Efficient Frontier

An Online Journal of Practical Asset Allocation

Edited by William J. Bernstein

Spring 2000

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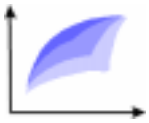
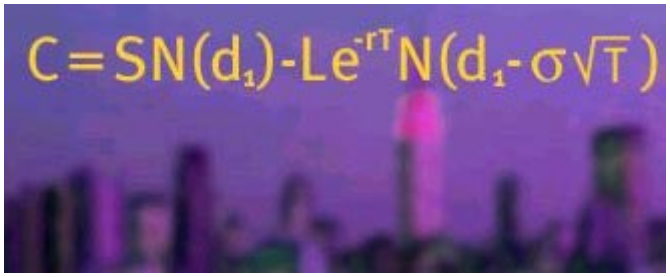


William J. Bernstein

The Merchants of Greenwich



Aside from my *Simpsons* addiction I don't watch much television. But when a friend called me up one evening and told me to catch the PBS/Nova documentary "The Trillion Dollar Bet" I knew I wasn't going to be disappointed. After all, it's not every day that you get an hour's face time with the likes of Paul Samuelson, Myron Scholes, Zvi Bodie, Roger Lowenstein, Robert Merton, and Merton Miller and their respective versions of the 1998 near-Gotterdammerung of the world's economy—the Long Term Capital Management debacle.

If you've not seen this superb program I urge you to seek out a rebroadcast, or even purchase the tape (1-800-949-8670 x498). It's no exaggeration that anyone with an interest in the capital markets will find this production lush and hypnotic—an exquisitely produced Shakespearean tale of hubris and humiliation.

The producers deftly explore the history of the efficient market hypothesis, the Black-Scholes equation (the

image shown below the title) and subsequent birth of the modern options market, which in turn gave rise to LTCM's basic strategy—placing tens of thousands of small derivatives bets that the historical relationships among global asset class prices would eventually mean-revert. So if, say, the gap between the price of Danish Mortgage options and the mark/yen swap got significantly larger than its historical average, the appropriate positions would be taken to profit from the move back to equilibrium.

As the hour wore on, the question repeatedly arose; what's wrong with this picture? How did the financial world's best and brightest screw up so badly? The answer, I think, lies in this unobtrusive observation from one of the LTCM principals:

> In August 1998 after the Russian default all the relations that tended to exist in the recent past seemed to disappear.

One can almost imagine these folks glumly sitting around an oak-paneled room, slapping their collective foreheads and exclaiming; "Jeez, we've never seen the markets do *that* before!" However, even a cursory reading of financial history shows that markets behave in unique, never-before-seen ways on a remarkably frequent basis. In fact, it's astonishing that this group of brilliant financial economists seemed oblivious to the fact that even the longest statistically well-behaved series of securities and asset class returns and correlations can radically change character in a heartbeat. In short, they forgot Newton's rueful admission, prompted by losing a fortune in the South Sea Bubble, that although he could precisely calculate the motions of the heavenly bodies, he could not predict the madness of crowds.

The mere mention of the years 1987 and 1929 should serve as a reminder of this, but market history is replete with other gross discontinuities in asset class behavior. My personal favorite is the performance of bonds before and after 1984. For the 50-year period from 1934 to 1983 the return of the long treasury was 3.48% annualized. Had you depended on the historical record for an estimate of expected bond returns you'd have guessed wrong about the 11.34% return over the next 16 years. (And on October 19, 1987 things got spectacularly singular—a minus 23 daily-standard-deviation fall in stock prices. For those of you unfamiliar with statistics, 23 standard deviations is about the same odds as your computer suffering spontaneous decomposition and reassembly on one of Jupiter's moons, or of my starting at cornerback for the 49ers next year.)

Even the supposedly immutable long-term relationship between debt and equity returns is not written in stone. From 1802 to 1900 the return of US stocks and bonds was nearly identical at 5.89% and 5.87%, respectively, compared to 10.30% and 4.01% in the 1900s. Remember that inflation was close to zero in the 1800s, but about 3.3% in the last century. Thus a large real return was earned for both stocks and bonds in the 1800s, but only for stocks in the 1900s. What will be the relative returns of stocks and bonds in the next century? If you think you have the answer, please tell me. I'd love to know.

One thing is clear, though—leveraging gargantuan sums without a proper appreciation of the capriciousness of the capital markets is the financial equivalent of skydiving while drunk. And if your models are largely based on the last few years of data you've just left your parachute on the plane.

Even more disturbing, the LTCM principals interviewed

on "The Trillion Dollar Bet" exhibited an almost other-worldly personal quality. How else to explain their insistence that their models still work, or their lack of regret and self-examination at nearly having brought the entire planet to the brink of financial disaster? In a memorable sequence one actually allowed the camera crews to capture him happily romping around, Sherman McCoy-like, a Greenwich golf course, while the narrator's rich, resonant voice described his former opulent lifestyle.

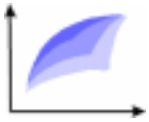
Such scenes force one to conclude that vast expanses of capital are managed by a type of idiot savant peculiar to the last half of our benighted century—someone who can derive complex canonical proofs as easily as they can brush teeth, but with the emotional intelligence of Mike Tyson and the appearance of having never cracked a history book.

What lessons does this saga provide the average investor? First, superlative mathematical ability confers no special advantage in the capital markets. Relying solely on your quantitative skills to invest successfully is like trying to fly an airplane based only on an exquisite knowledge of aeronautical engineering, ignoring the need of real-world flying experience and lacking a good sense of the fickleness of both aircraft systems and the weather.

This is not to deny that a certain amount of quantitative ability is necessary to invest properly. It's far more important, however, to possess an abiding respect for the unpredictability of the markets and a thorough working knowledge of financial history.

And lastly, investing requires a good dollop of common sense—something that turned out to be surprisingly uncommon in Greenwich.

Efficient Frontier



William J. Bernstein

The Dunn's Law Review

"When an asset class does well, an index fund in that asset class does even better." Steven Dunn

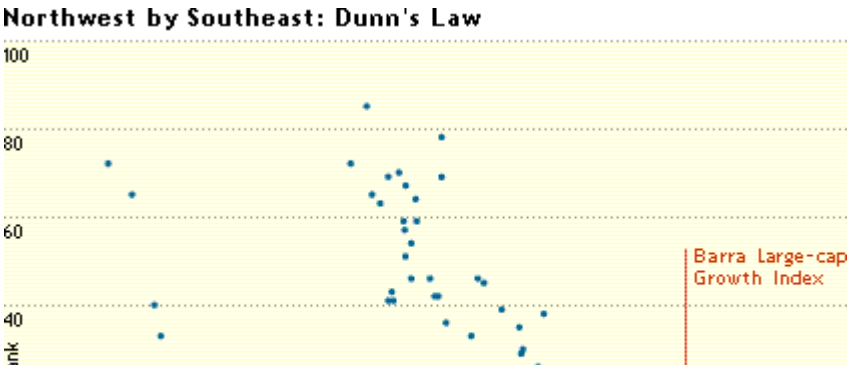
No concept threatens the investment professional more than indexing. After all, if even the most skillful and best-informed analysts cannot persistently outperform, why pay their advisory fees? Why incur their transactional costs? In short, why should the investing public support what is in effect an enormous class of trust-fund children?

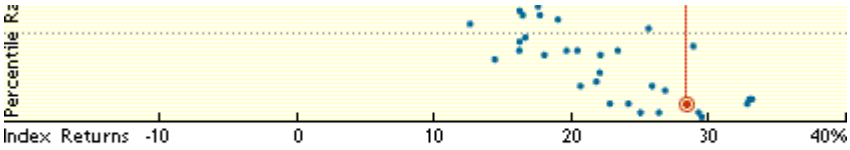
Human nature being what it is, plausible rationalizations are offered. The oldest and hoariest is the "efficiency argument," which goes something like this; "We'll admit that indexing works well with large cap stocks, but the markets in small and foreign stocks are inefficient; that's where you need the benefit of (our) active security analysis." This gets repeated so often that it's acquired the ring of truth. And, in fact, it seems superficially consistent with the data. Although the Vanguard 500 Index fund ranks 86th of 336 domestic large cap funds over the past 10 years, the DFA US Small Company and Vanguard Small Cap index funds rank only 34th and 38th, respectively, out of 85 domestic small cap funds. (The actual performance of these index funds is in fact a bit better than this because the Morningstar database I used suffers from survivorship bias. In other words, the

worst-performing funds didn't survive to make it into the sample. This is particularly true of the small cap funds, where it is likely that on 1/1/90 there may have been as many as 100 to 120 funds.)

Still, at first glance it appears that large cap indexing works better than small cap indexing. Enter Dunn's Law. What the erstwhile Mr. Dunn observed is that indexing works much better with large than small cap stocks simply because during the past decade large caps have outperformed small caps. The key concept here is that of "asset class purity." An actively managed large-cap fund is likely to own some medium or even small cap stocks which will drag down its performance relative to the index, while an actively managed small cap fund will likely own some larger companies which will have the opposite effect. When you buy an index fund you are getting the unvarnished item, for better or for worse. So the recent impressive performance of large cap indexing, as well as the not-so-impressing showing of small cap indexing are simply an artifact of recent asset class performance; unless you believe that large cap dominance is a permanent state of affairs, indexing should work equally well in all categories.

I've already covered this ground in a previous piece. John Rekenthaler more recently looked at the data from a somewhat different perspective (and, to my chagrin, coming up with bigger t-stats than mine). For example, take a gander at the summary graph from his piece:





According to "Dunn's Law", when an asset class does well, an index fund in that asset class does even better. Index percentile rankings are calculated versus relevant fund categories.

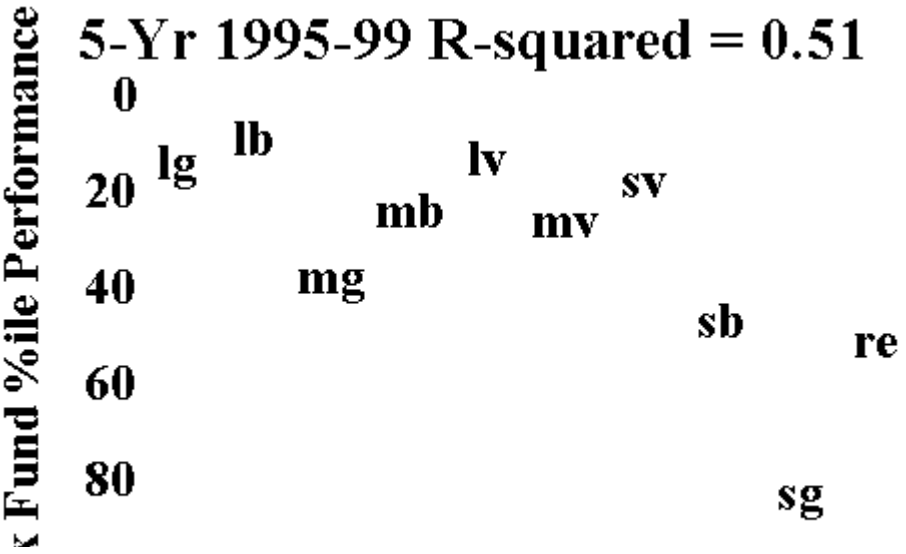
Mr. Rekenthaler's graph is a bit confusing, since his y-axis is conventionally plotted, meaning that the best index performances are at the bottom (the best performers have the lowest numbers—1st percentile is the top percentile, 100th the worst). But it is quite clear that there is a strong relationship between how well the asset class does and how well indexing that class works. In fact, if you closely examine his plot you'll see that the relationship is curvilinear; there isn't much difference between indexing the best and the middling asset classes. Index performance only begins to suffer with the very worst asset classes.

Dunn's Law is important enough that it deserves regular review. In this issue I decided to look at the index performance of domestic funds over each of the past 5 years. For consistency's sake I've used the S&P/Barra indexes for the 9 style boxes instead of the funds; only with REITs did I use an actual fund, DFA's:

Asset Class	Abbreviation	Index Used	Available Fund
Large Cap Growth	lg	Barra LG	Vanguard Growth Index
Large Cap Blend	lb	S&P 500	Vanguard 500 Index
Large Cap Value	lv	Barra LV	Vanguard Value Index

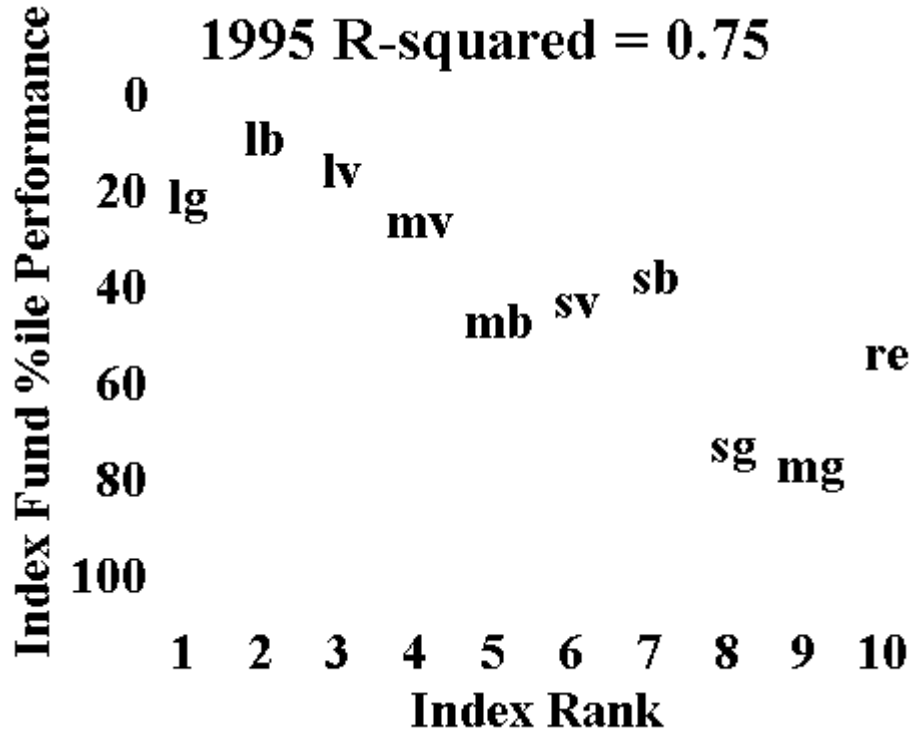
Mid Cap Growth	mg	Barra MG	None
Mid Cap Blend	mb	S&P 400	Vanguard Mid Cap Index
Mid Cap Value	mv	Barra MV	None
Small Cap Growth	sg	Barra SG	Vanguard Small Cap Growth Index
Small Cap Blend	sb	S&P 600	None
Small Cap Value	sv	Barra SV	Vanguard Small Cap Value Index
REIT	re	DFA REIT	DFA REIT

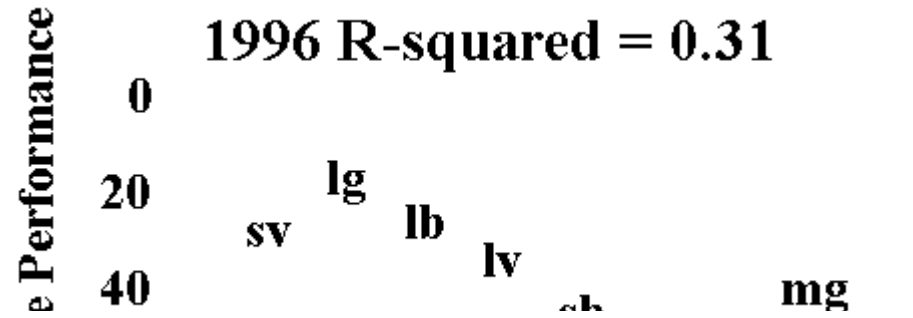
I then ranked, from 1 (best) to 10 (worst), the performance of each index, and plotted it versus the percentile performance for the index in each style box versus the active funds. Purists will chafe at the use of an index instead of an actual fund, but since funds were not available for all of the indexes I wanted to be internally consistent. Further, of the 6 funds available from Vanguard 4 have managed to equal or surpass their benchmarks by small amounts. Lastly, as already noted, survivorship bias tends to understate index/fund percentile performance. Here are the results for the 5-year period from 1995 to 1999:

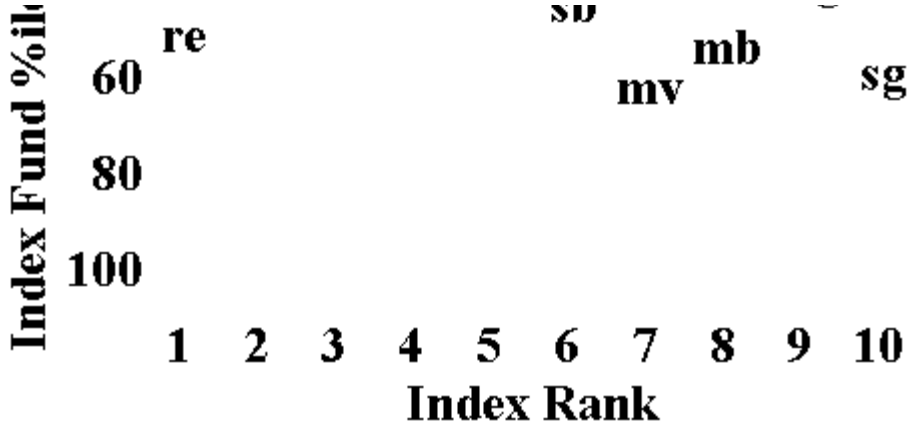


As you can see, there's an excellent relationship between asset class relative performance and index fund performance; the R-squared value indicates that 51% of index fund performance is explained in this manner.

But the annual data is even more fascinating:



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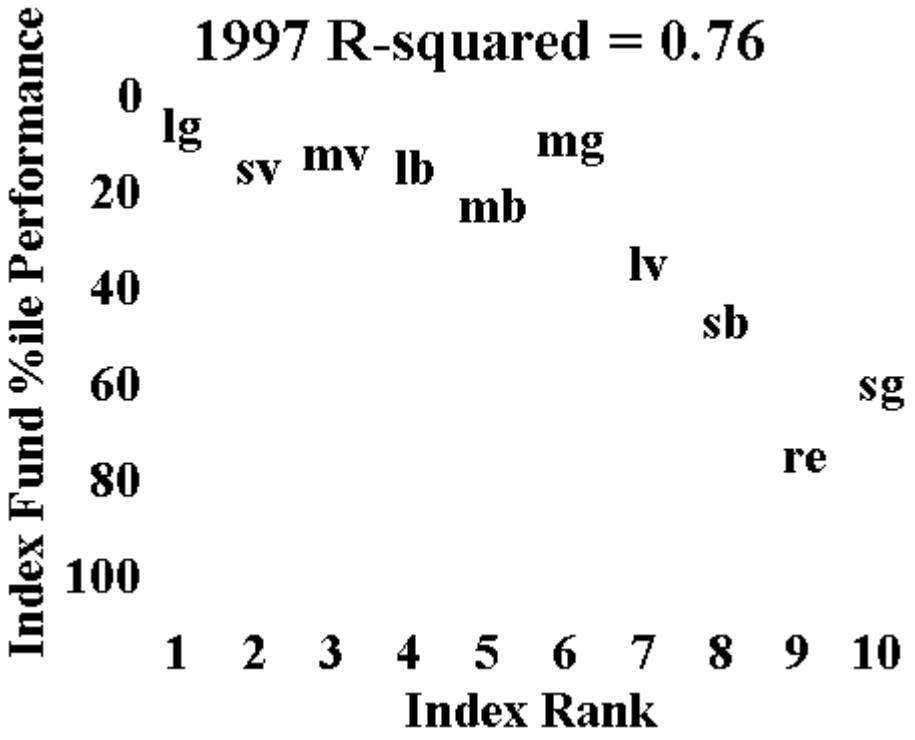
1997 R-squared = 0.76
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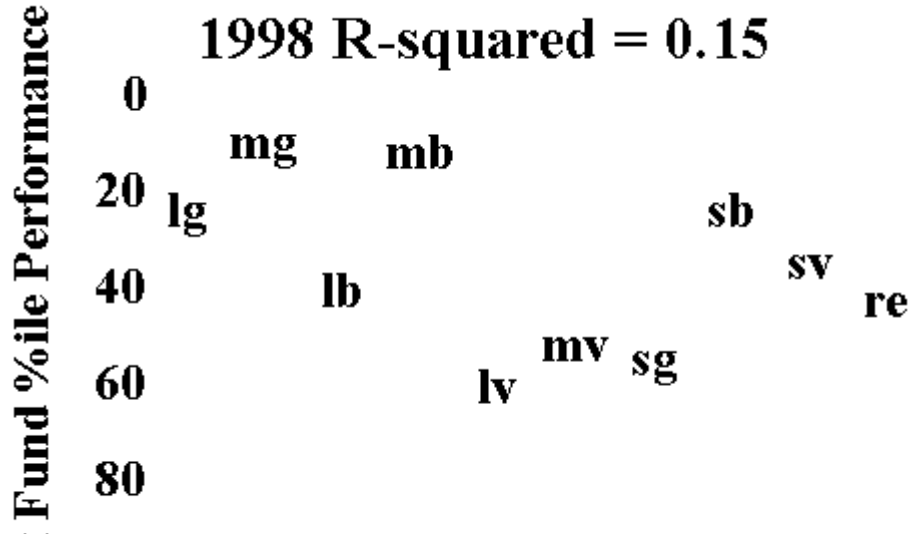
1998 R-squared = 0.15
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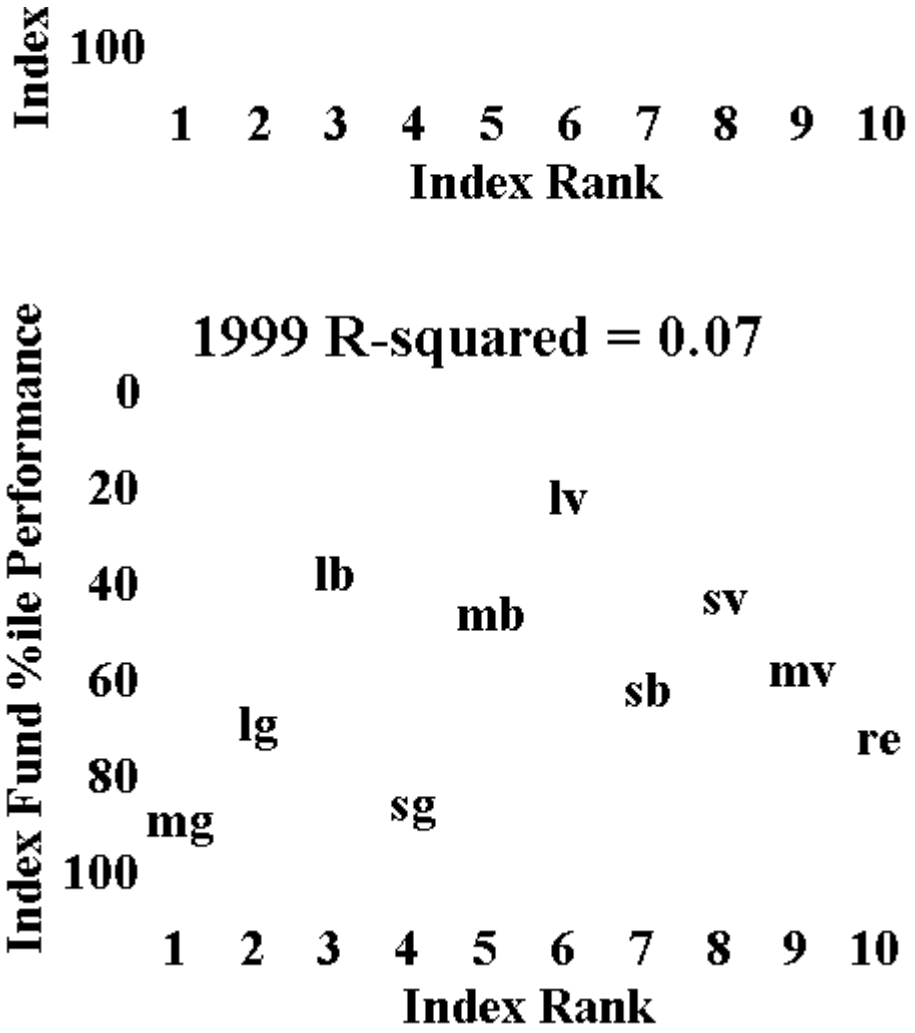
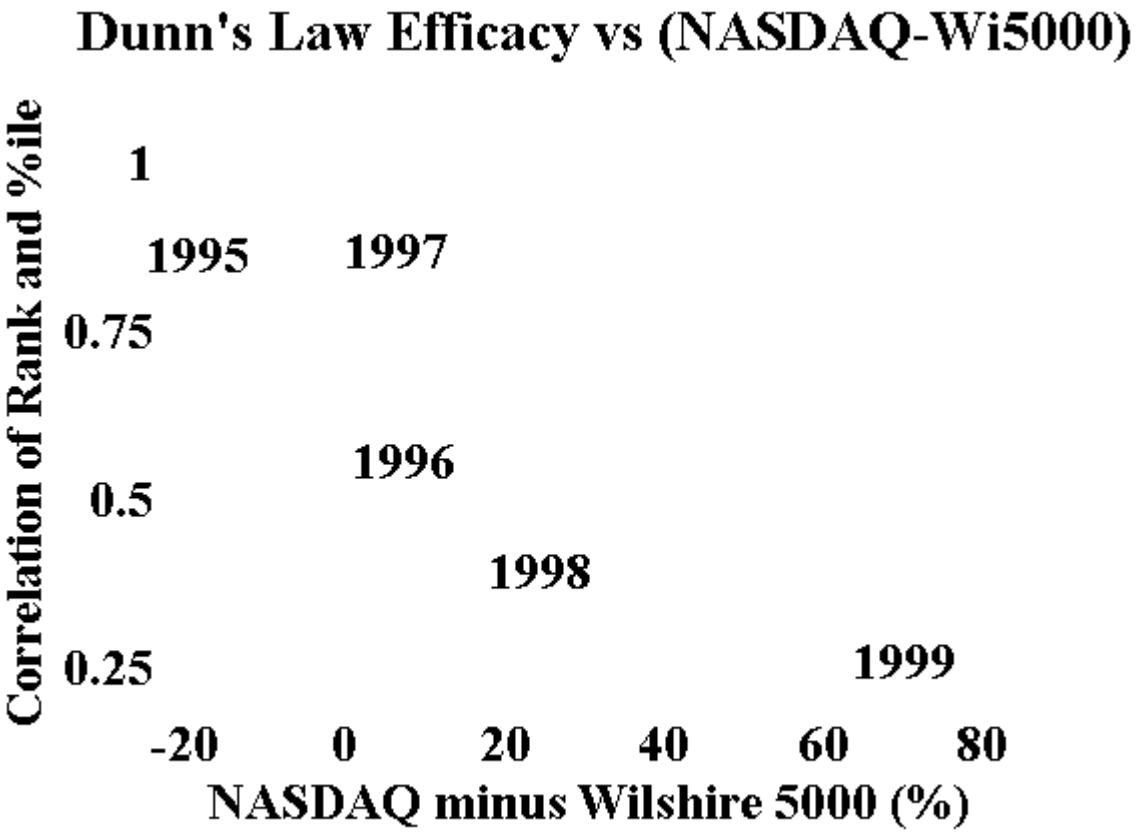


Note that in 1995 and 1997 the relationship was nearly perfect, in 1996 and 1998 fairly good, but that things fell apart in 1999. What happened? 1999 was a terrible year for indexing in general, for simple reason that a lot of tech/internet stocks with scorching performance and sizeable market caps didn't make it past the S&P committee fast enough. Take a close look at the 1999 plot. What is clearly seen is that indexing value stocks worked tolerably well, growth stocks terribly, and blend/market in between. And within each of these categories (growth, blend/market, and value) Dunn's Law actually worked pretty well.

Again, see Mr. Rekenthaler's superb exposition of this phenomenon. In order to test his hypothesis that the

failure of Dunn's Law in 1999 was due to nonbenchmark NASDAQ stocks (the NASDAQ has no tech-stock inclusion lag) I plotted the correlation of the asset class rank and index fund percentile ranking (which can be thought of as an indicator of how well Dunn's Law works) versus the difference in performance between the NASDAQ index and the Wilshire 5000:



As you can see, as long as the NASDAQ does not outrageously outperform the market, Dunn's Law works very well.

All of the above plots, save 1999's, demonstrate the same overall curvilinear relationship shown by Mr. Rekenthaler's data—there isn't that much difference in indexing efficacy between the best and the middling asset classes in for a given time period, and only the

worst classes show poor indexing performance.

And finally, the "big picture" is that for the full 5-year period the average performance over all 10 asset classes for indexing was 32nd percentile, even before factoring in survivorship bias.

Dunn’s Law is a powerful way of understanding the relative efficacy of indexing different asset classes. In future pieces we’ll apply it abroad.

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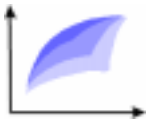


William J. Bernstein

Tangled WEBS

The fundamental advantage of international diversification is the fact that that the stock returns of different nations do not move in lock step, and yet over the long term seem to mean-revert. Rebalancing the world's major regional indexes against each other on an annual basis earns the investor about 1% of excess annualized return. For example, for the 30-year period from 1970 to 1999 an annually rebalanced portfolio consisting of 50% S&P 500, 20% continental European, and 10% each UK, Pacific Rim, and Japanese stocks had a return of 14.53%, versus 13.64% for the unrebalanced portfolio.

In some cases slicing the global equity pie even thinner can result in yet higher excess returns. In a another article in this issue we show that rebalanacing emerging markets results in a several percent excess return.

What could be simpler? Simply hold equal (or unequal but fixed) amounts of various national markets, rebalance periodically, and collect a few hundred or so basis points of excess returns over your cap-weighted colleagues. (Note that "cap weighted" is synonymous with "unrebalanced.")

The obvious tool for accomplishing this is the World Equity Bench Security (WEBS). These exchange-traded-funds (EFTs), produced in cooperation with Barclays and

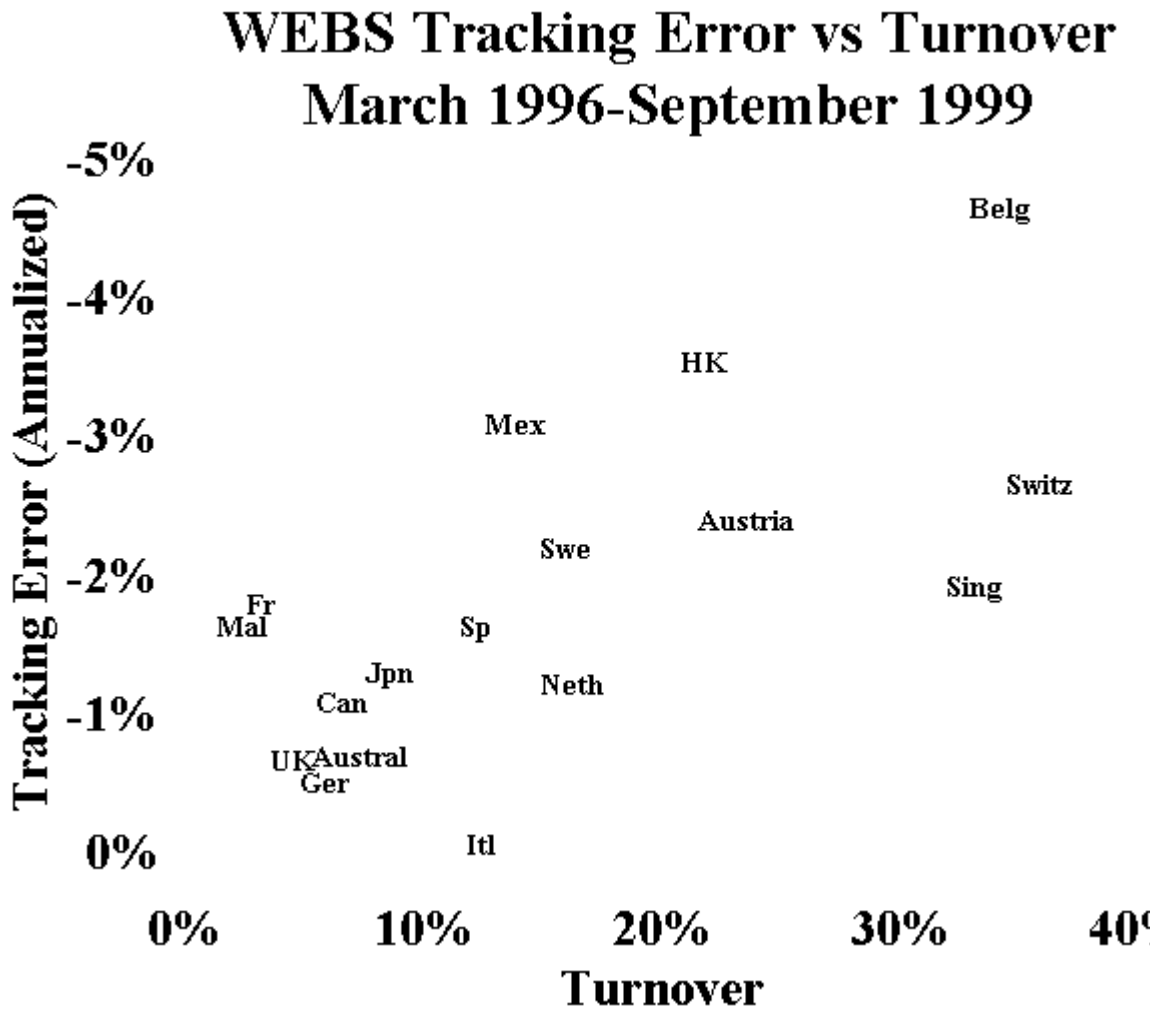
Chase-Manhattan and traded on the AMEX are essentially closed-end securities indexed to 17 national markets. The pesky closed-end discount/premium problem is eliminated through a complex arbitrage mechanism.

One problem with WEBS is that with the exceptions of Mexico and Malaysia (whose trading suffers from the currency controls instituted by that country in 1998) they are all in developed markets, particularly European. And as we've already shown, the benefits of rebalancing European national markets is both small and chancy.

An even bigger problem is that not all indexers are created equal. From inception in 1996 to September 1999 WEBS have returned an average of 1.81% less than their benchmark national indexes on an annualized basis. This shortfall is known as "tracking error" (TE). How did this happen? For starters, the average expense ratio on these exotic birds is a whopping 1.32%. But even more impressive is the correlation between the TE and the fund turnover. I've tabulated, then graphed, this relationship below:

	Tracking Error 3/96-9/99 (Annualized)	Expense Ratio	Turnover
Australia	-0.69%	1.24%	7.37%
Austria	-2.38%	1.49%	23.54%
Belgium	-4.63%	1.45%	34.13%
Canada	-1.07%	1.01%	6.60%
France	-1.78%	1.40%	3.20%
Germany	-0.49%	1.38%	5.84%
Hong Kong	-3.52%	1.26%	21.82%
Italy	-0.04%	1.20%	12.39%
Japan	-1.29%	1.14%	8.61%
Malaysia	-1.62%	1.39%	2.34%

Mexico	-3.08%	1.50%	13.87%
Netherlands	-1.20%	1.32%	16.23%
Singapore	-1.91%	1.26%	33.04%
Spain	-1.62%	1.40%	12.18%
Sweden	-2.19%	1.42%	15.98%
Switzerland	-2.64%	1.40%	35.83%
United Kingdom	-0.65%	1.25%	4.48%
Average	-1.81%	1.32%	15.14%



As you can see, there's a pretty good relationship

between the two; for each 14% of turnover 1% of return is lost (slope = -0.072). The t-stat/p-value for this is –3.44/0.0036, with an R-squared of 0.44. In other words, there can be no question that although you get badly nailed by these funds' expense ratios, the high-turnover funds, like Belgium, are particularly treacherous.

The Vanguard experience with international regional indexing has been far more agreeable. The TE since inception in 1990 for the Pacific and European funds has been +0.12% and +0.32% respectively, even *after* the approximately 0.35% expenses of these funds. In short, the theoretical benefits of using WEBS is small and the real-world execution awful; you're far better off going with Gus than putting on WEB feet.

What's curious about all this is that Barclays' recent foray into domestic EFTs has everyone so rattled; even Vanguard has an eagle eye on their venture, and is considering EFTs of their own. But if the WEBS experience is any guide, Barclays (like the Dreyfus index group) is the Gang That Couldn't Shoot Straight. They can't even seem to get the S&P 500 right; the Barclays 500 Index Fund lags Vanguard's by 32 bp per year since its 1993 inception despite a nearly identical expense ratio.

• For this reason alone I'd be exceptionally cautious about using any of the Barclays' new products. A prudent policy would be to keep an eye on their TEs over the next few years before jumping in.

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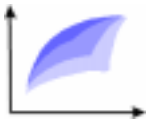

William J. Bernstein

The Forward Currency Premium

Have you ever wondered why anyone buys Japanese bonds? Consider that the 30-year Japanese government bond yields only 2.25%, and that the 6-month security yield is nearly zero (0.064%). Who invests in this stuff?

Actually, lots of smart foreigners do. Here's why; consider that yen-denominated bonds can easily be hedged back to US dollars by "selling forward" yen futures contracts. Since the futures contract value moves in exactly the opposite direction of the currency portion of the yen-denominated bonds, what we now have is a dollar-denominated security. So what, you say? It's still got a miserable yield.

Wrong. Since the futures contract you're selling forward has a higher value than the spot currency rate, you're actually being paid to hedge the yen. For example, as of January 28 the spot value of the yen was $0.009335, the March futures contract $0.009405, and the June contract $0.009562. So if the spot rate stays the same, you'll make a profit that amounts to about 6.8% per year. If the yen falls/rises you'll make a profit/loss which exactly counterbalances the currency loss/profit in the amount of your bond. So no matter what happens to the yen your Japanese 6-month security will yield 6.80% + 0.0624% = 6.8624%.

Let's take a look at the calculus for US, German,

Japanese, and UK 6-month hedged government bonds:

	1/28/00	March '00	June '00	Ann'd Forward	6-Month	Hed
	Spot Rate	Future	Future	Premium	Govt. Rate	Ra
Country						
US	N/A	N/A	N/A		5.83%	5.8
Germany	$0.4987	$0.5012	$0.5047	2.82%	3.68%	6.5
Japan	$0.009335	$0.009405	$0.009562	6.85%	0.06%	6.9
UK	$1.6189	$1.6208	$1.6200	-0.20%	6.13%	5.9

As you can see, the hedged investor in Japanese government paper actually makes a higher return than the US bill buyer. (I calculated the annual forward premium as the annualized difference between the March and June contracts. Slightly different values are obtained depending upon where one takes the "sampling points." And, if the bond and the currency contract have the same maturity/expiration date, the return should be the same as that of the US security.) There is a similar, but smaller phenomenon affecting the mark, and forward pound rates are about the same as the spot rates.

So, there really is no free lunch here—the annualized forward premium is in fact calculated from the difference in risk-adjusted interest rates.

Hedged bonds represent the simplest case, then, where the hedged foreign security should have the same risk-adjusted return as domestic bonds.

But what of the other 3 possibilities: unhedged foreign bonds, hedged foreign stocks, and unhedged foreign stocks? Here things become much stickier.

Let’s first consider the 6-month Japanese bill with its puny yield. What the forward currency rate seems to be saying is "Don’t worry. In 6 month’s time the yen will appreciate by 3.37% (6.85% annualized), so you’ll make up for the lousy yield with currency appreciation." There’s only one problem—it likely will not happen. It turns out that *forward rates are not predictive of future spot rates*. Interestingly, some of this work was done by none other than Gene Fama. If this isn’t an inefficiency, then I’m Frank Lloyd Wright. Think about it. If the direction of the value of the yen in 6 month’s time is not predictable, then its expected value in 6 months is *today’s value*. And if that’s the case, then the unhedged bond has an expected return of 0.064%, and the naked currency hedge (that is, a hedge unaccompanied by a yen-denominated asset) has an expected return of 6.85% per year. The hedge return is not riskless, of course—the yen is a notoriously volatile currency, and you could easily have your head handed to you. But clearly, owning the unhedged bond is a lousy idea, with a minuscule expected return and enormous currency risk.

So what does this mean to the global bond investor? Basically this; hedge those currencies with low yields and positive expected hedge returns, and do not hedge those currencies with high yields and negative expected hedge returns. Since at the present time the US has about the highest (except for the UK) interest rates in the developed world, this means completely hedging most global bond portfolios. Unfortunately for small investors, there are precious few hedged global or international bond portfolios that have reasonable expense ratios. The DFA 2-year and 5-year global portfolios have expenses of 0.29% and 0.41%, but require you to use a qualified financial advisor. The Standish International Fixed Income Fund has 0.53% expenses but high minimums—either $100,000 for direct accounts or $10,000 for

supermarket purchases associated with a transaction fee.

With stocks things are even stickier. Since there is no relationship between stock returns and forward currency rates why not hedge your entire portfolio and collect the forward premium? Because there are no hedged indexed international stock funds. Period. So if you want a hedged international stock portfolio you'll have to go with an actively managed international fund with its higher fees and trading costs. And, as we've discussed before in these pages a little bit of foreign currency in your portfolio is often the only item with a positive return in a global bloodbath, as occurred in 1973-4, 1987, 1990, and 1994. Still, if you must have hedged international stock exposure the Tweedy Browne Global Value Fund is not a bad choice.

So, at the end of the day, you're stuck. Yes, in today's global interest rate environment it pays to hedge your foreign stock and bond exposure. There just aren't any decent vehicles available to the independently-minded small investor. And in the long-term, it seems quite likely that the global yield gap will narrow, resulting in a falling dollar. In which case you'll be glad you didn't hedge in the first place.

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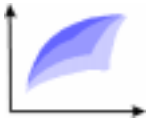

William J. Bernstein

Rebalancing Individual National Markets

In these pages I've extensively examined the returns and risks of rebalancing asset classes in a global portfolio. For those unfamiliar with the basics, the guiding principles are as follows:

- Rebalancing benefit is driven by low asset correlations and high asset volatility. The more volatile the asset and the lower the correlation with the rest of your portfolio, the better.

- The more similar your asset returns, the better. If the returns of one asset are regularly higher than another (as has happened with US and Japanese equity over the past 10 years) then it is quite possible to lose money rebalancing.

I thought that it might be instructive to compare rebalancing strategies for national markets in 3 different categories: Europe, the far east, and emerging markets.

Developed Markets—Not Worth the Trouble

Looking at annual returns over the past 11 years, from 1989 to 1999, I examined portfolios consisting of the

following 9 European markets:

	Return 1989-99
Austria	5.92%
France	14.92%
Germany	15.05%
Ireland	10.30%
Italy	8.60%
Portugal	6.81%
Spain	12.86%
Switzerland	17.55%
United Kingdom	14.92%

Over the 1989-99 11-year period the annually-rebalanced equally-weighted portfolio of these 9 nations returned only 0.09% more than the unrebalanced portfolio (12.62% versus 12.53%). It was quite easy to find asset pairs with unfavorable rebalancing characteristics. For example, one might expect that the German/Austrian pair would be a poor one, because of the wide difference in returns and close correlation (0.67) between the two markets. Such turns out to be the case—rebalancing the two countries cost you 0.47% in annualized return. Only where the returns are reasonably close, such as the UK/Germany pair, is there a benefit, and even here it is a razor-thin 0.16%.

The same occurs in the Pacific Rim:

	1989-99 Return
Australia	7.50%
Hong Kong	14.81%
Japan	-0.62%
Singapore	11.63%

Here the equally-weighted rebalanced portfolio underperformed the unrebalanced portfolio by 0.29%, mainly because of the miserable showing of the Japanese market.

Emerging Markets—Yes

Finally, I looked at the returns for 11 emerging markets:

	Return 1989-99
Argentina	21.63%
Brazil	15.61%
Chile	17.50%
India	20.12%
Indonesia	-3.90%
Korea	-1.82%
Malaysia	4.11%
Mexico	22.71%
Taiwan	4.45%
Thailand	-1.37%
Turkey	22.84%

Here, over the 1989-99 11-year period annual rebalancing an equally-weighted portfolio earned 5.71% of excess return over the unrebalanced portfolio. And only 4 of the 55 possible national pairs (Korea-Malaysia, Korea-Mexico, India-Indonesia, and India-Korea) had negative rebalancing effects. Even the Indonesia-Turkey pair, with its almost 26% annualized return difference, benefited from rebalancing. In fact, it is just about impossible to put together a reasonable emerging markets portfolio which does *not* benefit significantly from rebalancing.

Why the difference in rebalancing effects between the emerging and developed markets? First, the volatility of the emerging markets is much higher than the developed markets, with SDs averaging about 50%. Since the rebalancing bonus is proportional to the variance of the asset, a doubling of SD results in a quadrupling of variance, and thus of rebalancing benefit. Second, correlations are much lower in the emerging markets arena—typically about half of those in the developed world, providing yet another margin of benefit.

One area of concern with emerging markets rebalancing is trading costs. Although a significant problem, it is not a killer. The average annual turnover of the equally-weighted emerging markets portfolio was about 15%. Assuming that a round-trip costs about 6% in terms of spreads, commissions, and impact costs, the trading necessitated by annual rebalancing should cost less than 1%.

Practical Rebalancing Advice for the Small Investor

For the institutional investor, passively investing one's

emerging markets exposure in an equally-weighted (or otherwise fixed) portfolio of national markets is a no-brainer. But what is the small investor to do? There is only one equally-weighted indexed emerging markets product out there, and that is the DFA series of EM funds. And even it is not fully rebalanced, striving towards equal weighting only with inflows and outflows. Limiting "rebalancing" in this way is costs return, and the portfolios can get seriously out of wack. As of 9/30/99, for example, the DFA Emerging Markets I Fund had a 13.3% Korean contribution but only a 3.3% Indonesian one. This fund has outperformed the unrebalanced Vanguard Emerging Markets Index Fund by about 3% over from 6/1/94 to 12/31/99, or about half the theoretical 6% amount. It is interesting to speculate that this shortfall may be to the "inefficiency" of their rebalancing mechanism.

To invest in the DFA fund you will need to services of a financial advisor. What other options are available? Closed-end funds can be used, but most of these are actively managed, have high expenses, and in many case high turnovers, with their attendant trading costs. These beasts are also plagued with fluctuating premiums/discounts from NAV, and as I've previously noted this causes adverse portfolio behavior, since it increases correlation with the US market. A better option might be the ADRs of emerging markets nations, but managing a portfolio of a 20 to 50 of these would require considerable effort and attention, and would also probably run a fair amount of terminal wealth dispersion risk. (I.e., the risk that you may miss out on the best performers in each market, which is a real worry in a portfolio which only owns a few stocks from each country.)

My own opinion is that it is probably worth the 1% fee to own the DFA fund. (Disclosure is in order; I'm a

registered investment advisor, and I employ their funds.) The ADRs are not a bad second choice, although going this route is quite a bit of effort.

Bottom line; for tax-sheltered investing with the developed nations it's best to go with Gus and his Vanguard Pacific and European portfolios. For the emerging markets rebalancing individual national allocations is quite worthwhile. Unfortunately there is at present no simple way for the small investor to do this; consider the above options.

And for taxable accounts I'd forget about rebalancing altogether and keep it simple with Vanguard's International Tax-Managed Portfolio (VTMIX). Since VTMIX does not have any emerging markets exposure you may wish to add the Emerging Markets Fund, which is reasonably tax-efficient. The adverse tax consequences of portfolio rebalancing are on the order of a percent or two per year, and obliterate any rebalancing benefit.

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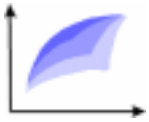
Efficient Frontier



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February's *Journal of Finance*

As readers of these pages are aware, if you really want to know what's new in finance, forget *The Wall Street Journal*, *Wall Street Week*, and *Forbes*. You've no choice but to consult the primary finance literature, particularly the JoF. The only problem here is that most of its pages serve up a choking bolus of jargon and stochastic formulae, incomprehensible to most nonacademics.

The February issue is a remarkable departure from this grim tradition, with several important and nearly entertaining pieces which speak to all investors. It's online and free to all. ***All of the articles are published in pdf format, which requires the Acrobat reader, available available for free here.***

Agency Problems and Dividend Policies Around the World, Rafael La Porta, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert W. Vishny. Why do corporations distribute dividends? Basically, because their shareholders don't trust them. And with good reason, as demonstrated by the next two articles:

The Cost of Diversity: The Diversication Discount and Inefficient Investment, Raghuram Rajan, Henri Servaes, and Luigi Zingales. The authors show that large, multiindustry conglomerates are not likely to make efficient use of your capital.

Agency Costs and Ownership Structure, James S. Ang, Rebel A. Cole, and James Wuh Lin. So you think that the interests of the managers and shareholders of companies are well-aligned? Guess again.

Characteristics, Covariances, and Average Returns: 1929 to 1997, James L. Davis, Eugene F. Fama, and Kenneth R. French. The world's foremost financial economists confirm the existence of premia for both small and value stocks, and make a powerful argument that the excess returns from these factors are due to risk, and not mispricing.

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