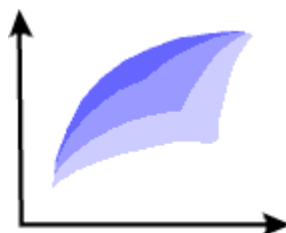# Efficient Frontier

An Online Journal of Practical Asset Allocation

Edited by William J. Bernstein

April 1999

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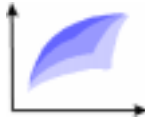
William J. Bernstein

The Investment Entertainment Pricing Theory (INEPT)

Stocks, Bonds, Bills, and Lottery Tickets

The interplay between return and risk is the heart and soul of the financial markets. You want high returns? Fine, prepare to have your bells seriously rung every now and then. You want safety of capital? OK, but forget about retiring to La Jolla or Provence.

And once you've decided to embrace risk in search of higher returns, it can't be just any old risk, it has to be systematic risk—the risk of the market as a whole, which cannot be diversified away. As Bill Sharpe is fond of pointing out, you're not rewarded simply for going to Las Vegas, or for taking the risk of investing all your assets in a nondiversified portfolio of stocks.

It's worth probing the good professor's *bon mot*. Consider a simple lottery ticket: Your one dollar purchase at the local convenience store is in reality a marketable security with a one week expected return of about minus fifty percent and a standard deviation in excess of one hundred percent. Clearly, a miserable asset class if ever there was one. Even its zero correlation with the rest of your portfolio does not redeem it. In Professor Sharpe's argot, it has a hideously low alpha.

And yet, folks buy these things. Why? Because a lottery ticket's return is only partly financial. What it lacks in strictly fiscal terms it makes up for in entertainment value. In other words, the low return is supplemented by the heady but short-lived fun of dreaming about spending the rest of your life on Maui. Taking this line of reasoning to its logical extreme, we can view a theater ticket as an investment with a return of minus one hundred percent, a standard deviation of zero, and very high entertainment value.

Does this model tell us something about investing? I think so. Even a cursory look at asset-class behavior provides some rich parallels. Initial public offerings (IPOs) come most readily to mind. There is a wealth of data demonstrating that IPOs in the aggregate return considerably less annually than the market and certainly with much greater risk. To quote Ben

Graham's exasperated summary of unseasoned offerings, "Why do folks buy this junk?" In my opinion, here's why: Because it's so much more fun taking a chance on finding the next Amazon.com or Iomega than owning Federal Screw Works or Caterpillar. In short, IPOs are the investment equivalent of a lottery ticket—one is in effect trading return for entertainment.

An even meatier example is seen in one entire corner of the market. Eugene Fama and Kenneth French (F/F) have shown that one can explain almost all of the returns of equity portfolios based on only three factors: market exposure, market capitalization (size), and price-to-book (value). According to F/F, all three factors are proxies for risk. While there is serious debate as to whether the higher return of value stocks is related to their inherent riskiness and whether in fact there even is a premium for small stocks, the fact remains that F/F's "three-factor model" does a crackerjack job of explaining domestic portfolio returns, with R-squareds of about 0.95 anywhere you want to look. There is one exception, though—small growth stocks—which seem to have had returns much lower than predicted by the model. How much lower? I've plotted the growth of one dollar of the four style-corner portfolios since 1927:
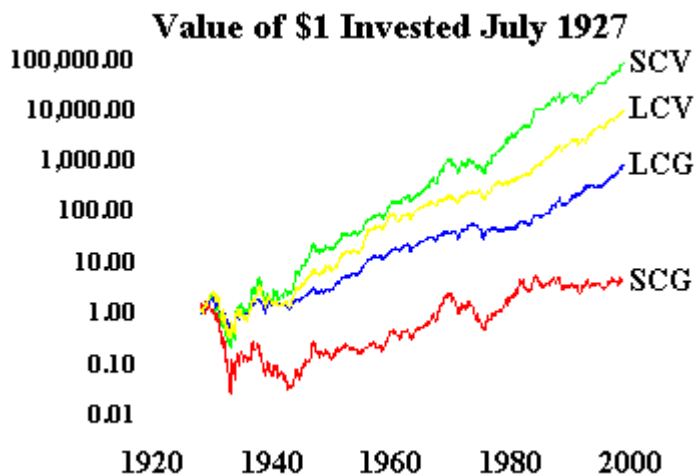
The returns of small growth stocks are ridiculously low—just 2.18 percent per year since 1927 (versus 17.47 percent for small value, 10.06 percent for large growth, and 13.99 percent for large value). It should be noted that the above returns are for hypothetical portfolios: the returns of real portfolios using the above methodology are lower still, particularly for small stocks, because of little things like commissions, bid/ask spreads, and market impact.

In fact, the F/F model successfully predicts the returns of stock portfolios of a given size and value status with one significant exception: small-cap growth stocks. In this one case, portfolios of small-cap growth stocks have had annual returns several percent per year lower than predicted. Since these are your best shot at a Peter Lynch ten- or hundred-bagger stock, they are not simply securities, but also lottery tickets. It's not unreasonable to suppose

that because of their entertainment value, their expected returns are lower.

The burgeoning world of mutual funds is rich with examples as well. Go with Heikko (of the notoriously volatile American Heritage Fund) and you will be well entertained, but likely not well compensated. Rumble with the "Tough Guys" (of the Kaufmann Fund) and fulfill your investment Rambo fantasies… and again, most likely, you will pay the piper on the bottom line. (A small personal confession: For years I've been mildly amused by Ralph Wanger's well-written Acorn Fund quarterly reports, and over the past decade I too have paid the price.)

The Fourth Factor

To recap, F/F decompose portfolio returns into three factors: market exposure ("Mrk"), size (small minus big, or "SmB"), and value (high book-to-market minus low book-to-market, or "HmL"). I propose a fourth factor for the excess returns offered by dull stocks. Using F/F's nomenclature, I designate this factor "dull minus boffo," or "DumB." DumB differs from the three classic factors in that it carries no discernible financial risk. Unfortunately, however, in finance there are no free lunches: Seek the excess return of DumB stocks and you suffer a major tedium penalty, forgo bragging rights, scintillating cocktail party chatter, and the pleasure of having Dan Dorfman plug your holdings.

Where do you find DumB? With disciplined, low-key managers. With low portfolio turnover. And, of course, with that mother lode of dullness—index investing, preferably in out-of-favor asset classes.

I propose to name this concept the "investment entertainment pricing theory," or "INEPT." Over short time periods, small growth stocks and IPOs can do very well, but in the end, investing in DumB stocks is the safest way to avoid becoming an INEPT investor.

> *Editor's Note: Four weeks after this article was written, the Chairman of the Federal Reserve Board appeared before the Senate Budget Committee, and explained the excessive valuations of internet stocks in terms of a "lottery premium." EF's Internal Affairs Division swung into action, and the source of the leak was swiftly pinpointed. Prompt and merciless punishment was administered—the perpetrator's rations of tiramisu and chianti were drastically curtailed. EF assumes no liability for market or economic dislocations caused by the unauthorized use of its intellectual property by Central Bankers, foreign or domestic.*
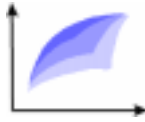
Efficient Frontier

William J. Bernstein

When Indexing Fails

When an asset class does relatively well, an index fund in that class does even better. - "Dunn's Law"

Yea, the wise Prophet Bogle brought knowledge to the masses, and they saw that it was good. In fact, better than good. S&P indexing has done so well that sometime this year, failing apostasy or Armageddon, the Vanguard 500 Index Fund (VFINX) will surpass Fidelity Magellan as the planet's biggest mutual fund.

The reason is simple. VFINX has beaten 83, 93, 95, 89, and 92 percent of all mutual funds in its Morningstar class over the past 1, 3, 5, 10, and 15 year periods, respectively.

Unfortunately, the news for indexing is not that sunny elsewhere. Consider that the same numbers for the granddaddy of all small cap index funds, the DFA 9-10 US Small Company Portfolio (DFSCX), are 31, 29, 70, 57, and 43 percent, respectively. And for foreign funds the data are all over the place: 86, 46, 71, 9, and 100 percent, respectively.

What are we to make of this? Is indexing really *that* good for domestic large cap stocks? And is it *that* bad for small cap stocks? And just how good is it, really, for foreign stocks?

The Importance of Style

The plaintive cry of the active money manager goes something like this: "Just you wait. Of course we've not been able to beat the S&P over the past several years. Our portfolios hold smaller stocks, and we carry cash for a rainy day as well. Some day the market leadership will shift away from the megacaps, or we may even have a bear market. Then you'll be sorry you didn't heed our warnings against the false gods of indexing." Still others admit the superiority of indexing large cap stocks but argue that small cap and foreign markets are less efficient and therefore require active portfolio management.

Well, there is a grain of truth to all this. It turns out that when small stocks

outperform large stocks, indexing doesn't look quite as good. I've plotted the annual percentile ranking of VFINX for 1987-98 in each year versus the large stock advantage, i.e., the difference in return between large and small stocks. (The percentile rankings are for the combination of Morningstar Growth and Growth/Income categories, and the large stock advantage is calculated as the return of VFINX minus the return of DFSCX.)

VFINX vs Size Effect
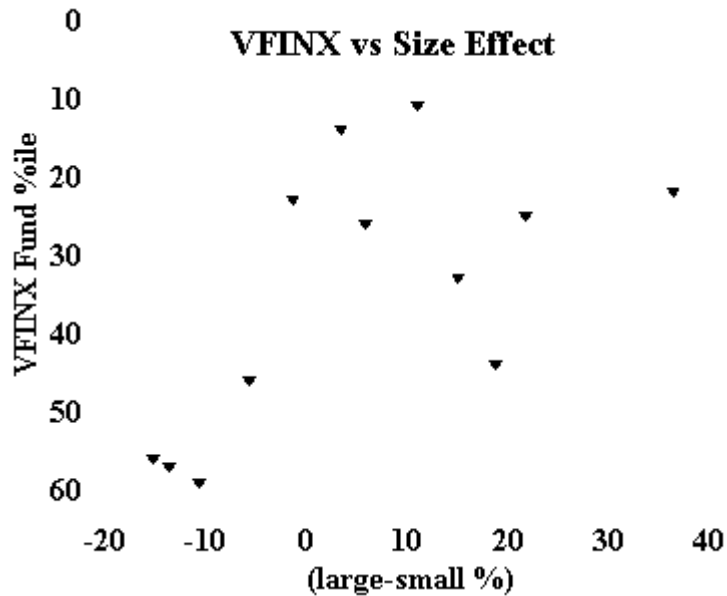
As you can see, in those years when large stocks out performed small stocks (left side of graph), VFINX's percentile rankings were superb. And, when small stocks outperformed large stocks, (right side of graph) VFINX did not do quite so well. Using statistical regression techniques, it is possible to calculate that in a hypothetical year when the returns of large and small stocks are the same, VFINX should land in the 38th percentile.

Small May Still be Beautiful

The same phenomenon applies in reverse to small caps. Because many, if not most, small cap funds are contaminated with some larger stocks, one might reasonably expect small cap indexing to work best when small cap returns exceed those of large caps. For 1987-98 this is exactly what happens:
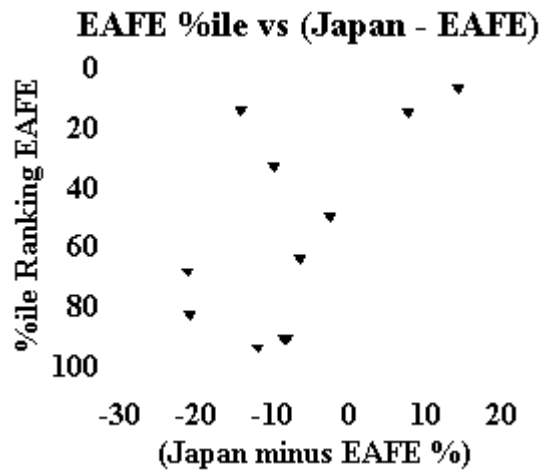
DFA 9-10 Fund vs Size Effect
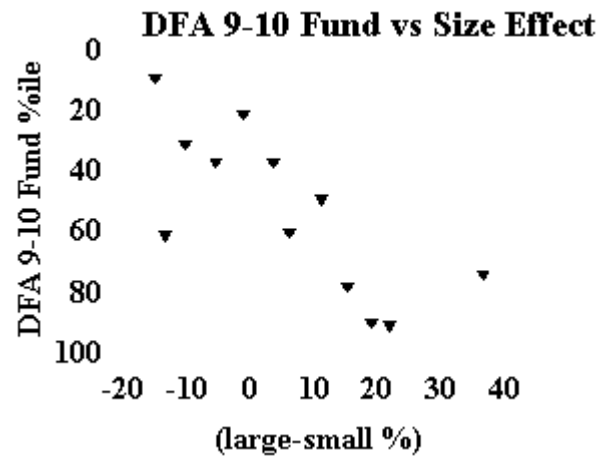
This graph shows that when small caps outperform large caps (left half of graph) DFSCX does best relative to its peers (in this case, Morningstar's small cap prospectus objective category). And when small caps underperform large caps (right half of graph) DFSCX underperforms its small cap peers. Regression techniques show that in a hypothetical year when long term small and large caps have equal returns, DFSCX should perform at the 48th percentile. Although DFSCX's "regressed" performance assuming equal large and small cap returns is not spectacular, if one assumes that there is in fact a small cap return premium over larger cap stocks, then in an average year, a small cap index fund which is wholly invested in small cap stocks should do relatively better. Whether or not there actually is a small cap premium is a matter of some dispute, but it's interesting to note that if the small cap premium does exist, it would act to boost the relative ranking of small cap index funds, and reduce that of large cap index funds.

The Japan Problem

A similar problem plagues the analysis of foreign indexing, and it sticks out like a sore thumb. Had you decided to index your foreign holdings 10 years ago to the most widely used foreign stock benchmark, the MSCI-EAFE (Europe, Australia, and Far East), then when you started on January 1, 1989 your portfolio would have been more than 50 percent Japanese. Look out below! Had you been able to buy the EAFE as an index fund, it would have ranked 40th of 44 foreign funds Morningstar lists for the period. I've performed the same sort of analysis for foreign funds for 1987-98, using annual percentile rankings for the MSCI-EAFE as if it were a fund. In this case, the performance of the Japanese market relative to the EAFE as a whole was plotted on the x axis:

EAFE %ile vs (Japan - EAFE)

%ile Ranking EAFE

0
20
40
60
80
100

-30   -20   -10   0   10   20
(Japan minus EAFE %)

Again, when the Nikkei performed well relative to the rest of the non US markets (left side of graph) international indexing did well. On the right side of the graph, the reverse is true. Regressing assuming equal Japanese and EAFE performance, in an average year an EAFE index fund should perform at the 41st percentile. Over longer periods, it should do much better. In fact, Morningstar lists 12 international funds with 15 year track records, and the EAFE beat all of them, in spite of the fact that over this period the Nikkei trailed the EAFE by 5.49 percent per annum.

One can demolish the market inefficiency argument for active foreign management in a heartbeat by examining actual emerging market performance. Surely, if there are exploitable inefficiencies abroad they are to be found in places like Brazil, Korea, and Indonesia. Yet the emerging market index funds from DFA and Vanguard have 3 year percentile rankings of 30 and 38, respectively. Both index funds are just shy of having a 5 year track record, but if one substitutes emerging market index returns to fill in the missing months, despite some shorter periods of subpar performance the DFA and Vanguard funds would rank 3rd and 4th of 20 funds, respectively, for the 1994-8 period.

Dunn's Law: Other Asset Classes

My friend and portfolio theory colleague Steve Dunn nicely codified the observation that the short term fortunes of an index fund are tied to to that of its asset class. In other words, if asset class X is doing relatively poorly, then an index fund which is wholly invested in that category will tend to lag actively managed funds *even in that asset class* given their more diffuse portfolios. Examples other than those cited above abound. If the MSCI Japan was an index fund, then it would rank only 4th of 7 Japan funds with a 5 year track record. In fact, the worst was the DFA Japan Small Company Fund, cursed by both that market and its hideously negative small cap premium. (This particular fund makes the list of "worst" or "best" fund in

the foreign category with alarming regularity, depending on the year. In fact, it is neither a good nor a bad fund—it is an index fund whose fortunes, unlike its managed cousins, are wholly tied to the fate of a single narrow asset class.)

The DFA Real Estate Index fund ranks 9th of 12 REIT funds over the past 5 years. On the other hand, the Vanguard Index European Fund ranks 3rd of 23 continental funds during the same period. It is no accident that over the past 5 years REITs and Japan have been poorly performing asset classes, while European stocks have done about as well as the S&P 500. The point, of course, is this: over long enough time periods the returns of various equity asset classes tend to converge, washing away the short term deleterious effects of Dunn's Law. What remains is:

The Index Fund Advantage

In fact, index funds possess advantages over actively managed funds which become almost insurmountable over the long haul. To demonstrate this I've extracted from the Morningstar fund universe data which allows us to calculate this advantage. Let's start with simple fund expense ratios and turnover:

	Expense Ratio	Turnover
Average Morningstar Large Blend Fund	1.21%	68%
Vanguard Index 500 Fund	0.19%	5%
Average Morningstar Small Blend Fund	1.44%	72%
Vanguard Small Cap Index Fund	0.23%	29%
Average Morningstar Foreign Fund	1.71%	72%
Vanguard Total International Index Fund	0.37%	6%
Average Morningstar Emerging Markets Fund	2.11%	91%
Vanguard Emerging	0.57%	19%

Consider the large cap category. The Vanguard Index 500 Fund has an expense advantage of 1.02 percent (1.21 minus 0.19) over the average managed fund in its class. But that's not all. Note that it has 63 percent less portfolio turnover than the average managed fund (68 minus 5). The average buy/sell spread for large cap stocks is about 0.40 percent, so the decreased turnover results in another 0.25 percent advantage (0.63 times 0.40 percent). But we're still not done. Buying and selling the large blocks involved in fund transactions results in so-called "impact costs." In other words, when the Amalgamated Capital Depreciation Fund decides to dump a million shares of XYZ widgets, the resultant price decrease will reduce the price those shares will fetch. The opposite happens on the buy side. This effect is difficult to measure and, of course, varies with the size of the fund. Let's estimate it as equal to the spread, adding another 0.25 percent. Thus, in the large cap arena the "index advantage" is about 1.5 percent.

The advantage of indexing is even more impressive in small caps and abroad. In these arenas buy/sell spreads start at about 1 percent and increase as company size falls. Performing the same calculation for these two categories gives a total index advantage of about 2.5-3.0 percent. Finally, in the emerging markets arena the buy/sell spread averages about 2 percent, yielding an index fund advantage of about 4.5 percent. So, contrary to the conventional wisdom, indexing should be most advantageous in the *least* efficient markets.

Summing Up

Because of the recent dominance of large cap performance, large cap indexing looks much better than one would expect and small cap indexing much worse. However, it must be realized that the recent prolonged large cap dominance is unprecedented, and unlikely to continue. Over the long term, because of its relatively greater cost advantages, and the small cap premium to the extent it exists, small cap indexing should actually do better than large cap indexing. The 15 year record of international fund performance and the more recent data with emerging markets seems to confirm the enormous theoretical advantage of indexing these markets.

So yes, Virginia, indexing works almost everywhere, but over periods as long as 15 years its rewards may be distorted in either direction by factors such as the small stock premium and returns divergence among nations. Over the long haul, though, the benchmark is your friend. Use the force, and not just at home.
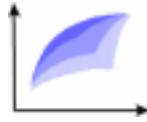
Efficient Frontier

William J. Bernstein

The Magic of Percentile Compounding

One of the wonders of financial journalism is the ink wasted on the reporting of short term money manager rankings. Most serious observers know that fund rankings over monthly, quarterly, or even annual periods are virtually meaningless. The importance of the of the time period examined cannot be overemphasized. In the previous piece I showed that we can expect 40th percentile index fund performance in an average year, but that it is not unusual to find an index fund at the bottom of the pile in any given year. In fact, it is not unusual to see index funds underperform for far longer periods. But the more years you string together performance averaging at the 40th percentile, the better indexing looks. The easiest way to think about this is to consider a decathlon competition with 100 entrants. An athlete who averages 40th place in the 10 events will pbobably come in about 15th overall, and the winner's average performance in each event is likely to be not much better than 20th. Over the longest evaluation periods available for large cap domestic, foreign, and emerging markets fund returns indexing shines. Only in the small cap arena, where index fund returns are hobbled by the poor performance of the index as a class, is the issue in much doubt.

Assume that you've just arrived from another planet, and are looking for a place to park the fortune some guy from Pentagon Ordnance paid you for your hyperspace transport module. Being good with numbers, you collect daily returns for the stock market, and discover to your horror that 49 percent of the time its return is lower than t-bills. Consider what would happen if the financial media ranked mutual funds every day. We'd be treated to headlines like "Treasury Money Market Funds Shine on Groundhog Day!" 49 percent of days you'd conclude that you were better off in cash. Extending our horizons, 38 percent of months and 28 percent of years had negative returns. Only when intervals longer than several years are chosen do negative returns largely disappear. The same thing is true of index fund performance. Any measurement period of less than 5 years is meaningless, and periods as long as 20 years may be necessary to demonstrate indexing's superiority for some asset classes.

Let's see how this plays out over long time periods. Let's take the easiest

case to understand—large cap US stocks. In the previous piece we calculated a 1.5 percent index advantage in this area. The average spread of annual fund returns can be measured by calculating the standard deviation ("SD") of individual fund returns for a given year. For large cap funds, this averages about 7 percent. So, in an average year the index will perform about $1.5/7 = 0.21$ SD above the mean, meaning that it will place in the 42nd percentile. {For those of you without training in basic statistics, this is calculated by plugging 0.21 SD into something called a "normal distribution function," which can be found on all spreadsheets. For example, in Excel you would enter =NORMSDIST(0.21).} So far, so good. Statistical magic transpires as the years pass. The index fund advantage will still be 1.5 percent each and every year, but the SD of fund returns decreases by the square root of the number of years. The SD for 15 years will thus be 7/sqrt $(15) = 1.81$ percent. So now the index fund performs $1.5/1.81 = .83$ SD above the mean, putting it at the 21st percentile. And at 30 years it's at the 13th percentile. Again, this may be a bit difficult if you're unfamiliar with statistics. I've represented it graphically below with a bell curve diagram:
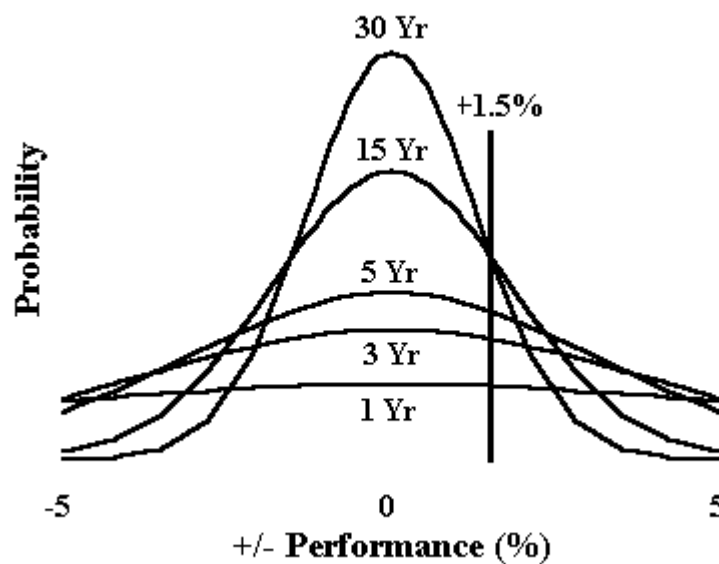
As you can see, the 1 year curve is a very wide, flat pancake. Moving 1.5 percent off center doesn't get you very far out the curve. As the time period increases, the distribution curve of fund performances becomes very thin and peaked. Moving 1.5 percent to the right on the 30 year curve leaves seven eighths of the active funds in the dust, off to the left of you.

Plugging in the same kind of data for small caps and internationals from the previous piece puts you at the 5th percentile after 15 years, and for emerging markets at the first percentile. I've not done extensive analysis for bond funds, but for long duration high grade corporate funds the index advantage is about 0.8 percent, with an average fund return SD of about 2 percent,

which yields the same magnitude of index fund advantage as seen with emerging markets portfolios. If you'd like to download the very simple Excel spreadsheet which does this calculation, <u>click here</u> .

From a theoretical viewpoint, indexing seems like a no brainer in all stock categories. In the real world, of course, the pretty bell curves shown above can get knocked into rather untidy sand piles by things like the small cap premium and variance among national market returns for considerable periods of time.

However, in the long run, the relentless push of the indexing advantage will eventually overwhlem these factors and result in agreeable performance.
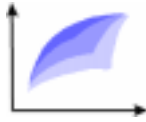
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Efficient Frontier

William J. Bernstein

Small Cap Growth Indexing and the Multifactor Threestep

Unless you've just spent the last decade looking for Elvis, you know that indexing most asset classes will beat most active managers. From time to time a majority of active managers in a given asset class will beat indexing, but this usually doesn't last very long. Not true with small cap growth stocks, which is one of active management's few persistently bright spots. Were the Wilshire small cap growth index a fund with no expenses, then it would have ranked 121st out of 173 SCG funds for the past 3 years, 50th out of 86 over 5 years, 25th out of 30 over 10 years, and 5th out of 10 for 15 years. Recall Dunn's Law, from the previous piece, "Where Indexing Fails:"

> *When an asset class does relatively well, an index fund in that class does even better.*

It follows that if you've invested in a bad asset class, it's better to be in an actively managed fund. The trouble with SCG is that it just hasn't had a bad 3, 5, 10, and 15 years. It's had a bad *seventy* years, as you can see from data by a study by Fama and French, alluded to in the article in this issue on investment entertainment value:
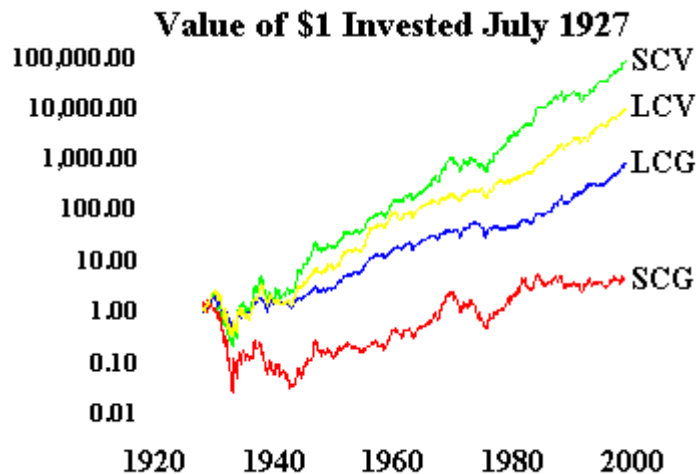
In contrast, over the past several years large growth stocks have been the

place to be. It's thus no accident that the Vanguard Index Growth Fund placed 4th of 185 funds in the Morningstar large growth category over the past 5 years. John Bogle covers this territory well in his famous "Tic Tac Toe" speech. Below is a figure from that piece which displays the added return of indexing over the average fund in the 9 Morningstar style categories:

Added Index Return

	Value	Blend	Growth
Large	+2.8	+1.8	+1.5
Medium	+2.9	+1.5	-0.4
Small	+3.1	+0.6	-2.8

Note the superiority of indexing almost everywhere except the lower right corner of the figure, where indexing cost 2.8 percent pa. This is where small growth lives. The farther away you get from this corner of the diagram, the better indexing looks.

Clearly, this entire corner of the equity market is a swamp, and to fully expose it it's worth a long but meaty digression into the Heart of Darkness of finance academia: the dreaded 3 Factor Model.

In June of 1992 academicians Eugene Fama and Kenneth French ("F/F") rocked the investing world with a study published in the *Journal of Finance*, innocuously entitled "The Cross-Section of Expected Stock Returns." The piece is the cognitive equivalent of an enormous hunk of marzipan cake which sits in your freezer for months—there's no way you'll get through it in one whack, and is properly consumed only in small sittings. In fact, unless you've gotten considerably beyond Stat 101, it's probably best avoided. So, here's the short course:

- "Beta," the measure of market exposure of a given stock or portfolio, which was previously thought to be the be-all/end-all measurement of stock risk/return, is of only limited use. F/F convincingly showed that this parameter did not predict the returns of all equity portfolios, although it is still useful in predicting the return of stock/bond and stock/cash mixes.

- The return of any stock portfolio can be explained almost entirely by two factors: Market cap ("size") and book/market ratio ("value"). The smaller the median market cap of your portfolio, and the doggier the stocks, the higher its expected return. F/F viewed both size and value as risk factors, for which one is rewarded with extra return. The term

"book/market ratio" generates some confusion. This bit of Famafrenchspeak is the inverse of the more familiar "price/book ratio." Thus, a high book/market ratio means the same thing as a low price/book ratio—value. In Famafrenchspeak, high book/market is acronymed "HBM."

Using the above formulation, F/F created a powerful 3 Factor Model ("3FM") for predicting the returns of any given stock portfolio. The 3 factors are as follows:

1. "Market Factor." This is the return for for being exposed to stocks and is calculated as the return of a broad basket of stocks, the CRSP 1-10 Decile portfolio (roughly equivalent to the Wilshire 5000), minus the T-Bill return.

2. "Size." This is the return of small stocks minus that of large stocks. When small stocks do well relative to large stocks this will be positive, and when they do worse than large stocks, negative.

3. "Value." This is the return of value stocks minus growth stocks, which can likewise be positive or negative.

Let's say you have a money manager whose performance you want to evaluate. Traditionally, you'd pick a benchmark appropriate to their investment style – the Russell 1000 Value Index, say, for a large cap value manager, and compare returns. The problem is that maybe the manager owns some growth stocks, or perhaps some small stocks. Except in very rare instances, it is impossible to pick a precise benchmark against which to meaningfully measure his/her performance.

The 3FM trumps this problem. Remember that each of the 3 factors has a return, just like a security. One simply matches the manager's series of monthly returns against the returns for the 3 factors and performs a multiple regression analysis. (This sounds formidable, but in the microprocessor era can be accomplished by a secretary with a spreadsheet.) The salient outputs from this analysis are as follows:

1. "Loading values" for each of the 3 factors—i.e., how much the manager is exposed to the market, small size, and value. The "market loading" typically will be the same as a fund's equity exposure—1.0 for an all equity fund, 0.5 for a fund with 50 percent stock. The "size loading" reflects the median market cap. In the convoluted logic of academic finance, a high size loading signifies small stocks, a low one large stocks. The S&P 500 has a size loading of about -0.16, whereas the CRSP 9-10 decile (very small stocks) has a size loading of +1.18. Lastly, the "value loading" reflects whether the fund behaves more like a value or growth fund. A high value signifies a value orientation, a low value a growth orientation. Values range from about +0.5 for value portfolios down to -0.15 for growth portfolios.

2. An "R squared," which measures how well the portfolio's returns are explained by the model.

3. Most importantly, an "alpha," or the amount by which the manager has led or lagged the custom benchmark provided by the 3FM.

Let's look at a typical example. I regressed the monthly returns of the highly regarded Tweedy Browne American Value (TWEBX) fund for the period 1/94-9/98 against the 3 factor return series, and came up with these outputs: The "market loading" was 0.92, about what one would expect for a fund which typically carries about 8-10 percent cash. The "size loading" was 0.12, again, reflecting that this is a mid-large cap fund. Lastly, the "value loading" was 0.37, indicating that this fund is true to its value orientation. The R-squared of the regression fit was 0.92. In other words, the 3FM explains 92 percent of the monthly returns. This is a bit lower than the 0.95 usually seen with domestic funds and is due to the fact that TWEBX carries about 15 percent foreign equity. So, a pretty good fit, but not perfect. Disappointingly, the fund's alpha was -0.08 percent per month. In other words, you'd have been better off indexing by 1.0 percent pa. This fund actually did beat the model before expenses, but the 1.4 percent expense ratio gobbled it up, and then some.

In fact, viewed on the pathologist's slab of the 3FM, precious few managers earn significantly positive alphas over the long term. And, needless to say, a past positive alpha does not predict a future one.

Which gets us back to F/F's original data. The June 1992 study aroused cries of anguish from the owners of a wide variety of gored oxen, the most salient of which was that F/F were "data mining," i.e., their results were an artifact of the 1963-90 study period. Fair enough, F/F said, so they dug up a pile of stock manuals from the 1929-63 period, and redid their study. The 1929-63 data was almost identical to the later data (which they extended to 1997). If you're a glutton for punishment, this paper is available online. (Strangely enough, I've not been able to find the original '92 paper on the web.)

Fama and French calculate loading factors, R squareds, and alphas for portfolios formed on size and book/market ratio, and as might be expected found very high R squareds and near zero alphas in almost all areas. (It is a bit of a tautology to calculate these parameters from portfolios from which the regression data is itself drawn, but no matter.) One bit of data sticks out from both periods like a sore thumb—small growth (or, in F/F lexicon, "S/L") stocks. There the alphas were -0.53 percent per month for the earlier period and -0.22 percent per month for the later period, or about -6.5 percent and -2.5 percent per annum, respectively.

So, we're dealing with a very bad actor here—an asset with low returns and ferocious risk. (I did mention that the standard deviation of small growth stocks is over 50 percent higher than the market as a whole, didn't I?) The

reasons for this underperformance (the "lottery ticket" phenomenon) are discussed elsewhere in this edition.

Back to Dunn's Law and small growth investing. These stocks are characterized by poor returns. Period. The active manager, who is free to sneak into his/her portfolio a little bit of Caterpillar or Merck, will benefit, but for the indexer there is no escape. In other words, active small growth managers succeed to the extent that they are free to invest elsewhere.

There is a certain irony here. The key to becoming a successful small growth manager is to first get yourself classified as one, and then avoid the real item. This happens automatically through asset bloat. Successful SG funds rapidly attract large inflows, and must of necessity invest in larger companies, slowly extricating themselves from Investing's Bermuda Triangle.

There's also another factor involved, and that's momentum. If you're running a small cap growth index fund you are going to sell your fastest growers as soon as they increase beyond a certain market capitalization, whereas the active manager is more likely to hold onto such a stock. This shows up rather nicely in F/F's data. For all four of their "style corners" they examine two different strategies. The first is involves selling a stock as soon as it moves beyond strict size and valuation parameters. Because this requires relatively high turnover, a second strategy is also examined, in which a "hold range" (in their terminology, "RGE") is established. This is a sort of buffer zone beyond the index's usual borders within which the stock is not sold.

For SCG for 1963-98, the strict portfolio strategy return was 10.46 percent, versus 11.93 percent for the RGE strategy. In other words, 1.47 percent of extra return was obtained by holding onto the winners a bit longer. In contradistinction, the returns for SCV were 17.82 percent for the "strict" strategy and 17.21 percent for the RGE strategy. In this case, you were 0.61% better off selling SCV stocks as soon as they got out of range, at least theoretically. F/F believe that the RGE disadvantage in this category is outweighed by the reduced trading costs.
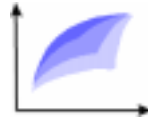
But the big picture is that with small stocks value beats growth by a wide margin. Whether your approach is active or passive, the best advice about small growth investing is to just say no.

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Efficient Frontier

William J. Bernstein

The Death of Diversification

The financial media transforms recent history into conventional wisdom with the same facility that Hormel cranks out sausage. 30 years ago only the most financially adventurous strayed abroad— the risks were just too great, and the go-go domestic markets of the 60s provided more than adequate returns. However, by 1986 every financial analyst and his dog was trumpeting the superior returns of foreign equity. No matter that almost all of those gains came from currency appreciation, which was not liable to recur.

We've come full circle. As of year's end, the 5 year return of the S&P 500 was *14.6 percent higher on an annualized basis* than for foreign stocks, in large part because of the Japanese financial debacle. Financial pundits now tell us that the practice of international diversification is as dead as John Cleese's parrot. The final nail was driven into its pitiful coffin by none other than Roger Lowenstein in his widely read "Intrinsic Value" column in the *Wall Street Journal* on December 18, 1997 entitled " '97 Moral: Drop Global-Investing Bunk."

Mind you, Mr. Lowenstein is one of the savviest folks around. Unlike most media gurus, he refuses to be spoonfed mindless pap about market direction from publicity hungry wire house "analysts" and "market strategists." He's one of a handful of financial journalists who have real expertise with number crunching. He does have the odd blind spot, the most obvious of which is his insistence that there is something out there called investment "skill." When the lack of statistical evidence of such among mutual and pension fund managers is pointed out to him, he'll tell you about Buffett (no argument there) and remark about the many hedge fund managers he knows with stellar records. The question is, of course, why aren't there more Buffetts, and why is it that the best anecdotal evidence of investment skill comes from areas with less than transparent performance verifiability.

The gist of his column was that in 1997 a global portfolio was the financial equivalent of an afternoon of root canal work. (And 1998 was much *worse* than any white knuckle trip I've had in the dental chair.) Further, according to Mr. Lowenstein foreign investing is *cetus paribus* unsound—in his words, "terra incognita." In other words, US investors should invest in the companies that they know the best:

> . . . the burden of proof should be higher away from home. For one, familiarity is an investor's ally. For another, while capitalism is revered in the U.S., it is fragile in may other parts. Disclosure is poor, currencies are risky and the shareholder in New Delhi or even in Amsterdam doesn't have the paramount place in law and in culture that he holds in Kansas City.

The notion that simple familiarity with GM cars or Microsoft software translates into higher returns and lower risks for the domestic investor strains credulity. First and foremost, almost all of the major capital markets of Europe have histories stretching much farther back than the Manhattan buttonwood tree. Second, and more important, the notion that the informational superiority of the US markets somehow enables both small and institutional investors to obtain superior returns is ludicrous on its face. By definition not everyone can earn above average returns, even on the sunny New York Stock Exchange. More importantly, it would seem obvious that it is easiest to earn superior returns in those markets which are *least* informationally efficient. If your goal is to lead the pack, the most difficult playing field is going to be US large cap stocks. In fact, the evidence that *anybody* can product sustained above market returns in this arena is marginal at best.

There is in fact no *a priori* reason to expect that the returns for foreign equity should be any different than for domestic equity. That investors in Sao Paulo, London, or Hong Kong would accept market prices high enough to provide returns lower than in New York in the era of keypad arbitrage is hard to swallow. It turns out that over the 29 years since Morgan Stanley first began to compile the EAFE index of non-US stocks, the return of the EAFE and S&P 500 have been almost identical. I do not believe that this is an accident. Over shorter periods, of course, returns have been very different. I've plotted below the difference in trailing 5 year annualized returns between the S&P 500 and the EAFE (US$). The negative values seen in the first decade of the graph signify higher returns for the EAFE, the positive values in the last decade higher returns for the S&P.

5-Year Trailing SP500-EAFE Gap
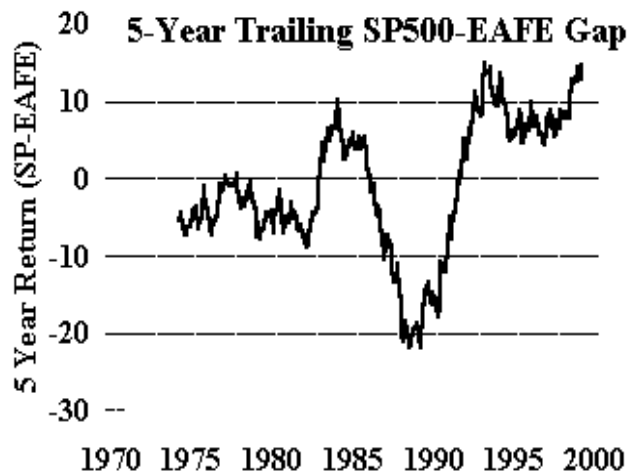
As you can see, over long enough periods the plot seems to dance around the x axis. Is there any guarantee that the future will also demonstrate mean reversion in the foreign-domestic return difference? Of course not, but if I had to place money (and we all do), I'd favor continued long term equivalency of US and foreign stock returns.

A more serious challenge to international diversification comes from scholars who have looked at very long term returns of foreign equity. They find that over the past century only the US and UK have shown high real stock returns (on the order of 5%-7%), but that for the rest of the world real returns were closer to 3-4%. Phillipe Jorion and Will Goetzmann have delved into this area extensively. Their study, Global Stock Markets in the 20th Century is required reading for any diversified investor. Also highly recommended is Brian Taylor's website which provides a wide angle view of global stock and bond returns, to say nothing of the base data for Jorion and Goetzmann's study.

It's difficult to dispute this data. It may be that the assumption of high real stock market returns is simply "history as written by the winners." However, it seems more likely that the reason for generally low long term stock market returns outside the US and UK was that most of the rest of the world was ravaged by two world wars and communism. Ben Graham's special genius was to state clearly in 1934 in *Security Analysis* that the economic events of the great depression were singular, and not likely to be soon repeated. Similarly, the peculiar military and political history of the 20th Century is not likely to repeat itself either. There is no reason to believe that mankind has eliminated the potential for global conflict. However, the next time Armageddon comes there will be no hiding in the stock markets of the US or UK. The entire planet will have problems dwarfing those on our financial statements, assuming we're lucky enough to get them in the mail.

What if future long term foreign returns are below US returns? Simple mean variance analysis or spreadsheeting shows that not until long term foreign returns are more than 3% lower than domestic returns is foreign

diversification detrimental. That's a bet I'm not willing to make.

In 1982, after a punishing 15 year period in US and foreign stock markets which saw stock prices fall in real terms, *Business Week* published an apocryphal edition with "The Death of Equity" emblazoned on its cover. I suspect that that august publication has learned its lesson; Mr. Lowenstein clearly has not.
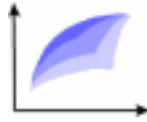
Efficient Frontier

William J. Bernstein

Dimensional Fund Advisor's Website

The long-awaited DFA website has finally arrived, albeit in a somewhat nascent stage. For those of you who are unfamiliar with them, DFA is founded and run by some of modern finance's brightest lights, including Eugene Fama Sr. and Rex Sinquefield. Fierce proponents of the efficient market hypothesis, they are champions of the passive management approach.

The "good stuff" is unfortunately well hidden:

- A delightful essay by Eugene Fama Jr. on the risks and rewards of value investing. If nothing else, "mean variance preferenced" is a wonderful buzz word to flummox your obnoxious stock broker brother-in-law with.
- Eugene Fama Sr.'s critique of Behavioral Finance
- An interview with Rex Sinquefield. A shrinking violet he's not.
- DFA's Global Investing Strategy. A peek at how the brightest minds in finance allocate their assets.

  Note: This site is at a very early stage of development. More research papers and perhaps a site map should be added with time. If you like what you see, bookmark it, and check back regularly.
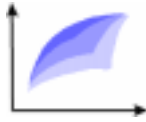
Hopefully Coming Soon

Tweedy Browne's site has been under construction for ages. When it finally arrives, it should contain their entertaining annual reports and investing pamphlets. Well worth checking in on periodically.

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William J. Bernstein

What's Cheap

Yield Vignettes

Successful allocation involves more than the manipulation of mere abstract entities with historically determined expected returns, risks, and correlations. Rather, we purchase interests in businesses. In the case of common stock our capital is rewarded with an earnings stream, which will hopefully increase over time.

In the case of bonds, we purchase a fixed flow of dividends with varying degrees of safety. One can purchase treasury securities which promise near absolute security of principal, or alternatively bonds of lower grade, and be rewarded for bearing higher risk. At the lowest tier of the domestic debt market are so called "junk bonds," whose long term ability to meet fixed dividend charges is uncertain.

Many, if not most, investors who invest in junk are woefully uninformed as to how much risk premium they are being paid for rolling the dice. Tucked away in a remote corner of the **Wall Street Journal** is a little gem of a daily table which is provides this information, if in somewhat cryptic form. It's well worth the periodic attention of every investor.

It's found in the back of the "Money and Investing" (C pages) embedded in the daily "Credit Markets" piece, just below the "Treasury Yield Curve" graph, contained in a table labelled "Yield Comparisons:"

Treasury Market Faces Shift

CREDIT MARKETS

Continued From Page C1

considered unlikely to raise interest rates until signs of rising inflation appear. But bond traders get paid to predict the future, not wait around for the Fed to move. And right now they are worried that the U.S. economy's continued impressive growth could ignite inflation and encourage the Fed to raise interest rates, perhaps as soon as the spring.
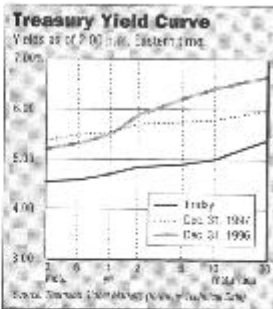
"This is a classic growth scare," says John Youngdahl, a money-market economist at Goldman Sachs. "The U.S. economy continues to grow at an almost breakneck pace and global growth prospects are improving," leading to fears that the U.S. economy may be overheating.

Some traders have even concluded that the Fed erred in cutting rates three times in the fall, and that two might have been enough. Taken together with the series of rate cuts in Europe and Asia, bond bears say too much money is sloshing around the system, leading to an inevitable rise in inflation this year that will send bond prices tumbling around the globe.

"Growth doesn't necessarily lead to inflation, but for 60 years on Wall Street, we have attached growth to inflation, and the growth argument is hurting the bond market right now," says James Bianco, president of Bianco Research in Barrington, Ill.

Indications on Friday that the Bank of Japan will stimulate its economy, but not buy Japanese government bonds, fed another growing fear in the bond market: that stimulative monetary policy worldwide will send bond yields rising and make U.S. Treasurys relatively less attractive in the year ahead.

Treasury Yield Curve
Yields as of 2:00 p.m. Eastern time.

Legend:
— Friday
---- Dec. 31, 1997
— Dec. 31, 1996

YIELD COMPARISONS

	2/12	2/11	52 Week High	Low
Corp.-Govt. Master	5.67%	5.52%	6.13%	4.84%
Treasury 1-10yr	5.05	4.92	5.77	4.19
10+ yr	5.68	5.52	6.12	4.86
Agencies 1-10yr	5.71	5.56	6.19	4.71
10+ yr	6.02	5.86	6.44	5.22

Treasurys also suggests that the bond market may have to look to new sources of strength this year.

I've magnified the table so that the yields may be more easily read:

YIELD COMPARISONS

Based on Merrill Lynch Bond Indexes, priced as of midafternoon Eastern time.

	2/12	2/11	52 Week High	Low
Corp.-Govt. Master	5.67%	5.52%	6.13%	4.84%
Treasury 1-10yr	5.05	4.92	5.77	4.19
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Agencies 1-10yr	5.71	5.56	6.19	4.71
10+ yr	6.02	5.86	6.44	5.22
Corporate				
1-10 yr High Qlty	5.79	5.64	6.27	5.06
Med Qlty	6.33	6.18	6.53	5.59
10+yr High Qlty	6.49	6.34	6.81	5.91
Med Qlty	6.98	6.83	7.22	6.46
Yankee bonds(1)	6.51	6.37	6.69	5.87
Current-coupon mortgages (2)				
GNMA 6.00%	6.40	6.31	6.81	5.79
FNMA 6.50%	6.50	6.36	6.77	5.87
FHLMC6.00%	6.47	6.38	6.80	5.89
High-yield corporates	10.03	9.99	10.81	8.17
Tax-Exempt Bonds				
7-12-yr G.O. (AA)	4.16	4.12	4.86	4.05
12-22-yr G.O. (AA)	4.64	4.60	5.25	4.50
22+yr revenue (A)	4.96	4.92	5.37	4.67

Note: High quality rated AAA-AA; medium quality A-BBB/Baa; high yield, BB/Ba-C.

(1) Dollar-denominated, SEC-registered bonds of foreign issuers sold in the U.S. (2) Reflects the 52-week high and low of mortgage-backed securities indexes rather than the individual securities shown.

(This is a very small table, so forgive the smudges and poor reproduction

quality.) The previous day's yields are listed in the far left column. The two key values are the 10+ (long) treasury yield of 5.68 percent (third from the top) and the high yield corporates 10.03 percent yield (bottom).

The key parameter is *the difference between these two values*—4.35 percent (10.03 minus 5.68). This so-called "junk treasury spread" ("JTS") is the premium that one is paid for risking default and bankruptcy. The JTS is a wonderfully simple thing. It tells you that if on average more than 4.35 percent of issuing companies disappear annually, you would have been better off in treasuries, and vice versa. The true average annual default rate of these companies is a matter of some dispute, but 3 percent is a figure not many will disagree strongly with. The crucial concept here is *average* default rate. This can vary greatly from year to year, exceeding 10 percent in severe recessions, or approaching zero in good times. Further, the bondholder is quite high up on the creditor food chain, so only flat bankruptcy will completely destroy the investment in any given company. (It goes without saying that we are talking about mutual fund investing here, not investing in individual bonds.) Default often means delay in coupon payment, but not total, or even substantial, loss of ultimate value.

The real value of the JTS is its relationship to historical norms. The past 10 years have been highly instructive in this regard. Thanks to Mike Milken and his merry crew, in 1991 it rose to about 9 percent, and early last year it actually fell briefly below 2 percent. When do you suppose was the better time to buy? It should be noted that the values quoted by the *Journal* are from the Merrill Lynch Bond Index series, which represents a slightly higher quality of junk than other indexes, so the JTS calculated from this table may be lower by about a percent than the JTS calculated elsewhere.

The JTS may also be viewed from the opposite perspective, namely, as the "price of safety." At just 2 percent a year ago, safety (e.g., treasuries) was dirt cheap. And in 1991, when we were looking at the brink of war and recession, it was quite expensive, at 9 percent.

So take a peek at this table every so often. Sooner or later it may just save you some grief.

More of the REIT Stuff

Another useful Section C *Journal* table is even more obscure and harder to find—the Dow Jones REIT (real estate investment trust) yield. This is found in the commodities columns, about 1-2 pages in front of the bond tables. Here's what it looks like:

Dow Jones REIT Indexes

Friday 12, 1999

	Close	Net Chg	% Chg	YTD % Chg	Yld
Equity REIT	125.28	− 1.21	− 0.96	− 4.66	7.61
Equity REIT-tot ret	241.22	− 2.33	− 0.96	− 4.03	....
Composite REIT	112.94	− 1.25	− 1.09	− 5.16	7.82
Composite REIT-tot ret	225.34	− 2.50	− 1.10	− 4.48	....

Indexes of publicly traded Real Estate Investment Trusts. Jan 1990 = 100. Yield based on indicated annualized dividend.

The index yields are the two values in the right hand column. The slightly higher yield for the composite REIT index includes some mortgage companies which are excluded from the equity REIT index. Mortgage REITs are usually highly leveraged companies, have lower historical total returns than equity REITs, and are probably best avoided.

Since by law REITs must pay out 95 percent of their earnings, this is as good a measure of valuation in this sector as any. Right now equity REITs yield about 7.5 percent, which is pretty close to an historic high. The correlation between REIT yields and returns is loose, but adding a few hundred basis points to the yield provides a conservative estimate of the long term return in this sector. In 1993 the REIT yield fell below 5 percent, just about the time when every other advisor quoted in the nations' financial pages were extolling REITs as relief for 3 percent treasury bills. Months later, REITs tanked. For the REIT investor, yield provides a superb reality check.

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