



Index Fund Strategies

ASSET CLASS

A monthly update of asset class performance, trends, & topics for long-term investors

Index Returns

	1997	1998	1999	Last 7 yrs.	3/17 2000
Bonds					
Short-term	6.0	5.7	4.6	5.3	+1.1
Intermediate	9.2	10.5	-3.6	6.0	+1.5
Long-term	14.3	12.0	-7.9	7.4	+4.7
Global	8.3	8.4	3.7	7.6	1.1
U.S. stocks					
Large Market	33.2	28.7	20.8	21.3	-0.1
Large Value	28.1	12.0	4.8	16.3	-7.6
Small Market	22.8	-7.3	29.8	16.5	+28.9
Small Value	30.7	-7.3	13.1	15.6	+10.3
Real estate	19.3	-15.4	-2.0	6.7	+0.9
Int'l stocks					
Large Market	5.5	18.2	28.5	14.3	-2.6
Large Value	-3.1	14.9	16.3	13.9	-7.2
Small Market	-23.7	8.2	21.9	6.6	+3.6
Small Value	-22.7	5.3	19.0	5.8	-1.2
Emerg. Mkts.	-18.9	-9.4	71.7	13.0	-1.8

Descriptions of Indexes

Short-term bonds	DFA One-Year Fixed Income fund
Intermediate bonds	DFA Intermed. Gov't Bond fund
Long-term bonds	Vanguard Bond Index Long-term
Global bonds	DFA Global Fixed Income fund
U.S. Large Market	Vanguard Index 500 fund
U.S. Large Value	DFA Large Cap Value fund
U.S. Small Market	DFA US 9-10 fund
U.S. Small Value	DFA US 6-10 Value fund
Real Estate	DFA Real Estate Securities fund
Int'l Large Market	DFA Int'l Large Cap fund
Int'l Large Value	DFA Int'l Large Cap Value fund
Int'l Small Market	DFA Int'l Small Company fund
Int'l Small Value	DFA Int'l Small Cap Value fund
Emerging Markets	DFA Emerging Markets fund

"Last 6 yrs." returns for U.S. Large Value (3/93), U.S. Small Value (3/93), Int'l Large Value (3/93), Int'l Small Market (10/96), Int'l Small Value (1/95), and Emerging Markets (5/94) include simulated data prior to fund inception (in parentheses).

This information is obtained from sources we believe are reliable, but we cannot guarantee its accuracy.

Past performance does not guarantee future returns.

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Markets Update Monday, March 20, 2000

Jeremy Siegel, Wharton School (From the March 14, 2000 *Wall Street Journal*):

In the late 1960s Polaroid was at the top of its game, dominating the photographic field and enjoying one marketing success after another. Investors bid the stock up to an unheard-of 95 times earnings. Never before had a large-capitalization stock been priced so high. But Polaroid's earnings growth had exceeded 40% a year over the previous 14 years, and the future seemed even brighter.

IBM became the most valued stock in the world in 1967 and held on to that position for more than six years. The dominant computer manufacturer enjoyed enviable margins and virtually no competition. Its stock value reached 50 times earnings, a striking multiple for the world's largest company. But why not? IBM had regularly cranked out 20% annual increases in earnings from the early 1950s, and the future obviously belonged to technology.

Yet investors who purchased these and many other stocks when the future looked brightest had much to regret. Polaroid faltered badly, and its stock gave investors negative total return over the next 30 years. And despite IBM's comeback under CEO Lou Gerstner, the company's return has been less than half that of the Standard & Poor's 500 index over the past generation.

These examples are typical. History has shown that whenever companies, no matter how great, get priced above 50 to 60 times earnings, buyer beware.

The Merchants of Greenwich

Bill Bernstein, www.efficientfrontier.com

$$C = SN(d_1) - Le^{-rT}N(d_2 - \sigma\sqrt{T})$$

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 hyp-

Large-cap stocks with P/E's over 100

Company	Market Cap (3/7/00, in bil.)	1999 P/E
Cisco Systems	\$452	148.4
AOL/Time Warner	232	217.4
Oracle	211	152.9
Nortel Networks	167	105.6
Sun Microsystems	149	199.0
EMC	130	115.4
JDS Uniphase	99	668.3
Qualcomm	91	166.8
Yahoo!	90	623.2
15 non-tech*	2,361	30.4
S&P 500	11,281	28.6

*The 15 of the 33 stocks with market caps > \$85 billion

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notic—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 otherworldly 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, at 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.