INVESTMENT INSIGHTS

from BARCLAYS GLOBAL INVESTORS

The Equity Risk Premium

by RICHARD GRINOLD *and* KENNETH KRONER

> *Long-run prospects for the stock market*

> *The debate over the equity risk premium, the expected return difference between US equities and US government bonds*

> *Why the equity risk premium is the most important number in investing*

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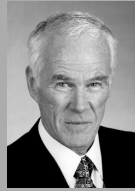415 717 9581 facsimile
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The Equity Risk Premium

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"The equity risk premium has been driven to nothing by everyone thinking that equities is the only place to be."

–PAUL MCCULLEY, PIMCO[1]

"The long-term equity risk premium is estimated to be about 6%."

–ROGER IBBOTSON AND PENG CHEN[2]

"The long-term forward-looking risk premium is nowhere near the 5% of the past….Our measure of the risk premium is around –1.1%."

–ROBERT ARNOTT AND PETER BERNSTEIN[3]

"The consensus forecast for the 30-year equity premium is about 5.0% to 5.5%."

–IVO WELCH[4]

"The outlook for the stock market into the next ten or twenty years is likely to be rather poor—and perhaps even dangerous."

–ROBERT J. SHILLER[5]

"The trick on staying alive as a forecaster is to give 'em a number or give 'em a date, but never give 'em both at the same time."

–CLIVE W. J. GRANGER, UNIVERSITY OF CALIFORNIA, SAN DIEGO ECONOMICS PROFESSOR[6]

Introduction

As these quotes suggest, opinions about the long-run prospects for the stock market are all over the map. This debate is a boon for academics, consultants and other stock market pundits, but it is clearly a problem for plan sponsors, asset managers and others who need this information to inform their investment decisions.

A key estimate of the long-term prospects of the stock market is known as the equity risk premium. We define it as the long-run (10- to 20-year) expected return difference between US equities and US government bonds. It is one of the most important numbers in investing because of its impact on a range of investment decisions for institutional investors, as well as its relevance to the Social Security debate. There is, however, a wide variety of opinions as to what that number is.

In this paper, we demonstrate that the equity risk premium is about 2.5%. We don't claim that this estimate is the only one that can be thoughtfully defended; rather, we argue that it is reasonable and supported by logic and evidence. We also critically evaluate the arguments supporting a zero or negative risk premium, and those supporting a risk premium as high as it has historically been (5% or more).

The answer to this debate is extremely important for asset owners, including pension plans, endowments, foundations, family offices, individuals and insurance companies. For example, it determines whether pension plans should cancel their funding holidays at one extreme, or continue to use their pension fund as a profit center at the other extreme. To illustrate, a plan that is 150% funded using an equity risk premium assumption of 5% would find that it is only 95%–110% funded if it used an equity risk premium assumption of 1.5%. This will require either employees to resume contributions or require companies to fund benefits out of earnings.

The size of the equity risk premium also impacts how plan sponsors should invest. For example, a low equity risk premium should increase the relative attractiveness of low-beta approaches like fixed income strategies, absolute return strategies and tactical asset allocation (TAA). To illustrate, if the equity risk premium is zero, then fixed income looks more attractive in a strategic asset allocation study because stocks and bonds will have the same expected return, but bonds will have lower risk and be a better hedge against liabilities. So plan sponsors should then increase their strategic allocations to fixed income. But if the equity risk premium is 6%, then stocks become more attractive simply because of their higher expected return. Also, if the expected equity return drops to the level of the expected bond return, then investors seeking higher returns must look to investments whose total return is not linked to the return of the equity market. Examples include market neutral strategies, convertible bond arbitrage and currency overlays. In contrast, if the equity risk premium is large, then these high absolute returns can be obtained by buying an equity index fund, making absolute return strategies less attractive. Finally, a high equity risk premium increases the opportunity cost for TAA strategies because a buy-and-hold equities strategy becomes difficult for TAA managers to outperform.

In addition, the equity risk premium affects the scrutiny with which plan sponsors are likely to examine costs. All else equal, a low equity risk premium implies lower overall portfolio returns, making costs a higher proportion of the plan's assets and (more to the point) returns. So lower-cost strategies are likely to become more attractive in a low equity risk premium world.

The implications of the equity risk premium debate extend well beyond the asset management community. In fact, the size of the equity risk premium is central to the debate about the benefits of allowing Social Security funds to be invested in the equity market. The higher the equity risk premium, the more attractive it becomes because it increases the probability of retirees entering their retirement years with a healthy nest egg. So if policymakers believe the equity risk premium is high, they are more likely to support the investment of Social Security funds in equities. For this reason, the Social Security Administration (SSA) solicited the input of several highly respected financial economists to weigh in on the magnitude of the equity risk premium.[7]

Over the last 76 years, the US stock market has delivered an average nominal return of 10.7% and the US Treasury bond market has delivered an average nominal return of 5.3%. So the realized premium that stocks delivered over bonds was 5.4%.

The organization of this paper is as follows: We begin by presenting the framework for measuring the equity risk premium that we will use throughout the paper. Having a single framework is useful because it allows us to identify, highlight and critically evaluate the assumptions that academics and consultants are implicitly using. We then present and evaluate the different views on the equity risk premium by examining each component separately. For the purpose of our discussion, we label the optimists as the "rational exuberance" camp and the pessimists as the "risk premium is dead" camp. Finally, we pull all the pieces together and provide evidence for a 2.5% equity risk premium.

The Equity Risk Premium Framework

We define the equity risk premium as the expected return differential between the S&P 500 equity index and a 10-year government bond, over the next 10 years.[8] Our forecast of the return to the 10-year government bond over the next 10 years is just the yield on that bond. Therefore, the equity risk premium becomes

$E(R_S - R_B)$ = expected S&P 500 return − 10-year bond yield

Forecasting the return to the S&P 500 over the next 10 years is more difficult, and therefore gets most of the attention of this paper. The framework we use is to decompose equity returns into several understandable pieces, then examine each piece separately. This framework serves two purposes. First, it allows us to focus on the drivers of equity market returns, and thereby obtain more informed long-run forecasts. And second, it allows us to better understand some of the more extreme long-run views on equities that appear in the literature.

The return to equities over a single period can always be decomposed into (see the Appendix)

R_S = income return
    + nominal earnings growth
    + repricing

The income return is the percent of market value that is distributed to shareholders as cash. If dividends are the only source of income, then this is equivalent to the dividend yield. Today, share repurchase programs are also a common means used to distribute cash to shareholders. The next two terms are the capital gain. Capital gains come from a combination of earnings growth and P/E expansion or contraction, which we call "repricing."

For expository purposes, it will be convenient to decompose the components further and to use more precise notation. As derived in the Appendix, the return over a single period is

$$R = \underbrace{\frac{D}{P} - {\scriptstyle\Delta}S}_{\text{income}} + \underbrace{i + g}_{\substack{\text{earnings} \\ \text{growth}}} + \underbrace{{\scriptstyle\Delta}PE}_{\text{repricing}}$$

The first term, D/P, is simply the dividend yield. The second term, $-{\scriptstyle\Delta}S$, is the percent change in number of shares outstanding, or the "repurchase yield." Together, these measure the percent of market value that the firm gives back to shareholders. Therefore, we will refer to the sum of these two as the "income return."

The remaining terms, $i + g + {\scriptstyle\Delta}PE$, make up the capital gain. The term i is the inflation rate. The term g is the real earnings (not earnings per share) growth rate over the period of measurement. The final term, ${\scriptstyle\Delta}PE$, is the percent change in the P/E multiple over the period. We refer to this piece as the "repricing" part of the return.

It is important to realize that this decomposition of returns is essentially an identity, not an assumption, *so any view on the equity risk premium can be mapped into these components.* To illustrate, given that the current 10-year bond yield is approximately 5%, anyone who believes that the equity risk premium is currently 4% must believe that the income return, nominal earnings growth and repricing will sum to about 9%.

To illustrate this decomposition, consider the last 76 years. During that period, the US stock market has delivered an average nominal return of 10.7% and the US Treasury bond market has delivered an average nominal return of 5.3%.[9] So the realized premium that stocks delivered over bonds was 5.4%. The ex-post decomposition in Table 1 can be used to understand this 10.7% equity return.

The income return (through dividends only) on the S&P 500 was 4.4% annualized over this 76-year period. In this illustration, we combined earnings growth and share growth into earnings per share (EPS) growth. Earnings per share grew at a rate of about 4.8% per year (1.7% real and 3.1% inflation) over the 76 years. The earnings yield, measured as the trailing 12-month earnings divided by end-of-year price, shrank from 9.8% in 1926 to 3.3% in 2001. So a $100 equity investment would have bought a claim on $9.80 of current earnings in 1926 and $3.30 in 2001. Stated differently, the reciprocal of the earnings yield, the "P/E multiple," grew from 10.2 in 1926 to 30.6 in 2001. This means that investors were willing to pay $10.20 for a dollar of current earnings in 1926, but $30.60 for a dollar of current earnings in 2001. This repricing from a 10.2 to 30.6 P/E over 76 years works out to an increase in the P/E multiple of about 1.5% per year.[10] A common view is that this P/E expansion (1.5% per year) was understandable and rational in light of the technological and financial innovations over this 76-year period. For example, accounting standards became more transparent (Enron notwithstanding). Innovations like the index fund make it easier for investors to diversify security-specific risk. Mutual fund complexes give easier access to diversified equity investments. The business cycle is perceived to be under better control than in the 1920s and

TABLE 1
Composition of average return of S&P 500 (1926–2001)

Source	Value
Income return	4.4%
Real EPS growth	1.7%
Inflation	3.1%
P/E repricing	1.5%
Total	10.7%

Source: Ibbotson Associates.

CHART 1
Annual equity return decomposition

RETURN (%)

DATE

■ REAL EARNINGS　■ P/E　■ INFLATION　■ INCOME
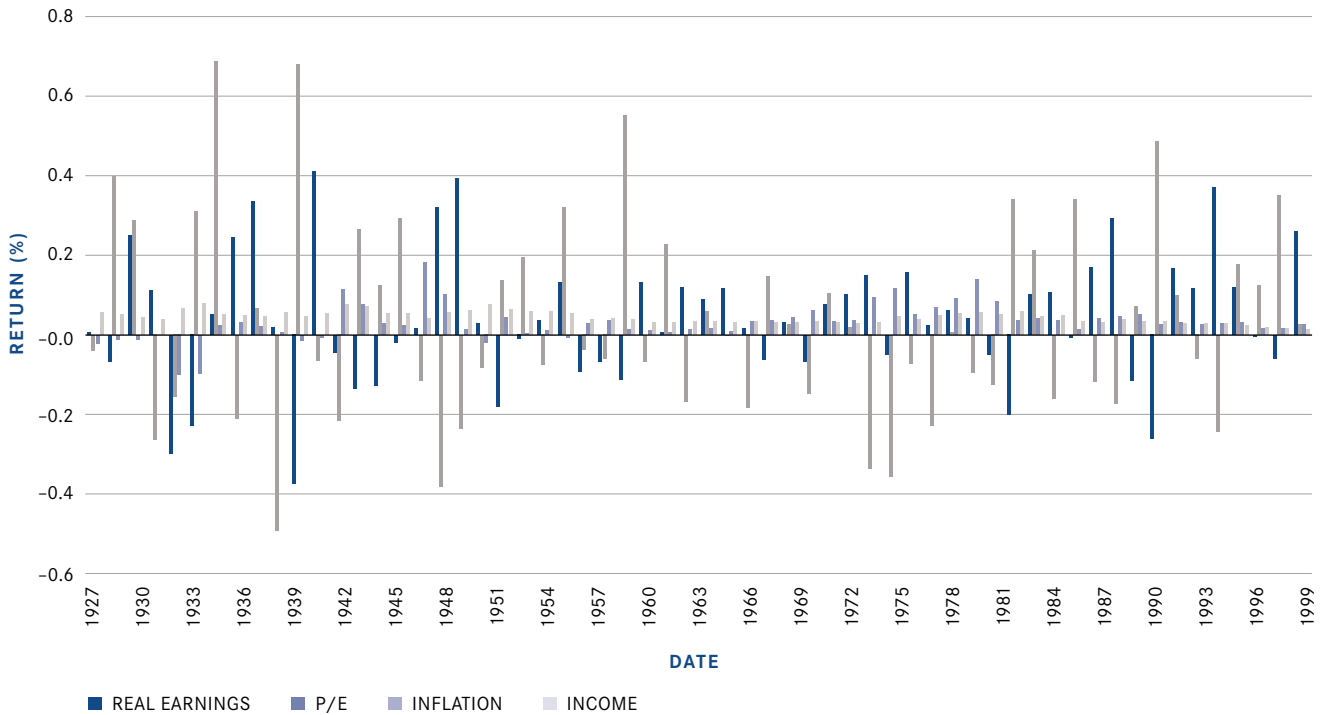
Source: Shiller.

1930s (very few investors think that another depression is likely in their lifetimes), making expected earnings smoother. All these factors make equity investing less risky, and contribute to the repricing that we saw over this 76-year period. Additionally, wealth has grown over this period, meaning that risk tolerance has also grown, making investors willing to pay more for the uncertain cash flows that equities provide. And the cost of owning stocks (tax rates and commissions) has dropped, contributing to the repricing.

Table 1 gives the decomposition of returns over the last 76 years. This same decomposition, done at an annual frequency, is illustrated in Chart 1. This graph demonstrates that the noisiest component of returns is clearly the P/E repricing component, followed by the real earnings growth component. Inflation and income returns are relatively stable through time. This implies that our real earnings growth and repricing forecasts are likely to be the least accurate, while our inflation and income return forecasts are likely to be more accurate.

Rajnish Mehra and Edward C. Prescott and many others have argued that this 5.4% equity premium was more than should have been necessary to entice investors to hold onto the risky cash flows offered by equities instead of the certain cash flows offered by bonds.[11] This has spawned a huge literature on the "equity risk premium puzzle."[12] The debate is largely academic, and is dependent on representative agent asset pricing models that have failed any and all predictability tests. We have always been puzzled by a debate that suggests history is wrong while the debaters' models are right.

Looking to the Future

Our focus here is more on predicting the future than explaining the past. And going forward, the picture is much more clouded. There are at least three distinct categories of views on the equity risk premium (see Table 2). At one extreme is the "rational exuberance" view, favored by the optimists who see no reason that the stock market can't continue to beat the bond market by up to 5% per year, as it has over the last 76 years. This camp includes Harry Dent, Roger Ibbotson, and an appreciable segment of the academic community.[13] At the other extreme is the "risk premium is dead" view, favored by the pessimists who believe that the glory days of the last 76 years are behind us and, going forward, stocks will be lucky to perform as well as bonds. This camp includes the likes of Robert Arnott, Clifford Asness and Robert Shiller. Between these two views is the "risk is rewarded" view, favored by those who believe that stockholders must still be rewarded for holding risky cash flows, but the reward need not be as much as the 5.4% that markets delivered in the past.

To look at the kinds of assumptions required to achieve these perspectives, we examine each component of the equity risk premium in turn. Of course, different members of each camp will have different views on each of the com-
ponents, and in some cases these views are wildly different. Some of the more extreme views are critiqued below. However, our objective here is not to characterize each and every possible view, but rather to give a flavor of the kinds of assumptions that are necessary to support such views, in order to identify which assumptions are the most reasonable.

INCOME RETURN

The income return measures the percent of market value that is distributed to shareholders. Currently, there are two popular means of distributing earnings to shareholders: dividend payments and share repurchases. Until the mid-1980s, dividends were essentially the only means of distributing earnings. But since then, repurchases have skyrocketed in popularity, in part because they are a more tax-effective means of distributing earnings and in part because of the stigma that dividend-paying companies tend not to be "growth" companies. In fact, Gustavo Grullon and Roni Michaely have shown that between 1980 and 1998, the nominal growth rate of repurchases was 28.3%.[14] Also, numerous studies show that over the broad market, share repurchases have surpassed dividends as the preferred means of distributing earnings.[15] Only about a fifth of publicly traded (non-financial and non-utility) firms even pay dividends today, compared to about two thirds as recently

TABLE 2
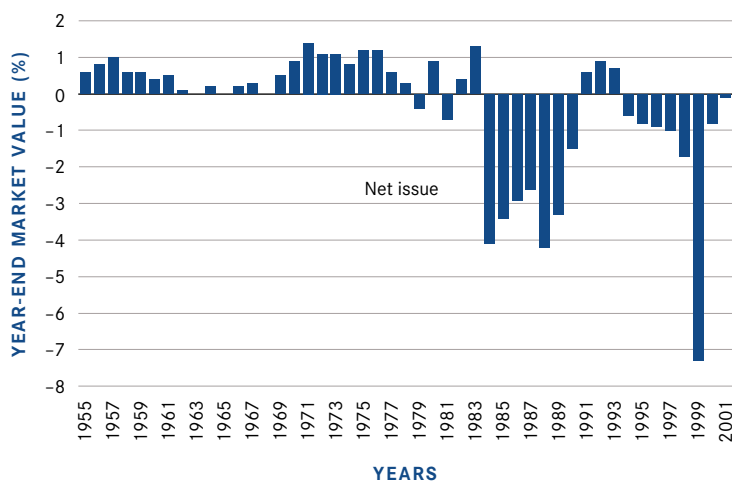**The debate over the equity risk premium**

Position	Rational exuberance	Risk premium is dead	Risk is rewarded
Estimated equity risk premium	>5%	<0%	2.5%
Who	Harry Dent, Roger Ibbotson. (Also, a 2001 survey of 500 economists estimated it at 4%.)	Robert Arnott, Clifford Asness, Robert Shiller	BGI
Why	Stocks have beaten bonds by 5% per year for 76 years. No reason why that can't continue.	The good times are behind us. Stocks are expensive and growth in earnings will be sluggish.	Expect moderate income return and real earnings growth. But the 1990s are over and investors will need to look at alternative strategies to increase returns.

as 1978.[16] So the "repurchase yield," $-\Delta S$, now exceeds the dividend yield. In fact, the dividend yield (as of February 28, 2002) is about 1.4%, and Nellie J. Liang and Steven A. Sharpe estimate the repurchase yield ($-\Delta S$) on large S&P 500 firms to be about 2%.[17] Their study covers the mid- to late-1990s, but if the repurchase yield is still about 2%, this would make the income return about 3.5%. This picture is very different from 20 years ago, when the repurchase yield was effectively zero and the dividend yield was about 5%.

Share dilution (whether caused by the issuance of stock options or by secondary offerings of equity to raise capital) clouds this picture. To illustrate, it is becoming increasingly popular to repurchase shares to fund exercisable employee stock options. In fact, several studies find a positive relationship between stock option grants and repurchases.[18] Such repurchases involve a distribution of earnings to employees, not to shareholders, and should not be included in the "repurchase yield." Adjusting for such dilution is difficult, but fortunately both Fenn and Liang and Grullon

and Michaely find only a small negative relationship between stock options and income return. For example, Fenn and Liang find that a one standard deviation increase in employee stock option activity leads to only a 0.13% decrease in the income return. (The *mix* of distributions changes from dividends to repurchases as expected, but the total is almost unaffected.) Also, Liang and Sharpe find that the *net* share retirements ($-\Delta S$) are indeed positive after accounting for stock option issuance, and were about 1% in the mid-to-late 1990s. So the repurchase yield remains about 1% even after accounting for the dilution caused by issuance of stock options. Additionally, according to Kathy Kahle, about half of stock options issued are not exercisable, which, if accounted for in the analysis, would further reduce the impact of option-related dilution.[19] Finally, Chart 2 shows the net new issuance (here measured as a percent of market value) has been negative since the growth in popularity of repurchases in the mid-1980s. This suggests that going forward, the repurchase yield will continue to be positive, despite the impact of stock option issuance and seasoned equity offerings.

A final factor that clouds this analysis is the potential for future changes in the dividend yield. Some might argue that yields will begin rising again as "new economy" firms mature, while others might argue that they will continue to fall as more firms abandon dividends because of their perceived link to the "old economy" and because of the persistence of high personal income tax rates on dividends.

Extreme views on the income return are taken by Ibbotson and Chen and by Robert D. Arnott and Ronald J. Ryan.[20] Ibbotson and Chen ignore all the above analysis, and assume that the future income return will be the same as the historic income return. So they are very bullish on equities, but their bullishness is based largely on an assumption that the dividend yield will exceed 4%. This seems highly unlikely, even irrational, given that it is currently much less than that. At the other extreme, Arnott and Ryan

CHART 2

Net issue of shares, as percent of market value

Source: Flow of Funds Accounts, Federal Reserve.

CHART 3

Real corporate profits (1950–2000)
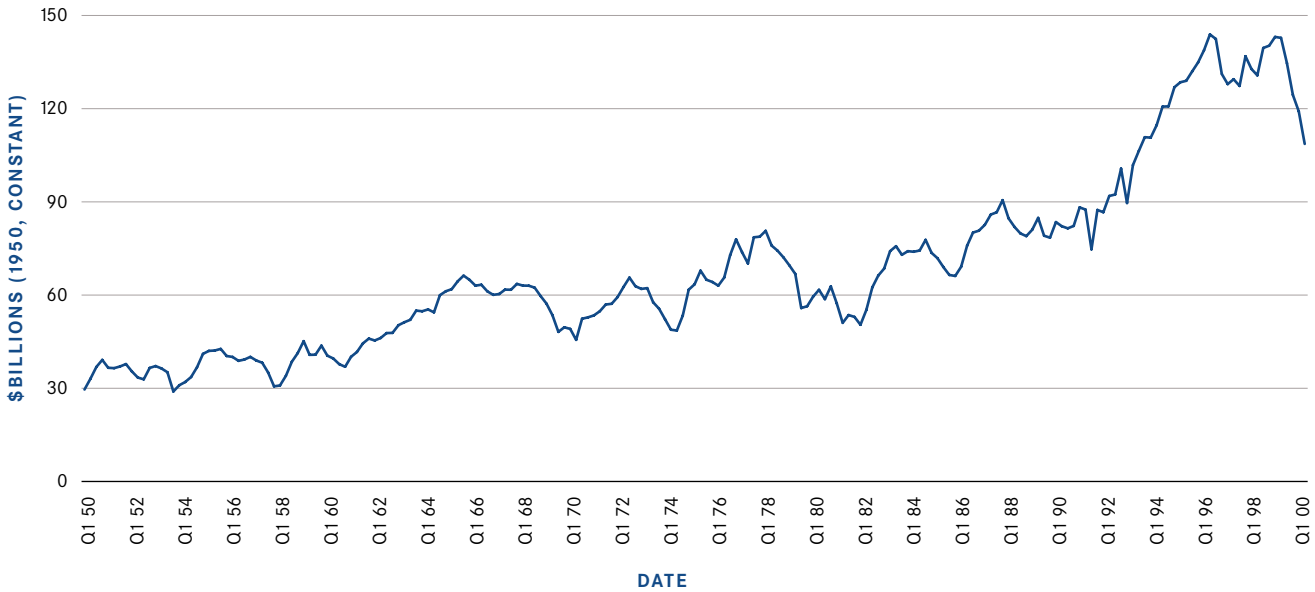
Source: Datastream.

ignore repurchases entirely, and assume that the income yield is only 1.4% (1.2% at the time of their writing). This seems almost as unrealistic, given that repurchases are now a fixture in corporate America, and will likely remain so for the foreseeable future.

In summary, these extreme views notwithstanding, we expect income from dividends to remain about 1.5% per year over the next decade. The repurchase yield will be positive, but due to stock options and seasoned equity offerings, probably much less than the 2% that some are estimating. In fact, we conservatively forecast that the repurchase yield will be about 0.75%, much less than the dividend yield and even less than the option-adjusted 1% found by Liang and Sharpe. Therefore, our forecast of the income return is 2.25%.

EXPECTED REAL EARNINGS GROWTH

The range of expected real earnings growth rates is wide. At one extreme are those who are very excited about the prospects for earnings growth in the future, and see no reason that real earnings growth cannot continue to grow at 5.5% over the next decade, as they have over the last decade. At the other extreme are those who see 1–2% as the upper bound on real growth.

For some perspective, Chart 3 shows real corporate profits from 1950–2000. During the 1980s, real profits grew at 1.3%, and during the 1990s they grew at 5.9%.[21] Overall, during the 1980s and 1990s, they grew at 4.4%, somewhat faster than the 1950–2000 average of 2.5%. We learn two things from this graph. First, as discussed above, there is clearly a lot of variation in this series, making it difficult to

forecast. And second, while one should not base an earnings growth forecast on growth rates over the last 20 years, recent history does suggest that growth rates exceeding 3% are reasonable.

The optimists who forecast continued high real earnings growth rates argue that the information revolution continues, decreasing cost structures, increasing competitive pressures, opening up new business opportunities and creating new distribution channels. There is no telling where this revolution will take us; all we know is that we are at the beginning of the revolution. Inflation is under control, which makes it easier for firms to plan and to execute on their strategic plans. Globalization (for example, the growth of trade with emerging markets) has the potential to reduce labor and input costs while creating huge new business opportunities by opening up vast new markets (like China). Demographic trends promise increased spending for at least the next decade as the population ages in most developed markets. The upshot of this, some argue, is that real corporate earnings should be able to grow by at least 5% over the next decade.

Others, like Harry S. Dent consider even 5% to be low. He projects the Dow Jones Industrial Average to skyrocket to, "at least 21,500 and as high as 35,000…around the year 2009"[22] which implies a geometric return of about 13% over the decade. He bases this forecast on demographic trends, which lead to predictable productivity gains and increased consumer spending. The upshot of this is both a positive repricing (as individuals spend some of their new-found

wealth on stocks) and increased profits (as people spend more and their productivity increases). Given these trends, a 5% real earnings growth is very achievable.

But some—in particular, many Wall Street equity analysts—make even Dent look like a pessimist. The average long-term earnings growth rate expected by Wall Street analysts on the stocks in the S&P 500 is currently about 13% nominal, or *over 10% real!*[23] This is preposterous, especially when you consider that the decade with the fastest growth since the 1870s was the 1920s, with real earnings growth rates of only 7.0%. But this optimism is not surprising, given that Wall Street analysts consistently forecast higher earnings than corporate America has been able to deliver.

Another explanation often provided for higher expected earnings growth is that some of the earnings that used to be distributed to shareholders are now being reinvested into the firm. Assuming that firms are plowing these retained earnings into high-growth projects, this bodes well for future earnings growth rates. In fact, many people use the logic advanced by Merton Miller and Franco Modigliani[24] to argue that if dividend policy has no bearing on the value of the firm, then increased retained earnings must lead to higher earnings growth rates. However, Robert Arnott and Clifford Asness show that over the last 130 years and during various subperiods since the 1870s, earnings growth rates have actually been *lower* when retained earnings were higher.[25] This result is a little inconsistent with Fama and French and others, who find that firms with more investment opportunities are less likely to pay dividends. These

The average long-term earnings growth rate expected by Wall Street analysts on the stocks in the S&P 500 is currently about 13% nominal, or *over 10% real!* This is preposterous, especially when you consider that the decade with the fastest growth since the 1870s was the 1920s, with real earnings growth rates of only 7.0%.

firms tend to use share repurchases instead.[26] In summary, the relationship between retention rates and growth rates is tenuous enough that it is probably not wise to use high-retained earnings as a justification for high (or low) expected growth rates.

At the other extreme, Arnott and Bernstein assume about 1% growth in real dividends. However, many of the assumptions they used to derive this were based on economic performance during the 1800s. For example, a cornerstone of their analysis, the assumption that expected real economic growth will be 1.8%, is based in large part on US real per-capita economic growth over the last 200 years. Also, they subtract about 70 bps from this number because over the last two centuries dividends have grown slower than the economy. While it would be unwise to completely ignore history, it is probably equally unwise to base projections for the 21st century on economic performance during the 19th century or on the relationship between dividends and economic growth during that period. After all, the Federal Reserve was only created in 1913, so we would expect economic performance to differ pre- and post-1913, at least to the extent that a coordinated national monetary policy affects economic performance. Also, the idea that prices are determined by discounted cash flows was first popularized in the 1930s by Benjamin Graham and David L. Dodd,[27] so we would expect the link between earnings and prices to be stronger in the 2000s than in the 1800s.

Like Arnott and Bernstein and many others, we forecast the earnings growth rate by exploiting the long-run link between broad economic growth and earnings growth.[28] Currently, corporate profits make up about 8% of GDP, as shown in Chart 4. This chart demonstrates that the share of GDP going to profits fluctuates, but has not deviated far from 8% since 1970. To the extent that this ratio remains constant in the future, earnings growth will be the same as economic growth. In the very long run, we would expect this to be approximately the case. In an economy in which earnings growth rates persistently exceed economic growth rates, earnings will eventually become larger than the
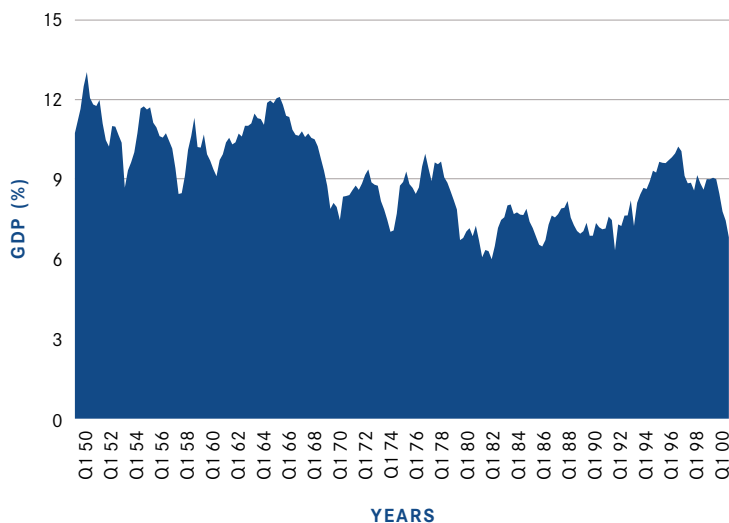
Source: Datastream.

economy. This obviously cannot happen. Conversely, if earnings persistently grow slower than the economy, this would mean either that the relative size of the corporate sector shrinks to zero or profit margins shrink to zero. This is also unlikely to happen.

Therefore, in the long run, we tie earnings growth rates to the economic growth rate. But this link need not hold perfectly over shorter horizons, as evidenced by the transitory fluctuations in Chart 4. Therefore, we adjust this anchor to reflect the fact that the corporate sector can grow at a different pace than the overall economy over shorter horizons:

Earnings growth = GDP growth + excess corporate growth

Consider first the economic (GDP) growth component. We anticipate the US economy to expand at about a 3% per year real growth rate over the next 10 years. For perspective, this is consistent with historic economic growth rates. Over the last 10, 20 and 50 years, real US GDP has grown annually at 3.3%, 3.2% and 3.4% respectively.

Several factors point to a continued 3% economic growth rate:

- In their most recent survey of over 50 US economists, Blue Chip found the consensus long-run (through 2008) economic growth rate forecast to be 3.1% per year. The forecasts had a very tight range, with the 10 most pessimistic economists predicting a 2.7% growth rate (on average), and the 10 most optimistic economists predicting a 3.6% growth rate.[29]

- Economic growth is determined by labor productivity growth and labor supply growth. For historical perspective, Chart 5 shows that labor productivity and labor force growth have each averaged almost 2% for many years. Productivity growth was strong in the 1960s and 1990s, averaging 1.9% since 1960. The labor force growth rate peaked in the 1970s, largely because the growth rate in that decade was unusually high due to the increased entry of young people ("baby boomers"),
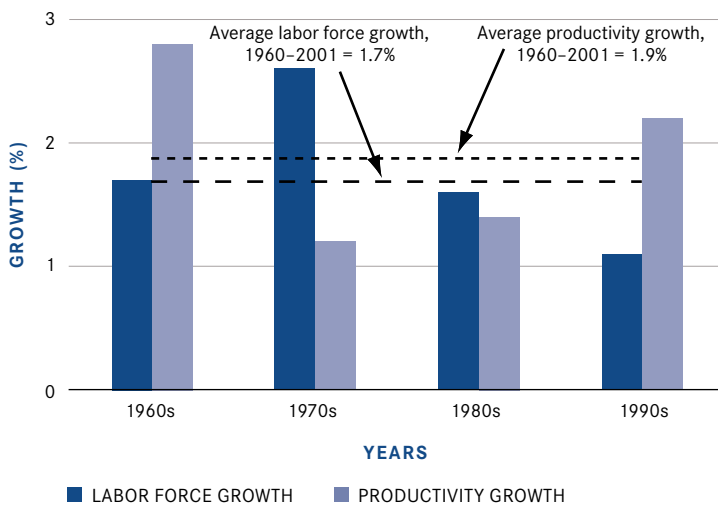
and women of all ages, into the labor force. The downward trend since then is likely to stabilize and equal the population growth rate as the labor force participation rate plateaus. The World Bank forecasts US population growth to be 0.8% per year over the next 10 years. This, combined with a small increase in the labor force participation rate, yields a 1% labor force growth rate. So our economic growth forecast of about 3% is consistent with labor force growth of 1% and labor productivity growth of 2%.

There exist forces pushing labor productivity growth away from 2%. For example, the recent technology boom could make our 2% forecast conservative. In fact, Fed Chairman Alan Greenspan believes the recent productivity boom (2.5% over the 1995–2000 period) is sustainable, and even "may have been somewhat understated."[30] In contrast, the pending retirement of many baby boomers as "freedom 55" looms large could have an adverse impact on productivity.

As discussed above, the link between economic and earnings growth is a long-run link only. Over the shorter run, it is entirely feasible for earnings to grow at a different rate than the economy. In fact, the economists surveyed by Blue Chip anticipate corporate profits to grow at 6.3% (nominal) through 2008, while they expect the economy to grow at 5.3%. Hence, they expect earnings will grow slightly faster than the economy. For perspective, corporate profits grew faster than GDP over the 1980s and 1990s (4.4% versus 3.1%), but slower over the entire post-1950 period (2.5% versus 3.4%).

We believe that S&P 500 earnings will grow about 0.5% faster than the broad economy over the next 10 years because the sectoral composition of the S&P 500 is much more "growthy" than the sectoral composition of the broad economy. For example, the overall economy includes some slow-growing sectors that are not represented in the S&P 500, like the farming sector and the government sector. Consider the government sector, for example. The size of the government sector (measured by labor input) will prob-

CHART 5

Productivity and labor force growth (1960–2001)

Average labor force growth, 1960–2001 = 1.7%

Average productivity growth, 1960–2001 = 1.9%

GROWTH (%)

YEARS

■ LABOR FORCE GROWTH   ■ PRODUCTIVITY GROWTH

Source: OECD.

ably grow along with the economy while its productivity is likely to grow more slowly, implying that the government sector is pulling down the GDP growth rate. Going forward, it is reasonable to expect this growth gap to widen as technological improvements and the information revolution impact the corporate sector more than the farming or government sectors. Also, the growthier sectors like information technology, telecommunications and health care have a greater representation in the S&P 500 (together comprising 30%) than in the broad economy (14%).

The S&P will grow faster, relative to the overall economy, than it once did because it went from being a representative index to a growthy one, as Chart 6 illustrates. It shows the sector composition of the S&P 500 since 1980. There has been a distinct trend toward the service-oriented sectors (the lower four categories, in blue) and away from the non-service sectors sectors (the top six categories, in grey). The basic materials, utility, resource, industrials and cyclical consumer goods sectors (top five in the plot) have especially shriveled in size, at the expense of the financial and IT sectors (lower two in the plot). The service sectors tend to be the more growthy sectors, perhaps explaining why recent S&P 500 earnings growth rates have been higher than economic growth rates—8.7% over the 1990s for the S&P 500 versus 5.5% for GDP (nominal). Additionally, while not shown in this plot, there has been a trend within each sector toward the growth industries. For example, even the IT sector has become more growthy, as evidenced by IBM, a company once known for making boxes that sit on people's desks but now known at least as much for their service-line businesses.

While most forecasts (including ours) have profit growth exceeding economic growth over the coming years, an argument can be made that the S&P 500 earnings will not grow as fast as overall corporate profits because the S&P 500 contains only large-cap stocks, which tend to have lower growth rates than the smaller-cap stocks. The stocks with the highest growth rates are likely to be those that are pre-
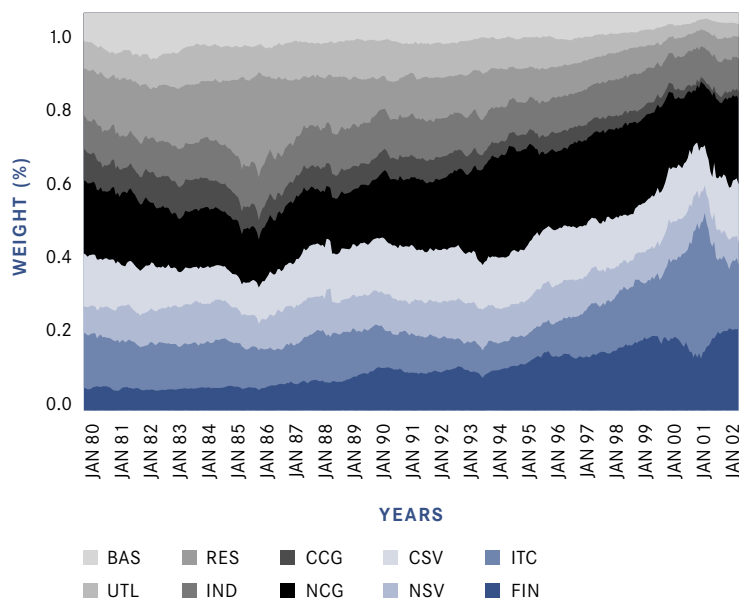
Source: BARRA.

initial public offering, and only after a growth spurt do they go public. As evidence of this, consider that over the 1980s and 1990s, S&P 500 operating earnings per share grew at about 2.3% (real) while overall corporate profits grew at about 4.4%. This large-cap bias in the S&P 500 tempers our growth gap forecast down to 0.5%. Our forecasted growth gap for the overall corporate sector would be wider than this.

To conclude, we base our earnings growth projections on GDP growth plus an adjustment that permits corporate profits to grow at a different rate than the broad economy over the next 10 years. We believe GDP growth rate will be about 3% and S&P 500 earnings will grow 0.5% faster than the broad economy. Overall, we forecast real earnings to grow at 3.5% over the next 10 years. This is substantially slower than the corporate profit growth rate over the 1980s and 1990s (4.4%), but faster than the growth rate since 1950 (2.5%).

CHART 7

Trailing 10-year inflation (1936–2002)
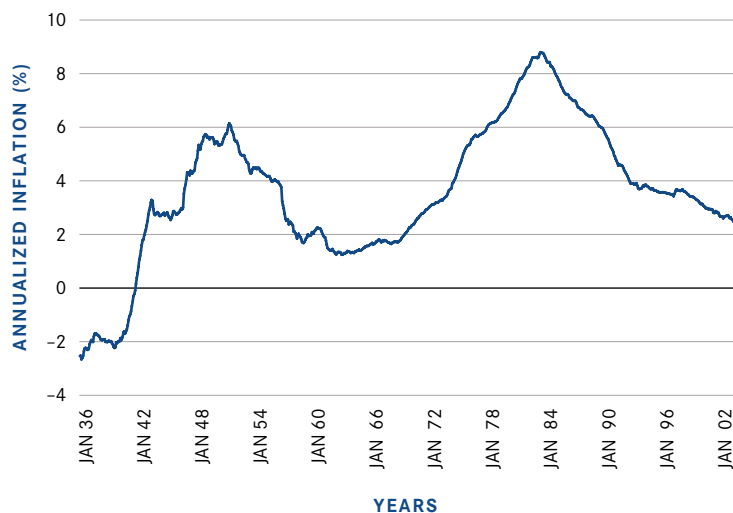
Source: Ibbotson Associates.

EXPECTED INFLATION

Expected inflation is the tide that raises and lowers all boats (expected returns) at the same time. If expected inflation increases, then expected equity returns and expected bond returns increase by the same amount, resulting in no change in the equity risk premium.[31] However, we must still measure today's 10-year expected inflation in order to determine how to decompose the 10-year nominal bond yield into its real and inflation components.

For perspective, Chart 7 gives trailing 10-year inflation since 1936. Over the last 10, 20 and 50 years, inflation has averaged 2.5%, 3.2% and 3.9%, respectively. The current 10-year nominal bond yield is about 5%. One could inflate (deflate) the equity risk premium simply by assuming a larger (smaller) part of this is expected inflation. At one extreme, Arnott and Bernstein implicitly assume that 1.5% of this

is expected inflation. They base their analysis on a 3.5% expected real bond return, which is obtained from the yield on 10-year inflation-indexed government bonds. At the other extreme, the inflation rate over the last 75 years has averaged about 3.1%. This is the assumption used by Ibbotson and Chen.

We believe both these extremes are unrealistic. Consider, for example, the most recent survey of over 50 economists by Blue Chip Economic Indicators. In this survey, the average long-run (through 2007) inflation forecast of the 10 most optimistic economists was 1.8%. In contrast, the average forecast of the 10 most pessimistic economists was 2.5%. The overall average was 2.2%.

We anticipate inflation over the next 10 years to be about 2.5%. To assume long-run inflation less than about 2–2.5% requires a lot of confidence in what can be presumed to be the post-Greenspan Fed. The recent period of very low inflation makes it easy to forget that the average inflation during the Greenspan years has been 3.1% so far—exactly the same as the 75-year average. In fact, the economists surveyed by Blue Chip seem to have forgotten that already. To assume that the Fed in the next 10 years will be able to knock 1% off what Greenspan delivered is to be very optimistic, explaining why we have a forecast that is about 0.3% higher than Blue Chip's consensus forecast of more than 50 economists.

As an aside, our forecast is also about 0.5% higher than the market-implied expectation derived from the difference between nominal and real yields. Given that current nominal yields are about 5%, our assumption of about 2.5% expected inflation implies a real yield of about 2.5%. Inflation-indexed bonds are currently yielding about 3%, implying that they are an attractive buy.

EXPECTED REPRICING

As discussed above, we've seen about a 1.5% per annum repricing over the last 76 years, as P/E ratios increased from about 10 to about 30. Interestingly, most of this repricing occurred during the last 20 years of this period, as Chart 8 demonstrates.

The repricing component is the most uncertain of all the components. It boils down to making an assumption about P/E in 10 years. The P/E at the end of February 2002 was about 28, and its historical average since 1926 was about 14. But in 2011, will it still be 28? Will it be 14? Or perhaps 22? As Chart 9 shows, the P/E in 2011 will have a significant impact on realized returns over the next decade.

If multiples stay at 28, then the repricing impact is zero and the return equity investors will receive will come only from income returns and nominal earnings growth. However, if the P/E multiple drops to 20, this will have a –3.3% impact per year on returns. If the multiple increases to 35, it will have a +2.3% impact on returns.

Forecasting where we'll be on this graph on Dec 31, 2011, is about as hard as forecasting the weather on Dec 31, 2011. There are long-run influences like global warming that we know will impact the weather, but the uncertainty far outweighs the known factors. To help identify what kinds of factors might impact the P/E ratio in 2011, we use the simple Gordon growth model.

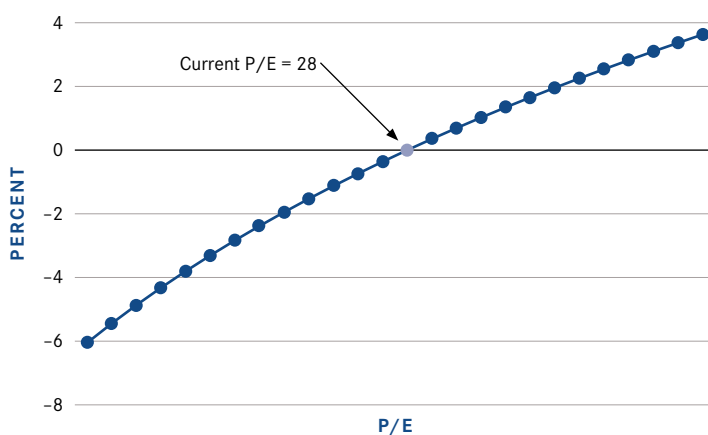$$P = \frac{\kappa E}{r - g}$$

$$\frac{P}{E} = \frac{\kappa}{r - g}$$

where κ, r and g are the "perpetual" payout rate, discount rate and growth rate respectively.[32]

CHART 8
Repricing (1926–2001)
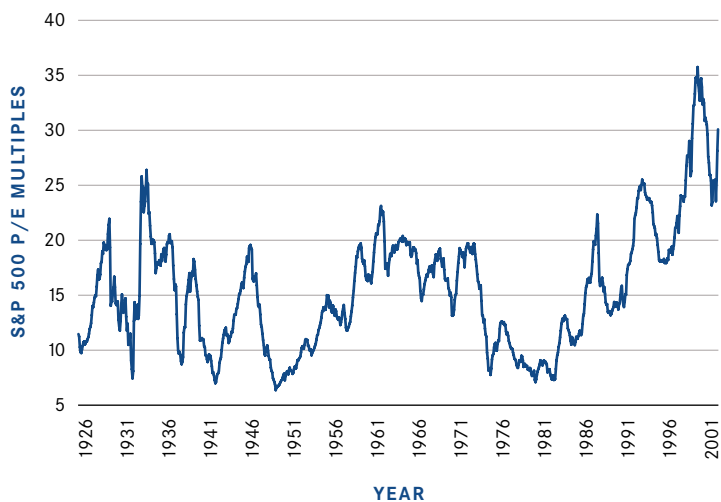
Source: Shiller.

CHART 9
Impact of repricing on annualized return forecast in 2011

Source: BGI.

The P/E ratio will be lower in 2011 than today if the perpetual payout rate is lower in 2011 than today, if the perpetual discount rate is greater than today, or if the perpetual growth rate is less than today. Table 3 illustrates some of the factors that can cause these perpetual rates to move over the next decade.

To the extent that these factors are expected by the markets (and therefore are already reflected in current perpetual rates), multiples will not change. These factors can only change multiples if they surprise the markets, that is, if they cause changes in the perpetual κ, r or g. Therefore, one should forecast a decrease in P/E multiples if one sees an increase in κ, a decrease in r or an increase in g *that the market does not see.* Also, any transitory effect over the next 10 years (such as war, recession, etc.) will not impact the perpetual growth rate in 2011, and therefore will not lead to P/E repricing. (They would, however, impact real earnings growth over the next 10 years.)

Higher P/E: A more stable price environment brought about by low inflation would increase expected real perpetual growth rates.[33] (It would also decrease both the nominal discount rate and the nominal growth rate, but these two impacts would offset each other.) Further positive productivity shocks and increased benefits from globalization would also increase perpetual growth rates. A successful repeal or reduction in capital gains tax rates or a decrease in income tax rates would decrease the rate at which investors discount earnings. Decreased real yields would also decrease the rate at which earnings are discounted. Any of these factors, if not already anticipated by the markets, would raise P/E ratios. Additionally, the upward repricing we've seen over the past 75 years can continue if financial and technological innovation continues to give investors easier access to the financial markets and allows them to diversify their risks more effectively. In just the last thirty years, we've witnessed several such revolutionary innovations. For example, exchange-traded funds and index funds give the average investor easy and inexpensive access to diversified investment portfolios. The World Wide Web gives the average investor access to information. Debt securitization (like Freddie Mac) lowers debt interest payments. Each of these recent innovations makes investors willing to pay higher prices for a given stream of earnings, raising the P/E multiple. Given that we continue to see such innovations, and given the legal and financial infrastructure continues to develop in derivative markets, we should not trivialize the possibility of more such innovations in the next decade.

Lower P/E: However, many of the reasons commonly given for high earnings growth going forward (like the information revolution and globalization, as discussed above) are probably already reflected in current prices. As evidence of this, one need only look at the recent upward repricing, which is largely attributable to the belief that future earnings growth will be higher than in the past. Therefore, these kinds of factors should not result in *further* upward repricing. Additionally, some of the sources of past upward repricing (like decreased transaction costs) are behind us, and will not lead to further repricing.

TABLE 3
Factors affecting P/E

Factors favoring higher P/E	Factors favoring lower P/E
Decreased inflation	Correction of irrational exuberance
Decreased real yields	Increased deficits
Financial innovation	More Enron-type accounting debacles
Productivity shock	Increased inflation, taxes, real yields, regulations
Decreased taxes	Ongoing (beyond 10 years) war, environmental costs, etc.
Globalization	

On the contrary, deficits have already begun to creep up as tax revenues have fallen and tax reductions have increased, putting upward pressure on interest rates. The higher defense expenditure associated with the war on terrorism has the potential to exacerbate this trend. This interest rate pressure, if not already anticipated by the markets, will drive multiples down. More accounting scandals will increase the rate at which investors discount future earnings, driving multiples down.

But perhaps the most powerful argument (or most controversial argument, depending on your perspective) is that the market is currently overpriced (perhaps due to "irrational exuberance") and multiples have only one way to go. John Y. Campbell and Robert J. Shiller together and Shiller separately take an extreme view here, based on the tendency of P/E multiples to mean-revert.[34] These studies emphasize that whenever P/E multiples reach a peak, the subsequent 10-year equity market return is at least very low, if not negative. In January 2000, the P/E multiple reached an all-time high, which "suggests substantially negative returns, on average, over the next 10 years."[35]

Shiller's pure mean-reversion argument is understandably a little simplistic, given his intended audience. But to the extent that markets overreacted to globalization or the information revolution, a good case can be made for some mean reversion from the current multiples.

It is our view that the recent increase in P/E was a slight overreaction to the expected increased growth rates caused by globalization, effective monetary and fiscal policy, technological advances, decreased inflation, and so on. Stated differently, investors priced in more growth than was reasonable. For example, it is widely believed that globalization should cause earnings growth to increase; yet we can point to very few solid examples where globalization has had a bigger impact on revenues than on costs. It is also widely believed that stable prices are driving higher real earnings growth expectations. But to the extent that investors, like

economists, focus too much on the recent past when forecasting inflation (and therefore have too low an inflation forecast), it is reasonable to assume that expected real growth rates reflected in the current prices are too high.

Additionally, it is our view that current P/E multiples are not reflective of true underlying fundamentals, given the earnings manipulation in the US market over the last several years. This manipulation led investors to expect unreasonably and unsustainably high growth rates, inflating the P/E multiples. As companies come clean or as investors view reported earnings with more skepticism, we would expect the perpetual growth rate to decrease, driving down P/E multiples.

It is our view that the recent increase in P/E was a slight overreaction to the expected increased growth rates caused by globalization, effective monetary and fiscal policy, technological advances, decreased inflation, and so on.

In summary, barring further *unexpected* increases in globalization, further *unexpected* reductions in inflation, further *unexpected* technological advances, etc., we expect to see a small amount of downward repricing to a P/E multiple of somewhere in the 25 to 26 range, or about 0.75% per year. This is not to say that we think the factors favoring higher multiples (first column of Table 3, page 16) are unlikely to occur. On the contrary, we *do* expect lower inflation (as discussed in the inflation section above), continued financial innovations, and so on. But so does the market. We're equally likely to see increased deficits and increased regulations. On balance, the argument that expected higher growth rates are perhaps overly reflected in the prices is very compelling, and causes us to give slightly more weight to the case for downward repricing than the case for upward repricing.

CHART 10

Ten-year periods with −10% repricing
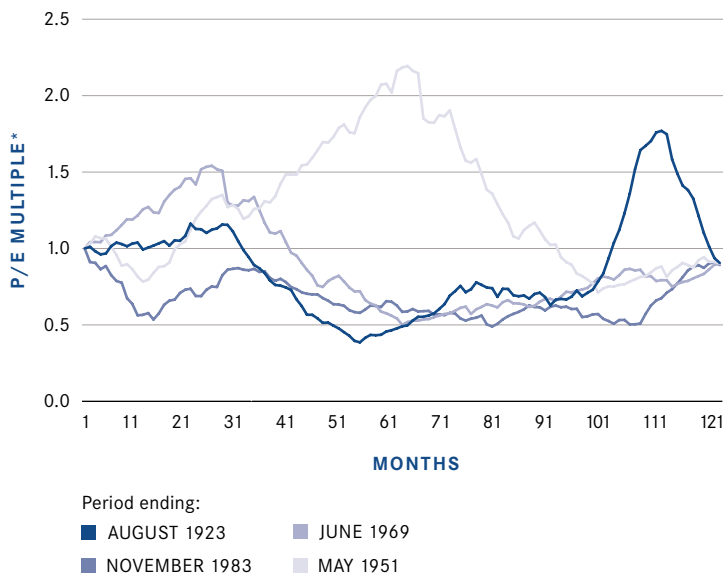
Period ending:

- ■ AUGUST 1923
- ■ JUNE 1969
- ■ NOVEMBER 1983
- ■ MAY 1951

*Scaled to 1.0 at beginning of 10-year period.

Source: Ibbotson Associates.

A −10% repricing can take many different paths. In fact, over the last 75 years, there have been several 10-year periods with −10% repricing. Some of them are plotted in Chart 10. In some cases, like the period ending in June 1969, it can trickle its way into the markets gradually over the 10-year period, while in other cases, like the period ending in August 1923, it can occur all at once.

Putting the Pieces Together

RATIONAL EXUBERANCE

Supporters of the rational exuberance view argue that the 5.4% equity risk premium over the last 76 years was understandable, reasonable and rational. Looking forward, this view holds that we can expect the strong equity outperformance to continue. However, examining the decomposition of expected returns makes it apparent that such an opti-

mistic overall view requires one to be either optimistic about each component of the expected equity return or irrationally optimistic about at least one of the components.

Putting these pieces together gives a flavor of the kind of assumptions that are required to obtain a 5.5% equity risk premium going forward.

TABLE 4

Equity expected return: rational exuberance view

Source	Value
Income return	2.5%
Expected real earnings growth	5.0%
Expected inflation	2.5%
Expected repricing	0.5%
Total	**10.5%**

Subtracting the current nominal 10-year bond yield of about 5.0% gives an equity risk premium of 5.5%. Indeed, members of the rational exuberance camp will point to a very high realized stock/bond return spread over the recent past (6.2% spread over the 1990s) as evidence that the world has not changed and we should reasonably expect to see stocks outperform bonds by at least 5% over the next many years. Nonetheless, notice that it is impossible to get a 10.5% expected return without at least one of the components being unreasonably high. (In this case, real earnings growth is assumed to be 5%, which is very high in light of the discussion above.)

RISK PREMIUM IS DEAD

The rational exuberance viewpoint is one extreme. At the other extreme are those who suggest that we should be grateful to the equity gods for their bountiful supply over the last century, because the good times are behind us. To wit, Arnott and Ryan say, "One of the most striking developments of the 1990s is the evaporation of the forward-looking risk premium."[36] In other words, the risk premium is dead.

To understand this viewpoint, we again examine each of the components of the expected equity return. As above, we do not attempt to present every possible viewpoint. Rather, we illustrate the kinds of arguments that are necessary to support such a pessimistic view, and show that such a pessimistic view requires either very conservative assumptions about each component or irrationally conservative assumptions about at least one of the components.

TABLE 5

Equity expected return: risk premium is dead view

Source	Value
Income return	1.4%
Expected real earnings growth	1.0%
Expected inflation	1.5%
Expected repricing	0.0%
Total	**3.9%**

Subtracting the 10-year government bond yield of 5.0% gives an equity risk premium of –1.1%. Again, it takes an extreme assumption (or set of extreme assumptions) to yield a negative equity risk premium. In this case (which is the case made by Arnott and Bernstein), the extreme assumption is a 1% real earnings growth rate combined with very conservative assumptions about income return and inflation. We discussed why this seems unreasonable to us above in our section on expected real earnings growth.

TABLE 6

Equity expected return: our view

Source	Value
Income return	2.25%
Expected real earnings growth	3.5%
Expected inflation	2.5%
Expected repricing	–0.75%
Total	**7.5**

RISK MUST BE REWARDED: OUR VIEW

We have a more moderate view. As discussed above, we have a moderate income return forecast of 2.25%, an aggressive nominal earnings growth forecast of 6%, and a conservative repricing forecast of –0.75%, as illustrated in Table 6. This yields an expected equity return of 7.5% over the next 10 years. Subtracting an expected bond return of 5% gives an equity risk premium of 2.5%. This conclusion is comforting, because we believe that investors must expect to be compensated for holding the uncertain cash flows that equities offer instead of the certain cash flows that bonds offer. A negative or zero equity risk premium contradicts the most basic tenet of finance: that higher non-diversifiable risk should be rewarded with a higher expected return.[37]

It is perhaps instructive to consider what the equity risk premium would be without the repricing component. As emphasized above, the current P/E ratio reflects current market expectations about the future, so one can only call for a repricing if one disagrees with the markets. In our case, we believe that the market is expecting too much perpetual earnings growth, and therefore we are calling for a 10% cumulative downward repricing over the next decade. This is easily the most controversial assumption we make. Readers who have more confidence in the markets than we have would ignore this component, and conclude the equity risk premium is 3.25% and expected equity returns are 8.25%. In contrast, we would interpret 3.25% as the long-run, normal or equilibrium equity risk premium. It is what is obtained either if there is no repricing (the markets are right) or if the repricing occurs over a very long period of time. For example, if the 10% repricing we call for takes place over 100 years, this translates to a negligible 8 basis points per year.

Conclusion

The equity risk premium, which we define as the expected return difference between the S&P 500 and US Treasury bonds over the next 10 years, is one of the most important numbers in the field of investing. It influences strategic asset allocation decisions, funding ratios, the optimal manager mix and even the Social Security debate. Yet despite its importance, no consensus has emerged on its value.

In this paper, we present the case for a "normal" or "equilibrium" risk premium of about 3.25% and a current (conditional) risk premium of about 2.5%. We expect the equity market to return about 7.5% over the next 10 years. As emphasized in this paper, this number is measured with a lot of noise. But one thing is certain—it is significantly less than what the markets delivered in the past.

The impact of this on the typical plan is substantial. Gone are the days when we could expect plans to deliver 9% nominal returns. Given a 7.5% return to equities and a 5% return to fixed income, 6.5% is a more reasonable expectation for overall plan performance. Also, gone are the days when high equity allocations were deemed prudent. Using the rule of thumb that a 1% decline in the equity risk premium results in a 4% decline in the optimal allocation to equities, this suggests that many strategic asset allocation mixes should be about 10–15% less in equities than in the past.

The decreased equity risk premium will also make the "search for alpha" more important than in the past. Rightly or wrongly, when markets were delivering +30% returns, a couple of extra percent return from active management was viewed as almost rounding error.[38] But with plans likely to earn single-digit returns over the next 10 years, a couple of extra percent becomes much more important. We expect to see an increased interest in higher expected alpha strategies like market neutral, currency overlays and hedge funds.

The fall in the equity risk premium is good news for fixed income managers, hedge fund managers, market neutral managers, currency managers and other managers whose returns have low correlations with the equity market. Investors will undoubtedly look to these investment strategies as they seek to offset the reduced performance they obtain from the equity part of their plans. But it is bad news for plan sponsors, who will see their funding ratios decline; for employees, who will see either their benefits reduced or their contributions increased; for corporate America, which will no longer be able to rely on their pension plans to make their profit picture look more attractive; and for individual (DC plan) investors and other asset owners who will find their wealth growing at an uncomfortably slow pace compared to expectations.

Appendix

Using the notation defined in the text, one can always decompose the single-period return of an asset into

$$R = \frac{D + P_1}{P_0} - 1 = \frac{D}{P_0} + \frac{P_1}{P_0} - 1 \tag{A.1}$$

$$= \frac{D}{P_0} + \frac{EPS_1}{EPS_0} \cdot \frac{P_1/EPS_1}{P_0/EPS_0} - 1 \tag{A.2}$$

$$= \frac{D}{P_0} + \frac{iEPS_1 + EPS_1^{\,r}}{EPS_0} \cdot \frac{P_1/EPS_1}{P_0/EPS_0} - 1 \tag{A.3}$$

$$= \frac{D}{P_0} + (1 + i + \%\Delta EPS^r) \cdot \left(1 + \%\Delta \frac{P}{EPS}\right) - 1 \tag{A.4}$$

$$\approx \frac{D}{P_0} + i + \%\Delta EPS^r + \%\Delta \frac{P}{EPS} \tag{A.5}$$

$$\approx \frac{D}{P_0} - \%\Delta S + i + \%\Delta E^r + \%\Delta \frac{P}{EPS} \tag{A.6}$$

where P_0 and EPS_0 are price and earnings per share at the beginning of the period, P_1 and EPS_1 are price and earnings per share at the end of the period, and D is income paid during the period. Equation (A.3) decomposes end-of-period earnings per share into an inflation component ($iEPS_0$) plus a real component (EPS_1^r), where i is the inflation rate over the period. Equation (A.5) drops the second-order terms. Equation (A.6) decomposes EPS^r into real earnings, E^r, and the number of shares, S.

The first two terms in the decomposition,

$$= \frac{D}{P_0} - \%\Delta S \quad,$$ are the income return. The final three

terms, $i + \%\Delta E^r + \%\Delta \dfrac{P}{EPS}$, are the capital gain.

Endnotes

1 *Global Investor* (Dec/Jan 2002): 6.

2 Roger C. Ibbotson and Peng Chen, "The Supply of Stock Market Returns," Yale International Center for Finance Working Paper No. 00–44 (June, 2001): 1–29.

3 Robert D. Arnott and Peter L. Bernstein, "What Risk Premium Is 'Normal'?" *Financial Analysts Journal* 58, No. 2 (March/April 2002): 64–85.

4 Ivo Welch, "The Equity Premium Consensus Forecast Revisited," Yale University Cowles Foundation for Research in Economics working paper No. 1325, (September 2001).

5 Robert J. Shiller, *Irrational Exuberance* (Princeton, NJ: Princeton University Press, 2000): preface page xii.

6 Interview with authors.

7 See, for example, John Y. Campbell, "Estimating the Real Rate of Return on Stocks over the Long Term," unpublished manuscript, presented to the Social Security Advisory Board (August 2001); Peter A. Diamond, "What Stock Market Returns to Expect for the Future?" *Social Security Bulletin,* Volume 63(2), (2000) and "What Stock Market Returns to Expect for the Future: An Update," unpublished manuscript, presented to the Social Security Advisory Board (August 2001); and John B. Shoven, "What Are Reasonable Long-Run Rates of Return to Expect in Equities?" unpublished manuscript, presented to the Social Security Advisory Board (August 2001).

8 We use the return on 10-year government bonds because the equity risk premium is what an equity investor can expect to receive to compensate for holding on to the risky cash flows of equities instead of the certain cash flows of bonds. Ten-year government bonds are the bonds that provide the most certain cash flows.

9 That is, the Long-Term US Government Bond return (source: Datastream), not the 10-year Government Bond return that we use elsewhere in the paper. Unless stated otherwise in this paper, all returns will be geometric returns.

10 See Roger C. Ibbotson and Peng Chen for other related ex-post decompositions of past returns.

11 Rajnish Mehra and Edward C. Prescott, "The Equity Premium: A Puzzle," *Journal of Monetary Economics* 15 (1985): 145-161.

12 For surveys of this literature, see Narayana R. Kocherlakota, "The Equity Premium: It's Still a Puzzle," *Journal of Economic Literature* 34 (1996): 42–71, or Rajnish Mehra, "The Equity Premium: Why Is It a Puzzle?" UC Santa Barbara working paper (October 2001).

13 In a survey of 500 academics, Welch (2001) reported that the average 30-year equity market forecast was 9.1% per year (geometric), which implies an equity risk premium exceeding 4%.

14 Gustavo Grullon and Roni Michaely, "Dividends, Share Repurchases and the Substitution Hypothesis," unpublished manuscript, Johnson Graduate School of Management, Cornell University (April 2000).

15 See, for example, Eugene F. Fama and Kenneth R. French, "Disappearing Dividends: Changing Firm Characteristics or Lower Propensity to Pay?" Center for Research in Security Prices Working Paper #509 (2000); Grullon and Michaely; and George W. Fenn and Nellie Liang, "Corporate Payout Policy and Managerial Stock Incentives," Federal Reserve Board working paper (March 2000).

16 Fama and French, "Disappearing Dividends: Changing Firm Characteristics or Lower Propensity to Pay?"

17 Nellie J. Liang and Steven A. Sharpe, "Share Repurchases and Employee Stock Options and Their Implications for S&P 500 Share Retirements and Expected Returns," unpublished manuscript, Board of Governors of the Federal Reserve System (1999).

18 See George W. Fenn and Nellie Liang, "Corporate Payout Policy and Managerial Stock Incentives," Federal Reserve Board working paper (March 2000) and Kathy Kahle, "When a Buyback Isn't a Buyback: Open Market Repurchases and Employee Options," *Journal of Financial Economics* (forthcoming 2002).

19 Kahle, "When a Buyback Isn't a Buyback."

20 Robert D. Arnott and Ronald J. Ryan, "The Death of the Risk Premium," *Journal of Portfolio Management* (Spring 2001): 61–74.

21 These growth rates are not overstated by the massive writedowns taken by acquirers in M&A deals because these numbers are based on the government's national income accounts and not on reported accounting data. Additionally, they are not overstated by share repurchases because to avoid double-counting we focus on earnings growth, not earnings-per-share growth. The changes in the number of shares are already accounted for in the "repurchase yield" component of the income return.

22 Harry S. Dent, *The Roaring 2000s: Building the Wealth and Lifestyle You Desire in the Greatest Boom in History* (New York: Touchstone Books, 2000): 41.

23 Source: Thomson Financial/IBES.

24 Merton Miller and Franco Modigliani, "Dividend Policy, Growth and the Valuation Shares," *Journal of Business* 34, No. 4 (October 1961): 411-433.

25 Robert Arnott and Clifford Asness, "Does Dividend Policy Foretell Earnings Growth?" AQR Capital Management (December 2001).

26 Fenn and Liang, "Corporate Payout Policy and Managerial Stock Incentives." All of these studies aren't directly comparable to Arnott and Asness, because those results are based on time-series relationships, while the others are based on cross-sectional relationships.

27 Benjamin Graham and David L. Dodd, *Security Analysis* (New York: Whittlesey House [McGraw-Hill], 1934).

28 Many others have also exploited this link, which as far as we know was first observed by Jeffrey J. Diermeier, Roger Ibbotson and Larry Siegel, "The Supply of Capital Market Returns," *Financial Analysts Journal* (March/April 1984): 74–80.

29 Blue Chip Economic Indicators, published by Pane Publishers: Frederick, Maryland, 27(3), (March 10, 2002).

30 Greg Ip, "Greenspan expresses optimism for growth of US economy," *Wall Street Journal,* 13 May 2002, page A2.

31 This point is debatable, especially during extreme inflation periods. In these periods, one would expect the equity risk premium to collapse because equities are often perceived as a good inflation hedge.

32 This model assumes that, standing today, the expected payout rate, discount rate and growth rate are constant into the infinite future. We refer to these expected permanent rates as the "perpetual" rates. By definition, any change in the perpetual rates must be a surprise to the markets. If the change was expected, it would have been reflected in the perpetual rate.

33 Steven A. Sharpe, "Stock Prices, Expected Returns, and Inflation," Federal Reserve Board (August 1999): 1–45.

34 John Y. Campbell and Robert J. Shiller, "Valuation Ratios and the Long-run Stock Market Outlook," *The Journal of Portfolio Management* (Winter 1998): 11–26. Also, see Shiller, *Irrational Exuberance.*

35 Shiller, *Irrational Exuberance,* p. 13.

36 Robert D. Arnott and Ronald J. Ryan, "The death of the risk premium," *Journal of Portfolio Management* (Spring 2001): 61–74.

37 Note, however, that Diermeier, et al argues that over horizons as long as 30 years, stocks might actually be less risky than bonds because inflation is more damaging to bonds than to stocks. Stated differently, stocks are a better hedge against inflation, so they could conceivably deserve to earn a negative risk premium.

38 Assuming mean-variance utility, the active/passive mix should theoretically be a function only of one's tolerance for active risk, the amount of active risk, and the expected active return. Ideally, the plan level expected return should not play a role. Practically, however, plan sponsors are under tremendous pressure to maintain the absolute level of their expected return assumptions, and we see evidence that they will make careful efforts that increase their exposure to active strategies.

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