## Abstract

It is widely believed that economic growth is good for stockholders. However, the cross-country correlation of real stock returns and per capita GDP growth over 1900–2002 is negative. Economic growth occurs from high personal savings rates and increased labor force participation, and from technological change. If increases in capital and labor inputs go into new corporations, these do not boost the present value of dividends on existing corporations. Technological change does not increase profits unless firms have lasting monopolies, a condition that rarely occurs. Countries with high growth potential do not offer good equity investment opportunities unless valuations are low.

Jay Ritter

Efficient Frontier
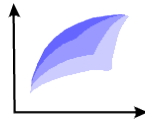
William J. Bernstein

Thick as a BRIC

One of the livelier comic relief items to recently grace the world of institutional investing is the so-called BRIC fund phenomenon—emerging markets offerings restricted to Brazil, Russia, India, and China. (B-R-I-C, get it?) The rationale behind these bizarre beasts, limited to four of the world's wildest equity markets, is that the four nations' spectacular economic growth rates will soon catapult them into the front ranks of the world economy.

This has to be good for investors, right? As put in a Goldman Sachs paper touting the concept, "Higher growth may lead to higher returns... As today's advanced economies become a shrinking part of the world economy, the accompanying shifts in spending could provide significant opportunities for global companies. Being invested in and involved in the right markets—particularly in the right emerging markets—may become an increasingly important strategic choice." You say you're invested in fuddy-duddy old nations like the U.S., France, Japan, Australia, Canada, and Sweden?

Good grief, man, their slice of the global investment pie is *shrinking*. Dump 'em and load up where the action is before the world leaves you behind!

You'd think that folks smart enough to work at Goldman would occasionally read the finance literature. Yes, there *is* a relationship between economic growth and equity returns, but unfortunately, it has the wrong sign. There is now a pretty impressive body of data from folks like Elroy Dimson, Paul Marsh, and Jeremy Siegel showing a *negative* relationship between growth and returns.

You don't have to go cross-eyed with regression analyses to convince yourself; a few anecdotes tell the story. During the twentieth century, England went from being the world's number one economic and military power to an overgrown outdoor theme park, and yet it still sported some of the world's highest equity returns between 1900 and 2000. On the other hand, during the past quarter century Malaysia, Korea, Thailand and, of course, China have simultaneously had some of the world's highest economic growth rates and lowest stock returns.

What gives? There are several possible explanations. First, just as you learned in Econ 101, stock returns lead economic growth and not the other way around. In even simpler terms, just as growth stocks have lower returns than value stocks, so do growth nations have lower returns than value nations—and they similarly get overbought by the rubes.

There's another possible explanation: share dilution. The bad news is that if a nation's economy grows at x% per year, per-share earnings and dividends do *not* also increase at x% per year—they increase at (x% - y%) per year, where y% is the amount of share dilution. Rob Arnott and I wrote a piece on this topic in *Financial Analysts Journal* in 2003 in which we determined the leakage was 2.3% per year in the U.S. and higher in nations devastated by military conflict. We've since speculated that rapid technologic change might have the same effect. (Sorry, you'll have to go to your local academic library to see the piece, but here's the [Readers Digest version](#) from our website.) While Rob and I didn't expect any early morning calls from Stockholm for this concept, we had at least hoped to stir up some discussion. For two years, we've heard nary a peep... until recently.

Jay Ritter, writing in *Pacific-Basin Finance Journal*, noted once again the negative correlation between growth and returns, and formulated several alternative hypotheses, the most promising of which being that managers expropriate wealth from minority shareholders. (In plain English, they steal.)

In a recent volume of *Journal of Investing*, Larry Speidell and three coauthors used our algorithm to measure dilution in several emerging markets, and their results were

eye-popping: double-digit dilution rates—as high as 30%—in most Asian markets. In Latin America, which has had a harder time of it economically, dilution was in line with Western levels. What does 30% annualized dilution mean? That earnings growth at the corporate level also has to clip along at 30% per year just to keep the price even. Rises in market cap, as you might expect, drove dilution, the highest rates being seen in the hottest markets, the lowest rates in the coldest. (That's right: Hugo Chavez just may be good for long-term stock returns. You heard it here first.)

This raises a larger point—just what are the long-term expected returns of emerging markets stocks? We simply do not know. We only have data on their returns going back to 1988: Between January 1988 and April 2006, the returns for emerging-markets equity and the S&P 500 were 18.78% and 12.07%, respectively. However, beginning the analysis in 1988 is the mother of all look-back biases; the lion's share of the emerging-markets return was earned before 1994, when there was little international interest in them. Begin the analysis on January 1994 and numbers change to 7.76% for emerging markets and 10.72% for the S&P 500.

One thing we do know, dividend yields in developing nations are, on average, about a percent higher than they are in the developed ones. Do the 100 or so basis points extra yield, added to the higher economic growth rates, compensate for their higher dilution? Maybe yes, maybe no. About the best you can say for the asset class is that it's still one of the finest diversification plays around and, occasionally, it gets really cheap. You can be sure when that happens, you won't see a plethora of gimmicky funds and wirehouse flacks babbling about investment opportunities in places like Brazil, Russia, India, and China.

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Efficient Frontier
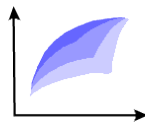
William J. Bernstein

The Two-Percent Dilution

Over the past two centuries, common stocks have provided a sizeable risk premium to U.S. investors. For the 200 years from 1802 until 2001, inclusive, the returns for stocks, bonds, and bills were 8.42%, 4.88%, and 4.21%, respectively. In the most simplistic terms, the reason is obvious: a bill or a bond is a promise to pay interest and principal and, as such, its upside is sharply limited. Shares of common stock, on the other hand, are claims on the future dividend streams of the nation's businesses. Instead of a fixed, paltry trickle from low-risk fixed-income securities, the ever-increasing fruits of technologically-driven economic growth fall to the shareholders.

Viewed over the decades, the national economy grows with remarkable uniformity. Figure 1 plots the real GDP of the U.S since 1820:


Figure 1
U.S. ($Billion, 1990)
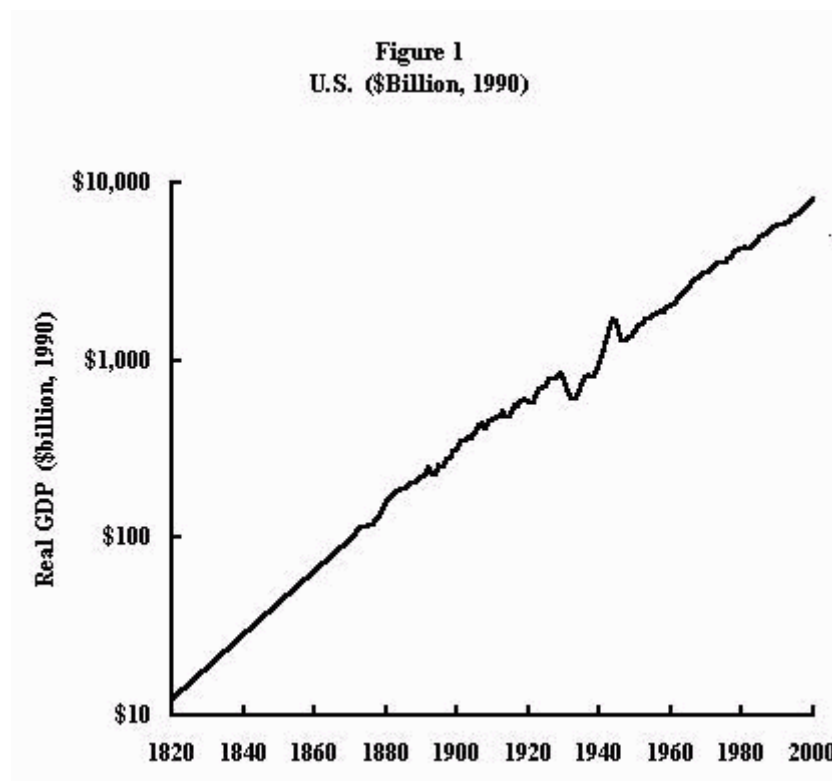
During this period, real GDP has grown fairly evenly at about 3.6% per year. The long-term uniformity of economic growth is both a blessing and a curse. It is reassuring to know that real U.S. GDP doubles once every 20 years (and real per-capita GDP once per generation). But it is also a dire warning to those predicting a rapid acceleration of economic growth from the computer and Internet revolutions. Such extrapolations of technologically-driven increased growth are painfully oblivious to the broad sweep of scientific and financial history. The impact of recent advances in computer science pales in comparison to the technological explosion that occurred between 1820 and 1850. This earlier era saw the most deep, far-reaching technology-driven changes in everyday existence throughout human history. They

profoundly affected the lives of those from the top to the bottom of the social fabric in ways that can hardly be imagined today. At a stroke, the speed of transportation increased tenfold, and communications became almost instantaneous. Before 1820, people, goods, and information could not move faster than the speed of the horse. Within a generation, journeys that had previously taken weeks and months now involved an order of magnitude less time, expense, danger, and discomfort. Important information could be instantaneously transmitted. Put another way, the average inhabitant of 1800 would have found the world of 50 years later incomprehensible, whereas a person transported from 1950 to 2000 would have little trouble understanding the relatively small intervening changes in everyday life.

The comparatively uniform increase in GDP also implies a similar uniformity in the growth of corporate profits, which is, in fact, the case. Figure 2 demonstrates that, except for the Great Depression when net corporate profits disappeared, aggregate company earnings have remained fairly constant at about 10% of nominal GDP:

Figure 2
U.S. Nominal Corporate Profits and GDP
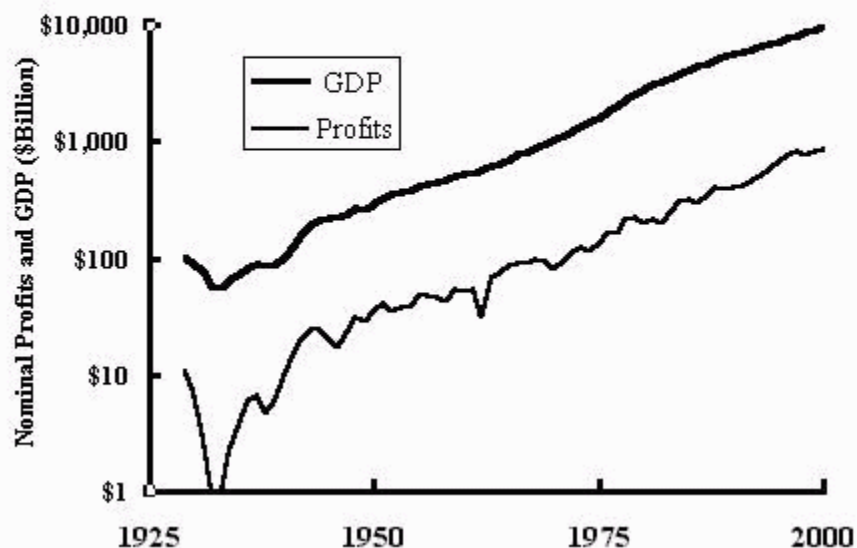
Should it not follow that stock prices also grow at the same rate? After all, there has been a direct relationship between corporate profits and GDP since 1929. Unfortunately for the shareholder, earnings and dividends will keep up with GDP *only if no new shares are created*. Since 1871, real stock prices have grown at 2.48% per annum versus 3.45% for the GDP (the slightly slower growth rate for the more recent period reflecting the slowdown in population growth). There has thus been about 1% per year of "slippage" between stock prices and GDP. Further, as we shall see, the true

degree of slippage is quite a bit higher, since much of the 2.48% rise in real stock prices after 1871 was due to an upward revaluation, as the highly illiquid industrial stocks of the post-Civil War period, selling at three to four times earnings, gave way to instantly and cheaply tradable common shares selling that much more dearly.

This slippage is the result of the net creation of shares, as existing and new companies capitalize their businesses with equity. It suggests a very simple paradigm for measuring the degree of slippage: the ratio of the proportionate increase in market capitalization to the proportionate increase in price. For example, if over a given period, the market cap increases by a factor of ten, and the cap-weighted price index increases by a factor of five, then there has been 100% net share issuance in the interim. More formally,
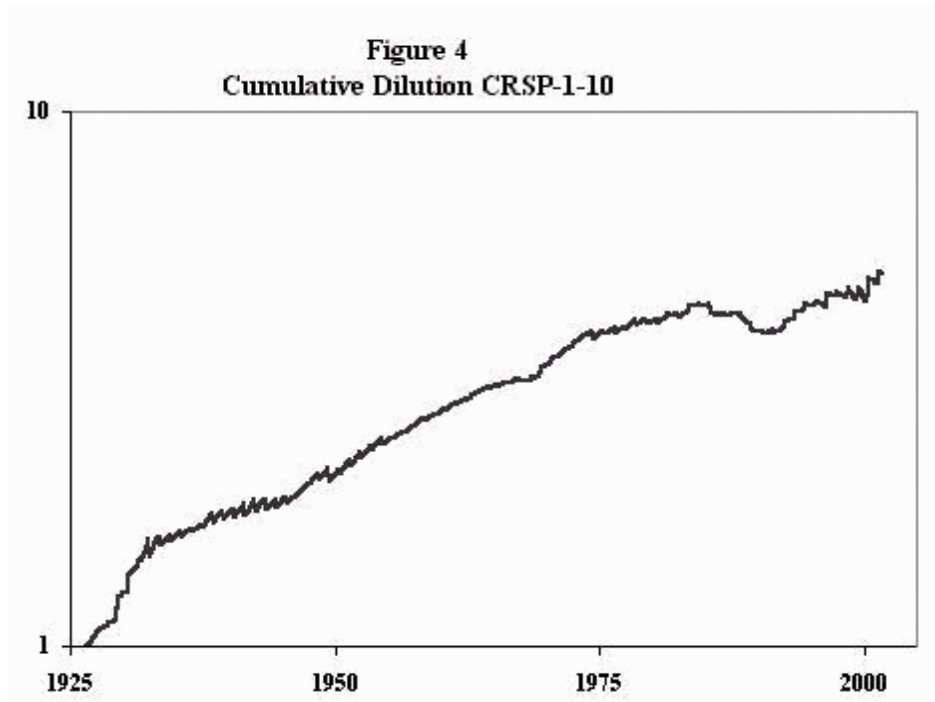
$$\text{Net Dilution} = \{(1+c)/(1+r)\} - 1$$

where c = capitalization increase, and r = price return

This relationship has the advantage of factoring out valuation changes, as they are embedded in both the numerator and denominator. Further, it holds only for universal market indexes such as the CRSP 1-10 or the Wilshire 5000, since less inclusive indexes can vary the above ratio simply by adding or dropping securities. In Figure 3, we plot the total market cap and price index of the CRSP 1-10, with 1926 equal to 100:

Figure 3
Price and Cap Indexes, CRSP 1-10
1926 = 100
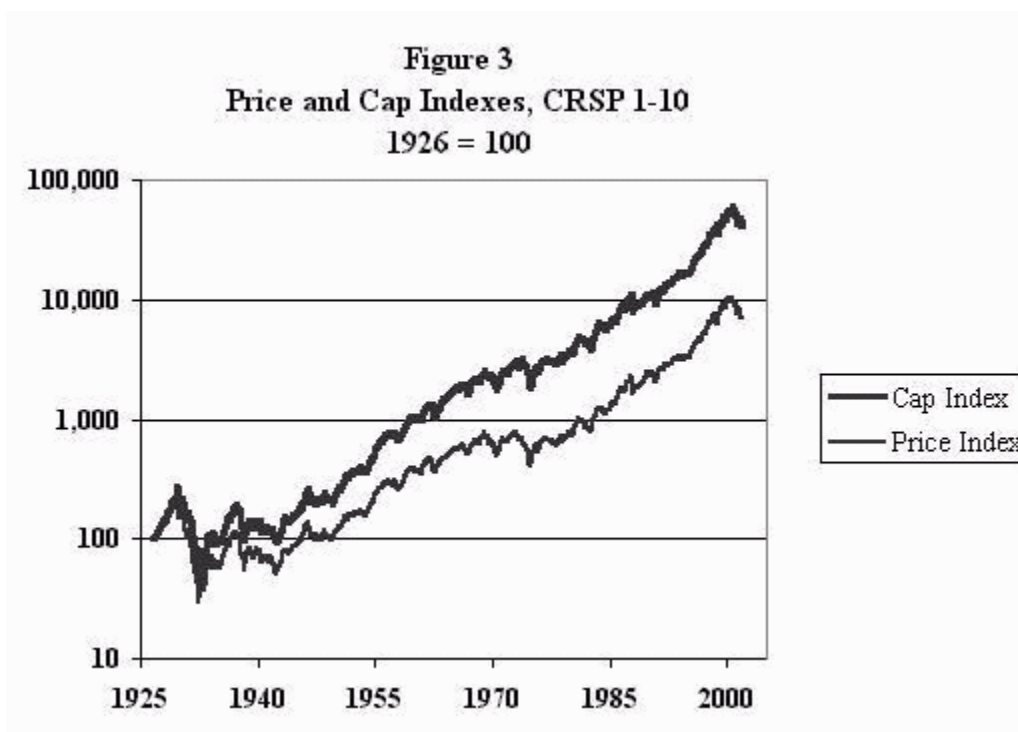
Note how market cap slowly and gradually pulls away from market price. By the end of 2001, the cap index has grown 4.97 times larger than the price index, suggesting that for every share of stock extant in 1926, there are now 4.97 shares! To give a better idea of how this has proceeded over the past 75 years, in Figure 4 we plot this dilution index, defined as the cumulative net creation of new shares:

These data are consistent with a nearly continuous net dilution of common shares. The process is seen to have been more rapid during the late 1920s, quickly decelerating after the crash of 1929. As capital costs rose in the 1970s, it slowed yet further, and during the late 1980s, there was even a brief net contraction as companies responded to peak capital costs with stock buybacks. However, in the 1990s, shares again began to dilute. The overall rate of dilution since 1926 is 2.15% per year.

The slippage between aggregate economic data and per-share performance can be independently examined by comparing the rise in per-share corporate dividends versus GDP growth around the globe. Recently Dimson, Marsh, and Staunton, in their wonderful monograph, *The Triumph of the Optimists*, have examined the real dividend-growth rates in 16 nations over the entire 20th century. These can then be compared to the growth of real GDP and real per-capita GDP growth rates.

We divide these nations into two categories according to the degree of devastation visited upon them by the calamities of the 20th century: Group 1, which suffered no substantial destruction of their productive physical capital during World Wars I and II and the Spanish Civil War, and Group 2, which did.

Group 1

	Div Growth	Real GDP Growth	Dilution		Real Per Capita GDP Growth	Dilution
Ireland	-0.80%	2.21%	3.01%		2.05%	2.85%
Switzerland	0.10%	2.66%	2.56%		1.85%	1.75%
Canada	0.30%	3.87%	3.57%		2.07%	1.77%
UK	0.40%	1.89%	1.49%		1.44%	1.04%
US	0.60%	3.28%	2.68%		1.96%	1.36%
Australia	0.90%	3.29%	2.39%		1.60%	0.70%
S. Africa	1.50%	3.49%	1.99%		1.16%	-0.34%
Sweden	2.30%	2.62%	0.32%		2.05%	-0.25%
Average	**0.66%**	**2.91%**	**2.25%**		**1.77%**	**1.11%**

Group 2

	Div Growth	Real GDP Growth	Dilution		Real Per Capita GDP Growth	Dilution
Japan	-3.30%	4.11%	7.41%		2.99%	6.29%
Italy	-2.20%	2.96%	5.16%		2.40%	4.60%
Denmark	-1.90%	2.86%	4.76%		2.09%	3.99%
Belgium	-1.70%	2.15%	3.85%		1.72%	3.42%
Germany	-1.30%	2.78%	4.08%		1.79%	3.09%
France	-1.10%	2.37%	3.47%		1.99%	3.09%
Spain	-0.80%	2.79%	3.59%		2.00%	2.80%
Netherlands	-0.50%	2.96%	3.46%		1.80%	2.30%
Average	**-1.60%**	**2.87%**	**4.47%**		**2.10%**	**3.70%**

The first column in each table tabulates the growth of real per-share dividends in each nation between 1900 and 1998, and the second, the growth of real aggregate GDP for the full century. The third column tabulates the difference between the two. It is noted that in all nations per-share dividends grow more slowly than aggregate GDP. The gap

is lowest in Sweden at 0.32% per year, and more than 2% per year in five of the eight Group 1 nations, including the U.S, where it was 2.68%. This is close to the 2.15% value obtained by the market-cap/market-price model. It is even closer to the 2.25% average for the Group 1 nations. The fourth and fifth columns do the same for per-capita GDP, where gaps of 1.11% and 3.70% are found for Groups 1 and 2, respectively.

The data for Group 2 are striking: Amazingly their economies repaired the devastation wrought by the 20th century, with overall GDP and per-capita GDP growth rates equivalent to Group 1. The bad news is that the same cannot be said for per-share equity performance; there was almost 4.5% slippage between the growth of their economies and per-share corporate payouts.

It thus seems that in "normal nations" of Group 1—those untroubled by war, political instability, and government confiscation of the economic commanding heights—the ongoing capitalization of new technologies produces a net dilution of outstanding shares of about 2% per year. (Did I hear anybody say "stock buybacks?" Ah, then I've some wonderful vacation plots in the Everglades to show you.) The Group 2 nations represent a more fascinating phenomenon. These can be thought of as experiments of nature in which physical capital is devastated and must be rebuilt. Fortunately, it is much harder to destroy a nation's intellectual, cultural, and human capital; within little more than a generation, GDP and per capita GDP catches up with, and in some cases surpasses, the Group 1 averages. Unfortunately, this requires a high rate of equity recapitalization, reflected in the large dilutions seen in columns 3 and 5, and which mulcts existing shareholders.

This analysis has disturbing implications for paradigmistas convinced of the revolutionary nature of biotech, the Internet, and personal computers. It may very well be that a rapid rate of technological change could, in effect, turn a Group 1 nation into a Group 2 nation, as an increased rate of obsolescence destroys the economic value of plant and equipment as surely as bombs and bullets. The resultant recapitalization would then dilute per-share payouts much faster than the technology-driven acceleration of economic growth, if such acceleration exists at all.

But whatever the true nature of the interaction of technologic progress and per-share earnings, dividends, and prices, it will come as an unpleasant surprise to many that even in the Group 1 nations, average real per-share dividend growth was only 0.66% per year; for the Group 2 nations, it was strongly negative.

Thus, at the dawn of the new millennium, the equity investor cannot expect a real return greatly in excess of a generally derisory dividend yield. Nor will he be rescued by more rapid economic growth, which is unlikely to occur. But even if it does, its

benefits will undoubtedly be more than offset by the dilution of his ownership interest necessitated by technologically-driven increased capital needs.