trailing earnings—a more than fourfold difference between top and bottom. This is not nearly as bad as the sevenfold difference at the Nasdaq peak in the spring of 2000, but enormous nevertheless. So, absent a permanent New Paradigm, the historical 2% value premium seems a good bet, yielding large-value real expected returns of about 5% and small-value real expected returns of about 7%.

Finally, precious metals equity. Frankly, your guess is as good as mine. Long-term real returns seem to be in the 2% to 3% range, with current P/Es in the 25 range. But ultimately, the long-term return of this asset class depends largely on the market price of the shiny yellow metal. Lotsa luck.

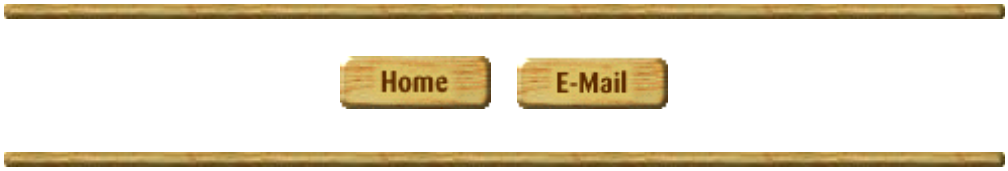
Pulling it all together then, here are our estimates of asset-class returns going forward.

Asset Class	Expected Real Return
Large U.S. Stocks	3%
Large Foreign Stocks	4%
Large Value Stocks (foreign and domestic)	5%
Small Value Stocks (foreign and domestic)	7%
REITs	5%
Junk	5%
Investment-Grade Corporates; TIPS	3.5%
Treasury Bills and Notes	2%
Precious Metals Equity	3%

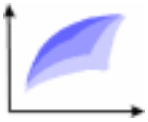
Understand that "expected" returns are just that. In finance, as in life, there is often a huge chasm between what is expected and what actually happens. Some of you may be tempted to take the above values and toss them straight into an optimizer, along with historical standard deviations and correlations. **Please resist this temptation.** (But if you do, I can tell you what will come out—a portfolio consisting almost entirely of foreign and domestic value stocks, particularly small ones.) Since the breakdown of Bretton Woods and the advent of increasingly active foreign-denominated derivatives, the currency markets have grown more and more volatile; this means that the gap between expected-versus-realized returns for foreign stocks is liable to be especially large.

In light of the above considerations, the prudent allocator might hold a bit more foreign and small stocks than normal, while still owning some of all the above asset classes. More importantly, the above estimates suggest that a higher than normal exposure to bonds, particularly TIPS, is advisable; if you're normally the 60/40 type, then perhaps 50/50 might not

be a bad idea.



Efficient Frontier



William J. Bernstein

Link of the Month: Face Time with Ken and Gene

From the advisory firm of IFA comes a series of streamed audio/video interviews with Ken French, Gene Fama, and Rex Sinquefield. Adds voices and faces to some of the most famous names in finance. You'll need to have Windows Media up and running. Works best with a broadband connection. If you're sipping through a phone line, use the Lo Fi or Audio buttons.

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