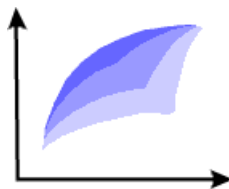# Efficient Frontier

An Online Journal of Practical Asset Allocation

Edited by William J. Bernstein

Fall 2000

Table of Contents

Home   E-Mail

Efficient Frontier
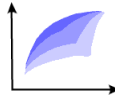
William J. Bernstein

Of Markets and Barbells

I've got a confession to make. I don't like midcap stocks. And I don't feel too bad about it, because neither do a lot of other portfolio theorists. It's nothing personal; the problem is that they're neither fish nor fowl.

First, let's get some preliminaries out of the way. The Center for Research in Security Prices (CRSP) divides the investable universe into 10 size deciles, based on the approximately 1,800 stocks trading on the New York Stock Exchange—180 NYSE stocks in each decile. The NYSE is used to demarcate the size limits in each decile for the thousands of other stocks in the NASDAQ and AMEX, most of which are quite small. So the 1st decile (largest market cap) has 212 stocks— 180 on the NYSE and 32 on the AMEX and NASDAQ, like Microsoft. The 10th (smallest) decile has 2,196 stocks— 180 on the NYSE and 2,016 on the AMEX and NASDAQ.

The original Coward's Portfolio is an extreme example of my aversion to midcaps— its domestic allocation is split equally between the S&P 500 and the DFA U.S. 9-10 Small Company Fund. At 1999 year-end 97.6% of the S&P 500's cap was in deciles 1 and 2; by definition the DFA 9-10 Fund is aimed at the smallest two deciles (although in reality it also has a fair amount of 8th decile contribution as well). So splitting one's domestic stock exposure between these two indexes produces a "barbell portfolio"— one which virtually ignores decile 3 through 7— i.e., midcaps. Using the Russell 2000, which is smeared broadly from deciles 4 through 8, instead of the 9-10, ameliorates, but does not eliminate the phenomenon.

I'm not alone in my avoidance of the middleweights. Dimensional Fund Advisors, not unsurprisingly, favors The Barbell as well. But there's an inconsistency here. After all, DFA is the Vatican of the Efficient Market Hypothesis; I regularly genuflect in that direction as well. And if you adhere to the EMH, then you *ceteris paribus* believe that you must hold the entire market in cap-weighted fashion. For academic types this means the CRSP-All Index, and for the rest of us it means the Russell 3000 or the Wilshire 5000, the latter of which can be purchased as the Vanguard Total Stock Market Fund. (The stock answer from Santa Monica is that small size is yet another dimension of risk, and that holding the market portfolio does not take this into account. But that still does not explain the complete avoidance of midcaps.) So why do we violate this sacrament?

The reason is that the essence of effective portfolio construction is the combination of noncorrelating assets. Let's look at the correlations of the S&P 500 (large), S&P 400 (midcap), S&P 600 (small), and the DFA 9-10 ("microcap") indexes (monthly returns, 10 years ending 4/30/00):

	S&P 500	S&P Midcap	S&P Small	DFA 9-10
S&P 500	1.00			
S&P Midcap	0.87	1.00		
S&P Small	0.70	0.89	1.00	
DFA 9-10	0.53	0.74	0.89	1.00

Not surprisingly, the larger the difference in cap size between two indexes, the lower their correlation; notice that the lowest correlation is between the largest and microcap stocks (0.53). By adding in the small and midcap indexes you are dumping highly correlating assets into the mix, which may be counterproductive.

In order to investigate this problem I considered the 10 deciles from 1926 to 1999 as separate portfolios and optimized return/SD, rebalancing annually. It cannot be emphasized strongly enough that this is a purely theoretical exercise, as these portfolios are not actually ownable in the real world; the decile portfolios themselves are reshuffled quarterly, with very high turnover. Here is the optimization output with ascending risk:

|						Decile:					
Return	SD	1	2	3	4	5	6	7	8	9	10
10.62%	18.86%	0.0%	79.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	20.7%
11.14%	20.00%	55.0%	38.1%	5.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.2%
11.74%	22.50%	32.8%	53.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	14.0%
12.13%	25.00%	15.4%	60.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	24.5%
12.39%	27.50%	1.3%	64.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	34.3%
12.57%	30.00%	0.0%	53.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	46.1%
12.67%	32.50%	0.0%	42.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	57.6%
12.72%	35.80%	0.0%	27.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	72.1%

The first row is the minimum-variance portfolio, and the last the maximum-return portfolio. As you can see, these are in fact all barbell portfolios, consisting almost exclusively of deciles 1, 2, and 10. So, looking at the 1926-99 data, there can be no question that The Barbell beats The Market.

Next, I compared this optimized portfolio (the red curve) with three others:

- The Market Portfolio; (CRSP-All),

- A naïve mix of 50% S&P 500, and 25% each CRSP 6-8 (small caps) and CRSP 9-10 (micro)

- "The Barbell"— all the possible mixes of the 1st (largest) and 10th (smallest) decile (the blue curve)

Decile Portfolios 1926-99

13%

Fully Optimized
Barbell

12%
✗ Portfolio A

11%
✗ CRSP-All

10%
15%   30%   45%
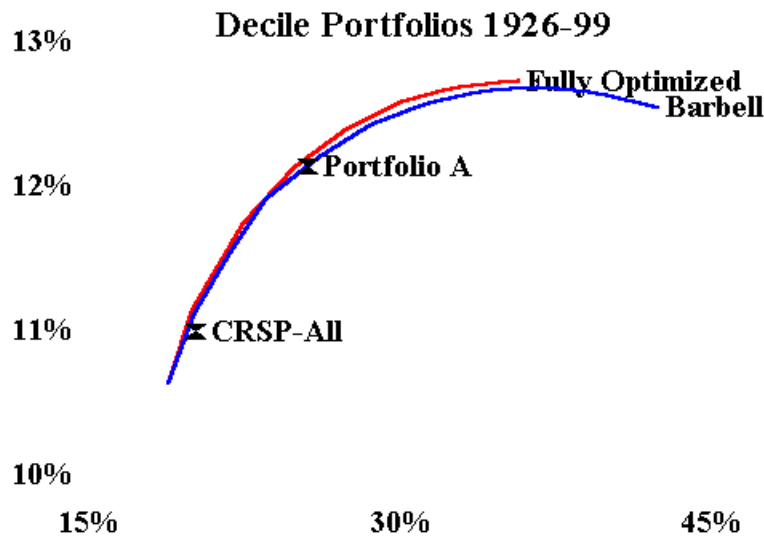
As you can see, none of these portfolios has much of an efficiency advantage. Most importantly, although the market portfolio (CRSP-All) has a very different composition from the barbell/optimized portfolios, its efficiency is only slightly less. Finally, very few rational investors operate much to the right of the Market Portfolio on the risk axis— most folks hold some cash and bonds. So let's complete the picture by drawing a line from the riskless asset (T-bills) to the market portfolio:

Decile Portfolios 1926-99

12%   ✗ Portfolio A
                       ✗ CRSP-All

9%

6%

T Bill

3%
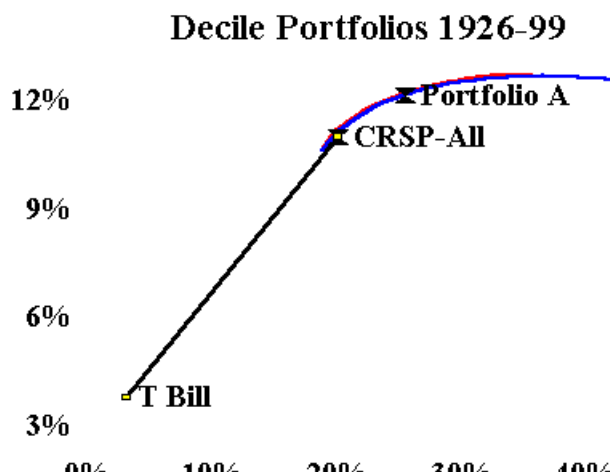
0%   10%   20%   30%   40%

As you can see, most investors would be quite well served by using the market portfolio. (And even if you were one of those truly risk adverse investors who could happily kiss goodbye 70% of their net worth from time to time, the most efficient way to obtain the best risk-adjusted return would be leveraging the market portfolio rather than attempting to travel up one of the graph's barbell-portfolio colored curves.)

Two more powerful arguments can be made against the barbell approach. The first is tracking error. No matter how rugged an individualist you are, temporarily underperforming The Market causes pain, and there can be no doubt that The Barbell does this, while offering little excess return. Second is the data-mining issue. The differences between The Market and The Barbell are so small that one cannot be sure that we're just looking at statistical noise, even with 74 years of detailed data.

So it's hard to make a case for The Barbell on theoretical grounds. A better case can be made on current market valuation, with small stocks being considerably cheaper than large stocks by almost any parameter you look at.

And we haven't touched a much more important issue, which is the use of value exposure. In fact, adding a large value component makes a portfolio less barbell-like, since "large value" stocks have a much smaller market cap than large growth stocks ($37B for Vanguard's Value Index Fund and $5B for DFA's, versus $93B for the S&P).

We'll save value for another day.

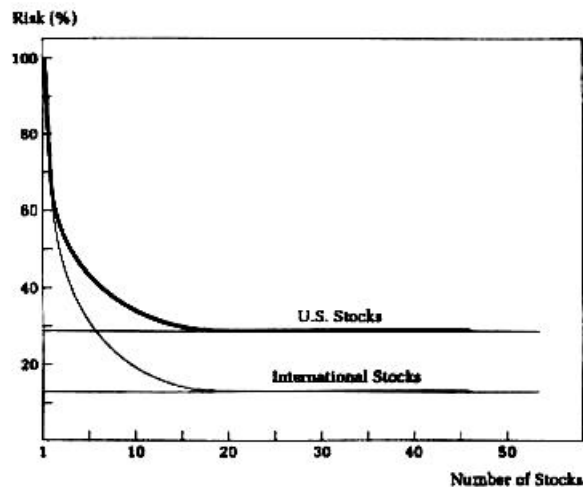Home   E-Mail

Efficient Frontier
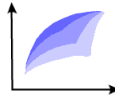
William J. Bernstein

The 15-Stock Diversification Myth

One of the most dangerous investment chestnuts is the idea that you can successfully diversify your portfolio with a relatively small number of stocks, the magic number usually being about 15. For example, Ben Graham, in *The Intelligent Investor*, suggests that adequate diversification can be obtained with 10 to 30 names. In a classic piece in *Journal of Finance* in 1968, Evans and Archer found that portfolios with as few as 10 securities had risk, measured as standard deviation, virtually identical to that of the market. Over the decades, the "15-stock diversification solution" has become enshrined in various texts and monographs, most famously in *A Random Walk Down Wall Street*:

> By the time the portfolio contains close to 20 equal-sized and well-diversified issues, the total risk (standard deviation of returns) of the portfolio is reduced by 70 percent. Further increase in the number of holdings does not produce any significant further risk reduction.

To emphasize the point, Mr. Malkiel collated data from a paper by Bruno Solnik, and combined the reduction in risk of both domestic and international portfolios into one nifty graph:
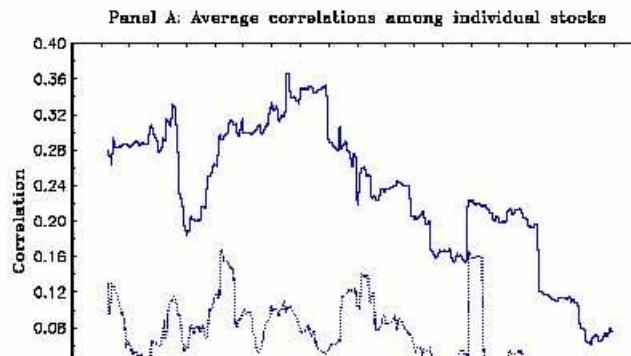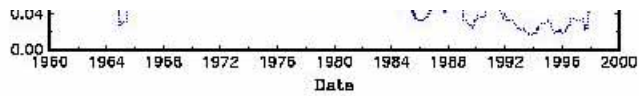

The Benefits of Diversification

in ***Journal of Finance*** Mr. Malkiel et. al. extend and update the state of our knowledge regarding portfolio diversification and market volatility. It's a wonderful piece, well-written and quite understandable, and comes to four fascinating conclusions:

1. The volatility of individual stocks has risen over the past few decades (the upper plot represents monthly returns, the lower plot annualized monthly returns):
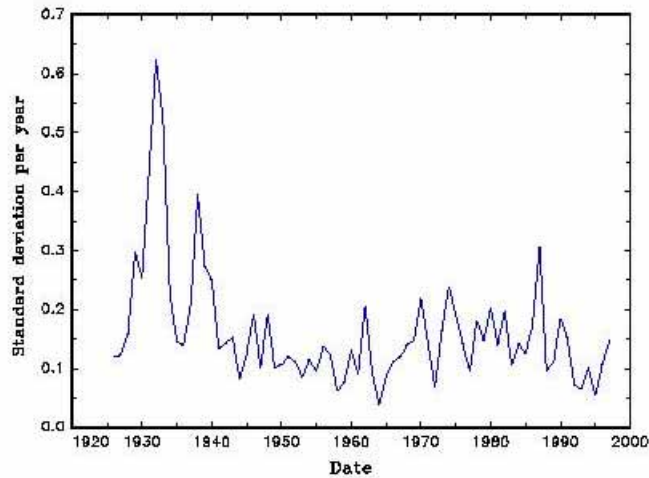

Panel A. Firm volatility

Panel B. Firm volatility, MA(12)
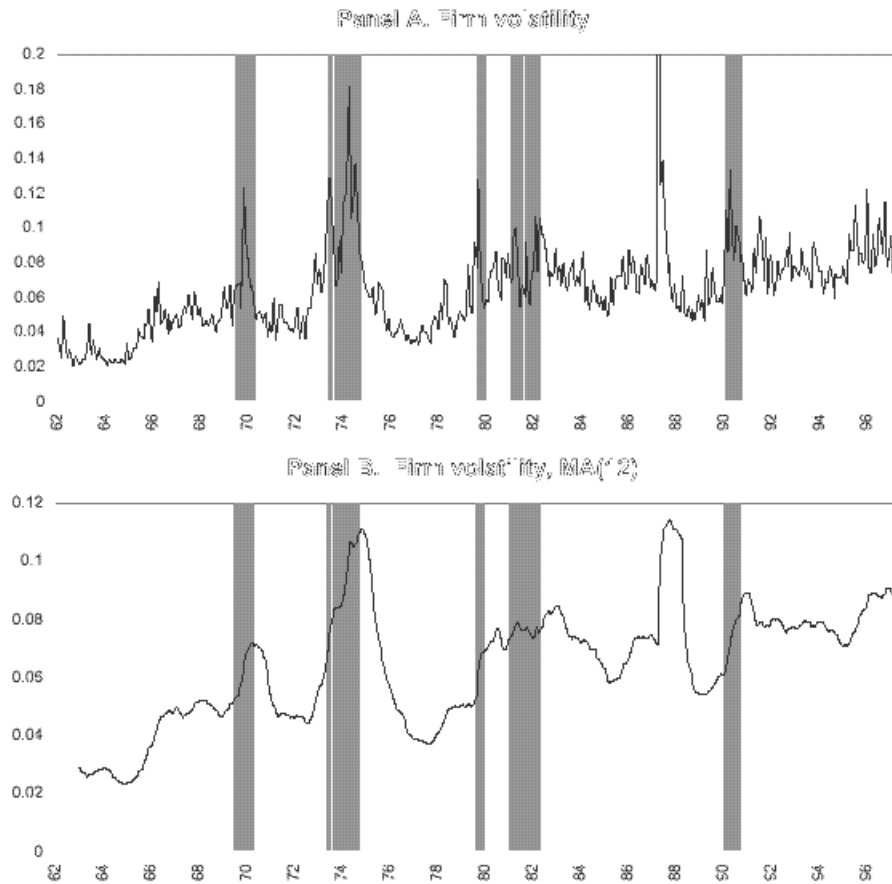
2. The correlation among stock returns is falling (the solid upper line represents monthly data, the lower line daily data):

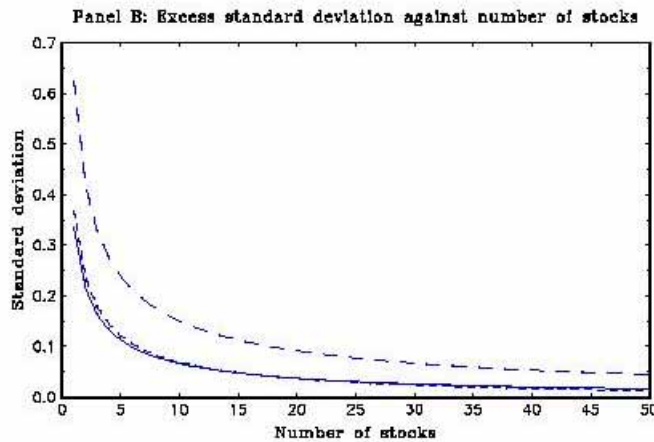Panel A: Average correlations among individual stocks

0.04
0.00
1960 1964 1968 1972 1976 1980 1984 1988 1992 1996 2000
Date

3. The effects of #1 and #2 cancel each other out. Consequently, the overall volatility of the market has not changed:

0.7
0.6
0.5
Standard deviation per year
0.4
0.3
0.2
0.1
0.0
1920 1930 1940 1950 1960 1970 1980 1990 2000
Date

4. However, also because of #1 and #2 the number of stocks necessary to eliminate nonsystematic risk is rising (the upper curve represents the more recent period):

Panel B: Excess standard deviation against number of stocks
0.7
0.6
Standard deviation
0.5
0.4
0.3
0.2
0.1
0.0
0   5   10   15   20   25   30   35   40   45   50
Number of stocks

This is all profound and important stuff. And, unfortunately, highly misleading. To be blunt, if you think that you can do an adequate job of minimizing portfolio risk with 15 or 30 stocks, then you are imperiling your financial future and the future of those who depend on you. The reason is simple: There are critically important dimensions of portfolio risk beyond standard deviation. The most important is so-called Terminal Wealth Dispersion (TWD). In other words, it is quite possible (in fact, as we shall soon see, quite easy) to put together a 15-stock or 30-stock portfolio with a very low SD, but whose lousy returns will put you in the poorhouse.

This issue has not been much investigated or discussed. One of the pioneers in this area is Edward O'Neal of Auburn, who in a piece in *Financial Analysts Journal* a few years back looked at TWD as a function of the number of mutual funds. His data show that the risk of TWD falls off as 1/sqrt(n); in other words, a portfolio of four mutual funds is half as risky as one. However, I'm not aware of any definitive studies of TWD as a function of the number of stocks.

In order to investigate this problem, I looked at the stocks constituting the S&P 500 as of 11/30/99, and formed 98 random equally-weighted 15-stock portfolios for the 12/89-11/99 10-year holding period. Below is a histogram of the annualized portfolio returns:
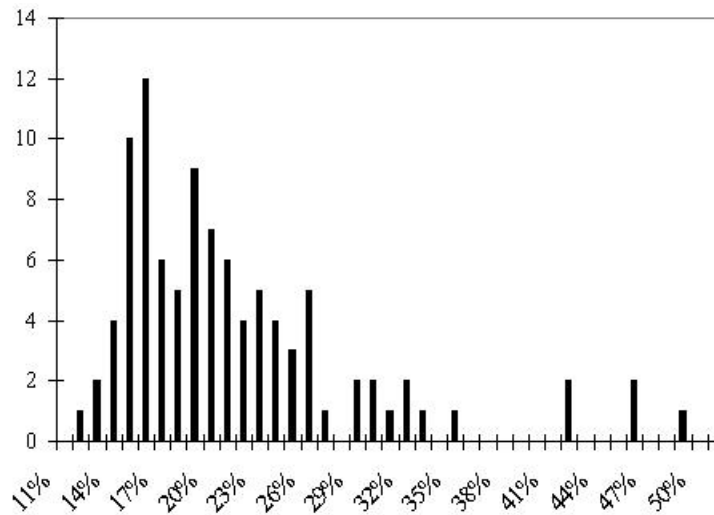
The "market return" (all 500 stocks held in equal proportion) was 24.15%. This is considerably higher than the 18.94% return of the actual S&P for two reasons: First, the S&P is a cap-weighted, not an equal-weighted, portfolio. Second, and much more important, many of the stocks in the S&P on 11/30/99 were not in the index at the beginning of the period. The recently-added stocks obviously had much higher returns than the companies they replaced, upwardly biasing the entire series of returns. Nonetheless, these flaws in the methodology do not change the basic conclusion; the TWD of these 15-stock portfolios is staggering—three-quarters of them failed to beat "the market." (Had the study been done with the S&P stocks extant on 12/1/99, it seems certain that the positive kurtoskewness of the present sample would have been replaced with a significant negative kurtoskewness—a much more important descriptor of risk. If anybody wants to give me a survivorship-bias-free S&P database for the past 10 years, my modem and mailbox are in fine working order.) Even so, the scatter of returns was quite high, with more than a few portfolios underperforming "the market" by 5%-10% per annum.

The reason is simple: a grossly disproportionate fraction of the total return came from a very few "superstocks" like Dell Computer, which increased in value over 550 times. If you didn't have one of the half-dozen or so of these

in your portfolio, then you badly lagged the market. (The odds of owing one of the 10 superstocks are approximately one in six.) Of course, by owning only 15 stocks you also increase your chances of becoming fabulously rich. But unfortunately, in investing, it is all too often true that the same things that maximize your chances of getting rich also maximize your chances of getting poor.

If the O'Neal data are generalizable to stocks, and I believe that they are, then even 100 stocks are not nearly enough to eliminate this very important source of financial risk.

So, yes, Virginia, you can eliminate nonsytematic portfolio risk, as defined by Modern Portfolio Theory, with a relatively few stocks. It's just that nonsystematic risk is only a small part of the puzzle. Fifteen stocks is not enough. Thirty is not enough. Even 200 is not enough. *The only way to truly minimize the risks of stock ownership is by owning the whole market.*
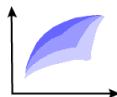
Home   E-Mail

Efficient Frontier

William J. Bernstein

The Heisenberg Equity Principle

In my more grandiose moments I imagine that I'm Charly Ellis, principal of Greenwich Associates and advisor to some of the nation's wealthiest individuals, funds, and endowments. He's also the author of *The Loser's Game*, a true investment classic published in *Financial Analysts Journal* in 1975. (Long story short: Portfolio management at all levels resembles amateur tennis, in which the winner typically is not the player who makes the most brilliant shots, but rather the one making the fewest mistakes. In short—buy, hold, and do not trade unless absolutely necessary.)

I was thus surprised to catch him repeating in his 1998 book, *Winning the Loser's Game* (McGraw-Hill), an old bromide which should have been long ago consigned to an anthology of investment mythology:

> " . . . the typical pension fund was, in the 1970s, 1980s, and 1990s, only 50 percent in equities. . . . . These funds paid an opportunity cost in returns foregone. As it turned out, the cost of not being fully invested in stocks in the 1980s and 1990s was *very* large . . . . ."

In other words, had the nation's largest investment pools invested more heavily in stocks, they would have reaped the high equity returns of the past two decades.

Such observations are not new. In an infamous interview in *Ladies Home Journal* in 1929 entitled "Everyone Ought to be Rich," John Raskob proposed that if everyone simply invested $15 in the stock market each month, before very long we would all become rich. Unfortunately, his computations imputed an annualized return of 24%. These days we're much more sophisticated. Proponents of social security privatization are careful to assume the historical 8% real return for accounts invested in equities. Happily, even at this lower return, everybody still gets rich.

The mistake made by Ellis, Raskob, and privatization enthusiasts is subtle but important. Imagine for a moment that in 1980 all the nation's pension funds and other long-lived investment pools shifted to 100% equity. What would obviously have occurred is a one-time pop in equity prices, followed by much lower subsequent returns, since half of equity returns are from dividends. (I'm indebted to Jason Zweig of *Money* for pointing out to me

that this is precisely what happened in Chile, which experienced spectacular stock performance due to retirement privatization in the early 1980s, with lousy returns since.)

The problem can be thought of in another way. Since 1926 the real return of corporate equity has been about 8%, while that of corporate bonds has been about 2%. Which means that the aggregate return on corporate capital was somewhere in the vicinity of about 5%. Imagine for a moment that in 1926 Congress had made bonds illegal, forcing all investment/corporate capitalization into stocks. Equity prices would have initially been bid up, lowering subsequent returns as dividends fell. More importantly, companies would have been forced to issue huge amounts of equity for capitalization, diluting shareholder cash flow streams, lowering returns yet further. Let's call this scenario "stockworld."

Now imagine the opposite had occurred—that in 1926 Congress had outlawed equity, leaving bonds as the only source of investment/capitalization—"bondworld." Here things get even more interesting. You can't "dilute" interest payments. (Well, actually, you can. But that's called *default*.) So the bond market becomes flooded with supply, driving down prices and forcing up yields. Even worse, the companies become very highly leveraged, lowering their credit quality, forcing up yields even more. Hello 5% real bond yields.

In fact, bondworld may be a preferable state of affairs to stockworld, since the former is very highly leveraged and the latter completely deleveraged. In bondworld there is zero margin for error in corporate capital allocation, and since all of the company's profits flow to its private owners, the usual agency problems arising from differences between shareholder and manager goals cease to exist—there are no shareholders. In stockworld additional capital is more easily available via additional stock issuance, with much less incentive for management to use it efficiently.

In short, *the aggregate national investment return will be approximately the same no matter what the overall stock/bond mix of the capital markets*. To the extent that debt tends to decrease agency conflicts, a small nod may go to an increase in the overall debt/equity ratio. If everybody issues/invests in stocks, then stock returns must fall to the aggregate return rate. Which may actually already have happened. If all of the nation's pension funds and newly-privatized social security accounts shifted to stocks, they most decidedly would *not* obtain the historical 7%-8% real return.

This situation is analogous to that of a physicist who attempts to measure the precise position of an electron. The laws of physics dictate that it cannot be done, since the measurement itself will displace the electron's original position—once we've ascertained that stocks have returns vastly superior to bonds, their prices will be rapidly bid up, and the previous expected equity risk premium reduced or eliminated. On the other hand, for opposite reasons, it seems likely that expected bond returns are much higher than actualized historical returns; perhaps even greater than that of stocks.

But one thing is clear: it's not kosher to play the game of shoulda, woulda, coulda with a large slab of the nation's investment pool. Had the majority of corporate pension officers known that stocks would beat bonds by 6% per year over the next several decades, it could not have happened. And now that *tout le monde* knows it, it won't.
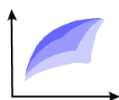
Home   E-Mail

Efficient Frontier

William J. Bernstein

God Bless This Ponzi Scheme

For the past 30 years, the quintessential third-rail issue in American politics has been Social Security. And for most of that period, the Democrats have wielded it against the opposition with the same speed and devastation as a Mike Tyson right hook. But with the public's increasing financial sophistication, the New Right has finally developed an effective counterpunch: *Social Security is a lousy investment*.

In the beginning, with the worker/retiree ratio in excess of 10, the average annualized real rate of return for the earliest participants was a robust 5%-6%. But with worsening demographics, returns fell. For future retirees, things will be even worse—real return rates steadily decline towards zero for most workers born after 1970. Moreover, certain family configurations are treated better than others. Married folks do better than singles. Men do worse than women because of their shortened life expectancy, and, for the same reason, black males do worst of all. Since benefits are not proportional to contributions, low-income participants do better than high-income ones; the real return for the latter group is now negative. A monograph from the American Heritage Institute plots the fall in real returns to later participants:
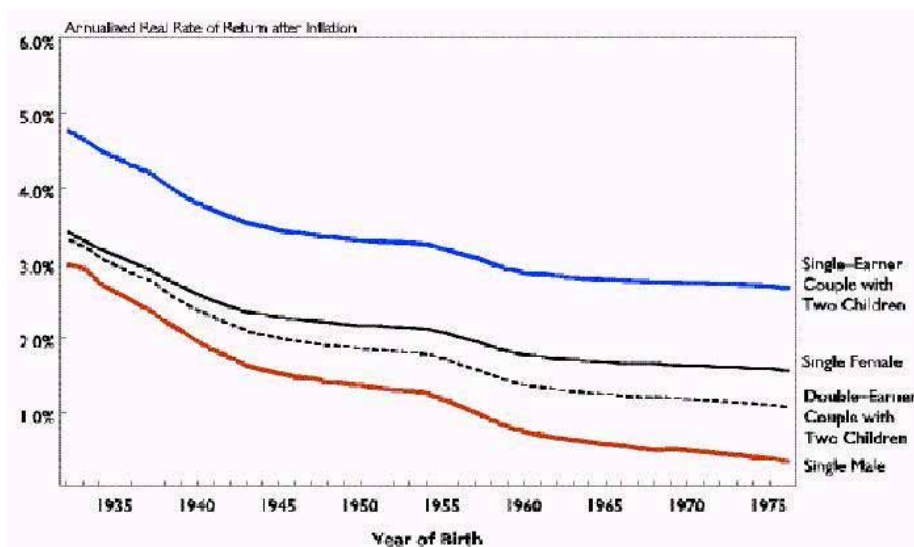
Writing in the Op-Ed section of the **Wall Street Journal**, former Fed governor Lawrence Lindsey pouted that he will not earn quite the return on Social Security as on his other retirement accounts:

Doing the math, I found that I would get all my money back three months short of my 83rd birthday. God willing, I will live well past this date, but the actuarial tables predict that I will fall about five years short. In other words, the expected real return on my Social Security contributions is negative. To add insult to injury, I will have paid taxes both on my contributions to the system and on 85% of the benefits I take out of the system. This makes the real after-tax return I can expect even more negative.

The problem with this sort of analysis is that not in anybody's wildest imagination can Social Security be considered an investment operation. It is pass-through wealth redistribution, pure and simple. Today's retirees are not paid from their past contributions; their checks instead come from currently-employed younger workers. The "Social Security Trust Fund" is merely a slip of paper denoting the part of the federal deficit owed by the Treasury to the Social Security Administration. It is no more an investment pool than the yellowing IOU from your cousin Bennie that resides in your desk drawer. The system is elegantly summed up by Jagadeesh Gokhale and Kevin Lansing of the Cleveland Fed:

Consider the following investment scenario. You turn over 10 percent of your salary each year to an investment manager who pools your contributions with those of others to form something that looks like a mutual fund. The manager assembles a portfolio that ends up earning a meager rate of return—less than 1 percent after adjusting for inflation.

Next, you learn that before you ever joined the fund, the manager made some unwise promises to the early investors. In particular, he guaranteed that they would receive very high rates of return—far exceeding the fund's ability to pay, given its less-than-spectacular investment performance. Moreover, he handed out all sorts of cash bonuses along the way to keep the early investors happy. To maintain investor confidence, the manager used incoming cash from the new investors to make direct payments to the early investors.

This precarious setup actually worked for awhile. Now, however, like all pyramid schemes, the fund is on the brink of collapse because the supply of new investors has begun to dry up. Indeed, the manager informs you that you will have to increase

> your annual contribution to keep the fund solvent,
> and that you should reduce your expectations about
> future payoffs from this investment.

Personally, I find nothing inherently wrong with this. Long, long ago, around the turn of the last century, we lived in a world of unfettered Ayn-Randian capitalism, with minimal government interference in daily life and commerce. And no income tax— a gauzy sort of New-Right Valhalla. The only problem was that the reaction to this system's excesses and inequities led to a backlash that inflicted communism and fascism on most of the planet. The US escaped these modern plagues, but just barely. This was largely because our political leadership had the courage and foresight to modestly redistribute income and wealth via antitrust legislation, a progressive income tax, and finally, Social Security. Of course, social and political peace also require a functioning market economy—Bismark's prototypical welfare system did not save German society from the depredations of the Versailles Treaty, and the social benefits of the communist state did not overcome its crippling economic and political disadvantages.

Social Security has not been a lousy investment; it never was an "investment" in the first place. It makes no sense to talk about the "rate of return" of a pass-through wealth redistribution scheme. But it also just may have saved the republic. (The ultimate irony of the interwar near-Götterdamerung of capitalism is that by severely depressing stock prices it set the stage for the spectacular returns now being drooled over by privatization enthusiasts.) When I become unhappy with the paltry reward I'm going to get from my FICA deductions, I think of my neighbor who lives down the road in a trailer park—call him Fred Smith. Fred's 75, has had a stroke, and worked all his life in a lumber mill, finding himself without a pension plan after a reorganization left him high and dry. Undoubtedly Fred has made a higher rate of return on his Social Security deductions than I'm going to make on mine. But unlike poor Mr. Lindsey, this doesn't bother me one bit. I'm as unhappy as everyone else with the huge crater made by the layers of deductions in my monthly paycheck. But the New Right just doesn't get it; that hole in our take-home is largely responsible for a prolonged period of social peace and prosperity nearly unique in world history.

The fact still remains that in two or three decades the system will be exhausted. The solution, say the critics, is simple: allow workers to opt out and invest in their own retirement accounts. After all, stocks have an annualized real return of 8%, right? Give Jim Glassman (***Dow 36,000***) a few minutes with a spreadsheet and he'll show you how diverting just 2% of the FICA contribution into stocks will fund the plan. In short, in the words of the late John Raskob, "everybody ought to be rich." What's wrong with this picture? Plenty.

For starters, everybody cannot get rich investing in stocks at the same time. Consider the past 75 years in the capital markets. Yes, stocks have produced an 8% real return, but the real return of bonds has been only 2%. If you

subsume the nation's entire capital structure of stocks, bonds, real estate, and bank loans as a whole, its overall real return was probably closer to 5%-6%. The key point here is that *a nation's aggregate investment return is independent of its capital structure.* In other words, if current stock valuations hold it is entirely possible that we may be sitting on the cusp of a new investment paradigm—one in which stock and bond returns are approximately equal. In addition, the flood of Social Security money into retirement and pension plans at the present demographic front end of the investment baby boom and the flood out at its back end in 20-30 years will further reduce the returns of both stocks and bonds. (For a fuller discussion of why everybody can't get rich with stocks at the same time, see ***The Heisenberg Equity Principle*** in the current issue of ***EF***.)

Further, expecting the average worker to competently manage their own investments is akin to asking him or her to fly their own airliner. This is not an unfair analogy. Surveys show that a majority of people do not have a clear idea of the difference between stocks and bonds and have no grasp of their expected returns and risks. Even more importantly, there is no convincing evidence that the average investor has the knowledge and discipline to stay the course in tough times; as has happened so often in the past, they will most likely chase performance, buy high, and sell low. There are no high-quality data on the return of individual retirement accounts, but it is safe to assume that because of fund fees and frictional costs it will be at least 2% less than the aggregate national capital return—i.e., in the 3%-4% real range going forward.

A fast spreadsheet run shows that a worker earning a constant real salary from age 20 to 65 with a 10% savings rate requires a 4.03% real return to sustain a 20-year retirement at the same salary level. And even this is a wildly optimistic model, as most younger workers have relatively low incomes with zero savings. Start at age 30 and the required rate real of return is 5.74%, and if you delay retirement saving until age 40 you'll need an 8.86% real return. So, Houston, we have a problem— it is a mathematical certainty that privatizing even 5% of FICA deductions would prove woefully inadequate for most workers. At some point a government-sponsored privatized retirement plan would become The Mother of All Moral Hazards. Remember that there have been periods as long as 18 years with *zero* real stock returns. It is quite likely that this might occur between 2010 to 2030, as millions of boomers sell their securities. (And, as the old stockbroker's joke goes, to whom?) It is hard to imagine the government not stepping in to rescue the armies of seniors with prematurely dry pension accounts.

Last, and not least, in a privatized system Fred Smith is not as likely to earn anywhere near the returns of the erstwhile Mr. Lindsey. While tolerable in a private retirement setting, a large disparity of returns in a government-sponsored system is politically and morally untenable.

Social Security privatization is not just fiscally risky, as suggested by Mr. Gore, but also socially and politically dangerous. Any national pension scheme must be executed in a uniform manner, if at all. Is such a system

possible?

One tempting option would be to establish a government retirement fund. I imagine that Vanguard's Gus Sauter could run the whole operation with a few dozen assistants for a fraction of a basis point. For starters, it would have to be established as a quasi-independent entity, *a la* the Fed, with its board serving long terms. Because of its prestige, it should have little problem attracting the cream of money managers, in spite of the modest salaries the agency would offer.

However, the possibilities for mischief at multiple levels are daunting. You don't need a doctorate in political science to envision such an investment pool as the Mount Everest of pork; simply selecting the universe of eligible securities might prove to be a politically insurmountable task. And once you're past that hurdle there would remain corporate governance issues to turn Fidel Castro's hair gray.

At the end of the day, it is wisest to conclude that in this arena the job of the federal government should be limited to maintaining social and political peace. It needs to be admitted, once and for all, that Social Security is simply a safety net, whose benefits will accrue most heavily to least fortunate. *It is not now, and has never been, a retirement fund*. (A modest suggestion. President Clinton should play to his strengths; appear on Oprah, tearfully confess that Social Security was in reality a vast Ponzi scheme, apologize for its sins, and beg the nation's forgiveness.) Lastly, it should be accepted that the government should not be in the business of running or sanctioning retirement plans.

This is not to say that the government shouldn't encourage private retirement saving as strongly as possible via legislation and education. It should dramatically expand pension portability and tax-deferred saving beyond the pitiful thicket of IRAs, 401(k)s, 403(b)s, and Keoghs we currently have. In an era when the 15th percentile of surviving spouse life expectancy is well north of age 90, it is monumentally stupid to mandate depletion of most retirement accounts by age 80.

But enmeshing Uncle Sam in the direct payroll funding of retirement is political and social napalm. Because of the coming demographic tidal wave, the safety net is badly frayed and unless reformed, it will break sometime in the next century. The FICA rate is already red-lined, so some combination of means testing and benefits reduction is inevitable. Let's do the job and move on.
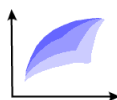
Home   E-Mail

Efficient Frontier

William J. Bernstein

Selection Skill, Transactional Skill

The evidence that money managers cannot persistently earn excess returns is impressive. Burton Malkiel's famous monkey-throwing-darts-at-the-stock-page analogy resonates with anyone familiar with the data on manager performance persistence. Yes, in any given period a few simians will obtain superb results. But this is due to chance—last year's winners, in the aggregate, will have only average performance next year. (Actually, the empirical data show that the prior fund winners do ever-so-slightly better than average, due primarily to expense and momentum factors. But the margin is only a small fraction of the increased overall expense of active management.)

But what if I were to tell you that there is a manager who runs 13 funds, and that over the past 3 years *every one of them, adjusting for expenses, has beaten its benchmark*? The odds of flipping heads 13 times in succession is one in 8,192, and this in fact understates the odds of this occurring by chance, as frictional costs should lower the odds of a fund's gross return exceeding its benchmark to less than 50-50.

Most of you can guess whom I'm talking about: Gus Sauter, who runs Vanguard's index shop. The below figures (source: Morningstar Principia) are for the three-year period from May 1997 to April 2000, except for VISVX, VISGX, and VMCIX, which launched 6/1/98. VGSIX is a special case—Principia does not contain its benchmark, the Morgan Stanley REIT Index, so I was stuck using the data in Vanguard's annual report, which covers 1/13/96 to 1/31/2000.

Fund	Return	Expenses	Gross Return	Benchmark	Gross TE	Net TE
VIVAX	16.45%	0.22%	16.67%	16.58%	0.09%	-0.13%
VIGRX	30.16%	0.22%	30.38%	30.07%	0.31%	0.09%
VISGX	23.95%	0.25%	24.20%	22.12%	2.08%	1.83%
VISVX	-2.16%	0.25%	-1.91%	-5.51%	3.60%	3.35%
VFINX	23.67%	0.18%	23.85%	23.69%	0.16%	-0.02%
VMCIX	39.62%	0.25%	39.87%	37.65%	2.22%	1.97%
VEXMX	23.00%	0.25%	23.25%	23.01%	0.24%	-0.01%
NAESX	16.34%	0.25%	16.59%	15.24%	1.35%	1.10%
VTSMX	23.22%	0.20%	23.42%	23.34%	0.08%	-0.12%
VPACX	6.47%	0.37%	6.84%	6.62%	0.22%	-0.15%
VEURX	19.66%	0.29%	19.95%	19.13%	0.82%	0.53%
VEIEX	-1.24%	0.58%	-0.66%	-4.22%	3.56%	2.98%

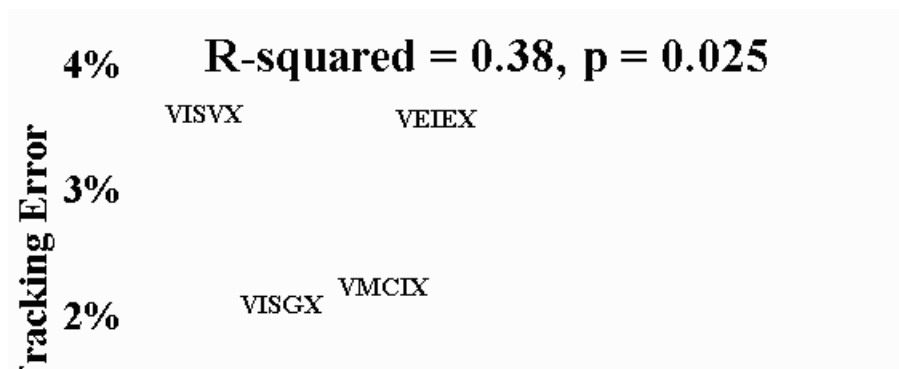|						
VGSIX	6.20%	0.33%	6.53%	5.90%	0.63%	0.30%
Average					1.18%	0.90%

In order to make this table more clear, I've added each fund's expenses to its return to get the "Gross Return" in the fourth column, which is compared with the benchmark return in the next column to get the "Gross TE" (tracking error). The "Net TE" is the tracking error after expenses—i.e., the TE that the investor actually sees. Note that in all cases the "Gross TE" is positive. Especially amazing is that VFINX, the world's largest fund, comes within 2 basis points of making back its expenses.
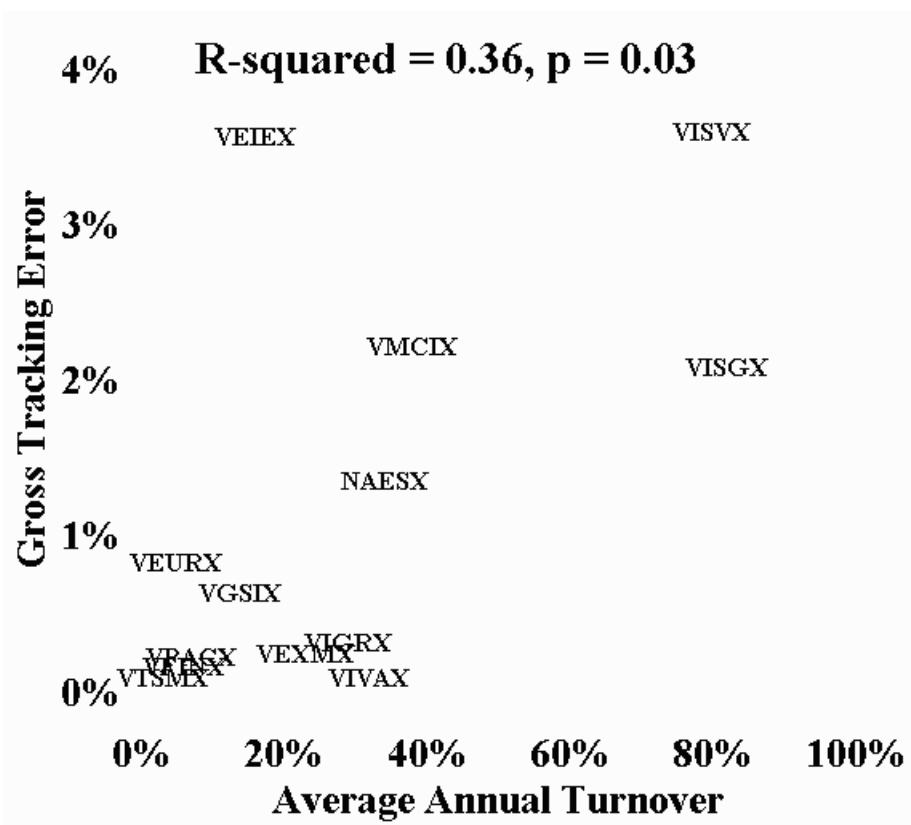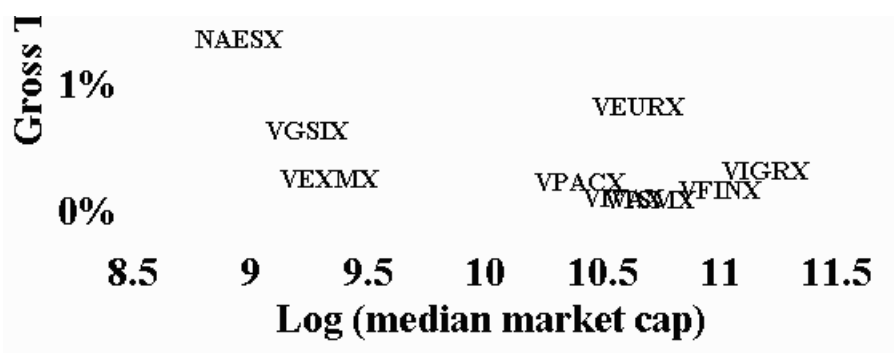
Vanguard's S&P 500 index funds provide another window onto the issue of transactional skill since there are a relatively large number of competing funds. Looking at the 34 funds with five-year track records from 1995 to 1999, the Vanguard Institutional and Index Trust 500 funds rank first and second, respectively. And this ranking *is sorted on gross returns*. In other words, the superiority of the Vanguard funds is due to trading strategy and not their expense advantage, which boosts their net returns relative to their peers even further.

How does he do it? Mr. Sauter must have the world's smallest ego, because he ain't telling. He's not merely being contrary; Gus knows that revealing his strategy will spawn imitation, thus eliminating his advantage.

Dimensional Fund Advisors also has a positive TE in some of its funds, particularly its flagship U.S. 9-10 Small Company Fund, which has beaten its benchmark (the CRSP 9-10 Index) by 2% per annum since 1982. Their strategy is fairly well-known. Since they're the world's largest owner of equity in the microcap area, they have the capacity to execute market-clearing purchases of large sell-overhangs at below-market prices. But Vanguard is a bit player in all of its markets. Even VFINX owns only about 1% of the S&P 500, and Vanguard's small-cap funds do not have anywhere near the size and clout of DFA's.

As you can see below, there's a pretty good relationship between the TE and both market cap and turnover—the smaller the stocks and the higher the turnover, the more excess return is earned.

Chart 1 (Y-axis: Gross T, X-axis: Log (median market cap))

Gross T

1%   NAESX

          VEURX

          VGSIX

0%   VEXMX   VPACX   VIGRX
                  VMFSMX VFINX

8.5   9   9.5   10   10.5   11   11.5

Log (median market cap)

Chart 2 (Y-axis: Gross Tracking Error, X-axis: Average Annual Turnover)

R-squared = 0.36, p = 0.03

4%

          VEIEX   VISVX

3%

                    VMCIX
                                VISGX
2%

                NAESX

1%   VEURX
        VGSIX

                    VIGRX
        VPACX   VEXMX
0% VTSMX   VIVAX

0%   20%   40%   60%   80%   100%

Average Annual Turnover

So, clearly, some sort of trading strategy is involved. One possibility is that this revolves around the "reconstitution" of the S&P indexes which occurs in January and July. But no, the annualized TEs occurring during the months of June, July, December, and January are actually less than during the rest of the year. Besides, when a stock is tossed from one index to the next, the obvious mechanism is simply to trade them in frictionless fashion by book-entry transactions from one fund to the other.

One thing is clear. Mr. Sauter has skill. Not *selection* skill, but *transactional* skill. It's a lot like figure-skating competition. Turn on the TV and you get the impression that it's all about the glamorous free-form event. But half of the performance is scored on the compulsory "school" maneuvers, which are duller than toast. Money management is no different; the glamour event is active selection, where there is no evidence of persistently superior performance. The compulsory maneuvers are what really matter, and here there does seem to be evidence of real persistence.

Undoubtedly there are active managers with transactional skill—John Montgomery and John Bogle Jr. come most easily to mind. But active security selection is such a noisy, random process that it completely obscures transactional performance, which has a much smaller scatter. So we'll never know. Only with index funds, which eliminate the noise of security selection, is it possible to detect transactional skill.

No doubt about it: there are skilled indexers. And just as clearly, as I pointed out with WEBSs in the Spring issue, there are also unskilled ones. A lot of excitement is being generated with the introduction of exchange traded funds (ETFs) by just about everybody. In a way, it is gratifying to see investors finally beginning to notice the difference between 18 bp and 8 bp of expense. But ironically, as the last bit of juice is being squeezed out of the expense lemon, skill—of a very particular and easily-measured variety—becomes for the first time critically important.

Home   E-Mail

Efficient Frontier
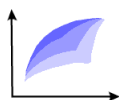
William J. Bernstein

Links of the Month
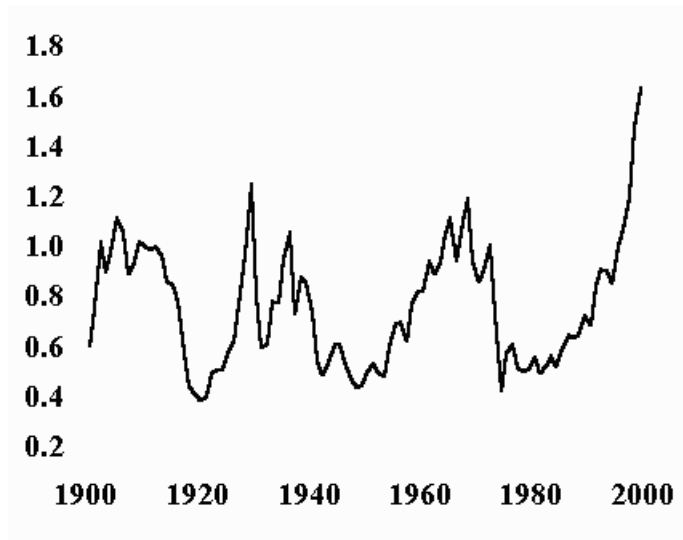
Tobin's Q, Data From Shiller

Fellow valuation worrywarts, rejoice: you can now wallow in a lush, mordant pool of data that shows just how historically overvalued the U.S. markets really are.

From Robert Shiller at Yale comes monthly prices, earnings, and dividends, both nominal and inflation adjusted, back to 1871; this is the data in back of *Irrational Exuberance*. For example, if you want to blindside your least-favorite new-era paradigmista, just plot inflation-adjusted S&P real dividends for the past 129 years, the slope of which rises at a blistering 1.3% per year:
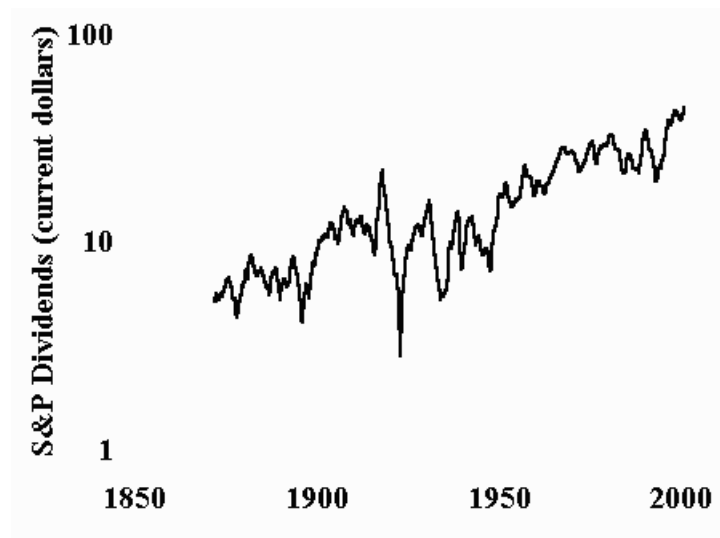
If he or she can see a productivity-triggered increase in the past few decades, send them to the eye doctor.

And from Andrew Smithers and Steven Wright, authors of *Valuing Wall Street*, comes Tobin's q (roughly speaking, the market price divided by its replacement value), paired with somewhat less detail on earnings and dividends than from Professor Shiller. Here's the big picture:

Caveat emptor.