average, then in a period like the past 20 years (in which we have had this dramatic fall in dividend payout rates and dividend yields), if you don't include repurchases, you have a problem. Past growth is going to be below future growth, and the dividend model predictions miss this point. I think Stephen Ross is saying that dividend payouts are unstable but might be stable if we added back in repurchases. In my view, the dividend model is a questionable framework.

RAVI BANSAL: Both Rajnish Mehra and Bob Shiller commented on the size of the premium but didn't comment on, or make predictions about, the underlying volatility of the market portfolio. From John Campbell's comment, if I am interpreting it correctly, he views the current scenario as a form of a drop in the Sharpe ratio. Has uncertainty fallen or risen? What is happening to the Sharpe ratio?

CAMPBELL: There haven't been any long-term trends in the volatility of the market as a whole. Certainly, marketwide volatility fluctuates. Volatility was unusually low in the mid-1990s and has risen a lot since then, but if you look over decades, you don't see any trend. The result is different when you look at the idiosyncratic volatility measure, however, because then you do see a trend over the last three decades. But looking marketwide, we do not see trends. Actually this lack of trend is a puzzle because of the evidence that the real economy has stabilized. GDP growth seems to be less volatile. So, some people claim that risk has fallen, which would justify the fall in the equity premium. Yet, we don't see that lower volatility when we look at short-term stock returns. The market does not appear to think that the world is any less risky.

JEREMY SIEGEL: Could I suggest something? Because real uncertainty has declined, companies can lever up more, generate higher P/Es. The result is maintenance of equity volatility, but it's because of an endogenous response to the increased real stability of the economy. So, greater leverage and higher P/Es could be generating the same equity volatility, which wouldn't be a puzzle even with the more stable real economy.

CAMPBELL: But if companies have levered up to maintain the same equity volatility, the equity premium should not fall as a result.

SIEGEL: Yes, if you don't take labor income being more stable into account as one of the factors that might determine risk preferences. In fact, some research shows that if there were more stability on the wage side (labor income), that stability would give people more incentive to buy equities.

WILLIAM GOETZMANN: Just a word on dividends: With all the studies that have looked at historical dividend yields, the problem is that we do not know very much about the dividends on which the studies were based. For data before 1926, we have the Cowles Commission (1938) information on dividends, but when you start reading Cowles' footnotes, you see he had a problem figuring out whether he was actually identifying all the dividends that were being paid by the companies.

ROBERT SHILLER: Have you solved this problem? We had the same problem.

GOETZMANN: Well, no, but we found it was a striking problem. We started from the Cowles period and worked back to see if we could collect information on dividends. We have the information back to the 1820s or so, but we could be missing dividends.

SHILLER: You're concerned that you don't have all the information, that you are missing a significant chunk of it?

GOETZMANN: Yes. You have a set of stocks that are similar to each other—their industrial characteristics are similar, for example. One stock may be paying 8 percent dividends for 10 years, but for another stock, you have no dividend information available. Are you to presume that the second stock did not pay any dividends or that your records simply do not show the dividend? So, what we have had to resort to is to report the high number and to report the low number. And we don't think anybody else has ever really been able to get any better information about dividends than we have. So, if we're going to talk about model uncertainty, let's also talk about data uncertainty—particularly as the records go back through time.

SHILLER: Do you think that companies sometimes reported dividends to commercial and financial chronicles and at other times, misreported them or didn't report them at all?

GOETZMANN: Yes, that could be true.

SHILLER: Wouldn't it have to happen on a big scale to affect the aggregate numbers?

IBBOTSON: As you go back in time, it is not clear who or what was getting the reports. For one period of time, there was an official source for the NYSE, but later, that source disappeared. It is hard enough to get actual stock price data, but it is much harder to find out who reported dividends to whom. Therefore, dividend information comes from all sorts of sources.

GOETZMANN: So, for what it's worth, sprinkle some more noise into this whole process. It's a real challenge to focus on valuation ratio regressions. We've been talking about valuation ratio regressions and statistics in one form or another for eight or nine years now, and we have all sorts of details about the econometrics, but the real issue to me is whether we really know what the payouts were as we push backward in time.

IBBOTSON: For the stock price data, we only needed to go to one (or possibly two or three) sources, but for the dividend data, we had to go to many sources, and even after going to many sources, we found we were getting only some of the data. However, when we found the data, companies paid all their earnings out in dividends. They had 100 percent payout ratios in the 19th century. But for the missing data—who knows.

ROSS: In this entire discussion, we are focusing entirely on the risk premium, and we have sort of ignored the other variable, volatility. What is interesting about volatility is that it is the one variable about which we do have confident expectations.

Volatility has two features that are curious. One feature is that we can actually measure volatility with a certain amount of precision; we know what volatility is. Volatility is a lot less ambiguous than the equity risk premium. We need to bring volatility to bear on such questions as long-run portfolio allocation problems. Someone who has great estimation error about the risk premium and cannot quite figure out what it is but who, nonetheless, is taking others' advice as to what to do, would perhaps be informed in this decision by observing that we do know a lot about the pattern of volatility, we have far less estimation error for it, we sort of know what volatility is today, and we have pretty good ability to predict it over fairly long horizons. At least this person should understand the volatility of volatility, which shows up as much in those allocation problems as does expected return.

The second curious feature of volatility is, it seems to me, that we can use this variable in some interesting ways. Implied volatilities have been around now for 20 years. I know that the week before the 1987 crash, implied volatilities went to an annualized rate of about 120 percent. Prior to the current crash, implied volatilities again rose substantially. The cynic would say, well, implied volatility was quite high, but people didn't know whether the market was going up 200 points or down 200 points the next day; they just knew it was going to be a big move. But my guess is that investors figured that the market wasn't going to go up much more; they really thought the market was going to go down. It would be nice for those who are doing the empirical work on the risk premium to have a variable that actually has expectation recorded in it. It might be fun to look at its empirical content for the puzzles we are talking about today.

SIEGEL: I would like to add something to that comment. I think we know short-run volatility because we can measure it using options, most of which are very short term. But the question of long-run volatility depends very much on the degree of mean reversion, which is very important for long-term investors and is, as we all know, subject to great debate.

ROSS: Actually, I suspect long-term volatility is subject to less debate than long-run returns. For short-run volatility, even for an option one year out, with pretty good liquidity, you can start to see reversion—pretty clear reversion—one year out.

SIEGEL: But we don't have 10-year, or 20-year, or 30-year options, which might be very important for longer-term investors.

ROSS: Volatility is a lot better measure than returns, for which we have nothing that tells us anything about the short term or the long term.

SHILLER: I want to remind you of the very interesting discussion in Dick Thaler's talk this morning about *perceived* volatility [See the "Theoretical Foundations" session]. We seem to be forgetting about the distinction between the actual and the perceived risk premium. When Marty Leibowitz was saying that people would not be interested in stocks with an equity premium of 1.5 percent, he may have been assuming that the perceived volatility was very high. Dick was saying that it is the *presentation* to the general public that affects the public's perception of volatility. His research disclosed a very striking result, which is that when you present investors with high-frequency data, they have a much different perception of what the data are saying than when you present them with less-frequent—say, annual—data. And the way the data are being presented is changing. When I walk down the street now, I can look up at a bank sign that alternates between time, temperature, and the Nasdaq.

LEIBOWITZ: I have a couple of comments. First, if you had a volatility estimate that you could live with and you had actual asset allocations that were stable and common—most asset allocations, at least by institutional investors, are surprisingly stable and common—you could (theoretically) clearly back out from those variables the implied risk premium. No big challenge. At least, you could back out mean–variance estimates. Of course, the question is: What kind of time horizon would you be looking at? The horizon would be the critical ingredient. If you were looking over a long enough time horizon, the risk premium could be 0.1 percent. If you were looking over a short horizon, the risk premium could be something enormous.

Robert Merton wanted me to introduce along these lines the Zvi Bodie construct.[1] Bodie says that the kind of option you would have to buy as you go out to very long horizons is very different, in terms of the Sharpe ratio, from a short-horizon option; it is a very expensive option. That reality has to tell you something.

The other thing that I want to mention is that the issue of equilibrium payout ratios is very important. The question is: When an equilibrium is reached, at which point earnings are growing at either the growth rate of the economy or near that rate (i.e., that rate is your stable equilibrium view), then in terms of dividends, how much of a company's aggregate earnings have to be put back into the company to sustain that growth? This is the critical question. All else would then follow from the answer. It's surprising that this issue has not been much addressed, as far as I know, even from a macro level.

PHILIPS: There is a pragmatic solution to the question that Stephen Ross and Jeremy Siegel raised. We have about 20 years of option data, so you might construct the volatility data going back 20 years, and you could explore the fact that as you sample faster and faster, the estimates of volatility get sharper and sharper. Just take a perfect-foresight model: Assume it's 1920, and you're going to assume that the world is rational and that the forecasted volatility would have been the volatility that was actually realized over 1921, or 1921–1925, or whatever years you want to use. From those data, you could impute a data series going back in time and then try to do the appropriate tests. Cliff Asness has a very nice paper in the *Financial Analysts Journal* that explores this approach (2000b). Cliff looks at historical volatility and then backs out future returns as a function of historical volatility.

[1] Robert Merton was invited to attend but could not.

Implications for Asset Allocation, Portfolio Management, and Future Research I

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A practitioner's empirical approach to estimating prospective (expected) equity risk premiums does not bode well for finding alpha through conventional U.S. equity allocations. In the United States and the United Kingdom, real earnings and real dividends have been growing materially slower than real GDP. Based on empirical evidence, if today's dividend yield is 1.7 percent and growth in real dividends is about 2.0 percent, cumulative real return on stocks will be about 3.7 percent. With a 3.4 percent real yield on bonds available, the *ex ante* risk premium all but disappears. Perhaps most troubling in the empirical evidence is the 60 percent negative correlation between payout ratios and subsequent 10-year earnings growth. With current payout ratios close to 40 percent, the implication for earnings growth over the coming decade is a rate of about –2 percent. When an assumed negative earnings growth rate is combined with an assumed zero risk premium, we have a serious problem.

I have to begin by offering profuse apologies. You are seasoned, very capable academics, and I'm not. I'm just a practitioner and an empiricist. So, we're going to focus on practice and empiricism in this presentation and stay far away from the theory related to the equity risk premium.

History versus Expectations

First, I want to emphasize an observation that a number of speakers have made: Much of the dialogue about the risk premium is very confused because the same term, "risk premium," is used for two radically different concepts. One is the historical excess return of stocks relative to bonds or cash, and the other is the prospective risk premium for stocks relative to bonds on an *ex ante* basis, without any assumptions about changes in valuation levels. The two concepts are totally different, should be treated separately, and, I think, should carry separate labels. Excess returns measure past return differences. The risk premium measures prospective return differences. I wish the industry would migrate to using different terms for these two radically different concepts.

A quick observation: If you are a bond investor and you see bond yields drop from 10 percent to 5 percent, and in that context, you have earned a 20 percent return, do you look at those numbers and say, "My expectation of 10 percent was too low. I have to ratchet my expectation higher. I'll expect 12–15 percent"? Of course not. The reaction by the bond investor is, "Thank you very much for my 20 percent returns; now, I'll reduce my expectation to 5 percent." If the earnings yield on stocks falls from 10 percent to 5 percent, however, what is the investment community's response when they see the 20 percent return? They say, "Our expectations were too low! Let's raise our expectations for the future."

My impression of the discussion we have been having today is that the reaction in this room would be absolutely unanimous in saying the portion of return attributable to the drop in the earnings yield (earnings to price) or the drop in the dividend yield can and should be backed out of the historical return in shaping expectations. I haven't heard a lot of discussion of the fact—and I think it is a fact—that a drop in the earnings yield should have a second-stage impact. The first stage is to say 10 percentage points (pps) of the return came from falling earnings yields; therefore, let's back that out. The second stage is that the fall in the earnings yield should produce a haircut in future expectational returns. I don't hear this concept out in the marketplace, and I don't hear it much in the academic community either.

Strategic Implications of Lower Returns

Let's begin with the hypothesis that the risk premium, the forward-looking premium, on U.S. stocks is now zero. Please accept that supposition for the next few minutes. If the risk premium is zero, what is the implication for asset allocation policy? In the past, the policy allocation to stocks and fixed income was the king of asset management decisions. It was the number one decision faced by any U.S. institutional investor—indeed, any investor in general. The reason was that more stocks meant more risk and more return.

The fiduciary's number one job was to gauge the risk tolerance of the investment committee and to push the portfolio as far into stocks as that risk tolerance would permit. If that job was done correctly, the fiduciaries had succeeded in their primary responsibility. But if stock, bond, and cash real returns are similar, if the risk premium is approximately zero, then it doesn't matter whether you have a 20/80 equity/debt or an 80/20 equity/debt allocation. It does affect your risk and your year-by-year returns, but it doesn't affect your long-term returns. So, if the risk premium is zero, this fundamental policy decision is radically less important than it has ever been in the past.

As for rebalancing, the empirical data support the notion that rebalancing can produce alpha, but we do not have a lot of empirical data to support the notion that rebalancing adds value. History suggests that rebalancing boosts risk-adjusted returns, but it sometimes costs money. Rebalancing produces alpha by reducing risk, and in the long term, it typically adds some value in addition to risk reduction. Now, suppose we are in a world in which there is no risk premium and in which stocks and bonds have their own cycles, their own random behavior. If that behavior contains any pattern of reversion to any sort of mean, rebalancing suddenly can become a source not only of alpha but also of actual added value—spendable added value.

In the past, tactical asset allocation (TAA) provided large alpha during periods of episodic high returns but did not necessarily provide large added value. So, the actual, live experience of TAA in the choppy, see-saw market of the 1970s was awesome. In the choppy bull market of the 1980s, value added from TAA was not awesome but was still impressive. In the relentless bull market of the 1990s, the value added from TAA was nonexistent. Alpha was certainly still earned in the 1990s (a fact overlooked by many), but it came mostly from reduced risk. If we are moving into markets like those of the 1970s, then TAA certainly merits another look.

What about the strategic implications of lower returns for pension funds? If conventional returns lag actuarial returns, then funding ratios are not what they seem. I did a simple analysis of funding ratios for the Russell 3000 Index and found that for every 1 pp by which long-term returns fall short relative to actuarial returns, the true earnings of U.S. pension assets fall by $20 billion. If, as I believe is the case, long-term returns are going to be about 3 pps below long-term actuarial assumptions, pension fund earnings will be $60 billion less than what is being reported, and this shortfall will need to be made up at some later date.

In a world of lower returns, if you don't believe in efficient markets, alpha matters more than ever before. If you do believe in efficient markets, the avoidance of negative alpha by not playing the active management game matters more than ever.

Now, a truism would be that conventional portfolios will produce conventional returns. That is fine if conventional returns are 15 percent a year, as they were for the 18 years through 1999. In a market environment of 15 percent annual returns, another 1 pp in the quest for alpha doesn't matter that much to the board of directors, although it does make a material difference to the health of the fund. However, if the market environment is producing only 3–4 percent real returns for stocks *and* bonds, another 1 pp matters a lot.

What investments would be expected to consistently add value in a world of lower expected returns? "Conventional" alternative investments may or may not produce added value. Private equity and venture capital rely on a healthy equity market for exit strategies. They need a healthy equity market to issue their IPOs (initial public offerings). Without a healthy equity market, private equity and venture capital are merely high-beta equity portfolios that can suffer seriously in the event of any sort of reversion to the historical risk premium. International equities and bonds may have slightly better prospects than U.S. equities and bonds, but not much better.

Strategies well worth a look are the elimination of slippage, through the use of passive or tactical rebalancing, and cash equitization. If the equity risk premium is lost, then alternative assets whose returns are uncorrelated with the U.S. equity market will absolutely produce added value. Uncorrelated alternatives include TIPS,[1] real estate, REITs (real estate investment trusts), natural resources, and commodities. Absolute return strategies (market-neutral or long–short strategies and other hedge fund strategies) will also absolutely produce added value—if you can identify strategies that *ex ante* have an expectation of alpha. These approaches are, more than anything else, bets on skill and bets on inefficient markets. So, the investment strategies that will work in a world of lower returns differ greatly from the conventions that are driving most institutional investing today.

These reflections are from the vantage point of a practitioner. Much of what I've said makes the tacit assumption that markets are quite meaningfully inefficient, so these comments might be viewed with a jaundiced eye by a group that accepts market efficiency. Now, let's turn from practice to empiricism.

Empirical Experience

The Ibbotson data going back 75 years show about an 8 percent cumulative real return for stocks (see Ibbotson Associates 2001). Starting at the end of 1925 with a 5.4 percent dividend yield, the valuation attached to each dollar of dividends quadrupled in the 75-year span. That increase translated into nearly a 2 percent a year increase in the price/dividend valuation multiple—hence, 2 pp of the 8 percent real return. I think nearly everyone in this room would feel comfortable backing this number out of the returns in shaping expectations for the future. Over the 75-year period, real dividends grew at a rate of 1 percent a year. So, over the past 75 years, stocks produced an 8.1 percent real return. The real yield at the start of this period was 3.7 percent. (I say "real" yield because the United States was still on a gold standard in 1925; inflation expectations were thus zero. Bonds yielded 3.7 percent, and bond investors expected to earn that 3.7 percent in real terms.) Bonds depreciated as structural inflation came onto the scene. So, stocks earned a cumulative 4.7 percent real return in excess of the real return earned by bonds over the same period.

What does the future have in store for us from our vantage point now in the fall of 2001? **Table 1** contains the Ibbotson data and our analysis of the prospects from October 2001 forward. We'll start with a simple model to calculate real returns for stocks:

Real stock return = Dividend yield
+ Dividend growth
+ Changes in valuation levels.

In October 2001, the dividend yield is roughly 1.7 percent. If we assume that stock buybacks accelerate the past growth in real dividends, we can double the annual growth rate in real dividends observed over the past 75 years to 2 percent. Those two variables give us a 3.7 percent expected annual real return. TIPS are currently producing a 3.4 percent annual real return. Thus, the expected risk premium is, in this analysis, 0.3 pp, plus or minus an unspecified uncertainty, which I would argue is meaningful but not huge.

Why was the historical growth in real dividends (from 1926 through 2000) only 1 percent a year? Did dividends play less of a role in the economy? Were corporate managers incapable of building their companies in line with the economy? I don't believe either was the reason. The explanation hinges on the role of entrepreneurial capitalism as a diluting force in the growth of the underlying engines for valuation—that is, earnings and dividends of existing enterprises. The growth of the economy consists of growth in existing enterprises and the creation of new enterprises. A dollar invested in the former is not invested in the latter. **Figure 1** shows real GDP growth, real earnings per share (EPS) growth, and real dividends per share (DPS) growth since January 1970. Over the past 30 years, until the recent earnings downturn, real earnings have almost kept pace with real GDP

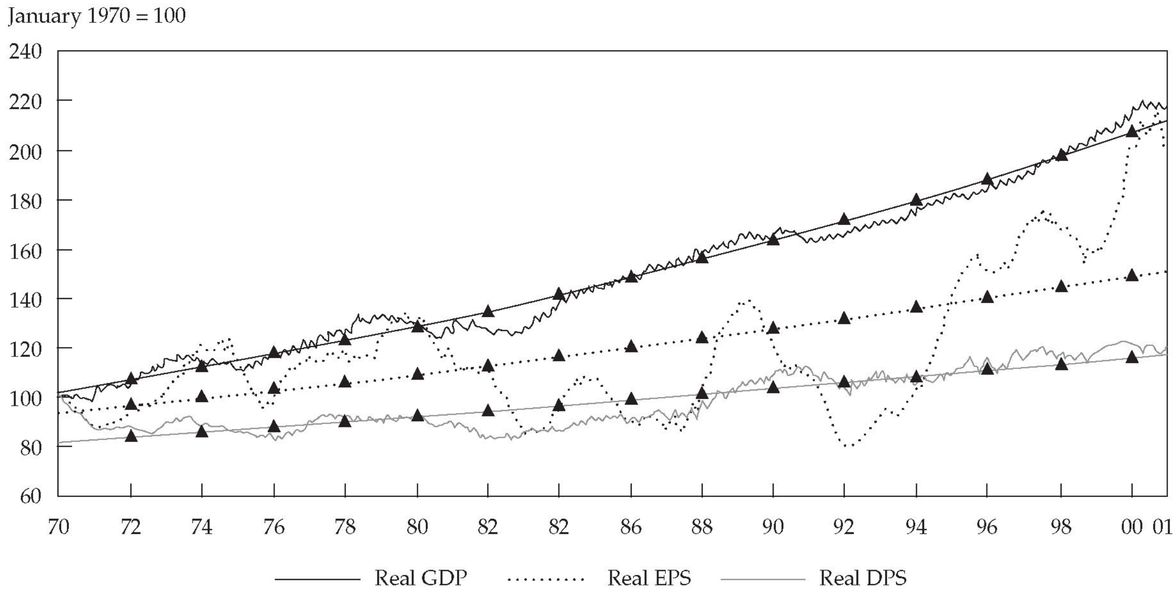
Table 1. The Ibbotson Data Revisited and Prospects for the Future

Component	75 Years Starting December 1925	Prospects from October 2001
Starting dividend yield	5.4%	1.7%
Growth in real dividends	1.0	2.0
Change in valuation levels[a]	1.7	???
Cumulative real return	8.1	±3.7
Less starting bond real yield	3.7[c]	3.4[d]
Less bond valuation change[b]	–0.4	???
Cumulative risk premium	4.7	±0.3

[a] Yields went from 5.4 percent to 1.4 percent, representing a 2.1 percent increase in the price/dividend valuation level.
[b] Bond yields went from 3.7 percent to 5.5 percent, representing a 0.3 percent annualized drop in long bond prices.
[c] A 3.7 percent yield, less an assumed 1926 inflation expectation of zero.
[d] The yield on U.S. government inflation-indexed bonds.
Source: Based on Ibbotson Associates (2001) data.

[1] TIPS are Treasury Inflation-Protected Securities; these securities are now called Treasury Inflation-Indexed Securities.

Figure 1. GDP, EPS, and DPS: United States, January 1970–January 2001



Note: Triangles identify exponentially fitted lines.
Source: Data from Organization for Economic Cooperation and Development (OECD).

growth. However, this pattern has occurred in the context of earnings as a share of the macroeconomy rising from below historical norms to above historical norms, including a huge boom in the 1990s. From the line of best fit, we can see that the growth trend in real earnings and real dividends is materially slower than the growth in the economy.

Is the picture different in Canada? Yes, it is. **Figure 2** illustrates that real earnings and real dividends on an indexed portfolio of Canadian equities have actually shrunk while real GDP has grown, producing a bigger gap between the series than we find in the United States. Why did this happen? In Canada, the fundamental nature of the economy has evolved in the past 30 years from resource driven to information and services driven.

The experience of the United Kingdom, where real earnings and real dividends grew materially slower than real GDP, has been similar to that of the United States. The experience of Japan has been rather more like Canada's. Japan, like Canada, is a fundamentally restructured economy. The result is that over the past 30 years, entrepreneurial capitalism in Japan has had a larger dilutive effect on shareholders in existing enterprises than it has in the United States.

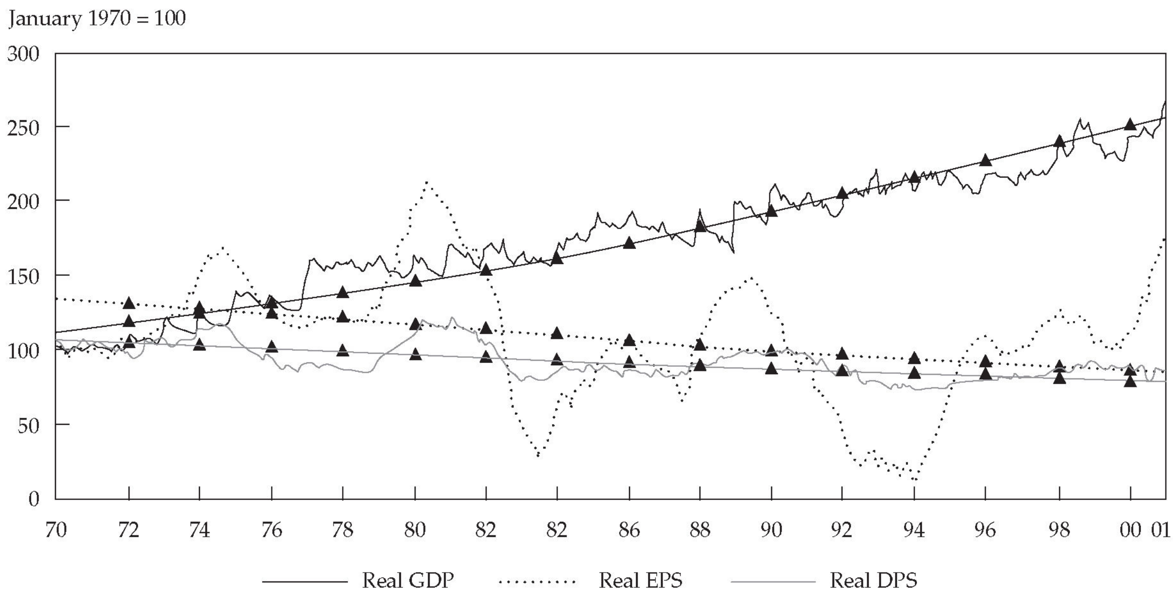
Table 2 shows, for the period from 1970 through 2000, the average growth of the four countries in real GDP, real EPS, real DPS, and average real EPS plus real DPS; Table 2 also shows the combined averages for each country and for all four countries grouped together. The general pattern is clear: Entrepreneurial capitalism is the dominant source of GDP growth, so it dilutes the growth of earnings for investors in existing enterprises.

We can look back over a much longer span for the U.S. market, from 1802 to 2001. **Figure 3** graphs the growth of $100 invested in U.S. stocks at the beginning of the 200-year period. Assuming dividends are reinvested, the $100 would have grown to more than $600 million by December 2001—a nice appreciation in any portfolio. By removing the effects of inflation and reinvestment of dividends, we can isolate the internal growth delivered by the existing companies. When the effect of inflation is removed, the ending value drops to $30 million. And when the assumption of reinvested dividends is removed, the ending value is reduced to a mere $2,000.

Figure 4 illustrates the link between real growth in stock value and economic growth. Real GDP growth increased 1,000-fold over the 1802–2001 period, real stock prices increased some 20-fold, and real per capita GDP growth similarly increased about 20-fold.

We can now assess the underlying engines of valuation. We'll examine the real dividend (you could do the same thing with real earnings). As **Figure 5**

Figure 2. GDP, EPS, and DPS: Canada, January 1970–January 2001



Note: Triangles identify exponentially fitted lines.
Source: OECD.

Table 2. Growth in GDP, EPS, DPS, and EPS + DPS, January 1970–January 2001

Measure	Canada	Japan	United Kingdom	United States	Average
Real GDP	2.7%	3.1%	2.4%	2.0%	2.5%
Real EPS	–1.4	–3.8	1.3	1.3	–0.6
Real DPS	–0.8	–1.6	2.0	1.0	0.1
Average real EPS + real DPS	–1.1	–2.7	1.6	1.1	–0.3
Average EPS + DPS growth as a percentage of GDP	–41.0	–87.0	67.0	57.0	–11.0

Source: OECD; Morgan Stanley Capital International.

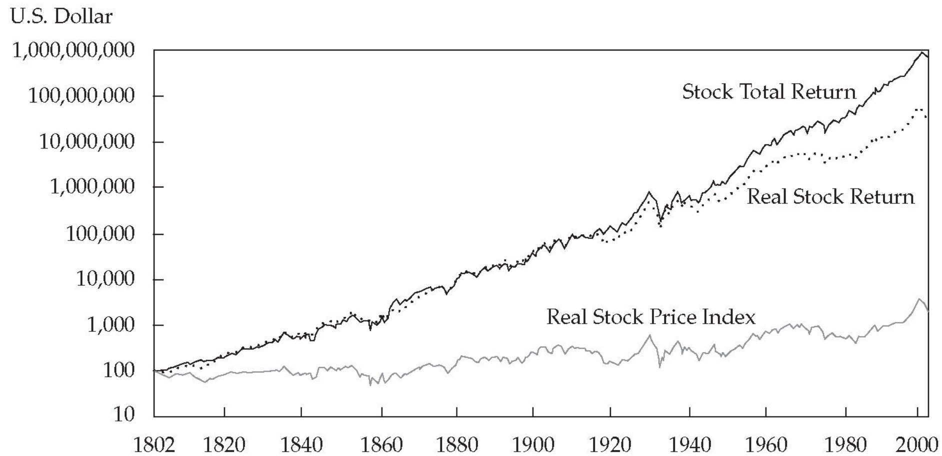
shows, real dividend growth matches very closely the growth in real per capita GDP. The implication is that the internal growth of a company is largely a matter of productivity growth in the economy and is, in fact, far slower than the conventional view—that dividends grow at the same rate as GDP.

Now we are ready to model and estimate real stock returns. In **Figure 6**, the dashed line represents the dilution of GDP growth in the growth of dividends. Growth in dividends tracks growth in real per capita GDP (the dotted line) remarkably tightly; the standard deviation is very modest—only 0.5 percent. This relationship is astonishingly stable. On a 40-year basis, the deviation is never above +0.1 percent and never below –1.6 percent. Moreover, current experience is in line with historical norms, despite anecdotal opinions that companies are delivering less in dividends than ever before.

A model that estimates real stock returns is useful only if its estimates actually fit subsequent experience. **Figure 7** is a scattergram providing the correlation between estimated and subsequent actual 10-year real stock returns. The correlation between the two is approximately 0.46 for the full period and far higher since World War II. The current figure for the real stock return is down in the 2–4 percent range. Of course, what the subsequent actual real return will be is anybody's guess, but I am not optimistic.

The same type of modeling can be done to estimate the real bond return. An inflation estimate can be subtracted from the nominal bond yield to arrive at an estimated real bond return. How do the

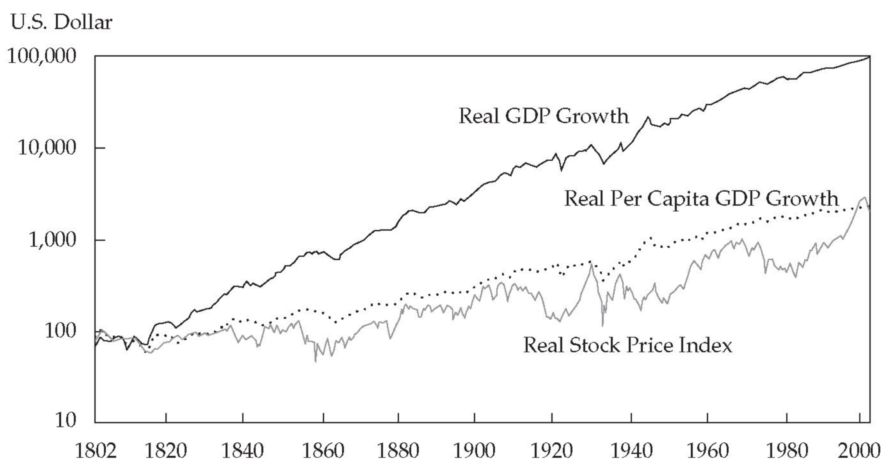
Figure 3. Return from Inflation and Dividends, 1802–2001



Notes: The "Real Stock Price Index" is the internal growth of real dividends—that is, the growth that an index fund would expect to see in its own real dividends in the absence of additional investments, such as reinvestment of dividends.

Source: Arnott and Bernstein (2002).

Figure 4. The Link between Stock Prices and Economic Growth, 1802–2001



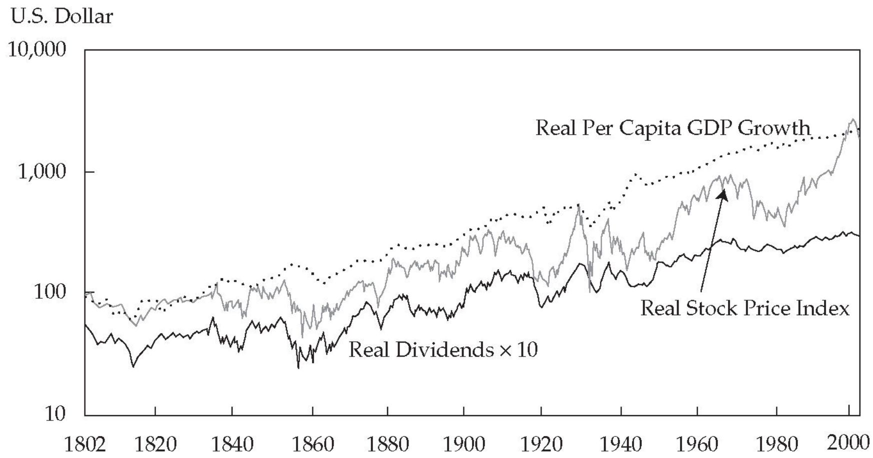
Source: Arnott and Bernstein (2002).

estimates calculated by this model fit with the subsequent real bond returns? As **Figure 8** shows, over a 200-year span, they fit pretty darned well. The loops off to the left relate to wartime. In several periods—the Civil War, World War I, World War II—investors were content to receive a negative expected real return for bonds, which can perhaps be attributed to patriotism. The country survived, so the real returns exceeded the expectations.

By taking the difference between the estimated real stock return and the estimated real bond yield, you get an objective estimate of what the forward-looking equity risk premium might have been for investors who chose to go through this sort of straightforward analysis at the various historical points in time. As shown in **Figure 9**, the *ex ante* risk premium of 5 percent, considered normal by many in the investment business, actually appears only during major wars, the Great Depression, and their aftermaths.

How good is the fit between this estimated risk premium and subsequent 10-year excess returns of

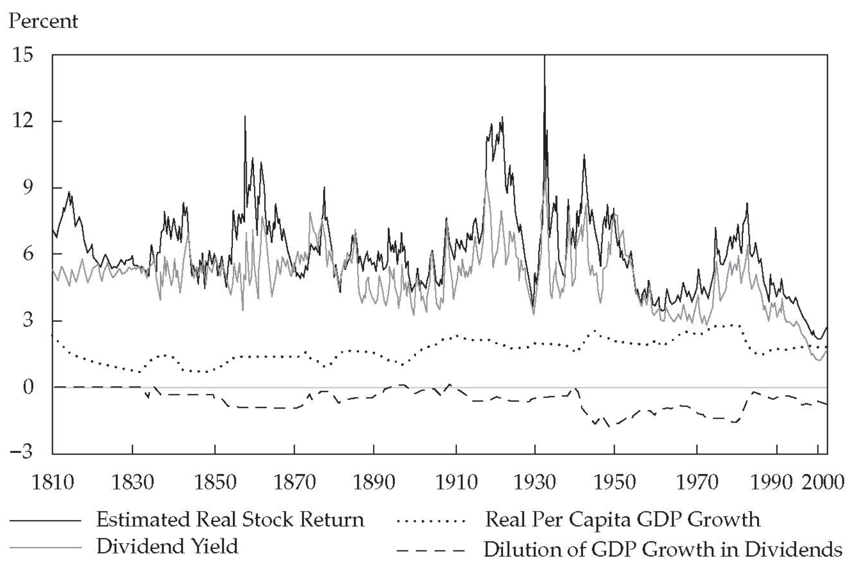
Figure 5. Dividends and Economic Growth, 1802–2001



Notes: Real dividends were multiplied by 10 to bring the line visually closer to the others; the result is that on those few occasions when the price line and dividend line touch, the dividend yield is 10 percent.

Source: Arnott and Bernstein (2002).

Figure 6. Estimating Real Stock Returns, 1810–2001



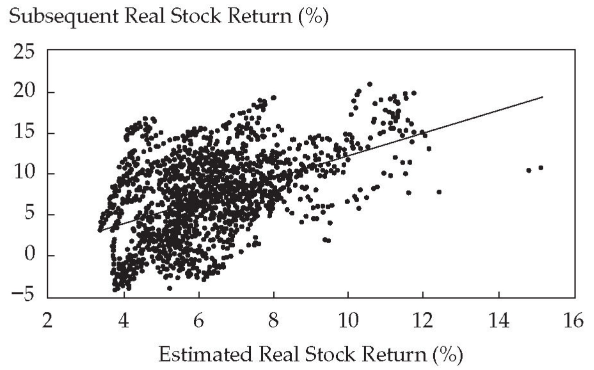
Notes: Based on rolling 40-year numbers. Real stock return = Dividend yield + Per capita GDP growth – Dividend/GDP dilution. The line "Dilution of GDP Growth in Dividends" indicates how much less rapidly dividends (and earnings) on existing enterprises can grow than the economy at large.

Source: Arnott and Bernstein (2002).

stocks over bonds? **Figure 10** shows that the fit is fairly good, which is worrisome in light of the poor current outlook. The current point on the *x*-axis (when this particular formulation is used) is about –0.5 percent. The implications for forward-looking 10-year real excess returns of stocks relative to bonds are worrisome—if this model holds in the future, if things are not truly different this time.

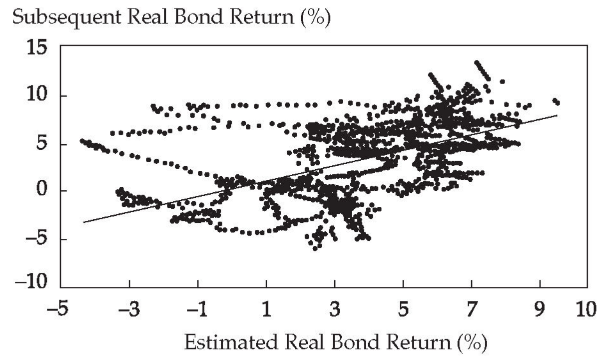
Figure 11 is a scattergram that relates the payout ratio to subsequent 10-year earnings growth from 1950 through 1991. This information ties in with Cliff Asness's talk [in the "Theoretical Foundations"

Figure 7. Estimated and Subsequent Actual Real Stock Returns, 1802–2001



Source: Arnott and Bernstein (2002).

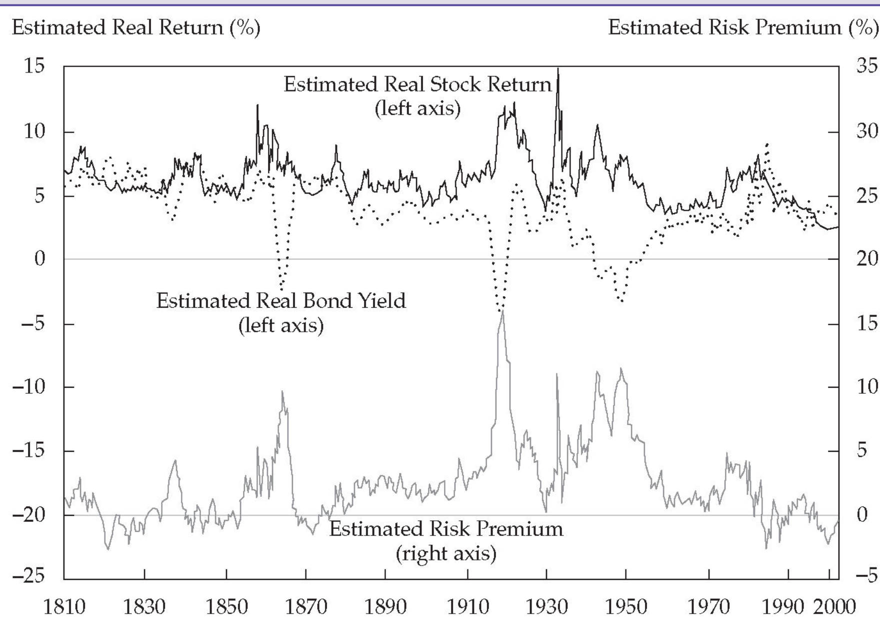
Figure 8. Estimated and Subsequent Actual Real Bond Yields, 1802–2001



Source: Arnott and Bernstein (2002).

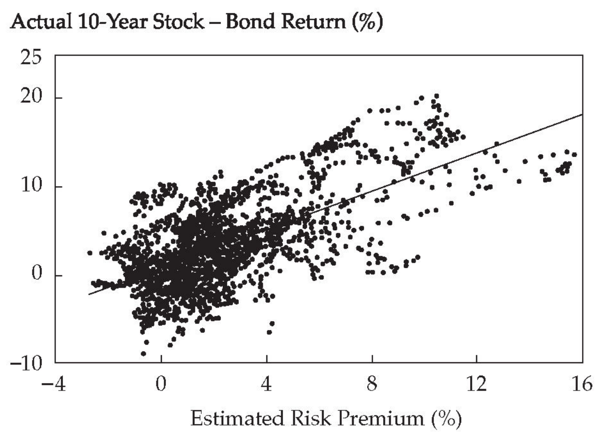
session]. Modigliani and Miller would suggest that if payout ratios are low (see Modigliani and Miller 1958), the reinvestment averaged across the market should produce the same market return that one could get by receiving those dividends and reinvesting them in the market. The tangible evidence is not encouraging. (Keep in mind that the M&M focus is cross-sectional, not intertemporal, so what I've just said is a variant of Modigliani and Miller's work, but it is a widely cited variant. M&M's work is frequently referred to in making the case that earnings growth is going to be faster than ever before.) Based on Figure 11, the correlation between payout ratios and subsequent 10-year earnings growth is a *negative* 0.60—which is worrisome. With recent payout ratios well below 40 percent, the implication for earnings growth is a rate of about –2 percent or worse, from the 2000 earnings peak, over the coming decade. If we combine an assumed negative earnings growth rate with an assumed zero risk premium, I believe that we have a serious problem.

Figure 9. Estimating the Equity Risk Premium, 1810–2001



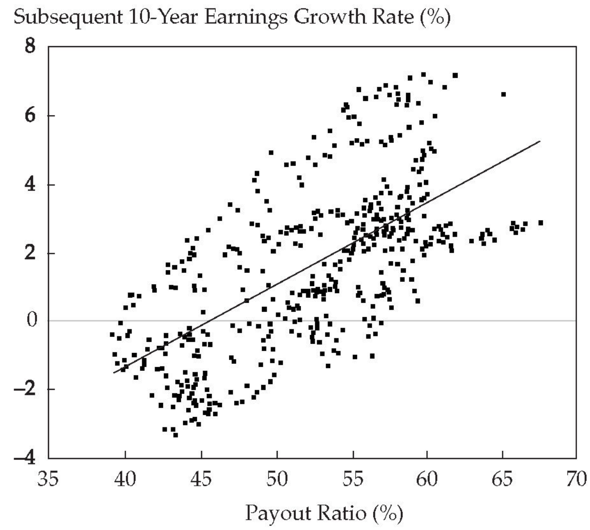
Source: Arnott and Bernstein (2002).

Figure 10. Risk Premium and Subsequent 10-Year Excess Stock Returns: Correlations, 1810–1991



Source: Arnott and Bernstein (2002).

Figure 11. Payout Ratio and Subsequent 10-Year Earnings Growth, 1950–91



Implications for Asset Allocation, Portfolio Management, and Future Research I

Robert D. Arnott
First Quadrant, L.P.
Pasadena, California

SUMMARY

by Peter Williamson
Amos Tuck School of Business Administration
Dartmouth College, Hanover, New Hampshire

Robert Arnott began with an emphasis on practice and empiricism, as opposed to theory. He urged the use of the terms "equity excess return" for the past and "equity risk premium" for the future.

We have seen a decline in bond yields. Does this decline portend an increase or a decrease in bond returns? And we have seen a decline in stock earnings yields (earnings to price). Does this decline portend an increase or decrease in stock returns? The participants in the Equity Risk Premium Forum would all, he believes, when shaping expectations, back out the portion of return attributable to the drop in earnings or dividend yield from the historical return. But he had not heard much discussion of the fact that a drop in earnings yield should have a second-stage impact—a haircut in expected returns accompanying the fall in earnings yield.

Arnott estimated an *ex ante* risk premium at the present time of zero. In this case, the old policy of balancing risk and return no longer works. Rebalancing used to recognize that more stock meant more risk and more return. So, fiduciaries gauged the risk tolerance of the investment committee and pushed the portfolio as far into stocks as that risk tolerance would permit. If the return expectations for stocks and bonds are similar, the policy asset allocation matters in terms of risk but not in terms of returns and the allocation decision is far less critical than it was in the past.

Strategic Implications

Historically, rebalancing has produced an alpha by reducing risk. Over long periods, it produced a little extra return. Now, with no risk premium, with any pattern of reversion to a mean for stocks and for bonds, rebalancing can boost returns.

Tactical asset allocation achieved episodic returns that conveyed a large alpha in the turbulent 1970s and 1980s but did not necessarily add value in the roaring bull market of the 1990s, although it could reduce risk. If the U.S. market is headed for a repeat of the 1970s, then TAA may be especially worthwhile in the near future.

What about strategic implications for pension funds? If conventional returns lag actuarial estimates, which is likely, then current funding ratios are misleading, contributions will have to catch up, and alpha matters. In a world of lower returns, an emphasis on such alternative investments as private equity may be appealing, but to the extent that this emphasis relies on a strong equity market for an exit strategy, it may not be so attractive. International stocks and bonds may be attractive, but the expected returns there will also be low. Rebalancing and cash equitization are worth a look. Uncorrelated alternatives such as TIPS, real estate, REITs (real estate investment trusts), and commodities will be promising.[1] Absolute return strategies may be seen as more important in inefficient markets. There will be increased searching for inefficiencies by active managers and increased searching for avoidance of negative alpha by those who believe in market efficiency.

Empirical Results

Turning from practice to empiricism, Arnott's **Table 1** showed the Ibbotson data together with the prospects based on our current situation. Starting with a dividend yield of 5.4 percent, the U.S. equity market has seen an approximately 8 percent compounded real return on stocks over the past 75 years. The change in the price/dividend valuation ratio added 1.7 percent, which should be backed out of the returns for forecasting purposes. Note that real dividends grew at a scant 1 percent. The initial real bond yield in 1925 was 3.7 percent, and because it

[1] TIPS are Treasury Inflation-Protected Securities; these securities are now called Treasury Inflation-Indexed Securities.

Table 1. The Ibbotson Data Revisited and Prospects for the Future

Component	75 Years Starting December 1925	Prospects from October 2001
Starting dividend yield	5.4%	1.7%
Growth in real dividends	1.0	2.0
Change in valuation levels[a]	1.7	???
Cumulative real return	8.1	±3.7
Less starting bond real yield	3.7[c]	3.4[d]
Less bond valuation change[b]	–0.4	???
Cumulative risk premium	4.7	±0.3

[a] Yields went from 5.4 percent to 1.4 percent, representing a 2.1 percent increase in the price/dividend valuation level.

[b] Bond yields went from 3.7 percent to 5.5 percent, representing a 0.3 percent annualized drop in long bond prices.

[c] A 3.7 percent yield, less an assumed 1926 inflation expectation of zero.

[d] The yield on U.S. government inflation-indexed bonds.

Source: Based on Ibbotson Associates (2001) data.

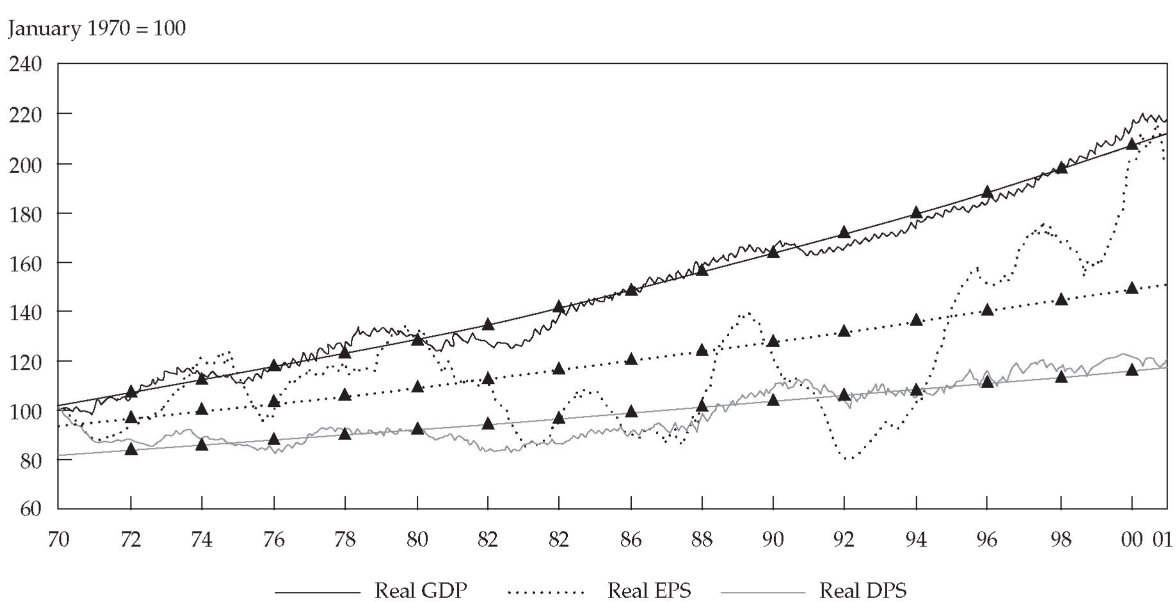
was the quoted bond yield, investors had no reason to expect that inflation would matter. So, the excess return of equities over bonds was close to 5 percent. Now, we are looking at a 1.7 percent starting dividend yield, roughly a 2 percent growth in real dividends, and probably no increase in valuation levels—for a total prospective real return of about 3.7 percent. Subtracting a 3.4 percent real bond yield (e.g., the TIPS yield) produces a 0.3 percent (30 bps) cumulative risk premium plus or minus some small standard deviation.

Why did dividends grow at only 1 percent in the past? Looking at the **Figure 1** graph of real GDP, real EPS, and real dividends per share (DPS), we can see that earnings have almost kept pace with GDP growth—but in the context of going from a small share of the national economy to a large share. Entrepreneurial capitalism dilutes the growth experienced by investors in existing enterprises. The trend in dividend growth is well below that of GDP. Over the period January 1970 to January 2001, real GDP growth was fairly steady. Real earnings growth and real dividend growth followed slower trends and were quite irregular, with relatively high earnings growth since about 1995. The relative growth in GDP, equity earnings, and dividends has been similar in the United Kingdom to that in the United States. In Canada and Japan, however, the trend in earnings and dividends has been down, not up, over the past 30 years.

Turning to the 200-year history beginning in 1802, Arnott's **Figure 3** indicated that \$100 invested in stocks in 1802 would have grown, with dividends reinvested, to nearly \$1 billion in 200 years.[2] In real

[2] Table and figure numbers in each Summary correspond to the table and figure numbers in the full presentation.

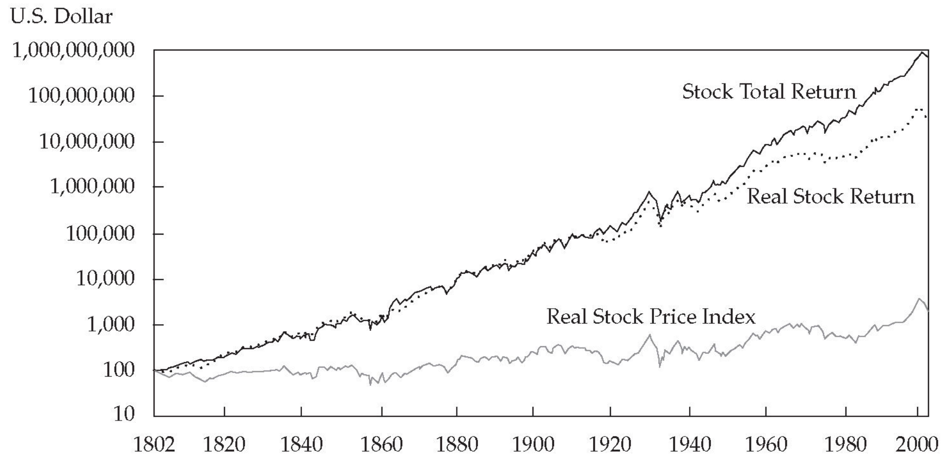
Figure 1. GDP, EPS, and DPS: United States, January 1970–January 2001



Note: Triangles identify exponentially fitted lines.

Source: Data from Organization for Economic Cooperation and Development (OECD).

Figure 3. Return from Inflation and Dividends, 1802–2001



Notes: The "Real Stock Price Index" is the internal growth of real dividends—that is, the growth that an index fund would expect to see in its own real dividends in the absence of additional investments, such as reinvestment of dividends.

Source: Arnott and Bernstein (2002).

terms, however, the ending amount is $30 million, and when we look at the index alone, without dividend reinvestment, the $100 rose barely above $1,000.

Real dividends have trailed per capita GDP growth. **Figure 4** indicated that, in this time frame, an index of real stock prices tracked real per capita GDP growth rather well in the United States, although the index persistently trailed aggregate GDP growth for the 200 years.

Figure 6 provided a basis for modeling and estimating real stock returns. Real per capita GDP growth and dilution of GDP growth in dividends are both remarkably stable and closely parallel. The note to Figure 6 provides Arnott's equation for estimating real stock returns. This equation can also be used for the more recent subperiod of 1950–2001 to forecast future real stock returns. A similarly simple model can be used to estimate future real bond returns.

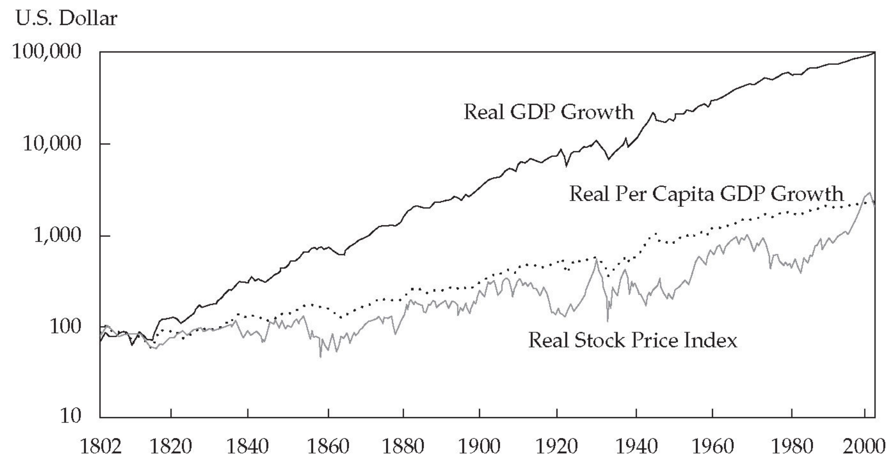
Figure 9 showed the results of using these simple models to estimate the real stock return, real bond yield, and equity risk premium (what might be called the "objective risk premium") year-by-year from 1810 to 2001. The risk premium rarely rose above 5 percent, only at the times of the Civil War, World War I, the Great Depression, and World War II. The premium is currently at or below zero.

During previous discussion of the Miller and Modigliani propositions, Arnott had commented that empirical evidence was not consistent with M&M. In this presentation, he showed the **Figure 11** plot of the payout ratio against subsequent 10-year earnings growth. Noting that M&M dealt with cross-sectional, not time-series, propositions and that he was showing time-series evidence, Arnott pointed out that high earnings retention (low payout) led *not* to higher earnings growth but to *lower* growth, a source of some concern.

Summary Implications

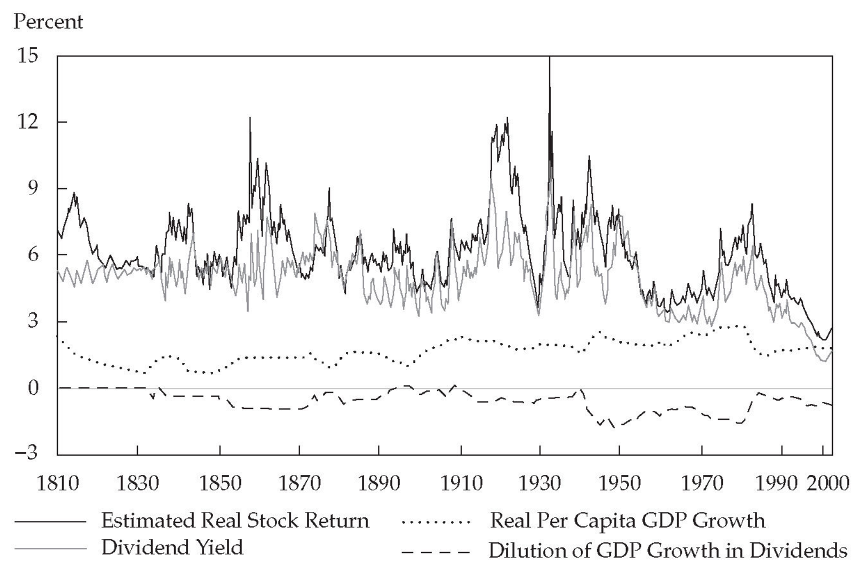
The implications of lower expected returns for policy allocation are as follows: In the past, the choice between stocks and fixed income was the essence of the policy asset-allocation decision. More stocks meant more risk and more return. For the future, with prospective stock and bond returns similar, policy allocation is no longer "king." If real earnings fall, as the empirical evidence on payout ratios suggests, or if valuation ratios "revert to the mean," then the situation is even worse.

Figure 4. The Link between Stock Prices and Economic Growth, 1802–2001



Source: Arnott and Bernstein (2002).

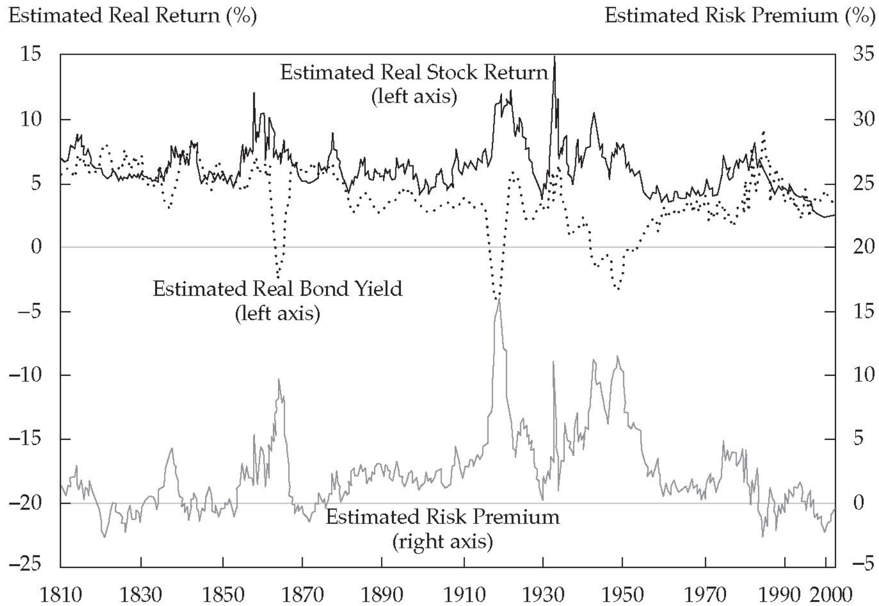
Figure 6. Estimating Real Stock Returns, 1810–2001



Notes: Based on rolling 40-year numbers. Real stock return = Dividend yield + Per capita GDP growth – Dividend/GDP dilution. The line "Dilution of GDP Growth in Dividends" indicates how much less rapidly dividends (and earnings) on existing enterprises can grow than the economy at large.

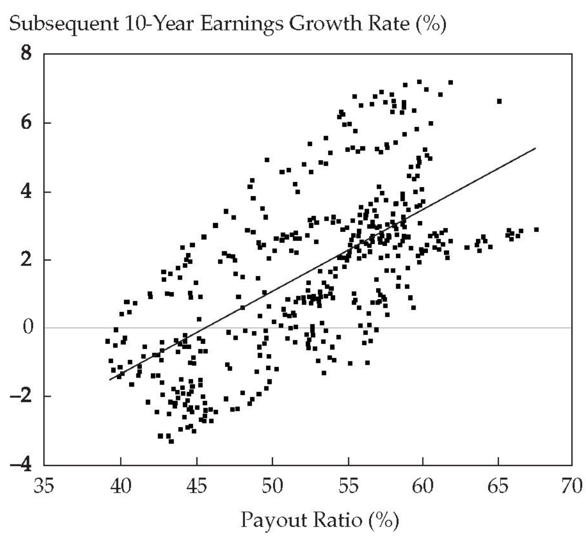
Source: Arnott and Bernstein (2002).

Figure 9. Estimating the Equity Risk Premium, 1810–2001



Source: Arnott and Bernstein (2002).

Figure 11. Payout Ratio and Subsequent 10-Year Earnings Growth, 1950–91



Implications for Asset Allocation, Portfolio Management, and Future Research II

Campbell Harvey

Duke University, Durham, North Carolina
National Bureau of Economic Research, Cambridge, Massachusetts

The reported survey of chief financial officers of U.S. corporations makes a unique contribution to the measurement of the expected equity risk premium and market volatility. Beginning with the second quarter of 2000, the research team has been conducting an ongoing, multiperiod survey of CFOs about their estimates of future equity risk premiums and equity market volatility. Results of the survey indicate the following: Return forecasts are positively influenced by past returns, which constitutes a type of "expectational momentum"; expected volatility is negatively related to past returns; the respondents seem to be very confident in their forecasts; and time horizon makes a big difference, in that a positive relationship was found between risk and expected return only for long-horizon forecasts.

After everything that has been said today, it is a challenge to make a unique contribution. We have heard how difficult it is to get a measure of expectations in terms of the equity risk premium, and what I am going to present is an approach to measuring expectations that is different from those that have been discussed.

For the past five years, John Graham and I, in conjunction with Financial Executives International, have been conducting a survey of chief financial officers of U.S. corporations about their estimates of future equity risk premiums and volatility.[1] Beginning in the second quarter of 2000 and, so far, extending into the third quarter of 2001, we have analyzed the more than 1,200 responses from the CFOs. Only 6 observations will appear in the graphs, but each observation is based on approximately 200 observations.

We know from other surveys that have been done that CFOs do actually think about the risk premium problem. We know that 75 percent of corporate financial executives—treasurers and CFOs—admit to using a CAPM-like or multifactor model. Therefore, we believe that the CFOs we are surveying are a reasonable sample of the population to question about the equity risk premium. I believe it is a sample group superior to that of economists surveyed—for example, by the Federal Reserve Bank of Philadelphia. The Philadelphia Fed's survey contains unreliable data (which I know from directly examining these data). I also think our survey has advantages over the survey of financial economists reported by Ivo Welch (2000) because our respondents are making real investment decisions. Finally, it is well known that the forecasts by financial analysts are biased. So, the survey we are conducting should provide some benefit in our search for *ex ante* risk premiums.

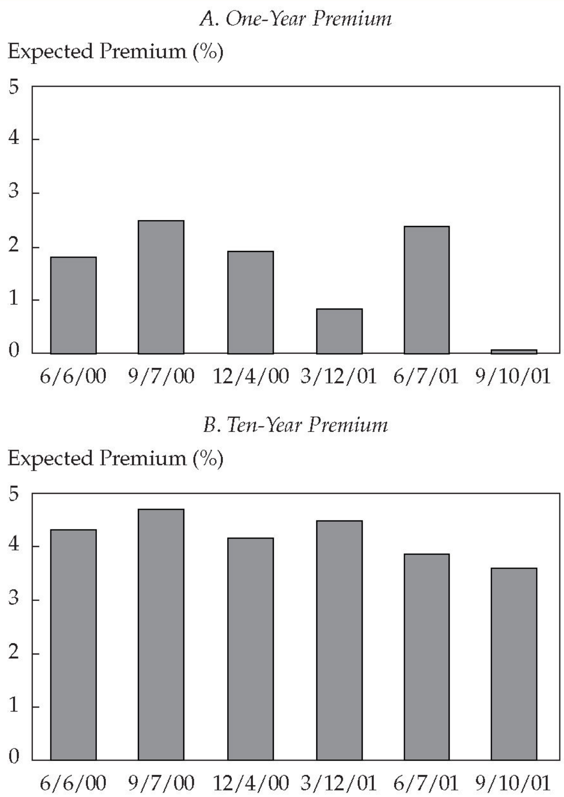
Survey of CFOs

Our survey has a number of components; it does not simply ask what the respondent thinks the risk premium is today. First, our survey is a multiperiod survey that shows us how the expectations of the risk premium change through time. Second, we ask about forecasts of the risk premium over different horizons. We have not talked much today about the effect of the investment horizon on the expected risk premium, but in our survey, we are asking about risk premium expectations for a 1-year horizon and a 10-year horizon. A third piece of information that we get in the survey is a measure of expected market volatility. Finally, we can recover from the responses a measure of the asymmetry or skewness in the distribution of the risk premium estimates.

[1]For a complete description of the study reported here, see Graham and Harvey (2001a).

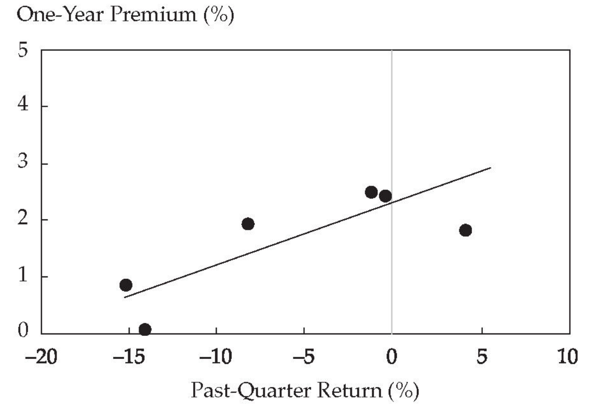
The first result I want to show you is striking. Panel A of **Figure 1** indicates that the CFOs' one-year *ex ante* risk premiums (framed in the survey as the excess return of stocks over U.S. T-bills) vary considerably over time. The last survey, finished on September 10, 2001, indicates the CFOs were forecasting at that time a one-year-ahead risk premium of, effectively, zero. The 10-year-horizon *ex ante* risk premium, given in Panel B, is interesting because it is higher than the 1-year-horizon forecast and is stable from survey to survey at about 4 percent (400 bps). Note that the September 10, 2001, forecast is 3.6 percent.

Figure 1. Survey Respondents' One-Year and Ten-Year Risk Premium Expectations



One of the first aspects we investigate is whether the CFOs' expectations about future returns are influenced by past returns. That is, if the market has performed poorly in the immediate past, does this performance lead to lower expected returns? **Figure 2** is a simple plot of the expected one-year equity risk premium against the previous quarter's return. (As we go through the analysis, please keep in mind that one can really be fooled by having so few observations. Indeed, this problem is exactly the reason we chose to present most of the results graphically. By eyeballing the data, you can see whether one observation is driving the relationship.) Figure 2 shows a fairly reliable positive relationship between past return and future near-term expected risk premium. Also, we found that you can pull out any of these observations and the fit is still similar. Apparently, a one-year-horizon forecast carries what Graham and I call "expectational momentum." Therefore, negative returns influence respondents to lower their forecast of the short-term future premium.

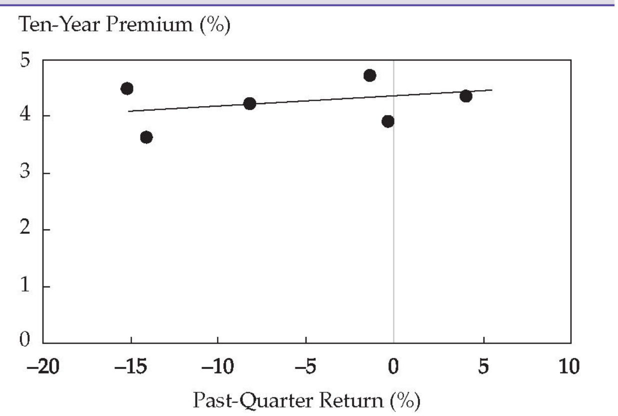
Figure 2. One-Year Risk Premium and Recent Returns



Notes: $y = 0.1096x + 2.3068$; $R^2 = 0.7141$.

Figure 3 plots the same variables for the 10-year horizon. There is a slight positive relationship between the past quarter's return and the *ex ante* 10-year-horizon risk premium, but it is not nearly as positive as the relationship observed for the 1-year horizon.

Figure 3. Ten-Year Risk Premium and Recent Returns

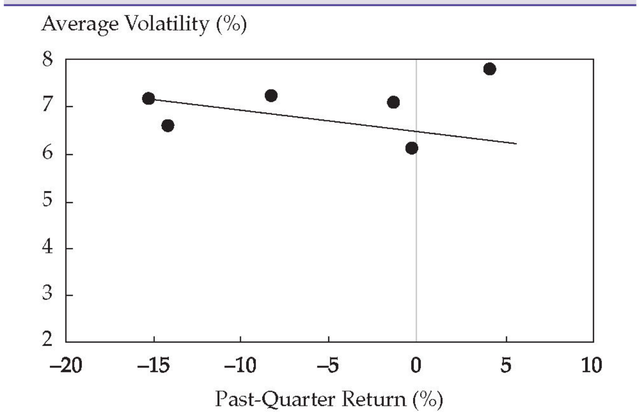


Notes: $y = 0.0179x + 4.3469$; $R^2 = 0.1529$.

We measured expected market volatility by deducing each respondent's probability distribution. We asked the respondents to provide a high and a low forecast by finishing two sentences: "During the next year, there is a 1-in-10 chance the S&P 500 return will be *higher* than ______ percent" and "During the next year, there is a 1-in-10 chance the S&P 500 return will be *lower* than _______ percent." The expected market volatility is a combination of the average of the individual expected volatilities (which I will refer to in the figures as "average volatility") plus the dispersion of the risk premium forecasts (referred to as "disagreement").[2]

Figure 4 shows that (annualized) average expected volatility for the one-year horizon is weakly negatively related to the past quarter's return. In fact, if one observation were pulled out, we might find no relationship whatsoever. And **Figure 5** shows the (annualized) disagreement component—basically, the standard deviation of the risk premium forecast—for the one-year horizon. The disagreement component for the one-year horizon is strongly related to the past quarter's return. A bad past return suggests a higher disagreement volatility. Even with so few data points, this relationship appears to be strong.

Figure 4. Average (One-Year-Horizon) Volatility and Recent Returns



Notes: $y = -0.0452x + 6.4722$; $R^2 = 0.1282$.

One thing to keep in mind is that these points on Figures 4 and 5 are annualized. When you examine the individual volatilities, you find that these respondents are extremely confident in their assessments. The result is a 6–7 percent annualized volatility in

[2] Market volatility was measured as

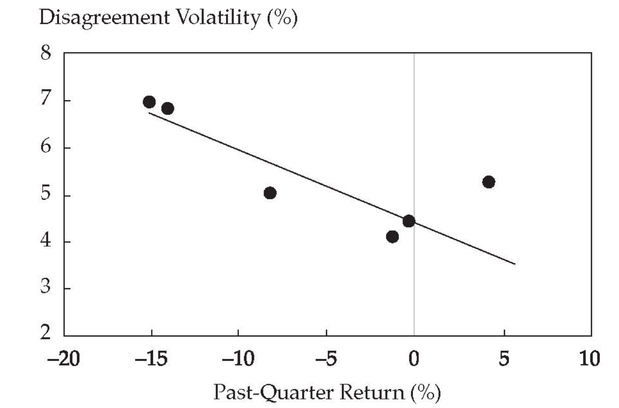
$$\text{var}[r] = E[\text{var}(r|Z)] + \text{var}[E(r|Z)],$$

where r is the market return, Z is the information that the CFOs are using to form their forecasts, $[E(r|Z)]$ is the expected risk premium conditional on the CFO's information, $E[\text{var}(r|Z)]$ is the average of each CFO's individual volatility estimate, and $\text{var}[E(r|Z)]$ is disagreement volatility or the variance of the CFOs' forecasts of the premium. Individual volatilities were measured as

$$\text{var} = \left[\frac{x(0.90) - x(0.10)}{2.65}\right]^2,$$

where $x(0.90)$ is the "one in ten chance that the return will be higher than" and $x(0.10)$ is the "one in ten chance that the return will be lower than." The equation for individual volatilities is from Davidson and Cooper (1976).

Figure 5. Disagreement (One-Year Horizon) Volatility and Recent Returns



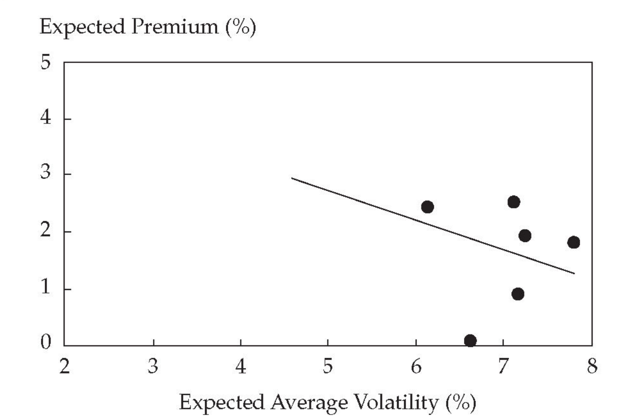
Notes: $y = -0.153x + 4.3658$; $R^2 = 0.7298$.

the one-year-horizon *ex ante* risk premium. This volatility is much smaller than typical market estimates, such as the Chicago Board Options Exchange VIX (Volatility Index) number on the S&P 100 option, which averages around 20 percent.

We also found that our measure of asymmetry is positively related to the past quarter's return. Given that we get the tails of the distribution, we can look at the mass above and below the mean and compare them, which gives us an *ex ante* measure of skewness. If past returns are negative, we find more negative *ex ante* skewness in the data.

Instead of looking at the relationship of the forecasted risk premium to past return, **Figure 6** relates the forecasted (*ex ante*) risk premium to expected (*ex ante*) volatility. Many papers in academic finance have examined the relationship between expected risk and expected reward. Intuitively, one would expect the

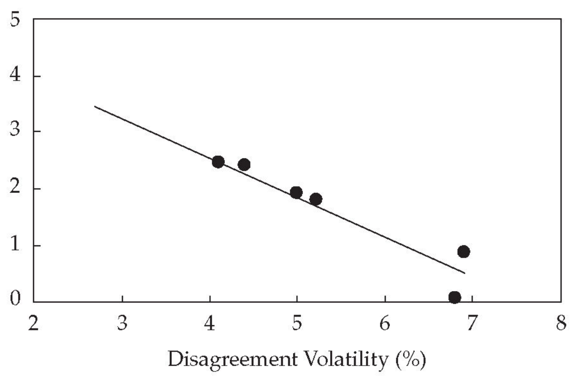
Figure 6. Expected Average Volatility and Expected Risk Premium: One-Year Horizon



Notes: $y = -0.5178x + 5.2945$; $R^2 = 0.2538$.

relationship to be positive, but the literature is actually split. Indeed, many papers have documented a negative relationship, which is basically what we see for the one-year-horizon predictions. In Figure 6, the *ex ante* premium and the *ex ante* average volatility appear to be weakly negatively related. **Figure 7** plots the one-year-horizon expected risk premium against disagreement about the expected premium. The result is a strongly negative relationship: The higher the disagreement, the lower the expected premium over one year. Again, almost any observation could be pulled out without changing the degree of fit.

Figure 7. Disagreement Volatility and Expected Risk Premium: One-Year Horizon

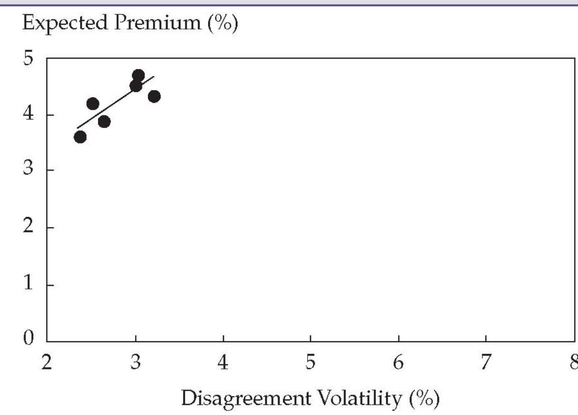


Notes: $y = -0.6977x + 5.3410$; $R^2 = 0.9283$.

Using the same variables as in Figure 7 and keeping the scale the same, **Figure 8** shows the data for the 10-year horizon. The fit is again strikingly good, but the relationship is positive. Notice that the disagreement is much smaller for the 10-year horizon than for the 1-year horizon. This positive relationship between the *ex ante* premium and *ex ante* volatility is suggested by basic asset-pricing theory.

The latest survey documented in Figures 2–8 is June 1, 2001, plus data returned to us by September 10, 2001. We just happened to fax our most recent quarterly survey to the survey participants at 8:00 a.m. on the morning of September 10. I did not include observations from the surveys returned on September 11 because the survey might have been completed on either September 10 or 11, and classification of the responses as pre- or post-September 11 was not possible. The response data we received on September 12 or later we maintained and analyzed separately. **Table 1** provides a comparison of pre- and post-September 11 data for the 1- and 10-year horizons. Although the size of the sample is small (33 observations), one can see the impact of September

Figure 8. Disagreement Volatility and Expected Risk Premium: Ten-Year Horizon



Notes: $y = 0.9949x + 1.4616$; $R^2 = 0.6679$.

11. The 1-year-horizon mean forecasted premium decreases after September 11, but volatility—both disagreement and average—increases. For the 10-year horizon, the mean forecasted premium and disagreement volatility increase. I'll be the first to admit that these results are not statistically significant, but the data tell an interesting story. After September 11, perceived risk increases—which is no surprise. In the short term, participants believe that market returns will be lower. In the long term, however, premiums increase to compensate for this additional risk.

Table 1. Impact of September 11, 2001: Equity Risk Premium and Volatility

Measure	Before	After
Observations	127	33
1-year premium		
Mean premium	0.05 %	–0.70 %
Average volatility	6.79	9.76
Disagreement volatility	6.61	7.86
10-year premium		
Mean premium	3.63 %	4.82 %
Disagreement volatility	2.36	3.03

Implications of Results

So, what have we learned from this exercise? First, expectations are affected, at least in the short term, by what has happened in the recent past—an expectational momentum effect. Second, these new expectational data appear to validate the so-called leverage effect—that negative returns increase expected volatility. Third, the individual volatilities (at 6–7 percent) seem very low, given what we would have expected. And fourth, there is apparently a positive relationship between risk and expected return (or the risk premium) only at longer horizons. So, the horizon is critical.

How should we interpret these results, what are the outstanding issues, and where do we go from here? The CFOs in the survey are probably not using their one-year expected risk premiums for one-year project evaluations. What CFOs think is going to happen in the market is different from what they use as the hurdle rate for an investment. I do think that the 10-year-horizon risk premium estimates we are getting from them are close to what they are using. An interesting paper being circulating by Ravi Jagannathan and Iwan Meier (2001) makes some of these same arguments—that higher hurdle rates are probably being used for a number of reasons: the scarcity of management time, the desire to wait for the best projects, and financial flexibility. Corporate managers want to wait for the best project, and with limited management time, a hurdle rate that is higher than what would be implied by a simple asset-pricing model allows that time.

Another angle is that the premium *should* be high in times of recession. Indeed, a lot of research documents apparently countercyclical behavior in the premium. Such behavior implies that today's one-year-horizon investment should have a high hurdle rate.

Further Research

We hope our research sheds some light on the measure of expectations. I believe in asset-pricing models based on fundamentals, but it is also enlightening to observe a direct measure of expectations. Our data may not be the true expectations, but they supply additional information about the *ex ante* risk premium in terms of investment horizon, expected volatility, and asymmetry.

Our next step is to conduct interviews in the first week of December 2001 with a number of the CFOs participating in the multiperiod survey. We have already carried out a few preliminary interviews, and we find it extraordinary how much thought CFOs have given to these issues. The main question we want to ask in December is the reason (or reasons) for the difference between their risk premium forecasts for a one-year horizon and the actual internal hurdle rates they use to evaluate one-year-horizon projects. How do CFOs use the *ex ante* risk premium in terms of making real allocation decisions? I will keep you updated on the progress of our research project.

Implications for Asset Allocation, Portfolio Management, and Future Research II

Campbell Harvey
Duke University, Durham, North Carolina
National Bureau of Economic Research, Cambridge, Massachusetts

SUMMARY

by Peter Williamson
Amos Tuck School of Business Administration
Dartmouth College, Hanover, New Hampshire

The presentation made by Campbell Harvey was unique, in that it was based essentially on surveys of investor expected risk premiums. What he had heard from the previous speakers was how difficult it is to get a measure of investor expectations.

Harvey's surveys, over time, of chief financial officers offered what he considered to be a less biased sample than the surveys that have been made of economists or financial analysts. CFOs are known to be concerned about a measure of their cost of capital for investment planning purposes and have no reason to favor high or low forecasts. He stated that, although he does not see the survey results as a replacement for the kind of analyses presented by previous speakers, he does believe that the surveys add valuable information.

The survey questions and responses were for 1-year and 10-year time horizons, which provided an opportunity to compare short-term with long-term expectations. The surveys elicited information not only on the expected premiums but also on the probability distributions of the respondents' forecasts. Harvey considered two components of expected market volatility: the average of the individual expected volatilities (from each individual's probability distribution) and the disagreement over the risk premium forecasts (the standard deviation of the risk premium forecasts).

Figure 1 shows the results of six surveys asking for a 1-year risk premium estimate and a 10-year estimate. The 10-year forecasts show little variation, whereas the 1-year forecasts vary widely through time. The 10-year forecasts are also consistently higher than the 1-year forecasts.

Figure 1. Survey Respondents' One-Year and Ten-Year Risk Premium Expectations

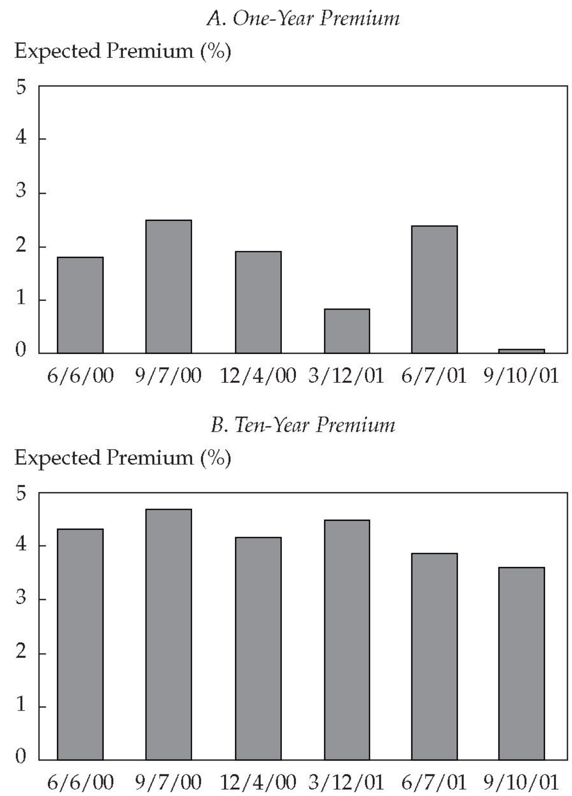
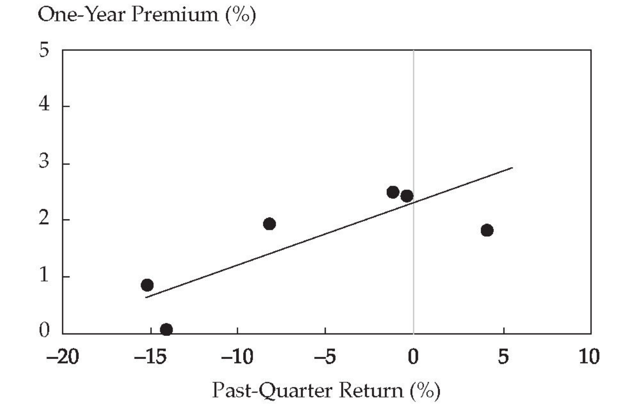


Figure 2 shows the influence of past returns on forecasts of 1-year premiums, and **Figure 3** does the same for 10-year premiums. Past returns had a positive impact on 1-year forecasts and a very slight positive effect on 10-year forecasts. Past returns also had a weak negative effect on expected 1-year average volatility and a strong negative effect on disagreement. They had a strong positive effect on expected skewness. Negative returns led to more negative skewness in the forecasts.

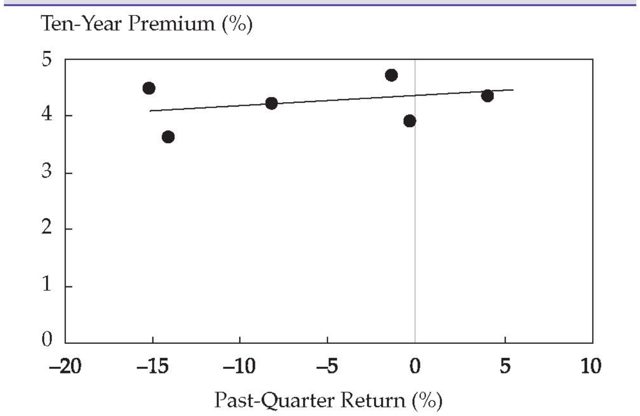
Turning to the effect of expected rather than past returns, Harvey showed in **Figure 6** that the average

Figure 2. One-Year Risk Premium and Recent Returns



Notes: $y = 0.1096x + 2.3068$; $R^2 = 0.7141$.

Figure 3. Ten-Year Risk Premium and Recent Returns

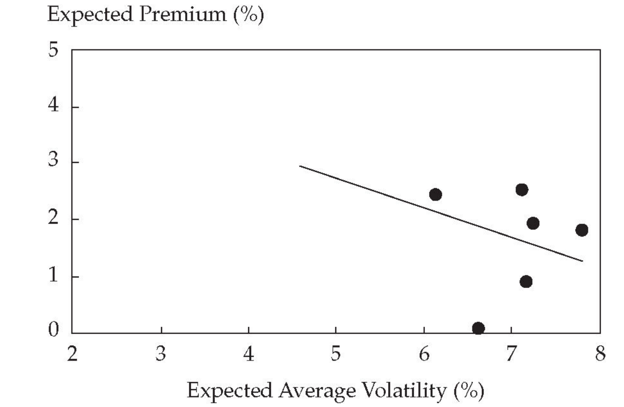


Notes: $y = 0.0179x + 4.3469$; $R^2 = 0.1529$.

of individual volatilities is weakly *negatively* related to expected 1-year returns.[1] One-year expected returns were found to be strongly negatively related to disagreement volatility, as shown in **Figure 7**. This finding may seem counter to the usual risk–expected return theories, but the finding is for very short term forecasts. For the 10-year horizon shown in **Figure 8**, however, expected returns are strongly *positively* related to disagreement—which is consistent with the way we usually think about risk and expected reward.

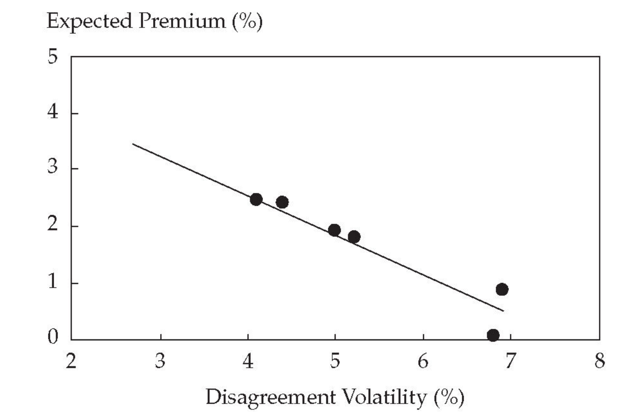
Harvey reported the impact of the events of September 11, 2001, in **Table 1**. After the crisis, the CFOs revised expected returns for the 1-year forecasts downward. For both the 1-year and the 10-year forecasts, expected volatility increased after the crisis.

Figure 6. Expected Average Volatility and Expected Risk Premium: One-Year Horizon



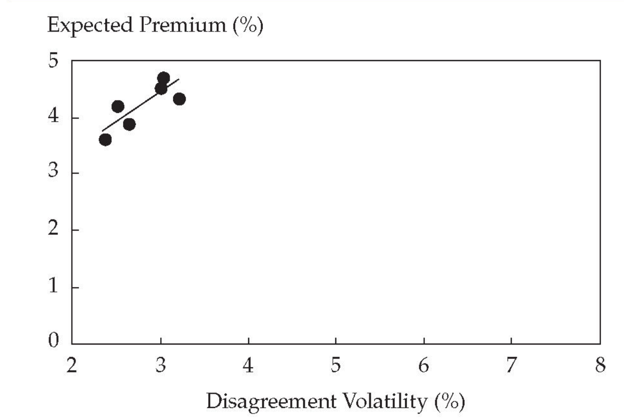
Notes: $y = -0.5178x + 5.2945$; $R^2 = 0.2538$.

Figure 7. Disagreement Volatility and Expected Risk Premium: One-Year Horizon



Notes: $y = -0.6977x + 5.3410$; $R^2 = 0.9283$.

Figure 8. Disagreement Volatility and Expected Risk Premium: Ten-Year Horizon



Notes: $y = 0.9949x + 1.4616$; $R^2 = 0.6679$.

[1] Table and figure numbers in each Summary correspond to the table and figure numbers in the full presentation.

Table 1. Impact of September 11, 2001: Equity Risk Premium and Volatility

Measure	Before	After
Observations	127	33
1-year premium		
Mean premium	0.05%	–0.70%
Average volatility	6.79	9.76
Disagreement volatility	6.61	7.86
10-year premium		
Mean premium	3.63%	4.82%
Disagreement volatility	2.36	3.03

Summarizing, Harvey presented the following conclusions:

- Survey measures of expectations provide useful alternatives to statistical measurements.
- Return forecasts are positively influenced by past returns—what John Graham and Harvey (2001a) call "expectational momentum."
- Expected volatility is negatively related to past returns.
- Individual volatilities seem very low; the respondents seem very confident in their forecasts.
- Time horizon makes a big difference. There is a positive relationship between risk and expected return but only for long-horizon forecasts.

In closing, Harvey expressed doubt that the CFOs were actually using their 1-year forecasts for hurdle rates in 1-year project evaluations. He suggested that there is a difference between what CFOs believe will happen to the market next year and the rate of return they would accept for a new project. The 10-year forecasts are probably closer to what the CFOs are using for the cost of capital.

Implications for Asset Allocation, Portfolio Management, and Future Research: Discussion

Roger Ibbotson (*Moderator*)
Robert Arnott
John Campbell
Bradford Cornell
William Goetzmann
Campbell Harvey
Martin Leibowitz
Thomas Philips
William Reichenstein, CFA

ROGER IBBOTSON (Moderator)

I was particularly pleased to see Campbell Harvey's paper because we have seen surveys of financial analysts, individuals, and economists (such as Welch's 2000 survey of financial economists), but the Graham and Harvey (2001a, 2001b) survey breaks new ground by surveying a particularly astute group. The results of their survey bring fresh information to the table. The survey was also well designed, which gives us confidence in the data.

I think each of us understands that we are concerned with equity risk premiums looking forward, but the distance we are looking ahead, our horizons, may differ. And today we have had both discussions—looking short term and looking out long term. The differences between the short-run and the long-run risk premium were certainly brought out by Rajnish Mehra [in the "Current Estimates and Prospects for Change" session] and are highlighted in the Graham and Harvey work.

I would like to present a few ideas from a paper that Peng Chen and I wrote (Ibbotson and Chen 2002) that uses much of the same data that Rob Arnott used but interprets the data almost completely differently. One of the reasons for the lack of overlap in interpretations is that Rob's primary focus is a short-run prediction of the market.

Figure 1 is yet another P/E chart—this one based on the Wilson and Jones (forthcoming 2002) data because their earnings data match the S&P 500 Index earnings data. The S&P 500 had very low, not negative but very low, earnings in the 1930s, and the actual maximum P/E is off the chart for that period. Figure 1 begins with a P/E, calculated as price divided by prior-year earnings, of 10.22 in 1926 and ends with a P/E of 25.96 at year-end 2000 (the October 2001 P/E, excluding extraordinary earnings, is 21); that growth from about 10 to the most recent P/E is an important consideration in the forecast I will discuss.

The forecast that Peng and I are making is based on the real drivers of P/E growth. We focus on the contribution of earnings to P/E growth and on GDP. **Table 1** shows the historical average nominal return for stocks over the 75-year period of 1926 through 2000 to be 10.70 percent. We can break that nominal stock return into its contributing components: about 3 percentage points (pps) inflation, and so forth. The P/E growth rate from a multiple of about 10 in 1926 to a multiple of almost 26 in 2000 amounts to 1.25 percent a year. When we make our forecasts, we remove that historical growth rate because that P/E jump from 10 to 26, in our opinion, will not be repeated. The "Earnings Forecast" column in Table 1 shows what history was without the P/E growth rate; that is, the forecasted return is 1.25 pps less than the historical return.

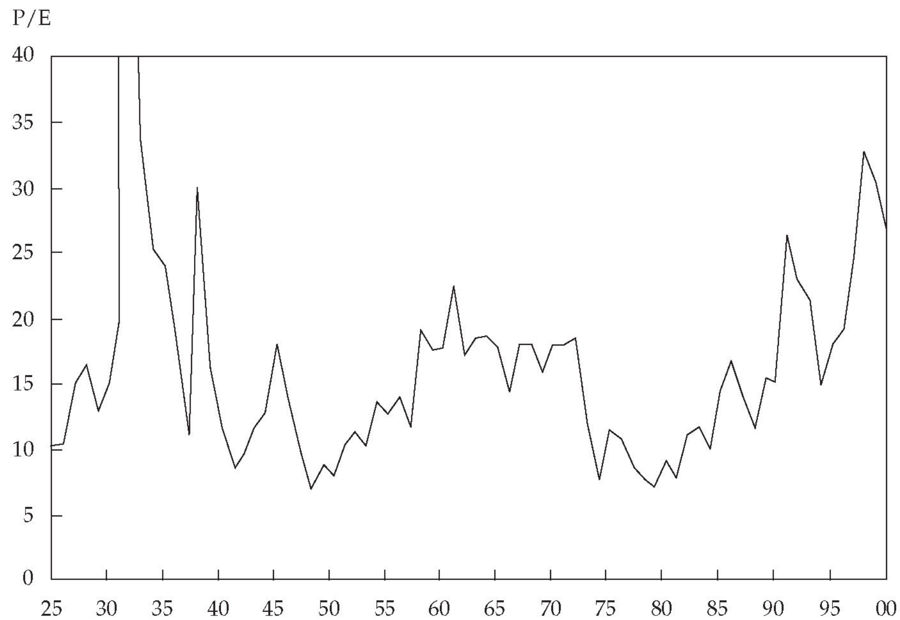
Table 1. Historical and Forecasted Components of Stock Returns, 1926–2000

Component	Historical[a]	Earnings Forecast
Income	4.28 pps	4.28 pps
P/E growth	1.25	—
Earnings growth	1.75	1.75
Inflation	3.08	3.08

[a]Total historical return for the period is 10.70 percent; data do not sum to that total because of the geometrical mathematics used.

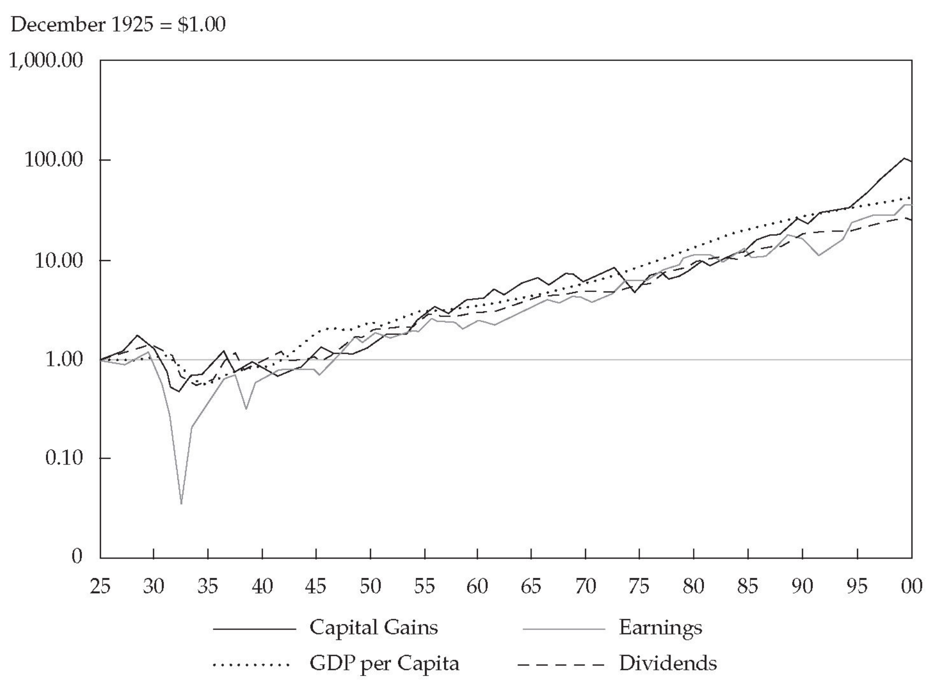
Figure 2 provides the historical growth of per capita GDP and of earnings, dividends, and capital gains on a per share, not aggregated, basis. All are indexed to $1 at the end of 1925. The capital gains grow to about $90 at the end of 2000—the most growth of any of the measures shown. Earnings are less because of the increase in the P/E multiple. The $90 is the $36 multiplied by 2.5, which was the P/E

Figure 1. The P/E, December 1925–December 2000



Note: The P/E for December 1932 was 136.5.

Figure 2. Historical Growth of per Capita GDP and of per Share Earnings, Dividends, and Capital Gains, December 1925–December 2000



Note: At end date, capital gains were $90.50, GDP per capita was $44.10, earnings were $35.60, and dividends were $24.20.

change from 10 to 26. The line for GDP per capita shows that the economy (on a per capita basis) has outgrown earnings by a small amount over the entire period. And finally, the growth in dividends trails the pack. So, I very much agree with the comment that Bill Reichenstein made earlier today that dividends are not a good forecasting tool; they grow the most slowly and even distort the picture for earnings growth [see "Current Estimates and Prospects for Change: Discussion"].

I am struck by how tied together each data series is—how the stock market is related to the economy, which is related to earnings, which are related to dividends. Although the link between earnings and dividends is a little less close than the other links, it is still there. One of the reasons Peng and I wanted to carry out this type of analysis is that the economy *should* be reflected in the stock market. And in fact, the separation in their behaviors is solely the result of the changing P/E, which we have thus removed from our forecasts. The P/E rose from 1926 to 2000 for a reason, but that reason will not continually recur in perpetuity. For that annual growth rate in the P/E multiple of 1.25 percent a year to continue, to assume that it will replicate, would mean that in another 75 years, the P/E will have grown to 62.

Figure 3 shows why dividends are not a good tool for forecasting the future. Dividend yields started the period at 5.15 percent and averaged 4.28 percent over the past 75 years; if you include the data for the 19th century, the historical average dividend yield is much higher. Every time we found a dividend for the 19th century, it seemed to be 100 percent. The dividend yield has now dropped to 1.10 percent (the most recent year would push it up somewhat). Thus, a long-run secular decline has occurred in the dividend yield, which was largely caused by the decreasing payout ratio. As **Figure 4** shows, the payout ratio, which began the period at 46.68 percent and averaged almost 60 percent over the 1926–2000 period, is now 31.78 percent.

Several reasons could explain the trend toward lower payout ratios. We interpret the trend as an issue of trust and changing attitudes about trust. As investors place more trust in the companies in which they invest and in the financial market system, shareholders no longer require that the companies pay all of their earnings to the shareholders; the discipline that dividends were designed to impose on corporations is gradually falling by the wayside. Another possible reason for the trend toward lower payout ratios is that, of course, dividends and capital gains (the fruit of reinvested corporate earnings) are taxed differently—providing an incentive for shareholders to relax their desire for company earnings to be paid out as dividends. Moreover, today, earnings can be taken out in many forms, such as share repurchases, buyouts in a merger or acquisition, or investment in internal projects of a company. I predict that these myriad forms of paying out earnings will remain. A

Figure 3. Dividend Yield, December 1925–December 2000

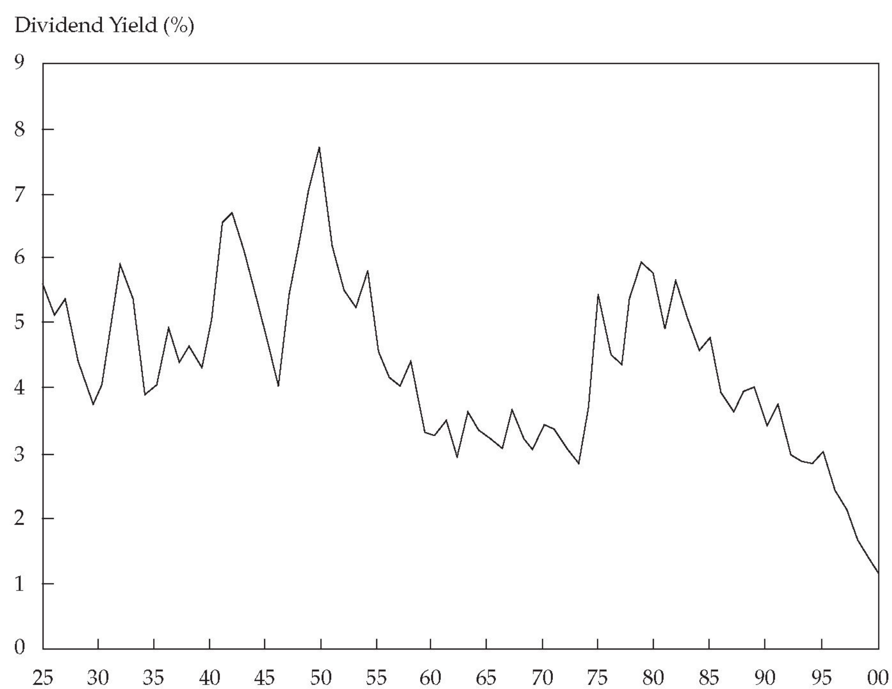
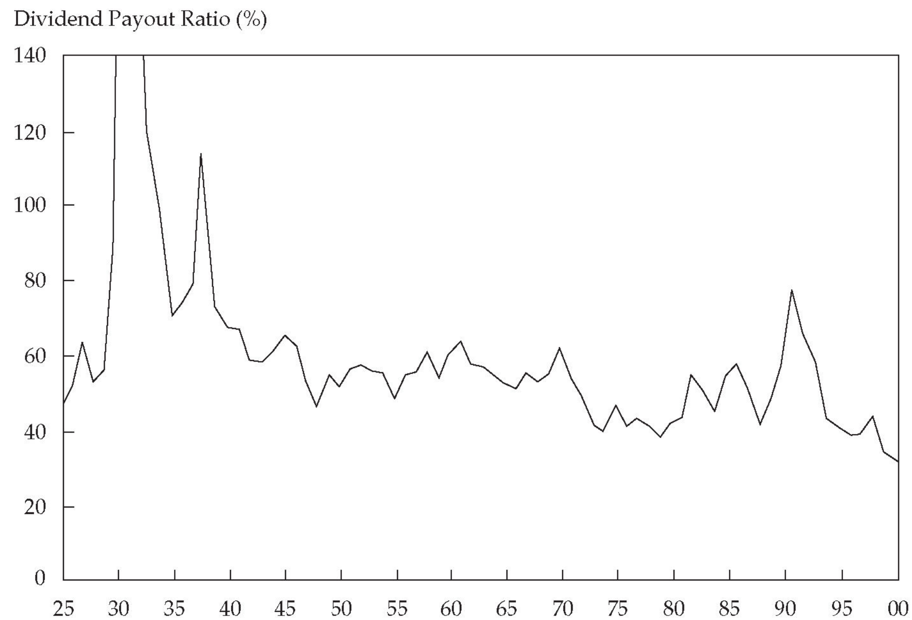


Figure 4. Dividend Payout Ratio, December 1925–December 2000



Note: The payout ratio as of December 1931 was 190.52 percent; as of December 1932, it was 929.12 percent.

larger and larger portion of companies in the market are not paying earnings out in the form of dividends. For example, the technology companies do not pay out any of their earnings as dividends. Thus, the payout ratio is not stable, and we may see it continue to fall.

A contender in the race to be a reliable forecasting tool (one that a number of people have already discussed today) is the dividend yield model in one of its many forms. If you could accept the dividend yield model by itself and with its purest assumptions—that is, the dividend yield plus dividend growth, assuming constant growth—the model would be a forecast of the stock market. But there are three problems with the pure dividend yield model that we must make adjustments for if the model is to be useful for forecasting. The first two problems are potential violations of Modigliani and Miller theory.

I am assuming that M&M holds true. (Despite what some of you have said about how dividend payouts do not seem to be reinvested in anything at all, I am clearly on the other side of that argument. If there is any truth to that supposition, however, that theory needs further investigation.) So, the first problem with some forms of the dividend yield model is that they violate M&M because they assume you can add the current dividend yield (which is now 1.10 percent) to historical dividend growth. Historical dividend growth underestimates historical earnings growth, however, because of the decrease in the payout ratio. Dividends have run slowest in the growth race because the payout ratio has continually dropped.

The second problem with using the dividend yield model as a forecasting tool (and it is, again, a violation of M&M) is that if the low payout ratios of today (31.8 percent) were reflected in the historical series, the percentage of earnings retained would have been higher and, therefore, historical earnings would have grown faster than observed. In short, the first problem is that dividend growth has been too slow historically, and the second problem is that with further earnings retention, historical earnings growth would have been potentially faster than observed.

The third problem with the dividend yield approach is the high P/E multiple observed today—over 25. Unlike some of you, I am going to assume efficient markets, which in this case I take to mean that the current high P/E implies higher-than-average future EPS growth.

My estimate of the average geometric equity risk premium is about 4 percent relative to the long-term bond yield. It is, however, 1.25 percent lower than the pure sample geometric mean from the risk premium of the Ibbotson and Sinquefield study (Ibbotson Associates 2001).

We have had some debate today on future growth rates—specifically for the 10-year horizon. Data that Peng and I are studying provide some support for the tie between high P/Es and high future growth. One of the problems with the 10-year horizon is that 10 years is not really long enough to encompass many independent events.

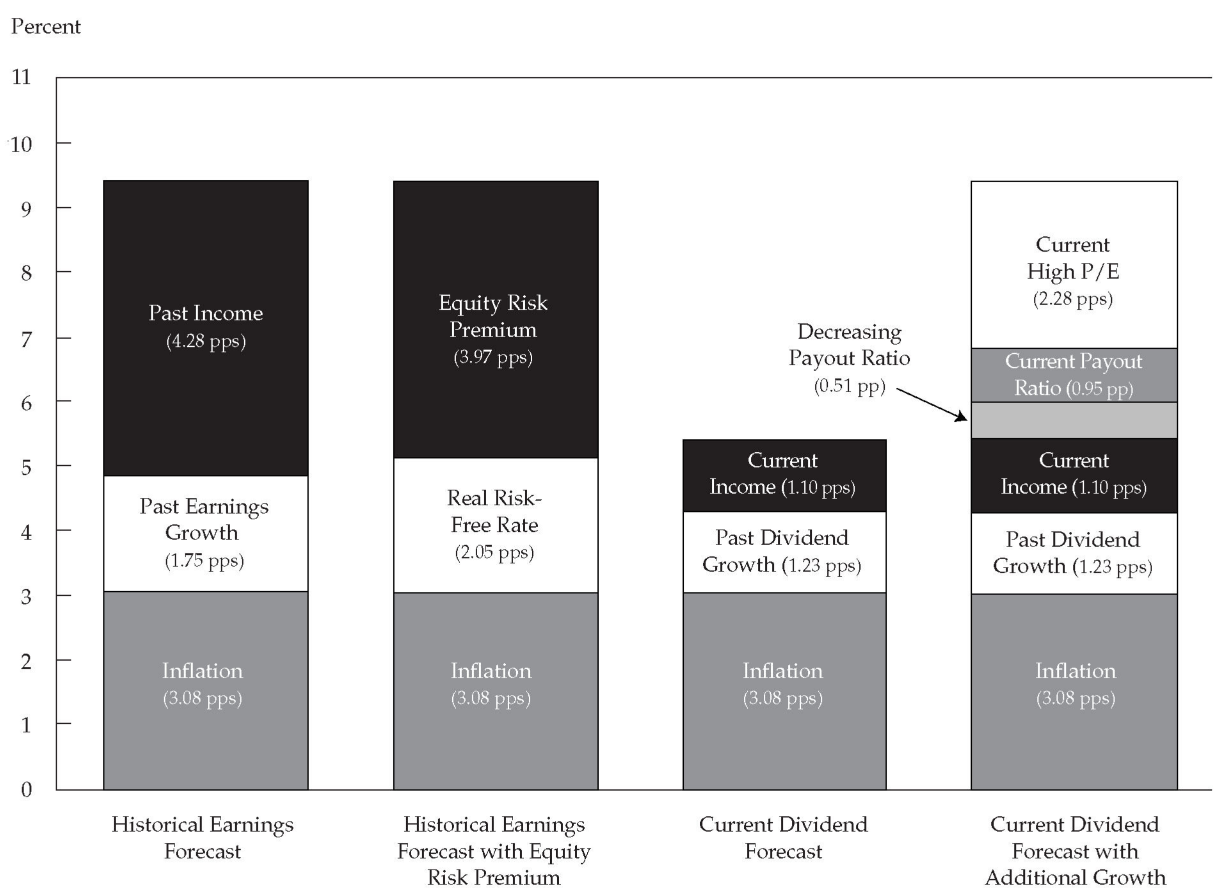
The extreme end of the spectrum of proponents of the dividend yield model would support using past dividend growth to forecast future dividend growth, then add current income. (Of course, that method almost wipes out the risk premium, and in some ways, it is actually similar to what Rob Arnott presented.)

In our response, we make three adjustments to the dividend yield model shown in the third column ("Current Dividend Forecast") of **Figure 5**. These are shown in the fourth column ("Current Dividend Forecast with Additional Growth"). We add 0.51 pp so that historical dividend growth matches historical earnings growth, we add an additional 0.95 pp because of the extra retention associated with the current record low payout rate, and finally we add 2.28 pps to future earnings growth to reflect the current high P/E that we assume forecasts higher earnings growth.

What about long-term earnings growth? Corporate America is likely to proceed in the next quarter century as it did in the previous 75 years. Corporate cash will be used for projects, investments, share repurchases, and acquisitions, but less and less will it be used for dividend payouts. Future earnings growth will be higher than past growth because of lower dividend payouts and the high current P/E. For the next 25 years, I predict (1) stocks will outperform bonds, (2) increased earnings growth will offset future low dividend yields, (3) the P/E jump from 10 to 26 will not repeat, and (4) the stock market return will provide more than 9 percent a year over the 25-year period.

JOHN CAMPBELL: When you make the adjustments, aren't you assuming not only efficient markets but also a constant discount rate? If so, you are assuming the answer. We are trying to find out what the discount rate is, but you assume the discount rate in your calculation. If so, aren't you bound to come up with an answer for the end that is the same as historical norms going in?

Figure 5. Historical versus Forecasts Based on Earnings and Dividend Models



IBBOTSON: True. In addition to assuming an efficient market (M&M), we are not assuming that the discount rate is dynamic. We are assuming it to be unknown, and we are searching for the single discount rate that best describes history. The presumption is that history can be extrapolated forward. It could be considered a reconciliation between the two approaches. Certainly, our quest is debatable.

BRADFORD CORNELL: I have some questions for Campbell Harvey. Are CFOs really not using their one-year-horizon market forecasts in evaluating their internal investments? Maybe the one-year market forecast they provide you is just a throw-away number; they are so uncertain about it that they do not incorporate it into any decision they make. If they really believe that the equity risk premium is zero today, shouldn't they be issuing stock?

CAMPBELL HARVEY: I think this survey gives us respondents' guesses of what is going to happen in the market; it does not necessarily map into what they are going to do in terms of their real project evaluations at a one-year horizon. In a recent working paper by Jagannathan and Meier (2001), which is based on some older work by McDonald and Siegal (1986), they say people tend to have higher hurdle rates than what the capital asset pricing model (CAPM) would suggest. CFOs are looking for the best projects, internal investments that throw off the best return, and there is no way they are going to accept a project with a rate of return equal to the T-bill rate—even if they expect next year's market return to be basically the same as the T-bill's return. So, what the data suggest to me is that there is a big difference between the short-horizon expectation of return and the hurdle rate one would actually use in terms of project evaluation. Of course, I want to go deeper into this problem by asking the survey participants for more details.

ROBERT ARNOTT: One would assume that to arrive at the estimated required return of any new commitment, a "credibility" hurdle rate is added on top of the cost-of-capital hurdle rate. Those cost-of-capital hurdle rates are always optimistic, so the credibility rate is added and is part of where the reported hurdle rate in the responses comes from.

MARTIN LEIBOWITZ: Just one clarification: How did your 10-year risk premium, 4.5 percent, relate to the hurdle rate? Do you have any evidence of what that longer-term hurdle rate is?

HARVEY: For the 10-year horizon, the risk premium reported is closer to the hurdle rate for internal projects than for the 1-year horizon. We don't have much information about the longer-term hurdle rate, but the next phase of my research with John Graham will be interviewing the CFO participants to shed additional light on these issues.

WILLIAM GOETZMANN: I was very excited to see Campbell Harvey's paper—to see more interesting data about dispersion of opinion. I know that in one of your earlier papers—the one on the market-timing ability of investment newsletter writers (Graham and Harvey 1996)—you unexpectedly found dispersion of opinion that had some forecasting ability. Cragg and Malkiel (1982) also found some dispersion in analysts' forecasts in relation to risk. Also, Massimo Massa and I have been finding some information about dispersion related to price effects and so forth (Goetzmann and Massa 2001). What particularly strikes me in looking at your results is the consistent message that this dispersion of opinion is having interesting effects that we ought to explore. If you are going to be talking to these CFOs, it would be great to find out more about the basis for the dispersion. It is an interesting potential area of research.

HARVEY: We have a lot of data on earnings forecasts, but I am more interested in the dispersion than the actual forecasts. An older paper by Frankel and Froot (1990) looked at dispersion of beliefs in terms of currency forecasting. It is very impressive. So, I agree that this area is worthy of more research.

THOMAS PHILIPS: I want to address the question about forecasts versus hurdle rates by describing an experience that I had. When I talk to our corporate clients, I often ask if they need help estimating their cost of capital (which, of course, is the same as the expected return) and I ask how they do it currently. Some tell me that they use the CAPM, while others say they use a more complicated factor model. But one answer stands out for its simplicity and its brilliance. At National Service Industries, an executive told me that his cost of capital was 10 percent. I asked him how he knew that it was 10 percent. He replied that he did not *know* that it was 10 percent. So, I queried further: "Why, then, do you assert that it is 10 percent?" He replied, "In my world, the cost of capital is not very important in terms of making new investment decisions. We have a hurdle rate to make that type of decision. The cost of capital is important to us because the lines of business that we are in are not fabulously profitable, and the simplest mistake we can make is to squander the capital we have invested in them. The one thing I want to do is to have every employee understand that capital is a real input and that it is incredibly easy to squander. When I use 10 percent as the cost of capital, everyone from the janitor to the CEO can apply it. They can move a decimal point; they can divide by 10. So, I can explain to them in simple terms that $1 million worth of equipment sitting idle represents $100,000 of real money going down the tubes every year. And that ability is much more important to me and to the company than having the right answer." Theoretically, he has the wrong answer, but in spite of that, his answer and approach are absolutely brilliant.

The other comment that I want to make is an observation on the difference in earnings growth rates. Roger Ibbotson is showing it growing close to per capita GDP.

ARNOTT: No, he has it growing faster than GDP.

PHILIPS: Roughly the same rate.

IBBOTSON: Historically, it is the same.

ARNOTT: But now the payout ratio is lower, so earnings would have to grow faster. Earnings growth is going to gain on GDP on a per share basis, not necessarily on an aggregate basis as Bradford Cornell was talking about.

WILLIAM REICHENSTEIN: Going back to what Rob Arnott said about taking another look at tactical asset allocation. Let's say that over the next 10 years, stocks, bonds, and cash will all produce a 10 percent rate of return. It seems to me the 10-year return should not make any difference; the asset-allocation decision is relatively insignificant at that point.

ARNOTT: Correct, the policy asset allocation decision is insignificant. For rebalancing to add value, for tactical asset allocation to add value, the absolutely crucial premise is that reversion to the mean will occur in at least a weak form.

REICHENSTEIN: That is when you pick up your alpha?

ARNOTT: Right. The presumption is based on a long-term historical record for live TAA experience. Even when it did not add value (in the 1990s), it did produce alpha. If there were not some weak reversion to the mean at work in the 1990s, it would not have produced an alpha.

LEIBOWITZ: Why do you say policy allocation is invariant? Even if you have zero difference in returns, you still have volatility.

ARNOTT: I am assuming geometric, not arithmetic, returns. If we assume arithmetic returns are the same, then the volatility differences carry a cost. If we assume the geometric returns are the same, then the return-maximizing portfolio is the risk-minimizing portfolio, which would probably have an allocation of only 10–20 percent equities. But the difference in returns would be tiny, so whether the allocation was 20/80 or 80/20 would not make much difference in the return.

LEIBOWITZ: But you would not have much in equities?

ARNOTT: This message is not welcomed with open arms by investors or investment practitioners. It has not been good for First Quadrant's business for me to publish this sort of stuff. Some consultants are annoyed because we are saying, basically, that the assumptions they are endorsing are wrong. Clients don't want to hear it because we've been correct for the last year and a half, and the losses hurt. When we first proposed the idea, it was viewed as slightly flaky, but since then, it's been on target—which has made some people even angrier.

GOETZMANN: I'm a bit confused. Are you talking about just *your* track record or evidence about TAA in general? I haven't seen any empirical evidence indicating that, on average (or even in the tails), any tactical allocators have been successful.

ARNOTT: I am speaking on the basis of our track record and what little information I can garner about competitors' track records. The comparative studies, like the one that Tom Philips did (Philips, Rogers, and Capaldi 1996), have dwindled to next to nothing because no one is interested in TAA. Our founding chairman was fond of saying, "Don't buy what's easy to sell. Do buy what's tough to sell." Well, TAA is tough to sell right now. I think it is an interesting idea that has fallen from favor in a circumstance where, prospectively, it is probably going to produce the kind of results that we had in the 1970s, which were breathtaking, just breathtaking.

PHILIPS: Let me comment on that. In the paper of mine that Rob Arnott is referring to, I took the actual live track records of every domestic TAA manager (about a dozen of them, and they had 95 percent of the assets under management in TAA at the time) and performed Henriksson–Merton and Cumby–Modest tests for timing skills. I found that in the 1970s, TAA was very successful. Then, in the 1980s, the results become a little mixed. If you include the period up to and including the crash of 1987, *all* the TAA managers added value; after the crash, no one added value. But here's an interesting twist to the story: Let's say a genie came to you once a quarter or once a month, take your choice, from 1980 onwards, and whispered "buy stocks" or "buy bonds" in your ear—and the genie was never wrong. And let's say you can make the appropriate portfolio changes without transaction costs. By how much did the genie outperform a simple 60/40 mixture of stocks and bonds? It turns out that the genie's outperformance went down enormously from the precrash to the postcrash period. It dropped from about 24 percent a year to about 15 percent a year. In effect, the genie got a lot less prosperous after 1987, so it's not surprising that TAA managers found themselves in trouble.

Summary Comments

Robert Arnott
John Campbell
Peng Chen, CFA
Bradford Cornell
William Goetzmann
Brett Hammond
Campbell Harvey
Roger Ibbotson
Martin Leibowitz
Rajnish Mehra
Thomas Philips
William Reichenstein, CFA
Robert Shiller
Kevin Terhaar, CFA
Peter Williamson

MARTIN LEIBOWITZ: I think it might be interesting to just go around the table for any last comments on our topic, the equity risk premium, or for any comments on any of the papers presented today.[1]

BRETT HAMMOND: I would like to hear more discussion from Roger Ibbotson and Rob Arnott. As I have listened to the presentations today, I have been trying to decide what we could say if we were charged as a group with coming to some consensus. I'm going to assume the role of the naive observer, and in that role, I can say I have learned that in some areas, we are talking past each other and in other areas, once we clarify the definitions (or what is being measured and how), we are closer together. That understanding is useful, but what is the next step in educating our colleagues and practitioners? What would we want to tell them about their problem, which is, of course, estimating the equity risk premium looking forward? I have been wanting to ask this question all day, so now I will: What would you tell them about the equity risk premium?

[1]For Martin Leibowitz's summary of academic and practitioner research on the equity risk premium, see the Webcast of his presentation to "Research for the Practitioner: The Research Foundation Pre-Conference Workshop" held in conjunction with the AIMR 2002 Annual Conference. The Webcast is available in summer 2002 at aimr.direct.org.

ROGER IBBOTSON: What you say is to the point. First, we see a need for clarification of what we mean by the equity risk premium: I think all of us in this room see it as an expectation, not a realization; if we look at realizations, it's to help us understand expectations. But not everybody outside the room understands this distinction.

The second issue is the use of "arithmetic" versus "geometric." Every time we make a forecast, we should say whether the forecast is arithmetic or geometric and which risk-free rate we are using—U.S. T-bills, the long bond, or TIPS.

Third, we need to distinguish between yields and returns. Jeremy Siegel, for example, used realized returns, whereas others today used realized yields.

Fourth, we should always specify the forecast horizon—whether we are talking about a short or a long horizon. The risk premium for a short horizon is basically about timing, an attempt to judge whether the market is currently over- or undervalued; the risk premium for the very long horizon provides a more stable concept of what the risk premium is—namely, the long-term extra return that an investor is expected to get for taking risks, assuming the market is fairly valued.

If we could at least get these definitions delineated and clarified and let everybody know what the definitions are, it would help identify the differences among us. We are actually much more of one mind than some might think. And the theoretical analyses actually come closer to the empirical results I might have imagined before this conference.

The 4 percent (400 bps) equity risk premium forecast that I have presented here today is a geometric return in excess of the long-term government bond yield. It is a long-term forecast, under the assumption that today's market is fairly valued.

WILLIAM REICHENSTEIN: I want to make a comment in terms of asset allocation based on the geometric difference between future stock and future bond returns. Let's say that the real return on stocks is expected to be 4 percent. Of course, the numbers would depend on the assumptions used; if you use the dividend model, the real return might be 2.5 percent, and with the earnings model, it might increase to 4 percent, but in either case, we are talking about a number well below the historical 7 percent real return on stocks. If we are looking at a real return on stocks of 4 percent and a real return on bonds of 3 percent, the equity risk premium is about 1 percent, which is much lower than in the past. So, the expectation for future equity real returns is down. But for a 50/50 stock/bond portfolio, if you use the historical Ibbotson numbers of 7 percent for stocks and 2 percent for bonds, then your historical real return on a 50/50 portfolio is 4.5 percent. How much worse off are you today at an estimate of 4 percent real return on stocks and 3 percent real return on bonds? That 50/50 portfolio has 3.5 percent real return instead of 4.5 percent, and that is only a 1 percentage point difference. Part of the reason the equity risk premium is lower, it seems to me, is because the real returns on bonds are up.

ROBERT ARNOTT: That's a very good point. The 4.5 percent versus the 3.5 percent expected *portfolio* return invites the question: Why is the actuarial community allowing sponsors to use 6.5 percent as an actuarial real return assumption for their aggregate balanced pension funds? The average nominal return is 9.3 percent, and the average inflation assumption is 2.8 percent. I would say that assuming a 6.5 percent real return is irresponsible and dangerous regardless of whether the reasonable expectation for real return going forward is 4.5 percent or 3.5 percent.

KEVIN TERHAAR: I think of the risk premium as most appropriately viewed as a discount rate element corresponding to a long horizon and relative to a risk-free rate, *commensurate with the asset's risk*. The risk premium issues that we have been discussing today are not unique to the U.S. equity market. Equities or bonds, or any other asset class for that matter, should be discounted in light of the risks that the asset entails. Although there seems to be some agreement on definition and, to a lesser extent, expectations, we are still left with a question that is one step removed from the equity risk premium: What is the appropriate price of risk as we look to the future? Even if we can agree that risk is more stable and thus more easily forecastable than return, and we are able to develop agreed-upon and reasonable forward-looking risk estimates, the issue of the appropriate *price of risk* still exists. Ultimately, it is this price of risk that determines the risk premium, not only of U.S. equities, but also of any other asset class. The risk premium on the domestic equity market should not and cannot be viewed in isolation.

LEIBOWITZ: In response to Brett Hammond, I'm very impressed by the level of consensus on the view that earnings can grow only at a somewhat slower rate than GDP per capita and that no one seems to feel it can grow much more—except Roger Ibbotson, who thought EPS could grow faster than GDP because of extra earnings retention and the implicit growth estimate inherent in the high recent price-to-earnings ratio. The fact that we're basically in agreement that earnings are tightly bound to the growth in the economy has, I think, a lot of implications. Also, I think we can agree that the distinction between arithmetic and geometric is important in terms of the way these concepts are discussed and analyzed. Another important point is that the term structure that is being used to analyze the risk premium must be defined. We also need to keep in mind that the estimation error over the short term is very, very high. So, our views, at least our expectations, may be more convergent over time, but the differences still remain.

Another thing that is surprising is the disconnect between the low growth assumption and the risk premium we tend to believe in, or at least corporate executives tend to believe in. Historically, the risk premium has been more than 5 percent, which may be tough to get in the future with the earnings growth numbers that have been cited today. I think we've come to some important agreements here.

I am troubled, however, by one aspect we haven't explored: Given the growth rate of GDP (the rate of all the corporate profits—including all the entrepreneurial profits that are not captured in the public market, all the free enterprise profits in the economy), how much of the earnings has to be reinvested to sustain that growth? That's a critical equilibrium question. Roger is the only person who addressed it, which he did in terms of his historical study. I think this point is worthy of a lot more thought.

ARNOTT: In terms of the lessons learned today, a tidy way to look at the whole returns picture is to hearken back to the basic notion that the real return on stocks has just three constituent parts—changes in valuation levels, growth, and income (whether income is dividends or dividends plus buybacks). We typically know the yield, so much of the discussion gets simplified to a reexamination of two key issues: (1) Is current pricing wrong? Should valuation levels change? (2) What growth rate is reasonable to expect? As you saw in the rather sharp dichotomy between my formulation for growth and Roger Ibbotson's formulation for growth, there's plenty of room for dialogue—in fact, immense room for dialogue.

A related aspect I think is interesting to observe is that, although there are a whole host of theories relating to finance, some of them elegant, brilliantly crafted, and sensible formulations of the way the world *ought* to work—the capital asset pricing model and Modigliani and Miller being two vivid examples—comparatively few people believe that the world actually works in exact accord with any such theories. We've seen tangible evidence that M&M, while a fine theory, doesn't necessarily work intertemporally. And we know that the CAPM in its raw form doesn't fit the data very well. This doesn't make it a bad theory; it's a wonderful theory and a wonderful formulation of the way the world ought to work. Similarly, the notion that higher P/Es should, in an efficient market, imply faster future permanent growth makes sense. It's an intuitive theory. Does it stand up to historical testing? No.

A similar lesson I think we can take away from today is that the theory and the reality of the risk premium puzzle differ. There are a host of theories that relate to the risk premium puzzle and, from our views on the risk premium, relate to the asset allocation decision, but the theories don't stand up to empirical tests. A very interesting area of exploration for the years ahead will be to try to find a theoretically robust construct that fits the real world.

CAMPBELL HARVEY: I was struggling through the morning just with the vocabulary related to the risk premium: It depends on the horizon; it depends on the risk-free rate; it's a moving target through time; it's conditional; it's unconditional. I now have a better understanding of these concepts and the difficulties in defining them. It is extraordinary that, given the importance of the definitions of these variables, there is so much disagreement in terms of approach. Indeed, I have to teach this material, and it is a difficult topic for the students. We talk in class about the risk premium, but we also have to take a step back and define risk, which is extraordinarily difficult to do.

We have talked today about the current state-of-the-art models. There is a burgeoning literature on different measures of risk, and we are learning a lot from the new behavioral theories. So, we are moving forward in our understanding of the risk premium. Indeed, some of the foremost contributors to this effort are in this room. And I think more progress will be made in the future. It is somewhat frustrating that we are not there yet. I cannot go into the classroom or into the corporate world and say with some confidence, "*This* is the risk premium."

ROBERT SHILLER: I was thinking about the ambiguity of our definitions of the equity risk premium and about what we mean by expectations. We tend to blur the concepts of our own expectations with the public's expectations and with rational expectations. And the interpretations we give to the concept of expectations have changed through time. The history of thought about expectations is interesting. I remember a 1969 article by Conard and Frankena about the term structure—before the rational expectations revolution—that asserted that there is no objective way to specify expectations in a testable model but by assuming perfect foresight. They wrote this after Muth (1961) wrote the first treatise on rational expectations but before it had any impact on the profession. Without access to the theoretical framework proposed by Muth, there was no concept at all of rational expectations. That was then, and now, today, 30 years later, we economists often seem to think that the word "expectations" has no other meaning than "rational expectations."

Economists today think expectation is the summation of P_iX_i, where P is the probability, but that is a very abstract concept that we've been taught. We can trace the word "probability" very far back in time, but it didn't always have all the associations that it has today. The word "probability" didn't even have the meaning that we attach to it now until the mid-1600s, when it seemed to suddenly explode on the intellectual scene. Before then, the word "probability" existed, but it meant "trustworthiness" and had no connection at all to our modern concept of probability. Suddenly, Blaise Pascal and others got people talking about probability, which led naturally to the concept of mathematical expectation.

Just as "probability" is not a natural concept, I think "expectations" is not a natural concept. When you do surveys and you ask people for their expectations, should we expect them to give us some calculation of mathematical expectations? In fact, their reaction to questions about their expectations often seems a sort of a panic: What are these people asking for? What kind of number do they want? I have to come up with a number fast! (Incidentally, a lot of people don't remember that John Maynard Keynes' first claim to fame was a 1921 book about probability in which he argued that people really don't have probabilities as we think of them today.[2])

With all of these ambiguities, one starts to wonder what the equity risk premium is measuring. When I was surveying individual and institutional investors about their outlook for the market, I found that if I asked investors what they thought the DJIA would do in the next year, the average answer was + 5 percent. But the PaineWebber/Gallup survey taken at the same time found that investors thought the DJIA would rise by 15 percent. That's quite a big discrepancy. So, I called Gallup and asked them if we could figure out the reason for such different results. As it turned out, the different survey responses were a function of the wording of the questions. The Gallup

[2] This work can be found in Keynes (1973).

poll was conducted by randomly telephoning people at the dinner hour. Their question was (more or less): What return do you expect on the stock market in the next year in percentage terms? My survey was conducted through a written questionnaire, and the specific question about the market was (more or less): "What do you think the DJIA is going to do in the next 12 months? Put a plus mark if you think it's going to go up and put a minus mark if you think it's going to go down."

The critical difference is that I mentioned the possibility that the market might go down, so about one-third of my answers were negative. I called Gallup and asked them what fraction of their respondents said "Down." And they said that there were so few down responses that they rounded them to zero. So, I was trying to figure out why they got so few negative responses. Well, the Gallup respondents were called at dinnertime, and maybe the person who called was somewhat intimidating, so respondents had to have some courage to say they thought the market return was going to be negative. In my survey, however, I brought up in writing a possible negative choice, and I got a lot of negative responses. So, I think reported expectations are very fragile.

In the investment profession, we've learned to have respect for psychologists and the concepts they use because they've learned a lot by studying how people frame their thinking and decision making. The concepts arising from this knowledge can be very helpful to us in our work. And psychologists deal with other attitudes related to expectations—aspiration, hope, regret, fear, and the salience of stories. All of these parameters are constantly changing through time. So, when you ask someone about their expectations, the answer they give will be very context sensitive.

With surveys, we've learned you need to ask exactly the same questions in exactly the same order on each questionnaire. Even so, you don't know quite what you're really getting because expectations have so many different definitions.

RAJNISH MEHRA: I want to make two quick comments. My first point is that valuation models help us structure the problem, but what breathes life into a valuation model are the forecasts, and these forecasts have huge conditional errors. Not many of the estimates for the equity premium that were given today were accompanied by the standard deviation of that estimate. That standard deviation is too important to be missing. For example, in my data relating the expected mean equity risk premium to national income, the standard deviation around that mean is huge. Just giving a point estimate is not enough. The omission of the conditional error worries me.

My second point is that profound demographic shifts are going to be occurring in the United States, in terms of the Baby Boomers retiring, about which Ed Prescott and I wrote (1985). That phenomenon is going to lead to asset deflation, which has profound implications for the *ex ante* equity premium.

THOMAS PHILIPS: I have been very interested to see two broad strands of thought discussed today. One of these strands, exemplified by Rajnish Mehra, is the line of thinking in which the basic model involves human economic behavior, whether that behavior is utility maximizing or motivated by something else, and the effects of that behavior in the capital markets. The second strand is more empirical—constructing a point estimate for the equity risk premium—and it is exemplified by Rob Arnott's and Roger Ibbotson's work. I see two somewhat different challenges for these two strands, and ultimately, they have to meet in the middle so that we can build a unified theory.

For the economist, the challenge I see is related to Richard Feynman's argument about why scientific imagination is so beautiful: It must be consistent. You cannot imagine just anything; it has to be consistent with classical mechanics, with quantum mechanics, with general relativity, and so on and so forth. Within this set of constraints, beautiful ideas are born that tie neatly into a powerful edifice. I see the challenge for financial economists as not simply explaining the equity risk premium but explaining a fairly wide range of economic phenomena within a unified framework. Instead of a patchwork of models, financial economics needs to look more like physics.

The challenge for the second group of people, those who provide the point estimates, is (as Rajnish Mehra correctly points out) to estimate some of the errors in our estimates and to be able to communicate all this information in a language that is accessible to the person on the street. In particular, we need to dissuade investors from using the sample mean as the best estimator of the true mean.

So, the two challenges are different, but the overarching challenge is to somehow unify the two approaches in a clean way that answers the question of what the equity risk premium is and makes tactical predictions.

BRADFORD CORNELL: I like to think more in terms of valuation and expected returns than in terms of the equity risk premium. The salient feature to me in that regard is that corporate profits after tax seem to be closely tied to GNP, particularly if the market is measured properly, in the aggregate and not limited to the S&P 500 Index, so that what we have to value is not all that uncertain. However, the way we value earnings, as Rajnish Mehra pointed out, has changed quite a bit. Stock market value in the United States has varied over time from half of GNP to twice GNP, which is about where it is now. To say that earnings are twice GNP, we either have to say that the expected returns are low and are expected to remain low for the long term or that the market has simply made a mistake. The one point that I would make to practitioners, fund managers, and so forth, is that they cannot maintain a 6.5 percent actuarial assumption in light of these data.

PENG CHEN: I think there are probably two types of data: One type is what the companies and the economy reveal—the analysis that Roger Ibbotson and I are working on—and the other type is drawn from the investor's point of view—how much the investor expects from a project or a security. What I think is really interesting is that the answers are going to lie between these two dynamics. How people adjust to the dynamics, how the dynamics change people's behavior, and how that behavior affects the market are very important to observe. I think the reason we see the valuation of the market rise and fall is not necessarily because the entire investment community believes the actual risk premium has fallen or gone up or that risk rose or fell but because of this dynamic. Not all investors have to change their minds to affect market value. Maybe the dynamic affected only a small number or a certain group of investors; only a marginal number of investors have to change their minds. So, it would be interesting to see how the two sides work together dynamically.

PETER WILLIAMSON: One of the most interesting aspects of our discussion today is the areas of agreement and of disagreement. The benefit of identifying areas of disagreement is that it can lead to the search for the reason for the disagreement. It is fascinating to me how all of the findings or theory might be implemented. Can you imagine an active manager turning to his clients and saying, "You must understand that the growth in earnings of your portfolio can't exceed GDP growth"? The client wouldn't believe it, and the manager wouldn't believe it. An active manager can't afford to believe it. Or can you imagine a firm that sells S&P 500 indexed funds sending a letter to all of the shareholders saying that they must realize earnings cannot grow faster than GDP? I can't imagine that message going out. So, what impact does all of the discussion we have had today make on the actual allocation of assets, the actual management of money? I don't know. I don't know whether investors ever have to *really* understand the equity risk premium, whether it's even in their best interest to understand it.

As for allocation, my sense is that different sectors of the investment community will do very different things in terms of asset allocation on the strength of the same expected risk premium. I think that the CREF participant who's 25 years old—looking ahead 40 years to retirement, saving money—versus the investor who is 66 years old—in the process of "dissaving," consuming now—given the same expected rate of return on equity, might do very different things with their money.

Richard Thaler and I deal with the problem of college and university endowment funds. One would think that endowment funds should all be thinking very long term, but the decisions are made by people—who don't live centuries and who, in fact, can be very embarrassed if the endowment has even one very poor quarter. For example, I am on the investment committee of a prep school, and years ago, the trustees agreed that the school should be much more heavily invested in equities, that the school should be thinking long term—but not yet. And each year, the suggestion is repeated, but the decision is: not yet.

It's very, very difficult for people to think long term. Yet, to a large extent, what we've been talking about today is what's sensible for the long term. Well, if people simply cannot think long term, then we are reduced to decisions for the short term. And the asset allocation implications may be very different for investors who cannot think much beyond the next quarter from the implications for those who, in theory at least, ought to be thinking about the next 50 years.

In short, I'm really puzzled about where all that we have discussed goes in terms of making any impact on investment behavior and on asset allocation.

JOHN CAMPBELL: My starting point is that we live in a world in which the forward-looking, *ex ante* equity premium that you might expect if you're a thoughtful investor trying to be rational changes over time, and those changes have implications for the methods used to estimate the premium. We've discussed these estimation methods today, and I think we have quite a consensus that past returns can be very misleading so it is probably better to start with valuation ratios and adjust them for growth expectations.

If we live in a world in which these numbers—the real interest rate, the equity premium, and so forth—change over time, that has a big impact on asset allocation. So, I can't resist plugging my forthcoming book with Luis Viceira (2002), *Strategic Asset*

Allocation: Portfolio Choice for Long-Term Investors. Brad Cornell's colleagues at UCLA coined the term "strategic asset allocation" to contrast with tactical asset allocation (Brennan, Schwartz, and Lagnado 1997). TAA is myopic; it looks at the next period, at the risk–return in one period. The idea behind strategic asset allocation is that if risk premiums are changing over time, the risks of different asset classes may look different for different horizons. You wouldn't get such an effect if returns were identically and independently distributed, but it can become quite important if the stock market is mean reverting or if real interest rates change over time.

I'm a little more optimistic than Peter Williamson is. I think there is some hope of influencing the practical world to think about these issues, because many of the rules of thumb that financial planners have used for years have this flavor. That is, the rules make more sense in a dynamically changing world than they would in an i.i.d. world. So, there's been a mismatch between academic research and practitioners' rules of thumb. We can close that gap if we accept in our models of asset allocation that investment opportunities change over time. So, we might, with some additional work, be able to narrow the gap between how practitioners think and how academics think.

WILLIAM GOETZMANN: The thing that struck me about our discussion today is that, with the exception of Campbell Harvey's paper, almost everything we're doing is an interpretation of history—whether it's historical valuation ratios, arithmetic means, or what have you. That basis for argument is exciting but has its limitations. History, after all, is a series of accidents; the existence of the time series since 1926 might itself be an accident. So, I'm more convinced than ever that we've got to find a way out of the focus on U.S. historical data if we want to solve some of these questions and to reassure ourselves, if indeed we can, that the equity premium is of a certain magnitude.

LEIBOWITZ: Thank you all.

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Note on Value Drivers[1]

Value-based management assumes that value creation should be a primary consideration in managerial decision making. It requires a thorough understanding of what creates value and why as well as the ability to measure value accurately. The goal of this note is to highlight the determinants of equity value and, in doing so, provide a framework for making financial, strategic, and investment decisions. In particular, the note describes three value drivers: profitability, advantage horizon, and reinvestment. Using both a theoretical model and a numerical example, it shows how each value driver affects equity value and explains why. It also presents empirical evidence to support the relation between the value drivers and value creation.

Theoretical Equity Valuation Model

Discounted cash flow (DCF) analysis translates future cash flows into current market values. For example, given a stream of equity cash flows (ECF) and a discount rate equal to the cost of equity (K_E), the market value of equity (E_{MV}) is the present value of future equity cash flows:

$$E_{MV} = ECF_1/(1+K_E) + ECF_2/(1+K_E)^2 + \ldots \quad (1)$$

When the equity cash flows and discount rate are constant over time, this series is a stable perpetuity which can be written as:

$$E_{MV} = ECF/K_E \quad (2)$$

Assuming that the equity cash flows are equal to the accounting return on equity (ROE) times the book value of equity (E_{BV}) at the beginning of the period, then equation 2 can be rewritten as:

$$E_{MV} = [(ROE)*(E_{BV})]/K_E \quad (3)$$

$$\text{where ROE} = \text{Net Income}/E_{BV}$$

While the assumption that equity cash flows are equal to accounting earnings is convenient for expositional reasons, this assumption is clearly not valid except in very special circumstances. For example, non-cash items such as depreciation or deferred taxes, and cash-items that do not flow through the income statement such as changes in working capital and fixed assets both cause cash

[1] Much of the material in this note appears in Fruhan (1979), chapter 1.

Professor Benjamin C. Esty prepared this note as the basis for class discussion.

flows to deviate from reported net income. Nevertheless, this assumption is not a bad approximation and, as will be shown in the next section, seems to generate reasonable empirical predictions.

After dividing each side of equation 3 by the book value of equity, the left side of the equality becomes the market-to-book ratio (the market value of equity divided by the book value of equity):

$$\text{Market/Book} = E_{MV} / E_{BV} = \text{ROE}/K_E \quad (4)$$

Equation 4 says that a firm's market-to-book ratio equals the ratio of its return on equity to its cost of equity. This simple valuation model, or variations of it, can be used to analyze the relation between profitability, growth, and value.

Profitability

The first value driver, profitability, is immediately clear from equation 4. For a given industry, more profitable firms—those able to generate higher returns per dollar of equity—should have higher market-to-book ratios. Conversely, firms which are unable to generate returns in excess of their cost of equity should sell for less than book value.

Profitability	Value
If ROE > K_E	then Market/Book > 1
If ROE = K_E	then Market/Book = 1
If ROE < K_E	then Market/Book < 1

One implication of this model is that firms can increase equity value by increasing their return on equity. The Du Pont formula decomposes ROE into three components and provides some guidance on how to increase it:

$$\begin{aligned} \text{ROE} &= (\text{Net Income/Equity}) \\ &= (\text{Net Income/Sales}) * (\text{Sales/Assets}) * (\text{Assets/Equity}) \\ &= (\text{Profit Margin}) * (\text{Asset Turnover}) * (\text{Financial Leverage}) \end{aligned}$$

For example, increasing the profit margin through higher prices or lower costs will increase the ROE. Similarly, increasing the asset turnover by increasing inventory turnover or reducing days receivables will increase the ROE. However, increasing financial leverage has dual, and possibly contradictory, effects. It increases not only the ROE through the Du Pont formula, but also the cost of equity.

A firm's cost of equity, or equivalently investors' expected return on equity, can be estimated using the Capital Asset Pricing Model (CAPM). According to the model, the expected return on equity is a function of a firm's equity beta (β_E) which, in turn, is a function of both leverage and asset risk (β_A):

$$K_E = R_F + \beta_E (R_M - R_F) \quad (5)$$

where:

R_M = return on the market portfolio
R_F = risk-free rate of return

$$\beta_E = [\beta_A - \beta_D (D/V)] (V/E) \quad (6)$$

because:

$$\beta_A = \beta_D (D/V) + \beta_E (E/V) \quad (7)$$

and

$$\text{Firm Value (V)} = \text{Debt Value (D)} + \text{Equity Value (E)} \quad (8)$$

Assuming riskless debt, meaning the beta of debt is zero, then equation 6 can be written as:

$$\beta_E = \beta_A \text{ (V/E)} \quad (9)$$

As financial leverage (D/V) increases, the ratio of firm value to equity value (V/E) increases, the equity beta increases, and, according to equation 5, the expected return on equity increases. The expected return increases because equity cash flows are riskier: leverage increases debtholders fractional claim on the firm's cash flows. As a result, an increase in leverage can either increase or decrease the ratio in equation 4 depending on whether the return on equity (the numerator) or the cost of equity (the denominator) increases faster.

Advantage Horizon

Equation 4 presents a firm's market-to-book ratio as a stable perpetuity under the assumption that its profitability remains constant forever. An alternative, and more realistic assumption, is that firms generate positive abnormal returns—returns in excess of their cost of capital—for only a limited number of years. The period during which firms generate positive abnormal returns is known as the advantage horizon.

Using a variation of the simple valuation model in equation 4, Appendix 1 derives the market-to-book ratio as an annuity rather than a stable perpetuity. It assumes that a firm's equity returns can be divided into two parts: *normal* returns equal to the firm's cost of equity (K_E) and *abnormal* returns equal to the actual ROE less the cost of equity (ROE - K_E). Viewed in this fashion, one can think of abnormal returns and the advantage horizon in the same way Stewart (1991) defines economic value added (EVA) and the competitive advantage period (CAP). Equation A1.8 from the Appendix 1 is:[2]

$$\textbf{Market/Book} = 1 + (\textbf{ROE}\text{-}K_E) * [(1/K_E) - (1/(K_E(1+K_E)^n)] \quad (10)$$

where the advantage horizon is defined as n years. According to this formula, the greater the spread between a firm's return on equity and its cost of equity (ROE - K_E), the longer the advantage horizon (increasing n), and the sooner abnormal returns occur (positive abnormal returns in early years), the higher the market-to-book ratio. Firms that earn normal returns (K_E = ROE) in all periods should have market-to-book ratios equal to one; firms that generate negative abnormal returns during the advantage (disadvantage) period should have market-to-book ratios less than one.

Equation 10 is more realistic than equation 4 because most firms earn positive abnormal returns for only a limited number of years. The presence of positive abnormal returns encourages entry by new firms and increased competition by existing firms. Over time, competition reduces excess returns to the point where firms just earn the expected, or normal, rate of return. Although there is typically an inverse relation between the magnitude of positive abnormal profits and the length of the advantage horizon, this model implies that firms should seek to extend the advantage horizon as long as possible for a given level of profitability.

Ghemawat (1991) refers to this ability to preserve competitive advantage as sustainability and asserts it is a key determinant of value creation. Sustainability, he maintains, depends on a firm's ability to create scarcity value and for the firm's owners to capture or appropriate this value. Threats to scarcity value include imitation and substitution. A firm can defend against imitation by erecting barriers to entry or forestalling entry through aggressive positioning; a firm can defend against substitution by continually improving or augmenting its product. Threats to appropriability include

[2] This formula is a variation of the accounting-based valuation methods described in Bernard (1994); Palepu, Bernard, and Healy (1996), and Ohlson (1995).

slack and hold-up both of which result from misaligned incentives. Slack occurs when firms fail to create as much value as they are capable of creating; hold-up occurs when non-owners, instead of owners, capture value. Non-owners are often able to capture value when they provide complementary, and necessary, inputs.

Reinvestment

The third value driver, reinvestment, builds on the other two factors and incorporates the concept of growth. Firms that have attractive investment opportunities, meaning that investments are expected to generate positive abnormal earnings, can create equity value by reinvesting earnings or by investing additional equity. Appendix 2 derives a valuation model which allows for reinvestment of earnings at rate γ where γ equals the retention rate or the fraction of net income reinvested in the firm. The quantity γROE is a firm's sustainable growth rate, the rate at which it can grow its assets (or sales if they are proportional to assets) without changing its capital structure or raising external equity. With reinvestment, the valuation model becomes (equation A2.4):

$$\textbf{Market/Book} = [\textbf{ROE}(1 - \gamma)] / (K_E - \gamma \textbf{ROE}) \qquad (11)$$

When a firm pays out all of its earnings as dividends, then the retention rate is zero ($\gamma = 0$) and equation 11 reduces to the simple valuation model in equation 4. Assuming a firm has attractive investment opportunities in which it can generate positive abnormal returns (ROE>K_E), then it can increase value by retaining a larger fraction of earnings and investing them in the business. Thus reinvestment and growth creates value only when a firm can generate positive abnormal returns on future investment opportunities. Those firms with the greatest number and the most profitable investment opportunities should have the highest market-to-book ratios provided they are able to fund the projects.

In fact, it is often convenient to think of firm value as consisting of two parts: the present value of <u>assets in place</u> and the present value of <u>future growth opportunities</u> (Myers, 1977). The former require little in the way of additional investment, while the latter are investment opportunities which are expected to earn positive abnormal returns. These investment opportunities are called "real" options because they resemble financial options, particularly call options. They can be interpreted and managed using option pricing theory and valued using option pricing techniques (see Luehrman, 1995).

Numerical Example

Combining equations 10 and 11 produces a single valuation model that incorporates all three value drivers. Exhibit 1 shows this model as well as the relation between a hypothetical firm's market-to-book ratio and the value drivers. The exhibit presents three cases with differing levels of reinvestment (γ = 0%, 33%, and 66%). For each case, there is a sensitivity table showing how the market-to-book ratio depends on the advantage horizon and level of profitability (ROE).

Case #1 (no reinvestment) shows that more profitable firms have higher market-to-book ratios—the ratio increases as one reads across the rows. As stated earlier, the impact of the advantage horizon depends on whether a firm generates positive or negative abnormal earnings. The longer a firm can generate positive abnormal earnings, the greater its market-to-book ratio. However, because of discounting, abnormal earnings in later years have a smaller impact on the market-to-book ratio than abnormal earnings in early years. Alternatively, firms that generate negative abnormal earnings have market-to-book ratios less than one. Moreover, their market-to-book ratio falls as the advantage (disadvantage) horizon gets longer. Finally, the market-to-book ratio is equal to one and is independent of the advantage horizon for firms that generate normal earnings (the case where ROE=K_E).

Cases #2 and #3 (with reinvestment rates equal to 33% and 66%, respectively) illustrate the impact of reinvestment. Like the advantage horizon, reinvestment creates additional value only for firms that generate positive abnormal earnings. When firms are able to generate positive abnormal returns (ROE = 25%), have a long advantage horizon (30 years), and reinvest a large fraction of earnings (γ = 66%), they create significant value. The difference between the market-to-book ratio in the high return/long horizon with no reinvestment (case #1) and with reinvestment (case #3) is large: 1.66 vs. 4.27.

Empirical Evidence

This section presents empirical evidence on the relation between the value drivers and value creation. Despite the assumptions imbedded in the simple valuation models, they do, nonetheless, yield predictions which are consistent with what we observe in practice.

Profitability

The model predicts that there is a relation between a firm's market-to-book ratio and the ratio of its return on equity to its cost of equity. Given a set of firms in a single industry, the model implies that there should be a positive relation between ROE's and market-to-book ratios for these firms assuming their costs of capital are approximately equal. To a first approximation, it is reasonable to assume that firms in the same industry will have similar capital costs because they hold similar assets and, typically, have similar capital structures.

Exhibit 2 shows the relation between market-to-book ratios and firm profitability for two quite different industries: grocery stores and oil field service companies. Whereas the grocery industry is a retail business with high inventories and low margins, the oil-field services industry is a service business with industrial customers and higher margins. Yet in both cases, there is a very clear, positive relation between equity value and ROE's: higher ROE's are associated with higher market-to-book ratios. Fruhan (1996) presents similar evidence for a much wider range of industries including newspapers, telecommunications, and specialty chemicals.

There are at least two reasons why this relation does not hold perfectly. First, not all firms in the same industry have the same leverage or same asset risk. Thus, financial and operating differences cause the cost of equity to differ across firms. Second, accounting data is subject to manipulation by managers. On the one hand, managers provide valuable information through their choice of accounting disclosures and policies. On the other hand, they are biased which may lead them to distort reported numbers. Fortunately, however, most distortions occur through accruals which eventually get reversed. Because accounting data is subject to this kind of manipulation, it is critical to understand whether the reported numbers reflect economic reality. To the extent high ROE's reflect economic reality, and not unreasonable deferral of costs or a one-time aberrations, then the relation shown in exhibit 2 will be stronger. When accounting data does not reflect economic reality, one must undo the distortions before trying to make substantive conclusions about the business or its prospects.

Advantage Horizon

Several researchers have studied the length of the advantage horizon. For example, Fruhan (1995) examined a sample of 87 "high-performing" firms defined as those firms with sales of greater than $200 million and an average ROE of greater than 25% for five consecutive years between 1976-82. He calculated the median ROE for the firms from 1976-78 and from 1989-93, and then compared these medians against the average ROE for firms on the S&P 400 (see Exhibit 3). Whereas the median ROE for the high-performing subgroup was 21% above the average ROE for the S&P 400 in 1976-82, it was only 2% above in the later period. Thus the high-performing firms' abnormal earnings had largely dissipated over the fifteen year interval.

Palepu *et al* (1996, pp. 5.4-5.7) report similar findings: abnormally high or low ROE's tend to revert to normal levels, roughly between 10-14%, often within five years and usually within ten years.[3] The reversion in ROE's is largely due to reversion in profit margins rather than reversion in asset turnover or leverage which remain relatively constant over time. The fact that advantage horizon lasts for five or ten years provides some justification for using five or ten-year projections in discounted cash flow analysis.

In another study, Ghemawat (1991) examined the returns on investment (ROI) for 692 business units from 1971-1980. After sorting the business units by their ROI in 1971, he divided the sample into two equal subgroups and calculated the average ROI for each subgroup over the next ten years. Initially, the top group had an average ROI of 39% compared to 3% for the bottom group. The 36% spread between the two groups decreased to less than 3% by the end of ten years: the average ROI for the top group had decreased to 21.5% while the average ROI for the bottom group increased to 18.0%.

While the evidence consistently shows that the advantage horizon is finite, firms like Coca-Cola, Wal-Mart, and Microsoft have been able to extend their advantage horizons for many years. These firms have been able to create tremendous value for shareholders by sustaining their ability to generate positive abnormal profits.

Reinvestment

The key insight from the model regarding investment is that reinvestment of earnings is value enhancing only when investment opportunities generate expected returns in excess of the cost of equity (ROE>K_E). Because investment opportunities vary across firms and vary over time for the same firm, it is impossible to make conclusive statements on the value of reinvestment. Nevertheless, there is some evidence that reinvestment creates value. Recent studies have shown that firms which announce major capital expenditure or research and development (R&D) programs experience positive abnormal equity returns.[4] The market interprets these announcements as good news and their stock prices usually increase. While it may be the case that firms announce only their most positive NPV investments, Fruhan (1979, Table 1-6) provides evidence from a sample of almost 1500 firms that broadly supports the relation among high profitability, high reinvestment, and high equity valuations.

Acquisitions represent another form of investment for many firms. Jensen and Ruback (1983) review the many studies on acquirer returns surrounding merger announcements. They conclude that, on average, acquirer shareholders do not lose and target shareholders gain from merger

[3] See also Freeman, Ohlson, and Penman (1982).

[4] McConnell and Muscarella (1985) analyze capital expenditure announcements while Chan, Martin, and Kensigner (1990) analyze R&D expenditure announcements.

announcements. Thus, acquisitions create net gains for both firms combined even though they do not increase acquirer shareholder value.

Jensen (1986, 1993) presents an opposing view. He argues that managers often overinvest, i.e. invest in negative net present value projects, especially when their firms generate substantial free cash flow. Their incentive to overinvest results from their compensation being tied, indirectly, to firm size which, in turn, is a function of the amount investment. They are able to over invest because internal control systems such as board oversight are weak. In the absence of effective internal control systems, external forces such as the market for corporate control discipline investment activity. Jensen cites the oil industry in general and the Gulf Oil takeover in particular as examples where takeovers eliminated wasteful capital expenditures. Just as investing in positive NPV projects creates value, so, too, does eliminating negative NPV investments.

Warren Buffet, the prominent investor and chairman of Berkshire Hathaway, acknowledged the problem of overinvestment in his company's 1984 annual report:

> Many corporations that show consistently good returns have, indeed, employed a large portion of their retained earnings on an economically unattractive, even disastrous, basis. Their marvelous core businesses camouflage repeated failures in capital allocation elsewhere (usually involving high-priced acquisitions). The managers at fault periodically report on the lessons they have learned from the latest disappointment. They then usually seek out future lessons. (Failure seems to go to their heads.). . . In such cases, shareholders would be far better off if the earnings were retained to expand only the high-return business, with the balance being paid in dividends or used to repurchase stock...

Although stated in his characteristically droll way, Buffet's point is clear: reinvestment destroys value unless it generates an appropriate risk-adjusted rate of return.

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Exhibit 1: Numerical example of the relation between the value drivers and value creation

Combining equations 10 and 11 yields the following equation:

Market/Book = $[(1+\gamma ROE) / (1+K_E)]^n + [ROE(1-\gamma) / (K_E - \gamma ROE)] [1 - \{(1+\gamma ROE) / (1+K_E)\}^n]$

This Exhibit shows the hypothetical market-to-book ratios as a function of the three value drivers: profitability, advantage horizon, and re-investment.; assuming the firm has a cost of equity equal to 15%. The three cases differ by the level of reinvestment which varies from 0% to 66%.

Case #1: Reinvestment rate (γ) = 0%

Advantage Horizon	Return on Equity (ROE) 5%	15%	25%
5 years	0.66	1.00	1.34
15 years	0.42	1.00	1.58
30 years	0.34	1.00	1.66

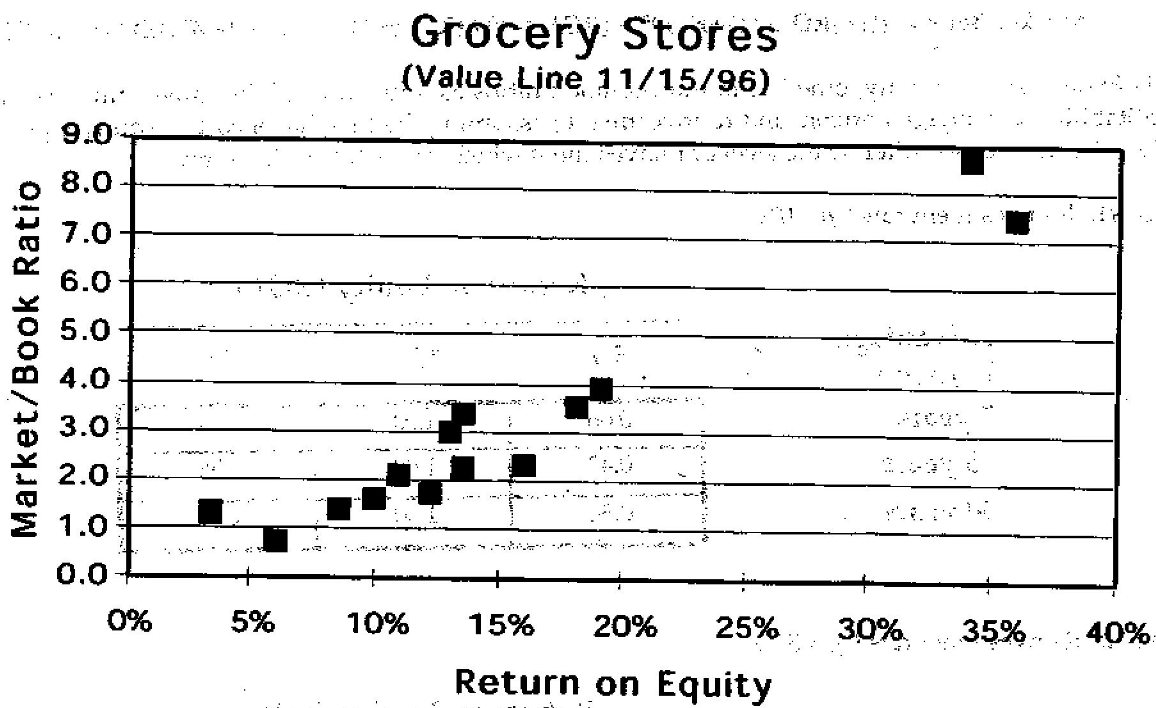
Case #2: Reinvestment rate (γ) = 33%

Advantage Horizon	Return on Equity (ROE) 5%	15%	25%
5 years	0.65	1.00	1.39
15 years	0.37	1.00	1.88
30 years	0.27	1.00	2.24

Case #3: Reinvestment rate (γ) = 66%

Advantage Horizon	Return on Equity (ROE) 5%	15%	25%
5 years	0.65	1.00	1.45
15 years	0.32	1.00	2.43
30 years	0.18	1.00	4.27

Exhibit 2: Relation between Return on Equity (ROE) and Market-to-Book Ratio



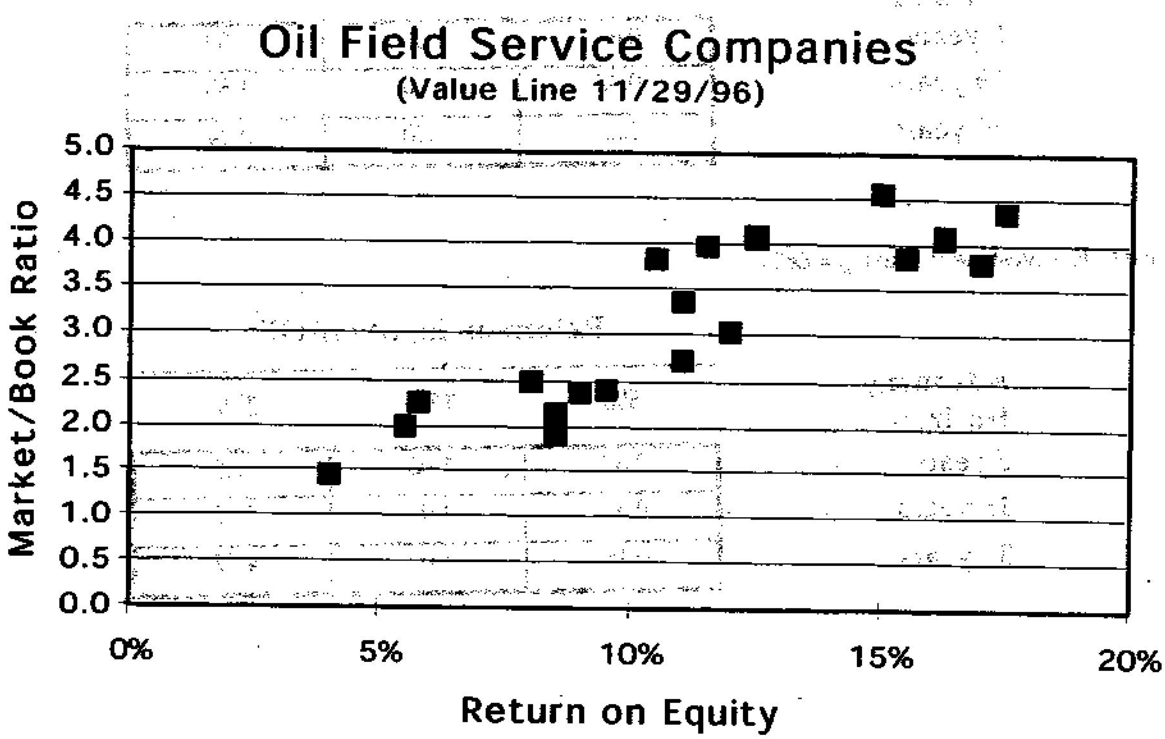


Exhibit 3: Advantage horizon

Fruhan (1995) analyzed the advantage horizon of a sample of 87 high-performing firms. To be included in the sample, firms had to have an average ROE of more than 25% for five consecutive years between 1976-82 and have sales greater than $200 million. He found the following:

Top Performers:	**1976-78 Average ROE**
1. Petrie Stores	2.03
2. H&R Block	1.45
3. Standard Microsystems	1.43
4. Airborne Freight	0.77
5. Wendy's International	0.74
6. Commerce Clearing House	0.67
7. Avon Products	0.67
8. Southwest Airlines	0.63
9. Charming Shoppes	0.56
10. Loctite Corp.	0.56

For the period from 1976-78:

Median ROE for the top 87 firms	= 37%
S&P 400 Average ROE	= 15%
Spread	= 21%

For the period from 1989-93:

Median ROE for the top 87 firms	= 17%
S&P 400 Average ROE	= 15%
Spread	= 2%

Lesson: The advantage horizon is finite.

Appendix 1: Equity value and the advantage horizon

Equations 1 and 3 show that a firm's equity market value is a function of its return on equity (ROE) and cost of equity (K_E). Assuming no retention of earnings and constant returns, equity value is:

$$E_{MV} = ROE^*E_{BV} /(1+K_E) + ROE^*E_{BV} /(1+K_E)^2 + \ldots \quad \text{(A1.1)}$$

dividing through by the book value of equity (E_{BV}) yields

$$\text{Market/Book} = E_{MV} /E_{BV} = ROE/ (1+K_E) + ROE /(1+K_E)^2 + \ldots \quad \text{(A1.2)}$$

The ROE can be divided into two parts: ROE = ($ROE - K_E$) + K_E. The first term (ROE- KE) consists of "abnormal" earnings, returns to equity in excess of the cost of equity; the second term consists of "normal" earnings because that is the expected return on equity. Substituting back into equation A1.2 yields:

$$\text{Market/Book} = [ROE\text{-}K_E) + K_E]/(1+K_E) + [ROE\text{-}K_E) + K_E] /(1+K_E)^2 + \ldots \quad \text{(A1.3)}$$

$$\text{Market/Book} = (ROE\text{-}K_E)/(1+K_E) + ([ROE\text{-}K_E)/(1+K_E)^2 + \ldots$$

$$+ K_E/(1+K_E) + K_E/(1+K_E)^2 + \ldots \quad \text{(A1.4)}$$

Equation A1.4 is the sum of two geometric series, one of normal earnings and one of abnormal earnings. The present value of the normal earnings (using a perpetuity formula) is one:

$$1 = K_E/K_E = K_E/(1+K_E) + K_E/(1+K_E)^2 + \ldots \quad \text{(A1.5)}$$

The present value of the abnormal earnings depends on how long the firm expects to earn abnormal earnings. It can be thought of as an annuity: The firm receives a stream of abnormal earnings for a period of n years. The present value of an annuity can be written as:

$$\text{present value} = (ROE\text{-}K_E) * [(1/K_E) - (1/(K_E(1+K_E)^n)] \quad \text{(A1.6)}$$

Combining equations A1.5 and A1.6 yields:

$$\textbf{Market/Book} = 1 + \{(ROE\text{-}K_E)^*[(1/K_E) - (1/(K_E(1+K_E)^n)]\} \quad \text{(A1.7)}$$

as n approaches infinity, equation A1.7 reduces to equation 4 in the note.

Appendix 2: Equity value and reinvestment

This appendix derives a model of equity valuation as a growing perpetuity. Given a firm with a constant return on equity (ROE), it can either retain its earnings or pay them out to equityholders as dividends. Assuming the firms retains a fraction of earnings (γ) and pays out the remainder, then the market value of equity can be determined as follows.

Time	Total Earnings	Amount Paid Out (ECF)	Amount Retained	Book Value of Equity
t=0				E_0
t=1	ROE^*E_0	$(1-\gamma)^*\ ROE^*E_0$	$(\gamma)^*\ ROE^*E_0$	$E_1 = E_0 + (\gamma)^*\ ROE^*E_0$ $E_1 = E_0\,(1+\gamma ROE)$
t=2	ROE^*E_1 $ROE^*[E_0(1+\gamma ROE)]$	$(1-\gamma)^*\ ROE^*E_1$ $(1-\gamma)^*\ ROE^*\ E_0\,(1+\gamma ROE)$	$(\gamma)^*\ ROE^*E_1$ $(\gamma)^*\ ROE^*\ E_0\,(1+\gamma ROE)$	$E_2 = E_1 + (\gamma)^*\ ROE^*E_1$ $E_2 = E_1\,(1+\gamma ROE)$ $E_2 = E_0\,(1+\gamma ROE)^2$
t=3	ROE^*E_2 $ROE^*[E_0(1+\gamma ROE)^2]$	$(1-\gamma)^*\ ROE^*E_2$ $(1-\gamma)^*\ ROE^*\ E_0\,(1+\gamma ROE)^2$	$(\gamma)^*\ ROE^*E_2$ $(\gamma)^*\ ROE^*\ E_0\,(1+\gamma ROE)^2$	$E_3 = E_2 + (\gamma)^*\ ROE^*E_2$ $E_3 = E_2\,(1+\gamma ROE)$ $E_3 = E_0\,(1+\gamma ROE)^3$
t=4	(etc.)			
Growth Rate	γROE	γROE	γROE	γROE

Value = discounted present value of payouts (equity cash flows)

$$= \frac{((1-\gamma)^*\ ROE^*E_0)}{(1+K_E)} + \frac{((1-\gamma)^*\ ROE^*\ E_0\,(1+\gamma ROE)}{(1+K_E)^2} + \ldots \qquad \text{(A2.1)}$$

$$= \frac{((1-\gamma)^*\ ROE^*E_0)}{(1+K_E)} \{1 + [(1+\gamma ROE)/(1+K_E)] + [(1+\gamma ROE)/(1+K_E)]^2 + \ldots\} \qquad \text{(A2.2)}$$

Equation A-2 is a growing perpetuity with growth rate equal to γROE. It can be rewritten as:

$$\text{Equity Value} = \frac{(1-\gamma)^*\ ROE^*E_0}{(K_E - \gamma ROE)} \qquad \text{(A2.3)}$$

After multiplying through by the book value of equity (E_0), one gets the ratio of equity at market value to equity at book value ($E_{MV}/E_{BV} = V/E_0$):

$$\text{Market/Book} = \frac{(1-\gamma)^*\ ROE}{(K_E - \gamma ROE)} \qquad \text{(A2.4)}$$

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The Equity Premium

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ABSTRACT

We estimate the equity premium using dividend and earnings growth rates to measure the expected rate of capital gain. Our estimates for 1951 to 2000, 2.55 percent and 4.32 percent, are much lower than the equity premium produced by the average stock return, 7.43 percent. Our evidence suggests that the high average return for 1951 to 2000 is due to a decline in discount rates that produces a large unexpected capital gain. Our main conclusion is that the average stock return of the last half-century is a lot higher than expected.

THE EQUITY PREMIUM—the difference between the expected return on the market portfolio of common stocks and the risk-free interest rate—is important in portfolio allocation decisions, estimates of the cost of capital, the debate about the advantages of investing Social Security funds in stocks, and many other applications. The average return on a broad portfolio of stocks is typically used to estimate the expected market return. The average real return for 1872 to 2000 on the S&P index (a common proxy for the market portfolio, also used here) is 8.81 percent per year. The average real return on six-month commercial paper (a proxy for the risk-free interest rate) is 3.24 percent. This large spread (5.57 percent) between the average stock return and the interest rate is the source of the so-called equity premium puzzle: Stock returns seem too high given the observed volatility of consumption (Mehra and Prescott (1985)).

We use fundamentals (dividends and earnings) to estimate the expected stock return. Along with other evidence, the expected return estimates from fundamentals help us judge whether the realized average return is high or low relative to the expected value.

The logic of our approach is straightforward. The average stock return is the average dividend yield plus the average rate of capital gain:

$$A(R_t) = A(D_t/P_{t-1}) + A(GP_t), \tag{1}$$

* Fama is from the University of Chicago and French is from Dartmouth College. The comments of John Campbell, John Cochrane, Kent Daniel, John Heaton, Jay Ritter, Andrei Shleifer, Rex Sinquefield, Tuomo Vuolteenaho, Paul Zarowin, and seminar participants at Boston College, Dartmouth College, the NBER, Purdue University, the University of Chicago, and Washington University have been helpful. Richard Green (the editor) and the two referees get special thanks.

where D_t is the dividend for year t, P_{t-1} is the price at the end of year $t - 1$, $GP_t = (P_t - P_{t-1})/P_{t-1}$ is the rate of capital gain, and $A(\ )$ indicates an average value. (Throughout the paper, we refer to D_t/P_{t-1} as the dividend yield and D_t/P_t is the dividend–price ratio. Similarly, Y_t/P_{t-1}, the ratio of earnings for year t to price at the end of year $t - 1$, is the earnings yield and Y_t/P_t is the earnings–price ratio.)

Suppose the dividend–price ratio, D_t/P_t, is stationary (mean reverting). Stationarity implies that if the sample period is long, the compound rate of dividend growth approaches the compound rate of capital gain. Thus, an alternative estimate of the expected stock return is

$$A(RD_t) = A(D_t/P_{t-1}) + A(GD_t), \tag{2}$$

where $GD_t = (D_t - D_{t-1})/D_{t-1}$ is the growth rate of dividends. We call (2) the dividend growth model.

The logic that leads to (2) applies to any variable that is cointegrated with the stock price. For example, the dividend–price ratio may be nonstationary because firms move away from dividends toward share repurchases as a way of returning earnings to stockholders. But if the earnings–price ratio, Y_t/P_t, is stationary, the average growth rate of earnings, $A(GY_t) = A((Y_t - Y_{t-1})/Y_{t-1})$, is an alternative estimate of the expected rate of capital gain. And $A(GY_t)$ can be combined with the average dividend yield to produce another estimate of the expected stock return:

$$A(RY_t) = A(D_t/P_{t-1}) + A(GY_t). \tag{3}$$

We call (3) the earnings growth model.[1]

We should be clear about the expected return concept targeted by (1), (2), and (3). D_t/P_t and Y_t/P_t vary through time because of variation in the conditional (point-in-time) expected stock return and the conditional expected growth rates of dividends and earnings (see, e.g., Campbell and Shiller (1989)). But if the stock return and the growth rates are stationary (they have constant unconditional means), D_t/P_t and Y_t/P_t are stationary. Then, like the average return (1), the dividend and earnings growth models (2) and (3) provide estimates of the unconditional expected stock return. In short, the focus of the paper is estimates of the unconditional expected stock return.

The estimate of the expected real equity premium for 1872 to 2000 from the dividend growth model (2) is 3.54 percent per year. The estimate from the average stock return, 5.57 percent, is almost 60 percent higher. The difference between the two is largely due to the last 50 years. The equity premium for 1872 to 1950 from the dividend growth model, 4.17 percent per year, is close to the estimate from the average return, 4.40 percent. In con-

[1] Motivated by the model in Lettau and Ludvigson (2001), one can argue that if the ratio of consumption to stock market wealth is stationary, the average growth rate of consumption is another estimate of the expected rate of capital gain. We leave this path to future work.

trast, the equity premium for 1951 to 2000 produced by the average return, 7.43 percent per year, is almost three times the estimate, 2.55 percent, from (2). The estimate of the expected real equity premium for 1951 to 2000 from the earnings growth model (3), 4.32 percent per year, is larger than the estimate from the dividend growth model (2). But the earnings growth estimate is still less than 60 percent of the estimate from the average return.

Three types of evidence suggest that the lower equity premium estimates for 1951 to 2000 from fundamentals are closer to the expected premium. (a) The estimates from fundamentals are more precise. For example, the standard error of the estimate from the dividend growth model is less than half the standard error of the estimate from the average return. (b) The Sharpe ratio for the equity premium from the average stock return for 1951 to 2000 is just about double that for 1872 to 1950. In contrast, the equity premium from the dividend growth model has a similar Sharpe ratio for 1872 to 1950 and 1951 to 2000. (c) Most important, valuation theory specifies relations among the book-to-market ratio, the return on investment, and the cost of equity capital (the expected stock return). The estimates of the expected stock return for 1951 to 2000 from the dividend and earnings growth models line up with other fundamentals in the way valuation theory predicts. But the book-to-market ratio and the return on investment suggest that the expected return estimate from the average stock return is too high.

Our motivation for the dividend growth model (2) is simpler and more general, but (2) can be viewed as the expected stock return estimate of the Gordon (1962) model. Our work is thus in the spirit of a growing literature that uses valuation models to estimate expected returns (e.g., Blanchard (1993), Claus and Thomas (2001), and Gebhardt, Lee, and Swaminathan (2001)). Claus and Thomas and Gebhardt, Lee, and Swaminathan use forecasts by security analysts to estimate expected cash flows. Their analyst forecasts cover short periods (1985 to 1998 and 1979 to 1995). We use realized dividends and earnings from 1872 to 2000. This 129-year period provides a long perspective, which is important for judging the competing expected return estimates from fundamentals and realized stock returns. Moreover, though the issue is controversial (Keane and Runkle (1998)), Claus and Thomas find that analyst forecasts are biased; they tend to be substantially above observed growth rates. The average growth rates of dividends and earnings we use are unbiased estimates of expected growth rates.

Like us, Blanchard (1993) uses dividend growth rates to estimate the expected rate of capital gain, which he combines with an expected dividend yield to estimate the expected stock return. But his focus is different and his approach is more complicated than ours. He is interested in the path of the conditional expected stock return. His conditional expected return is the sum of the fitted values from time-series regressions of the realized dividend yield and a weighted average of 20 years of future dividend growth rates on four predetermined variables (the dividend yield, the real rate of capital gain, and the levels of interest rates and inflation). He focuses on describing the path of the conditional expected return in terms of his four explanatory variables.

In contrast, our prime interest is the unconditional expected return, which we estimate more simply as the sum of the average dividend yield and the average growth rate of dividends or earnings. This approach is valid if the dividend–price and earnings–price ratios are stationary. And we argue below that it continues to produce estimates of the average expected stock return when the price ratios are subject to reasonable forms of nonstationarity. Given its simplicity and generality, our approach is an attractive addition to the research toolbox for estimating the expected stock return.

Moreover, our focus is comparing alternative estimates of the unconditional expected stock return over the long 1872 to 2000 period, and explaining why the expected return estimates for 1951 to 2000 from fundamentals are much lower than the average return. Our evidence suggests that much of the high return for 1951 to 2000 is unexpected capital gain, the result of a decline in discount rates.

Specifically, the dividend–price and earnings–price ratios fall from 1950 to 2000; the cumulative percent capital gain for the period is more than three times the percent growth in dividends or earnings. All valuation models agree that the two price ratios are driven by expectations about future returns (discount rates) and expectations about dividend and earnings growth. Confirming Campbell (1991), Cochrane (1994), and Campbell and Shiller (1998), we find that dividend and earnings growth rates for 1950 to 2000 are largely unpredictable. Like Campbell and Shiller (1998), we thus infer that the decline in the price ratios is mostly due to a decline in expected returns. Some of this decline is probably expected, the result of reversion of a high 1950 conditional expected return to the unconditional mean. But most of the decline in the price ratios seems to be due to the unexpected decline of expected returns to ending values far below the mean.

The paper proceeds as follows. The main task, addressed in Sections I and II, is to compare and evaluate the estimates of the unconditional annual expected stock return provided by the average stock return and the dividend and earnings growth models. Section III then considers the issues that arise if the goal is to estimate the long-term expected growth of wealth, rather than the unconditional expected annual (simple) return. Section IV concludes.

I. The Unconditional Annual Expected Stock Return

Table I shows estimates of the annual expected real equity premium for 1872 to 2000. The market portfolio is the S&P 500 and its antecedents. The deflator is the Producer Price Index until 1925 (from Shiller (1989)) and the Consumer Price Index thereafter (from Ibbotson Associates). The risk-free interest rate is the annual real return on six-month commercial paper, rolled over at midyear. The risk-free rate and S&P earnings data are from Shiller, updated by Vuolteenaho (2000) and us. Beginning in 1925, we construct S&P book equity data from the book equity data in Davis, Fama, and French (2000), expanded to include all NYSE firms. The data on dividends, prices, and returns for 1872 to 1925 are from Shiller. Shiller's annual data on the

Table I

Real Equity Premium and Related Statistics for the S&P Portfolio

The inflation rate for year t is $Inf_t = L_t/L_{t-1} - 1$, where L_t is the price level at the end of year t. The real return for year t on six-month (three-month for the year 2000) commercial paper (rolled over at midyear) is F_t. The nominal values of book equity and price for the S&P index at the end of year t are b_t and p_t. Nominal S&P dividends and earnings for year t are d_t and y_t. Real rates of growth of dividends, earnings, and the stock price are $GD_t = (d_t/d_{t-1})*(L_{t-1}/L_t) - 1$, $GY_t = (y_t/y_{t-1})*(L_{t-1}/L_t) - 1$, and $GP_t = (p_t/p_{t-1})*(L_{t-1}/L_t) - 1$. The real dividend yield is $D_t/P_{t-1} = (d_t/p_{t-1})*(L_{t-1}/L_t)$. The real income return on investment is $Y_t/B_{t-1} = (1 + y_t/b_{t-1})*(L_{t-1}/L_t) - 1$. The dividend growth estimate of the real S&P return for t is $RD_t = D_t/P_{t-1} + GD_t$, the earnings growth estimate is $RY_t = D_t/P_{t-1} + GY_t$, and R_t is the realized real S&P return. The dividend and earnings growth estimates of the real equity premium for year t are $RXD_t = RD_t - F_t$ and $RXY_t = RY_t - F_t$, and $RX_t = R_t - F_t$ is the real equity premium from the realized real return. The Sharpe ratio for $RD_t - F_t$ (the mean of $RD_t - F_t$ divided by the standard deviation of R_t) is SD, SY is the Sharpe ratio for $RY_t - F_t$ (the mean of $RY_t - F_t$ divided by the standard deviation of R_t), and SR is the Sharpe ratio for $R_t - F_t$ (the mean of $R_t - F_t$ divided by the standard deviation of R_t). Except for the Sharpe ratios, all variables are expressed as percents, that is, they are multiplied by 100.

	Inf_t	F_t	D_t/P_{t-1}	GD_t	GY_t	GP_t	RD_t	RY_t	R_t	RXD_t	RXY_t	RX_t	SD	SY	SR
Means of annual values of variables															
1872–2000	2.16	3.24	4.70	2.08	NA	4.11	6.78	NA	8.81	3.54	NA	5.57	0.20	NA	0.31
1872–1950	0.99	3.90	5.34	2.74	NA	2.96	8.07	NA	8.30	4.17	NA	4.40	0.22	NA	0.23
1951–2000	4.00	2.19	3.70	1.05	2.82	5.92	4.74	6.51	9.62	2.55	4.32	7.43	0.15	0.25	0.44
Standard deviations of annual values of variables															
1872–2000	7.51	8.48	1.39	12.37	NA	17.83	12.56	NA	18.03	13.00	NA	18.51			
1872–1950	9.11	10.63	1.12	15.28	NA	18.48	15.41	NA	18.72	16.02	NA	19.57			
1951–2000	3.11	2.46	1.17	5.09	13.79	16.77	5.21	13.51	17.03	5.62	14.02	16.73			
Means of annual continuously compounded returns and growth rates															
1872–2000	1.86	2.87		1.34	NA	2.48			7.00						
1872–1950	0.59	3.33		1.60	NA	1.22			6.41						
1951–2000	3.88	2.14		0.92	1.89	4.46			7.94						

	b_t/p_t	RD_t	RY_t	R_t	Y_t/B_{t-1}
Means of annual values of variables					
1951–2000	0.66	4.74	6.51	9.62	7.60

level of the S&P (used to compute returns and other variables involving price) are averages of daily January values. The S&P dividend, price, and return data for 1926 to 2000 are from Ibbotson Associates, and the returns for 1926 to 2000 are true annual returns.

Without showing the details, we can report that the CRSP value-weight portfolio of NYSE, AMEX, and Nasdaq stocks produces average returns and dividend growth estimates of the expected return close to the S&P estimates for periods after 1925 when both indices are available. What one takes to be the risk-free rate has a bigger effect. For example, substituting the one-month Treasury bill rate for the six-month commercial paper rate causes estimates of the annual equity premium for 1951 to 2000 to rise by about one percent. But for our main task—comparing equity premium estimates from (1), (2), and (3)—differences in the risk-free rate are an additive constant that does not affect inferences.

One can estimate expected returns in real or nominal terms. Since portfolio theory says the goal of investment is consumption, real returns seem more relevant, and only results for real returns are shown. Because of suspicions about the quality of the price deflator during the early years of 1872 to 2000, we have replicated the results for nominal returns. They support all the inferences from real returns.

The dividend and earnings growth models (2) and (3) assume that the market dividend–price and earnings–price ratios are stationary. The first three annual autocorrelations of D_t/P_t for 1872 to 2000 are 0.73, 0.51, and 0.47. For the 1951 to 2000 period that occupies much of our attention, the autocorrelations are 0.83, 0.72, and 0.69. The autocorrelations are large, but their decay is roughly like that of a stationary first-order autoregression (AR1). This is in line with formal evidence (Fama and French (1988), Cochrane (1994), and Lamont (1998)) that the market dividend–price ratio is highly autocorrelated but slowly mean-reverting. S&P earnings data for the early years of 1872 to 2000 are of dubious quality (Shiller (1989)), so we estimate expected returns with the earnings growth model (3) only for 1951 to 2000. The first three autocorrelations of Y_t/P_t for 1951 to 2000, 0.80, 0.70, and 0.61, are again roughly like those of a stationary AR1.

We emphasize, however, that our tests are robust to reasonable nonstationarity of D_t/P_t and Y_t/P_t. It is not reasonable that the expected stock return and the expected growth rates of dividends and earnings that drive D_t/P_t and Y_t/P_t are nonstationary processes that can wander off to infinity. But nonstationarity of D_t/P_t and Y_t/P_t due to structural shifts in productivity or preferences that permanently change the expected return or the expected growth rates is reasonable. Such regime shifts are not a problem for the expected return estimates from (2) and (3), as long as D_t/P_t and Y_t/P_t mean-revert within regimes. If the regime shift is limited to expected dividend and earnings growth rates, the permanent change in expected growth rates is offset by a permanent change in the expected dividend yield, and (2) and (3) continue to estimate the (stationary) expected stock return. (An Appendix, available on request, provides an example.) If there is a permanent shift in the expected stock return, it is nonstationary, but like the average return in (1), the dividend and earnings growth models in (2) and (3) estimate the average expected return during the sample period.

Indeed, an advantage of the expected return estimates from fundamentals is that they are likely to be less sensitive than the average return to long-lived shocks to dividend and earnings growth rates or the expected stock return. For example, a permanent shift in the expected return affects the average dividend yield, which is common to the three expected return estimates, but it produces a shock to the capital gain term in the average return in (1) that is not shared by the estimates in (2) and (3). In short, the estimates of the expected stock return from fundamentals are likely to be more precise than the average stock return.

A. The Equity Premium

For much of the period from 1872 to 2000—up to about 1950—the dividend growth model and the average stock return produce similar estimates of the expected return. Thereafter, the two estimates diverge. To illustrate, Table I shows results for 1872 to 1950 (79 years) and 1951 to 2000 (50 years). The year 1950 is a big year, with a high real stock return (23.40 percent), and high dividend and earnings growth estimates of the return (29.96 percent and 24.00 percent). But because the three estimates of the 1950 return are similarly high, the ordering of expected return estimates, and the inferences we draw from them, are unaffected by whether 1950 is allocated to the earlier or the later period. Indeed, pushing the 1950 break-year backward or forward several years does not affect our inferences.

For the earlier 1872 to 1950 period, there is not much reason to favor the dividend growth estimate of the expected stock return over the average return. Precision is not an issue; the standard errors of the two estimates are similar (1.74 percent and 2.12 percent), the result of similar standard deviations of the annual dividend growth rate and the rate of capital gain, 15.28 percent and 18.48 percent. Moreover, the dividend growth model and the average return provide similar estimates of the expected annual real return for 1872 to 1950, 8.07 percent and 8.30 percent. Given similar estimates of the expected return, the two approaches produce similar real equity premiums for 1872 to 1950, 4.17 percent (dividend growth model) and 4.40 percent (stock returns).

The competition between the dividend growth model and the average stock return is more interesting for 1951 to 2000. The dividend growth estimate of the 1951 to 2000 expected return, 4.74 percent, is less than half the average return, 9.62 percent. The dividend growth estimate of the equity premium, 2.55 percent, is 34 percent of the estimate from returns, 7.43 percent. The 1951 to 2000 estimates of the expected stock return and the equity premium from the earnings growth model, 6.51 percent and 4.32 percent, are higher than for the dividend growth model. But they are well below the estimates from the average return, 9.62 percent and 7.43 percent.

B. Evaluating the Expected Return Estimates for 1951 to 2000

We judge that the estimates of the expected stock return for 1951 to 2000 from fundamentals are closer to the true expected value, for three reasons.

(a) The expected return estimates from the dividend and earnings growth models are more precise than the average return. The standard error of the dividend growth estimate of the expected return for 1951 to 2000 is 0.74 percent, versus 2.43 percent for the average stock return. Since earnings growth is more volatile than dividend growth, the standard error of the expected return from the earnings growth model, 1.93 percent, is higher than the estimate from the dividend growth model, but it is smaller than the 2.43 percent standard error of the average stock return. Claus and Thomas (2001) also argue that expected return estimates from fundamentals are more precise than average returns, but they provide no direct evidence.

(b) Table I shows Sharpe ratios for the three equity premium estimates. Only the average premium in the numerator of the Sharpe ratio differs for the three estimates. The denominator for all three is the standard deviation of the annual stock return. The Sharpe ratio for the dividend growth estimate of the equity premium for 1872 to 1950, 0.22, is close to that produced by the average stock return, 0.23. More interesting, the Sharpe ratio for the equity premium for 1951 to 2000 from the dividend growth model, 0.15, is lower than but similar to that for 1872 to 1950. The Sharpe ratio for the 1951 to 2000 equity premium from the earnings growth model, 0.25, is somewhat higher than the dividend growth estimate, 0.15, but it is similar to the estimates for 1872 to 1950 from the dividend growth model, 0.22, and the average return, 0.23.

In asset pricing theory, the Sharpe ratio is related to aggregate risk aversion. The Sharpe ratios for the 1872 to 1950 and 1951 to 2000 equity premiums from the dividend growth model and the earnings growth model suggest that aggregate risk aversion is roughly similar in the two periods. In contrast, though return volatility falls a bit, the equity premium estimate from the average stock return increases from 4.40 percent for 1872 to 1950 to 7.43 percent for 1951 to 2000, and its Sharpe ratio about doubles, from 0.23 to 0.44. It seems implausible that risk aversion increases so much from the earlier to the later period.

(c) Most important, the behavior of other fundamentals favors the dividend and earnings growth models. The average ratio of the book value of equity to the market value of equity for 1951 to 2000 is 0.66, the book-to-market ratio B_t/P_t is never greater than 1.12, and it is greater than 1.0 for only 6 years of the 50-year period. Since, on average, the market value of equity is substantially higher than its book value, it seems safe to conclude that, on average, the expected return on investment exceeds the cost of capital.

Suppose investment at time $t - 1$ generates a stream of equity earnings for t, $t + 1, \dots, t + N$ with a constant expected value. The average income return on book equity, $A(Y_t/B_{t-1})$, is then an estimate of the expected return on equity's share of assets. It is an unbiased estimate when N is infinite and it is upward biased when N is finite. In either case, if the expected return on investment exceeds the cost of capital, we should find that (except for sampling error) the average income return on book equity is greater than estimates of the cost of equity capital (the expected stock return):

$$A(Y_t/B_{t-1}) > E(R). \tag{4}$$

Table I shows that (4) is confirmed when we use the dividend and earnings growth models to estimate the expected real stock return for 1951 to 2000. The estimates of $E(R)$, 4.74 percent (dividend growth model) and 6.51 percent (earnings growth model), are below 7.60 percent, the average real income return on book equity, $A(Y_t/B_{t-1})$. In contrast, the average real stock return for 1951 to 2000, 9.62 percent, exceeds the average income return by more than 2 percent. An expected stock return that exceeds the expected income return on book equity implies that the typical corporate investment has a negative net present value. This is difficult to reconcile with an average book-to-market ratio substantially less than one.

To what extent are our results new? Using analyst forecasts of expected cash flows and a more complicated valuation model, Claus and Thomas (2001) produce estimates of the expected stock return for 1985 to 1998 far below the average return. Like us, they argue that the estimates from fundamentals are closer to the true expected return. We buttress this conclusion with new results on three fronts. (a) The long-term perspective provided by the evidence that, for much of the 1872 to 2000 period, average returns and fundamentals produce similar estimates of the expected return. (b) Direct evidence that the expected return estimates for 1951 to 2000 from fundamentals are more precise. (c) Sharpe ratios and evidence on how the alternative expected return estimates line up with the income return on investment. These new results provide support for the expected return estimates from fundamentals, and for the more specific inference that the average stock return for 1951 to 2000 is above the expected return.

II. Unexpected Capital Gains

Valuation theory suggests three potential explanations for why the 1951 to 2000 average stock return is larger than the expected return. (a) Dividend and earnings growth for 1951 to 2000 is unexpectedly high. (b) The expected (post-2000) growth rates of dividends and earnings are unexpectedly high. (c) The expected stock return (the equity discount rate) is unexpectedly low at the end of the sample period.

A. Is Dividend Growth for 1951 to 2000 Unexpectedly High?

If the prosperity of the United States over the last 50 years was not fully anticipated, dividend and earnings growth for 1951 to 2000 exceed 1950 expectations. Such unexpected in-sample growth produces unexpected capital gains. But it does not explain why the average return for 1951 to 2000 (the average dividend yield plus the average rate of capital gain) is so much higher than the expected return estimates from fundamentals (the average dividend yield plus the average growth rate of dividends or earnings). To see the point, note that unexpected in-sample dividend and earnings growth do not affect either the 1950 or the 2000 dividend–price and earnings–price ratios. (The 2000 ratios depend on post-2000 expected returns and growth rates.) Suppose D_t/P_t and E_t/P_t were the same in 1950 and 2000. Then the total percent growth in dividends and earnings during the period would be the same as the percent growth in the stock price. And (1), (2), and (3) would provide similar estimates of the expected stock return.

It is worth dwelling on this point. There is probably survivor bias in the U.S. average stock return for 1872 to 1950, as well as for 1951 to 2000. During the 1872 to 2000 period, it was not a foregone conclusion that the U.S. equity market would survive several financial panics, the Great Depression, two world wars, and the cold war. The average return for a market that survives many potentially cataclysmic challenges is likely to be higher than the expected return (Brown, Goetzmann, and Ross (1995)). But if the positive bias shows up only as higher than expected dividend and earnings growth during the sample period, there is similar survivor bias in the expected return estimates from fundamentals—a problem we do not solve. Our more limited goal is to explain why the average stock return for 1951 to 2000 is so high relative to the expected return estimates from the dividend and earnings growth models.

Since unexpected growth for 1951 to 2000 has a similar effect on the three expected return estimates, the task of explaining why the estimates are so different falls to the end-of-sample values of future expected returns and expected dividend and earnings growth. We approach the problem by first looking for evidence that expected dividend or earnings growth is high at the end of the sample period. We find none. We then argue that the large spread of capital gains over dividend and earnings growth for 1951 to 2000, or equivalently, the low end-of-sample dividend–price and earnings–price ratios, are due to an unexpected decline in expected stock returns to unusually low end-of-sample values.

B. Are Post-2000 Expected Dividend and Earnings Growth Rates Unusually High?

The behavior of dividends and earnings provides little evidence that rationally assessed (i.e., true) long-term expected growth is high at the end of the sample period. If anything, the growth rate of real dividends declines during the 1951 to 2000 period (Table II). The average growth rate for the first two decades, 1.60 percent, is higher than the average growth rates for the last three, 0.68 percent. The regressions in Table III are more formal evidence on the best forecast of post-2000 real dividend growth rates. Re-

Table II

Means of Simple Real Equity Premium and Related Statistics for the S&P Portfolio for 10-year Periods

The inflation rate for year t is $Inf_t = L_t/L_{t-1} - 1$, where L_t is the price level at the end of year t. The real return for year t on six-month (three-month for the year 2000) commercial paper (rolled over at midyear) is F_t. The nominal price of the S&P index at the end of year t is p_t. Nominal S&P dividends and earnings for year t are d_t and y_t. Real rates of growth of dividends, earnings, and the stock price are $GD_t = (d_t/d_{t-1})*(L_{t-1}/L_t) - 1$, $GY_t = (y_t/y_{t-1})*(L_{t-1}/L_t) - 1$, and $GP_t = (p_t/p_{t-1})*(L_{t-1}/L_t) - 1$. The real dividend yield is $D_t/P_{t-1} = (d_t/p_{t-1})*(L_{t-1}/L_t)$. The dividend growth estimate of the real S&P return for t is $RD_t = D_t/P_{t-1} + GD_t$, the earnings growth estimate is $RY_t = D_t/P_{t-1} + GY_t$, and R_t is the realized real S&P return. The dividend and earnings growth estimates of the real equity premium for year t are $RXD_t = RD_t - F_t$ and $RXY_t = RY_t - F_t$, and $RX_t = R_t - F_t$ is the real equity premium from the realized real return. All variables are expressed as percents, that is, they are multiplied by 100.

	Inf_t	F_t	D_t/P_{t-1}	GD_t	GY_t	GP_t	RD_t	RY_t	R_t	RXD_t	RXY_t	RX_t
1872–1880	−2.77	9.86	6.29	4.62	NA	7.13	10.91	NA	13.42	1.06	NA	3.56
1881–1890	−1.72	7.23	5.04	0.69	NA	0.04	5.73	NA	5.08	−1.51	NA	−2.15
1891–1900	0.18	5.08	4.40	4.49	NA	4.75	8.89	NA	9.15	3.81	NA	4.08
1901–1910	1.95	3.18	4.45	3.25	NA	2.33	7.70	NA	6.78	4.52	NA	3.60
1911–1920	6.82	0.82	5.70	−3.43	NA	−6.52	2.27	NA	−0.83	1.45	NA	−1.64
1921–1930	−1.70	7.41	5.72	9.07	NA	11.83	14.78	NA	17.54	7.37	NA	10.13
1931–1940	−1.23	2.80	5.31	0.36	NA	2.21	5.67	NA	7.52	2.87	NA	4.72
1941–1950	6.04	−4.57	5.90	3.02	NA	2.33	8.91	NA	8.22	13.48	NA	12.79
1951–1960	1.79	1.05	4.68	1.22	0.61	10.64	5.90	5.30	15.32	4.85	4.24	14.27
1961–1970	2.94	2.27	3.21	1.98	2.07	2.69	5.19	5.27	5.90	2.92	3.01	3.63
1971–1980	8.11	−0.30	4.04	−0.86	3.47	−1.92	3.18	7.50	2.12	3.48	7.80	2.42
1981–1990	4.51	5.32	4.19	2.32	0.37	5.40	6.51	4.56	9.59	1.19	−0.75	4.28
1991–2000	2.68	2.61	2.36	0.58	7.58	12.80	2.94	9.94	15.16	0.32	7.32	12.54

Table III

Regressions to Forecast Real Dividend and Earnings Growth Rates, GD_t and GY_t

The price level at the end of year t is L_t. The nominal values of book equity and price for the S&P index at the end of year t are b_t and p_t. Nominal S&P dividends and earnings for year t are d_t and y_t. The real dividend and earnings growth rates for year t are $GD_t = (d_t/d_{t-1})*(L_{t-1}/L_t) - 1$ and $GY_t = (y_t/y_{t-1})*(L_{t-1}/L_t) - 1$, and R_t is the realized real return on the S&P portfolio for year t. The regression intercept is *Int*, and t-Stat is the regression coefficient (*Coef*) divided by its standard error. The regression R^2 is adjusted for degrees of freedom. Except for the dividend payout ratio, d_t/y_t, all variables are expressed as percents, that is, they are multiplied by 100.

Panel A: One Year: The Regressions Forecast Real Dividend Growth, GD_t, with Variables Known at $t-1$

	Int	d_{t-1}/y_{t-1}	d_{t-1}/p_{t-1}	GD_{t-1}	GD_{t-2}	GD_{t-3}	R_{t-1}	R_{t-2}	R_{t-3}	R^2
1875–1950, $N = 76$ years										
Coef	29.56	−23.12	−2.63	−0.12	−0.07	−0.03	0.22	0.13	0.09	0.38
t-Stat	3.22	−3.17	−1.77	−1.08	−0.64	−0.29	2.24	1.37	1.01	
1951–2000, $N = 50$ years										
Coef	−2.16	2.97	0.11	−0.07	−0.20	−0.06	0.11	0.07	0.01	0.01
t-Stat	−0.40	0.33	0.16	−0.45	−1.57	−0.45	2.17	1.33	0.22	

Panel B: Two Years: The Regressions Forecast Real Dividend Growth, GD_t, with Variables Known at $t-2$

	Int	d_{t-2}/y_{t-2}	d_{t-2}/p_{t-2}	GD_{t-2}	GD_{t-3}	R_{t-2}	R_{t-3}	R^2
1875–1950, N = 76 years								
Coef	6.61	−11.60	0.31	−0.26	0.05	0.24	0.11	0.07
t-Stat	0.64	−1.28	0.18	−2.02	0.39	2.03	1.00	
1951–2000, N = 50 years								
Coef	−4.11	7.62	0.32	−0.14	−0.03	0.05	−0.01	−0.05
t-Stat	−0.73	0.81	0.46	−1.13	−0.28	0.99	−0.16	

Panel C: One Year: The Regressions Forecast Real Earnings Growth, GY_t, with Variables Known at $t-1$

	Int	Y_{t-1}/B_{t-2}	d_{t-1}/y_{t-1}	y_{t-1}/p_{t-1}	GY_{t-1}	GY_{t-2}	GY_{t-3}	R_{t-1}	R_{t-2}	R_{t-3}	R^2
1951–2000, N = 50 years											
Coef	5.48	0.11	13.06	−1.36	0.21	−0.13	−0.31	0.28	−0.25	0.03	0.40
t-Stat	0.33	0.11	0.52	−1.91	1.17	−0.89	−2.64	2.39	−2.18	0.26	

Panel D: Two Years: The Regressions Forecast Real Earnings Growth, GY_t, with Variables Known at $t-2$

	Int	Y_{t-2}/B_{t-3}	d_{t-2}/y_{t-2}	y_{t-2}/p_{t-2}	GY_{t-2}	GY_{t-3}	R_{t-2}	R_{t-3}	R^2
1951–2000, N = 50 years									
Coef	−7.60	0.46	2.05	−0.74	−0.16	−0.39	−0.31	−0.12	0.23
t-Stat	−0.43	1.66	0.76	−1.02	−0.92	−2.54	−2.59	−0.97	

gressions are shown for forecasts one year ahead (the explanatory variables for year t dividend growth are known at the end of year $t - 1$) and two years ahead (the explanatory variables are known at the end of year $t - 2$).

The regression for 1875 to 1950 suggests strong forecast power one year ahead. The slopes on the lagged payout ratio, the dividend–price ratio, and the stock return are close to or more than two standard errors from zero, and the regression captures 38 percent of the variance of dividend growth. Even in the 1875 to 1950 period, however, power to forecast dividend growth does not extend much beyond a year. When dividend growth for year t is explained with variables known at the end of year $t - 2$, the regression R^2 falls from 0.38 to 0.07. Without showing the details, we can report that extending the forecast horizon from two to three years causes all hint of forecast power to disappear. Thus, for 1875 to 1950, the best forecast of dividend growth more than a year or two ahead is the historical average growth rate.

We are interested in post-2000 expected dividend growth, and even the short-term forecast power of the dividend regressions for 1872 to 1950 evaporates in the 1951 to 2000 period. The lagged stock return has some information ($t = 2.17$) about dividend growth one year ahead. But the 1951 to 2000 regression picks up only one percent of the variance of dividend growth. And forecast power does not improve for longer forecast horizons. Our evidence that dividend growth is essentially unpredictable during the last 50 years confirms the results in Campbell (1991), Cochrane (1991, 1994), and Campbell and Shiller (1998). If dividend growth is unpredictable, the historical average growth rate is the best forecast of future growth.

Long-term expected earnings growth also is not unusually high in 2000. There is no clear trend in real earnings growth during the 1951 to 2000 period. The most recent decade, 1991 to 2000, produces the highest average growth rate, 7.58 percent per year (Table II). But earnings growth is volatile. The standard errors of 10-year average growth rates vary around 5 percent. It is thus not surprising that 1981 to 1990, the decade immediately preceding 1991 to 2000, produces the lowest average real earnings growth rate, 0.37 percent per year.

The regressions in Table III are formal evidence on the predictability of earnings growth during the 1951 to 2000 period. There is some predictability of near-term growth, but it is largely due to transitory variation in earnings that is irrelevant for forecasting long-term earnings. In the 1951 to 2000 regression to forecast earnings growth one year ahead, the slope on the first lag of the stock return is positive (0.28, $t = 2.39$), but the slope on the second lag is negative (-0.25, $t = -2.18$) and about the same magnitude. Thus, the prediction of next year's earnings growth from this year's return is reversed the following year. In the one-year forecast regression for 1951 to 2000, the only variable other than lagged returns with power to forecast earnings growth ($t = -2.64$) is the third lag of earnings growth. But the slope is negative, so it predicts that the strong earnings growth of recent years is soon to be reversed.

In the 1951 to 2000 regression to forecast earnings one year ahead, there is a hint ($t = -1.91$) that the low earnings–price ratio at the end of the period implies higher than average expected growth one year ahead. But the effect peters out quickly; the slope on the lagged earnings–price ratio in the regression to forecast earnings growth two years ahead is -1.02 standard errors from zero. The only variables with forecast power two years ahead are the second lag of the stock return and the third lag of earnings growth. But the slopes on these variables are negative, so again the 2000 prediction is that the strong earnings growth of recent years is soon to be reversed. And again, regressions (not shown) confirm that forecast power for 1951 to 2000 does not extend beyond two years. Thus, beyond two years, the best forecast of earnings growth is the historical average growth rate.

In sum, the behavior of dividends for 1951 to 2000 suggests that future growth is largely unpredictable, so the historical mean growth rate is a near optimal forecast of future growth. Earnings growth for 1951 to 2000 is somewhat predictable one and two years ahead, but the end-of-sample message is that the recent high growth rates are likely to revert quickly to the historical mean. It is also worth noting that the market survivor bias argument of Brown, Goetzmann, and Ross (1995) suggests that past average growth rates are, if anything, upward biased estimates of future growth. In short, we find no evidence to support a forecast of strong future dividend or earnings growth at the end of our sample period.

C. Do Expected Stock Returns Fall during the 1951 to 2000 Period?

The S&P dividend–price ratio, D_t/P_t, falls from 7.18 percent at the end of 1950 to a historically low 1.22 percent at the end of 2000 (Figure 1). The growth in the stock price, P_{2000}/P_{1950}, is thus 5.89 times the growth in dividends, D_{2000}/D_{1950}. The S&P earnings–price ratio, Y_t/P_t, falls from 13.39 percent at the end of 1950 to 3.46 percent at the end of 2000, so the percent capital gain of the last 50 years is 3.87 times the percent growth in earnings. (Interestingly, almost all of the excess capital gain occurs in the last 20 years; Figure 1 shows that the 1979 earnings–price ratio, 13.40 percent, is nearly identical to the 13.39 percent value of 1950.)

All valuation models say that D_t/P_t and E_t/P_t are driven by expected future returns (discount rates) and expectations about future dividend and earnings growth. Our evidence suggests that rational forecasts of long-term dividend and earnings growth rates are not unusually high in 2000. We conclude that the large spread of capital gains for 1951 to 2000 over dividend and earnings growth is largely due to a decline in the expected stock return.

Some of the decline in D_t/P_t and E_t/P_t during 1951 to 2000 is probably anticipated in 1950. The dividend–price ratio for 1950, 7.18 percent, is high (Figure 1). The average for 1872 to 2000 is 4.64 percent. If D_t/P_t is mean-reverting, the expectation in 1950 of the yield in 2000 is close to the unconditional mean, say 4.64 percent. The actual dividend–price ratio for 2000 is

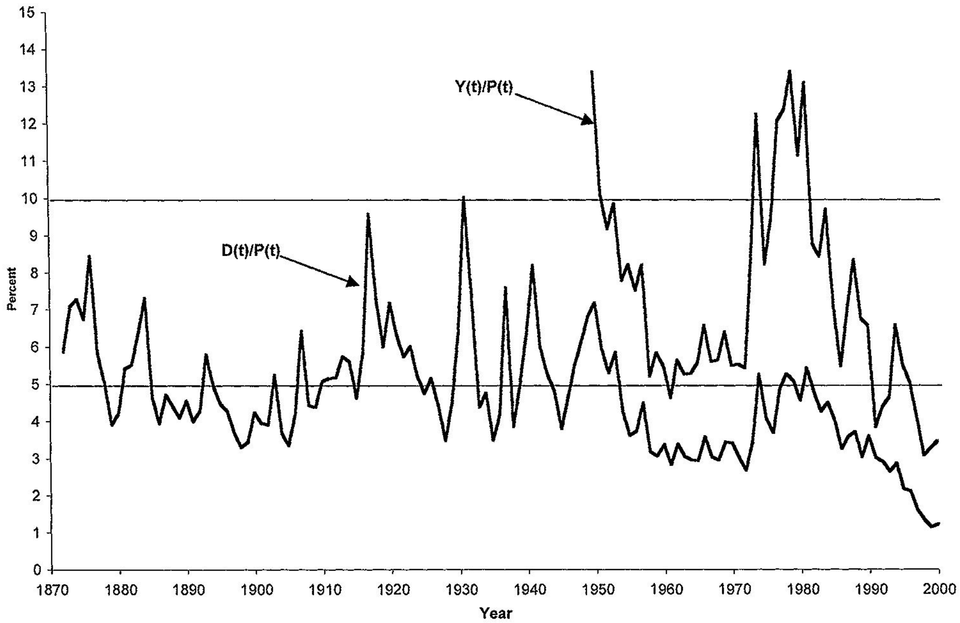

Figure 1. Dividend–price and earnings–price ratios.

1.22 percent. The 2000 stock price is thus 4.64/1.22 = 3.80 times what it would be if the dividend yield for 2000 hit the historical mean. Roughly speaking, this unexpected capital gain adds about 2.67 percent to the compound annual return for 1951 to 2000.

Similarly, part of the large difference between the 1951 to 2000 capital gain and the growth in earnings is probably anticipated in 1950. The 13.39 percent value of Y_t/P_t in 1950 is high relative to the mean for 1951 to 2000, 7.14 percent. If the earnings–price ratio is stationary, the expectation in 1950 of Y_t/P_t for 2000 is close to the unconditional mean, say 7.14 percent. The actual Y_t/P_t for 2000 is 3.46 percent. Thus, the 2000 stock price is 7.14/3.46 = 2.06 times what it would be if the ratio for 2000 hit the 7.14 percent average value for 1951 to 2000. Roughly speaking, this estimate of the unexpected capital gain adds about 1.45 percent to the compound annual return for the 50-year period.

In short, the percent capital gain for 1951 to 2000 is several times the growth of dividends or earnings. The result is historically low dividend–price and earnings–price ratios at the end of the period. Since the ratios are high in 1950, some of their subsequent decline is probably expected, but much of it is unexpected. Given the evidence that rational forecasts of long-term growth rates of dividends and earnings are not high in 2000, we conclude that the unexpected capital gains for 1951 to 2000 are largely due to a decline in the discount rate. In other words, the low end-of-sample price ratios imply low (rationally assessed, or true) expected future returns.

Like us, Campbell (1991), Cochrane (1994), and Campbell and Shiller (1998) find that, for recent periods, dividend and earnings growth are largely unpredictable, so variation in dividend–price and earnings–price ratios is largely due to the expected stock return. The samples in Campbell (1991) and Cochrane (1994) end in 1988 (before the strong subsequent returns that produce sharp declines in the price ratios), and they focus on explaining, in general terms, how variation in D_t/P_t splits between variation in the expected stock return and expected dividend growth. Campbell and Shiller (1998) focus on the low expected future returns implied by the low price ratios of recent years.

In contrast, we are more interested in what the decline in the price ratios says about past returns, specifically, that the average return for 1951 to 2000 is above the expected return. And this inference does not rest solely on the information in price ratios. We buttress it with two types of novel evidence. (a) The perspective from our long sample period that, although the average stock return for 1951 to 2000 is much higher than expected return estimates from fundamentals, the two approaches produce similar estimates for 1872 to 1950. (b) Evidence from Sharpe ratios, the book-to-market ratio, and the income return on investment, which also suggests that the average return for 1951 to 2000 is above the expected value.

III. Estimating the Expected Stock Return: Issues

There are two open questions about our estimates of the expected stock return. (a) In recent years the propensity of firms to pay dividends declines and stock repurchases surge. How do these changes in dividend policy affect our estimates of the expected return? (b) Under rather general conditions, the dividend and earnings growth models (2) and (3) provide estimates of the expected stock return. Are the estimates biased and does the bias depend on the return horizon? This section addresses these issues.

A. Repurchases and the Declining Incidence of Dividend Payers

Share repurchases surge after 1983 (Bagwell and Shoven (1989) and Dunsby (1995)), and, after 1978, the fraction of firms that do not pay dividends steadily increases (Fama and French (2001)). More generally, dividends are a policy variable, and changes in policy can raise problems for estimates of the expected stock return from the dividend growth model. There is no problem in the long-term, as long as dividend policies stabilize and the dividend–price ratio resumes its mean-reversion, though perhaps to a new mean. (An Appendix, available on request, provides an example involving repurchases.) But there can be problems during transition periods. For example, if the fraction of firms that do not pay dividends steadily increases, the market dividend–price ratio is probably nonstationary; it is likely to decline over time, and the dividend growth model is likely to underestimate the expected stock return.

Fortunately, the earnings growth model is not subject to the problems posed by drift in dividend policy. The earnings growth model provides an estimate of the expected stock return when the earnings–price ratio is stationary. And as discussed earlier, the model provides an estimate of the average expected return during the sample period when there are permanent shifts in the expected value of Y_t/P_t, as long as the ratio mean-reverts within regimes.

The earnings growth model is not, however, clearly superior to the dividend growth model. The standard deviation of annual earnings growth rates for 1951 to 2000 (13.79 percent, versus 5.09 percent for dividends) is similar to that of capital gains (16.77 percent), so much of the precision advantage of using fundamentals to estimate the expected stock return is lost. We see next that the dividend growth model has an advantage over the earnings growth model and the average stock return if the goal is to estimate the long-term expected growth of wealth.

B. The Investment Horizon

The return concept in discrete time asset pricing models is a one-period simple return, and our empirical work focuses on the one-year return. But many, if not most, investors are concerned with long-term returns, that is, terminal wealth over a long holding period. Do the advantages and disadvantages of different expected return estimates depend on the return horizon? This section addresses this question.

B.1. The Expected Annual Simple Return

There is downward bias in the estimates of the expected annual simple return from the dividend and earnings growth models—the result of a variance effect. The expected value of the dividend growth estimate of the expected return, for example, is the expected value of the dividend yield plus the expected value of the annual simple dividend growth rate. The expected annual simple return is the expected value of the dividend yield plus the expected annual simple rate of capital gain. If the dividend–price ratio is stationary, the compound rate of capital gain converges to the compound dividend growth rate as the sample period increases. But because the dividend growth rate is less volatile than the rate of capital gain, the expected simple dividend growth rate is less than the expected simple rate of capital gain.

The standard deviation of the annual simple rate of capital gain for 1951 to 2000 is 3.29 times the standard deviation of the annual dividend growth rate (Table I). The resulting downward bias of the average dividend growth rate as an estimate of the expected annual simple rate of capital gain is roughly 1.28 percent per year (half the difference between the variances of the two growth rates). Corrected for this bias, the dividend growth estimate of the equity premium in the simple returns of 1951 to 2000 rises from 2.55 to 3.83 percent (Table IV), which is still far below the estimate from the average return, 7.43 percent. Since the earnings growth rate and the annual rate of capital gain have similar standard deviations for 1951 to 2000,

Table IV

Estimates of the Real Equity Premium in Simple Annual and Long-term Returns: 1951 to 2000

The inflation rate for year t is $Inf_t = L_t/L_{t-1}$, where L_t is the price level at the end of year t. The real return for year t on six-month (three-month for the year 2000) commercial paper (rolled over at midyear) is F_t. The nominal value of the S&P index at the end of year t is p_t. Nominal S&P dividends and earnings for year t are d_t and y_t. Real rates of growth of dividends, earnings, and the stock price are $GD_t = (d_t/d_{t-1})*(L_{t-1}/L_t) - 1$, $GY_t = (y_t/y_{t-1})*(L_{t-1}/L_t) - 1$, and $GP_t = (p_t/p_{t-1})*(L_{t-1}/L_t) - 1$. The real dividend yield is $D_t/P_{t-1} = (d_t/p_{t-1})*(L_{t-1}/L_t)$. The dividend growth estimate of the real S&P return for t is $RD_t = D_t/P_{t-1} + GD_t$, the earnings growth estimate is $RY_t = D_t/P_{t-1} + GY_t$, and R_t is the realized real S&P return. The dividend and earnings growth estimates of the real equity premium for year t are $RXD_t = RD_t - F_t$ and $RXY_t = RY_t - F_t$, and $RX_t = R_t - F_t$ is the real equity premium from the realized real return. The average values of the equity premium estimates are $A(RXD_t)$, $A(RXY_t)$, and $A(RX_t)$. The first column of the table shows unadjusted estimates of the annual simple equity premium. The second column shows bias-adjusted estimates of the annual premium. The bias adjustment is one-half the difference between the variance of the annual rate of capital gain and the variance of either the dividend growth rate or the earnings growth rate. The third column shows bias-adjusted estimates of the expected equity premium relevant if one is interested in the long-term growth rate of wealth. The bias adjustment is one-half the difference between the variance of the annual dividend growth rate and the variance of either the growth rate of earnings or the rate of capital gain. The equity premiums are expressed as percents.

		Bias-adjusted	
	Unadjusted	Annual	Long-term
$A(RXD_t)$	2.55	3.83	2.55
$A(RXY_t)$	4.32	4.78	3.50
$A(RX_t)$	7.43	7.43	6.16

13.79 percent and 16.77 percent (Table I), the bias of the earnings growth estimate of the expected return is smaller (0.46 percent). Corrected for bias, the estimate of the equity premium for 1951 to 2000 from the earnings growth model rises from 4.32 to 4.78 percent (Table IV), which again is far below the 7.43 percent estimate from the average return.

B.2. Long-term Expected Wealth

The (unadjusted) estimate of the expected annual simple return from the dividend growth model is probably the best choice if we are concerned with the long-term expected wealth generated by the market portfolio. The annual dividend growth rates of 1951 to 2000 are essentially unpredictable. If the dividend growth rate is serially uncorrelated, the expected value of the compounded dividend growth rate is the compounded expected simple growth rate:

$$E\left[\prod_{t=1}^{T}(1 + GD_t)\right] = [1 + E(GD)]^T. \tag{5}$$

And if the dividend–price ratio is stationary, for long horizons the expected compounded dividend growth rate is the expected compounded rate of capital gain:

$$E\left[\prod_{t=1}^{T}(1 + GD_t)\right] = E\left[\prod_{t=1}^{T}(1 + GP_t)\right]. \tag{6}$$

Thus, when the horizon T is long, compounding the true expected annual simple return from the dividend growth model produces an unbiased estimate of the expected long-term return:

$$[1 + E(RD)]^T = E\left[\prod_{t=1}^{T}(1 + R_t)\right]. \tag{7}$$

In contrast, if the dividend growth rate is unpredictable and the dividend–price ratio is stationary, part of the higher volatility of annual rates of capital gain is transitory, the result of a mean-reverting expected annual return (Cochrane (1994)). Thus, compounding even the true unconditional expected annual simple return, $E(R)$, yields an upward biased measure of the expected compounded return:

$$[1 + E(R)]^T > E\left[\prod_{t=1}^{T}(1 + R_t)\right]. \tag{8}$$

There is a similar problem in using the average (simple) earnings growth rate to estimate long-term expected wealth. The regressions in Table III suggest that the predictability of earnings growth for 1951 to 2000 is due to transitory variation in earnings. As a result, annual earnings growth is 2.71 times more volatile than dividend growth (Table I). The compound growth rate of earnings for 1951 to 2000, 1.89 percent, is 2.05 times the compound dividend growth rate, 0.92 percent. But because earnings are more volatile, the average simple growth rate of earnings, 2.82 percent, is 2.69 times the average simple growth rate of dividends, 1.05 percent. As a result, the average simple growth rate of earnings produces an upward biased estimate of the compound rate of growth of long-term expected wealth.

We can correct the bias by subtracting half the difference between the variance of earnings growth and the variance of dividend growth (0.82 percent) from the average earnings growth rate. The estimate of the expected rate of capital gain provided by this adjusted average growth rate of earnings is 2.00 percent per year. Using this adjusted average growth rate of earnings, the earnings growth estimate of the expected real stock return for 1951 to 2000 falls from 6.51 to 5.69 percent. The estimate of the equity premium falls from 4.32 to 3.50 percent (Table IV), which is closer to the 2.55 percent obtained when the average dividend growth rate is used to estimate the expected rate of capital gain. Similarly, adjusting for the effects of transitory return volatility causes the estimate of the equity premium from realized stock returns to fall from 7.43 to 6.16 percent, which is still far above the bias-adjusted estimate of the earnings growth model (3.50 percent) and the estimate from the dividend growth model (2.55 percent).

Finally, we only have estimates of the expected growth rates of dividends and earnings and the expected rate of capital gain. Compounding estimates rather than true expected values adds upward bias to measures of expected long-term wealth (Blume (1974)). The bias increases with the imprecision of the estimates. This is another reason to favor the more precise estimate of the expected stock return from the dividend growth model over the earnings growth estimate or the estimate from the average stock return.

IV. Conclusions

There is a burgeoning literature on the equity premium. Our main additions are on two fronts. (a) A long (1872 to 2000) perspective on the competing estimates of the unconditional expected stock return from fundamentals (the dividend and earnings growth models) and the average stock return. (b) Evidence (estimates of precision, Sharpe ratios, and the behavior of the book-to-market ratio and the income return on investment) that allows us to choose between the expected return estimates from the two approaches.

Specifically, the dividend growth model and the realized average return produce similar real equity premium estimates for 1872 to 1950, 4.17 percent and 4.40 percent. For the half-century from 1951 to 2000, however, the equity premium estimates from the dividend and earnings growth models, 2.55 percent and 4.32 percent, are far below the estimate from the average return, 7.43 percent.

We argue that the dividend and earnings growth estimates of the equity premium for 1951 to 2000 are closer to the true expected value. This conclusion is based on three results.

(a) The estimates from fundamentals, especially the estimate from the dividend growth model, are more precise; they have lower standard errors than the estimate from the average return.

(b) The appealing message from the dividend and earnings growth models is that aggregate risk aversion (as measured by the Sharpe ratio for the equity premium) is on average roughly similar for the 1872 to 1949 and 1950 to 1999 periods. In contrast, the Sharpe ratio for the equity premium from the average return just about doubles from the 1872 to 1950 period to the 1951 to 2000 period.

(c) Most important, the average stock return for 1951 to 2000 is much greater than the average income return on book equity. Taken at face value, this says that investment during the period is on average unprofitable (its expected return is less than the cost of capital). In contrast, the lower estimates of the expected stock return from the dividend and earnings growth models are less than the income return on investment, so the message is that investment is on average profitable. This is more consistent with book-to-market ratios that are rather consistently less than one during the period.

If the average stock return for 1951 to 2000 exceeds the expected return, stocks experience unexpected capital gains. What is the source of the gains? Growth rates of dividends and earnings are largely unpredictable, so there is no basis for extrapolating unusually high long-term future growth. This leaves a decline in the expected stock return as the prime source of the unexpected capital gain. In other words, the high return for 1951 to 2000 seems to be the result of low expected future returns.

Many papers suggest that the decline in the expected stock return is in part permanent, the result of (a) wider equity market participation by individuals and institutions, and (b) lower costs of obtaining diversified equity portfolios from mutual funds (Diamond (1999), Heaton and Lucas (1999), and Siegel (1999)). But there is also evidence that the expected stock return is slowly mean reverting (Fama and French (1989) and Cochrane (1994)). Moreover, there are two schools of thought on how to explain the variation in expected returns. Some attribute it to rational variation in response to macroeconomic factors (Fama and French (1989), Blanchard (1993), and Cochrane (1994)), while others judge that irrational swings in investor sentiment are the prime moving force (e.g., Shiller (1989)). Whatever the story for variation in the expected return, and whether it is temporary or partly permanent, the message from the low end-of-sample dividend–price and earnings–price ratios is that we face a period of low (true) expected returns.

Our main concern, however, is the unconditional expected stock return, not the end-of-sample conditional expected value. Here there are some nuances. If we are interested in the unconditional expected annual simple return, the estimates for 1951 to 2000 from fundamentals are downward biased. The bias is rather large when the average growth rate of dividends is used to estimate the expected rate of capital gain, but it is small for the average growth rate of earnings. On the other hand, if we are interested in the long-term expected growth of wealth, the dividend growth model is probably best, and the average stock return and the earnings growth estimate of the expected return are upward biased. But our bottom line inference does not depend on whether one is interested in the expected annual simple return or long-term expected wealth. In either case, the bias-adjusted expected return estimates for 1951 to 2000 from fundamentals are a lot (more than 2.6 percent per year) lower than bias-adjusted estimates from realized returns. (See Table IV.) Based on this and other evidence, our main message is that the unconditional expected equity premium of the last 50 years is probably far below the realized premium.

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[1] **Consumption, Aggregate Wealth, and Expected Stock Returns**
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Markets & Finance June 10, 2010, 5:00PM EST

For Analysts, Things Are Always Looking Up

They're raising earnings estimates for U.S. companies at a record pace

By Roben Farzad

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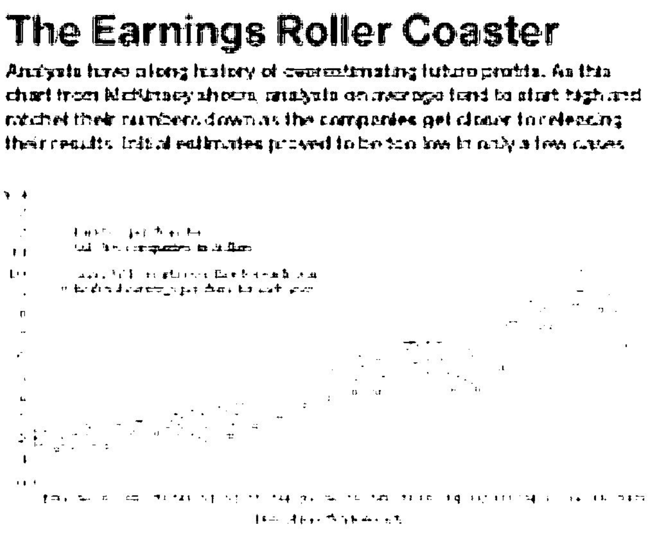

For years, the rap on Wall Street securities analysts was that they were shills, reflexively producing upbeat research on companies they cover to help their employers win investment banking business. The dynamic was well understood: Let my bank take your company public, or advise it on this acquisition, and—wink, wink—I will recommend your stock through thick or thin. After the Internet bubble burst, that was supposed to change. In April 2003 the Securities & Exchange Commission reached a settlement with 10 Wall Street firms in which they agreed, among other things, to separate research from investment banking.

Seven years on, Wall Street analysts remain a decidedly optimistic lot. Some economists look at the global economy and see troubles—the European debt crisis, persistently high unemployment worldwide, and housing woes in the U.S. Stock analysts as a group seem unfazed. Projected 2010 profit growth for companies in the Standard & Poor's 500-stock index has climbed seven percentage points this quarter, to

34 percent, data compiled by Bloomberg show. According to Sanford C. Bernstein (AB), that's the fastest pace since 1980, when the Dow Jones industrial average was quoted in the hundreds and Nancy Reagan was getting ready to order new window treatments for the Oval Office.

Among the companies analysts expect to excel: Intel (INTL) is projected to post an increase in net income of 142 percent this year. Caterpillar, a multinational that gets much of its revenue abroad, is expected to boost its net income by 47 percent this year. Analysts have also hiked their S&P 500 profit estimate for 2011 to $95.53 a share, up from $92.45 at the beginning of January, according to Bloomberg data. That would be a record, surpassing the previous high reached in 2007.

With such prospects, it's not surprising that more than half of S&P 500-listed stocks boast overall buy ratings. It is telling that the proportion has essentially held constant at both the market's October 2007 high and March 2009 low, bookends of a period that saw stocks fall by more than half. If the analysts are correct, the market would appear to be attractively priced right now. Using the $95.53 per share figure, the price-to-earnings ratio of the S&P 500 is a modest 11 as of June 9. If, however, analysts end up being too high by, say, 20 percent, the P/E would jump to almost 14.

If history is any guide, chances are good that the analysts are wrong. According to a recent McKinsey report by Marc Goedhart, Rishi Raj, and Abhishek Saxena, "Analysts have been persistently over-optimistic for 25 years," a stretch that saw them peg earnings growth at 10 percent to 12 percent a year when the actual number was ultimately 6 percent. "On average," the researchers note, "analysts' forecasts have been almost 100 percent too high," even after regulations were enacted to weed out conflicts and improve the rigor of their calculations. As the chart below shows, in most years analysts have been forced to lower their estimates after it became apparent they had set them too high.

While a few analysts, like Meredith Whitney, have made their names on bearish calls, most are chronically bullish. Part of the problem is that despite all the reforms they remain too aligned with the companies they cover. "Analysts still need to get the bulk of their information from companies, which have an incentive to be over-optimistic," says Stephen Bainbridge, a professor at UCLA Law School who specializes in the securities industry. "Meanwhile, analysts don't want to threaten that ongoing access by being too negative." Bainbridge says that with the era of the overpaid, superstar analyst long over, today's job description calls for resisting the urge to be an iconoclast. "It's a matter of herd behavior," he says.

So what's a more plausible estimate of companies' earning power? Looking at factors including the strengthening dollar, which hurts exports, and higher corporate borrowing costs, David Rosenberg, chief economist at Toronto-based investment shop Gluskin Sheff + Associates, says "disappointment looms." Bernstein's Adam Parker says every 10 percent drop in the value of the euro knocks U.S. corporate earnings down by 2.5 percent to 3 percent. He sees the S&P 500 earning $86 a share next year.

As realities hit home, "It's only natural that analysts will have to revise down their views," says Todd Salamone, senior vice-president at Schaeffer's Investment Research. The market may be making its own downward adjustment, as the S&P 500 has already fallen 14 percent from its high in April. If precedent holds, analysts are bound to curb their enthusiasm belatedly, telling us next year what we really needed to know this year.

The bottom line: *Despite reforms intended to improve Wall Street research, stock analysts seem to be promoting an overly rosy view of profit prospects.*

Bloomberg Businessweek Senior Writer Farzad covers Wall Street and international finance.

Survey: Market Risk Premium and Risk-Free Rate used for 80 countries in 2023

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ABSTRACT

This paper contains the statistics of a survey about the Risk-Free Rate (**RF**) and the Market Risk Premium (**MRP**) used in 2023 for **80 countries**. We got answers for 102 countries, but we only report the results for 80 countries with more than 6 answers.

The paper also contains the links to previous years surveys, from 2008 to 2022.

JEL Classification: G12, G31, M21

Keywords: equity premium; required equity premium; expected equity premium; risk-free rate

April 3, 2023

xPpLmnlsj

1. Market Risk Premium (MRP), Risk Free Rate (RF) and Km [RF + MRP] used in 2022 in 95 countries

We sent a short email (see exhibit 1) on March, 2023 to more than 15,000 email addresses of finance and economics professors, analysts and managers of companies obtained from previous correspondence, papers and webs of companies and universities. We asked about the Risk-Free Rate (**RF**) and the Market Risk Premium **(MRP) used** ***"to calculate the required return to equity in different countries"***.

By March 31, 2023, we had received 1,717 emails. 194 persons answered that they do not use MRP (see table 1), most of them use Km (required return to equity) but do not use MRP nor RF. The remaining emails had specific Risk-Free Rates and MRPs used in 2023 for one or more countries.[1] We would like to sincerely thank everyone who took the time to answer us.

Table 1. MRP and RF used in 2022: 1,624 emails

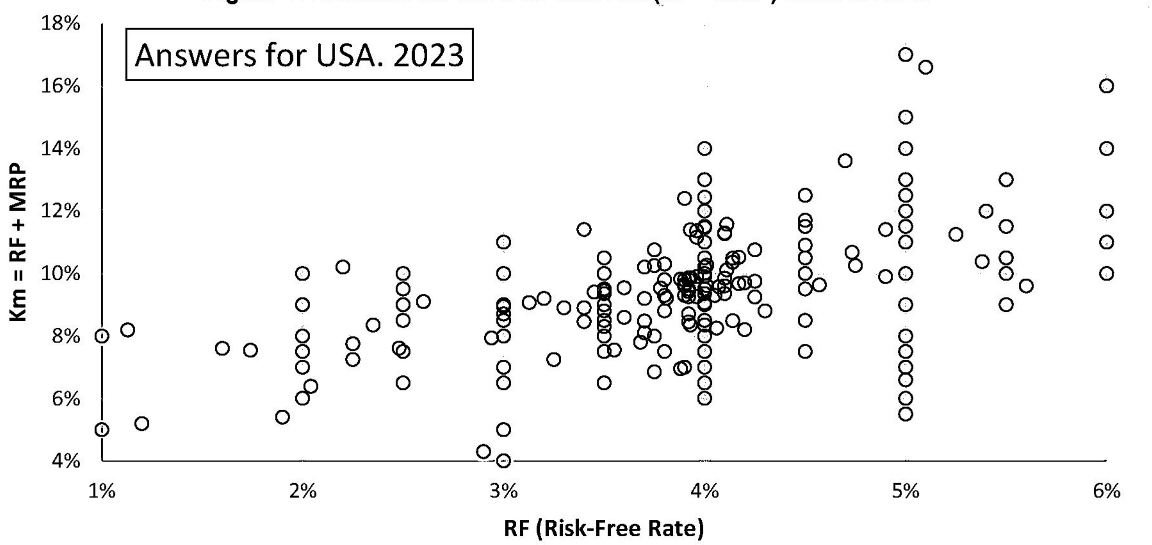
	Total
Answers reported (MRP figures)	**3,812**
Answers for countries with less than 6 answera	**61**
Outliers	**74**
"I can't provide you those figures: now are confidential"	**47**
Only MRP or RF (not both)	**36**
"We do not use MRP"	**194**

Table 2 contains the statistics of the **MRP** used in 2023 **for 80 countries**. We got answers for 102 countries, but we only report the results for 80 countries with more than 6 answers.

Table 3 contains the statistics of the Risk-Free Rate (**RF**) used in 2023 in the 80 countries[2] and **Table 4** contains the average of **Km** (required return to equity: Km = Risk-Free Rate + MRP).

Figure 1 is a graphic representation of the answers (Km and RF) we got for USA.

Figure 1. Answers for USA. RF and Km (RF + MRP) used in 2023



[1] We considered 74 of them as outliers because they provided a very small MRP (below 2%)

[2] Fernandez, P. (2020), "'Normalized' Risk-Free Rate: Fiction or Science Fiction?" Available at: https://ssrn.com/abstract=3708863

Table 2. Market Risk Premium (MRP) used for 80 countries in 2023

MRP	Number of Answers	**Average**	Median	MAX	min
USA	1378	5,7%	5,5%	15,0%	2,0%
Spain 2023	428	6,6%	6,3%	15,0%	3,0%
Andorra	8	8,9%	8,8%	10,2%	7,8%
Argentina	15	28,1%	26,7%	39,8%	7,5%
Australia	39	6,2%	6,0%	15,0%	3,3%
Austria	67	6,8%	6,6%	9,0%	5,0%
Belgium	63	6,4%	7,0%	8,2%	4,0%
Bolivia	10	14,3%	14,8%	17,0%	9,0%
Bosnia	9	16,6%	16,5%	18,9%	14,6%
Brazil	43	9,3%	9,7%	20,0%	4,0%
Bulgaria	10	8,1%	8,3%	9,6%	6,5%
Canada	41	6,0%	6,0%	8,0%	4,0%
Chile	25	6,9%	7,0%	8,1%	5,5%
China	25	8,6%	8,7%	12,0%	4,0%
Colombia	15	9,0%	9,2%	20,0%	3,0%
Costa Rica	9	14,2%	14,7%	17,0%	9,0%
Croatia	13	8,7%	9,0%	10,1%	7,0%
Czech Republic	24	6,6%	6,7%	9,0%	5,3%
Denmark	27	6,2%	5,9%	8,7%	4,8%
Dominican Rep.	8	11,7%	11,6%	13,4%	10,3%
Ecuador	19	20,9%	23,2%	32,2%	3,0%
Egypt	9	14,4%	14,7%	17,0%	10,8%
Estonia	19	6,9%	6,8%	8,9%	6,1%
Ethiopia	8	20,7%	20,5%	23,6%	18,3%
Finland	31	6,2%	6,6%	7,8%	3,5%
France	88	6,0%	6,3%	8,3%	0,3%
Germany	264	5,7%	5,9%	9,0%	0,0%
Greece	38	10,9%	12,2%	14,9%	5,5%
Hong Kong	17	6,8%	7,0%	7,6%	5,5%
Hungary	14	8,4%	9,0%	11,1%	3,2%
Iceland	6	7,1%	7,1%	8,4%	6,1%
India	19	8,5%	9,7%	14,0%	1,5%
Indonesia	12	8,0%	9,1%	11,4%	3,2%
Ireland	41	6,7%	7,2%	8,6%	3,5%
Israel	19	6,9%	7,1%	8,5%	5,1%
Italy	79	7,1%	6,8%	11,5%	1,9%
Japan	38	6,1%	6,0%	9,9%	2,0%
Kenya	11	14,7%	15,4%	18,3%	9,0%
Korea, (South)	17	6,4%	6,5%	8,0%	5,0%
Kuwait	15	6,9%	6,8%	9,9%	5,1%
Latvia	11	7,7%	7,7%	9,8%	5,8%
Lithuania	35	7,1%	7,1%	9,1%	6,3%
Luxembourg	36	5,9%	5,9%	7,1%	4,5%
Malaysia	10	7,6%	8,0%	9,2%	5,5%
Mexico	35	7,7%	8,2%	12,1%	2,0%
Mongolia	9	17,2%	16,5%	22,5%	14,6%
Morocco	18	9,9%	9,8%	12,3%	8,1%
Mozambique	8	20,7%	20,5%	23,6%	18,3%
Netherlands	56	5,6%	5,8%	6,9%	2,5%
New Zealand	10	6,3%	5,9%	8,5%	5,1%
Nigeria	9	16,8%	17,2%	18,6%	14,0%
Norway	14	5,8%	5,9%	8,0%	4,5%
Pakistan	9	19,5%	18,9%	24,0%	16,6%
Panama	9	8,5%	8,8%	10,2%	5,5%

Peru	16	8,4%	8,7%	12,0%	6,0%
Phillipines	9	8,6%	8,8%	10,2%	6,5%
Poland	28	7,2%	7,4%	10,0%	5,0%
Portugal	42	8,2%	7,9%	15,0%	3,8%
Qatar	8	6,7%	6,7%	7,7%	5,9%
Romania	17	9,4%	9,7%	11,5%	6,0%
Russia	14	18,2%	18,9%	35,0%	6,6%
Saudi Arabia	18	6,9%	6,8%	7,9%	6,1%
Serbia	10	10,9%	11,1%	12,8%	7,5%
Singapore	17	5,6%	5,7%	6,5%	4,0%
Slovakia	13	7,5%	7,4%	9,0%	5,5%
Slovenia	10	7,6%	8,0%	9,1%	5,5%
South Africa	17	8,7%	7,9%	13,4%	5,0%
Sweden	52	5,7%	5,4%	8,5%	5,0%
Switzerland	65	5,6%	5,9%	8,0%	2,8%
Taiwan	24	6,7%	7,0%	10,0%	3,0%
Tanzania	8	14,9%	14,8%	17,0%	13,1%
Thailand	12	8,1%	8,7%	10,1%	5,5%
Turkey	10	18,3%	17,2%	35,0%	9,0%
Uganda	6	14,9%	14,8%	18,0%	12,1%
Ukraine	9	22,7%	23,2%	25,1%	19,0%
United Arab Emirates	10	6,4%	6,5%	8,5%	4,5%
United Kingdom	79	6,0%	6,0%	9,0%	2,0%
Uruguay	11	9,3%	9,2%	11,2%	7,7%
Venezuela	8	29,5%	29,3%	33,7%	26,0%
Vietnam	9	10,8%	10,7%	12,2%	9,5%

Table 3. Risk Free Rate (RF) used for 80 countries in 2023

RF	Number of Answers	**Average**	Median	MAX	min
USA	1378	3,8%	4,0%	6,0%	1,0%
Spain 2023	428	3,5%	3,5%	8,5%	1,2%
Andorra	8	2,9%	3,0%	4,0%	1,1%
Argentina	15	29,6%	27,9%	42,3%	8,0%
Australia	39	3,8%	3,9%	6,0%	3,0%
Austria	67	2,7%	3,0%	4,1%	1,3%
Belgium	63	3,8%	3,4%	12,0%	0,3%
Bolivia	10	5,7%	5,8%	10,0%	1,3%
Bosnia	9	4,5%	5,0%	6,3%	1,1%
Brazil	43	12,2%	13,5%	16,0%	6,3%
Bulgaria	10	3,3%	3,7%	6,5%	-0,1%
Canada	41	3,5%	3,3%	6,0%	2,0%
Chile	25	4,9%	4,9%	11,0%	-1,0%
China	25	4,2%	3,9%	7,1%	1,9%
Colombia	15	11,6%	12,6%	14,9%	3,5%
Costa Rica	9	4,2%	3,5%	11,0%	-0,9%
Croatia	13	3,7%	4,0%	4,8%	2,5%
Czech Republic	24	4,3%	4,5%	5,9%	2,7%
Denmark	27	2,9%	3,0%	3,4%	2,0%
Dominican Rep.	8	7,4%	7,5%	9,5%	5,1%
Ecuador	19	13,6%	14,0%	15,6%	10,8%
Egypt	9	14,9%	14,8%	19,9%	10,7%
Estonia	19	1,5%	1,5%	4,0%	-0,4%
Ethiopia	8	11,4%	11,7%	20,5%	3,7%
Finland	31	3,2%	3,3%	3,5%	3,0%
France	88	3,0%	3,0%	4,0%	0,5%

Germany	264	2,5%	2,6%	7,0%	1,0%
Greece	38	4,1%	4,4%	5,3%	2,5%
Hong Kong	17	3,8%	3,9%	4,5%	2,5%
Hungary	14	8,3%	8,9%	10,3%	5,7%
Iceland	6	6,2%	6,1%	7,4%	5,0%
India	19	7,1%	7,3%	8,2%	5,0%
Indonesia	12	6,9%	7,0%	7,3%	6,3%
Ireland	41	2,9%	3,2%	4,2%	0,6%
Israel	19	3,9%	4,0%	5,0%	1,5%
Italy	79	4,0%	4,0%	5,3%	2,0%
Japan	38	1,1%	0,5%	4,0%	-0,6%
Kenya	11	14,1%	14,3%	14,9%	12,8%
Korea, (South)	17	2,9%	3,5%	4,5%	0,3%
Kuwait	15	1,9%	2,0%	3,5%	-0,4%
Latvia	11	1,2%	0,9%	3,5%	-0,6%
Lithuania	35	1,7%	1,5%	4,7%	-1,5%
Luxembourg	36	3,0%	3,0%	3,0%	3,0%
Malaysia	10	4,1%	4,1%	5,3%	3,5%
Mexico	35	8,3%	9,0%	12,0%	4,0%
Mongolia	9	9,6%	9,5%	13,0%	6,2%
Morocco	18	3,3%	3,4%	7,0%	0,0%
Mozambique	8	7,0%	7,1%	9,0%	4,4%
Netherlands	56	3,0%	3,0%	5,0%	2,3%
New Zealand	10	4,7%	4,7%	5,0%	4,5%
Nigeria	9	13,7%	14,2%	16,1%	10,0%
Norway	14	3,4%	3,3%	5,0%	2,0%
Pakistan	9	16,3%	15,7%	21,0%	13,3%
Panama	9	6,9%	6,9%	8,8%	4,4%
Peru	16	6,5%	7,0%	8,0%	3,5%
Phillipines	9	5,2%	6,3%	8,2%	0,6%
Poland	28	6,1%	6,4%	9,0%	2,0%
Portugal	42	3,4%	3,6%	5,0%	1,3%
Qatar	8	2,9%	3,0%	5,0%	0,2%
Romania	17	7,2%	7,8%	9,4%	3,3%
Russia	14	9,4%	10,5%	13,6%	3,5%
Saudi Arabia	18	5,1%	5,1%	7,0%	2,8%
Serbia	10	7,2%	8,0%	10,1%	3,1%
Singapore	17	2,6%	3,0%	4,4%	0,1%
Slovakia	13	3,4%	3,7%	4,1%	2,5%
Slovenia	10	3,6%	3,8%	4,4%	2,5%
South Africa	17	9,4%	10,1%	12,6%	4,0%
Sweden	52	1,9%	2,1%	3,5%	-0,5%
Switzerland	65	1,7%	1,5%	3,0%	0,8%
Taiwan	24	1,4%	1,2%	2,0%	0,9%
Tanzania	8	8,1%	8,2%	13,0%	4,9%
Thailand	12	3,0%	2,6%	6,0%	1,3%
Turkey	10	14,4%	11,5%	45,0%	-2,6%
Uganda	6	11,3%	11,4%	13,2%	8,7%
Ukraine	9	30,6%	29,0%	41,6%	12,7%
United Arab Emirates	10	3,7%	4,5%	5,6%	0,0%
United Kingdom	79	3,9%	3,8%	8,3%	2,0%
Uruguay	11	8,3%	8,0%	13,0%	3,0%
Venezuela	8	34,8%	32,2%	70,4%	10,4%
Vietnam	9	4,1%	4,5%	5,9%	1,7%

Table 4. Km [Required return to equity (market): RF + MRP)] used for 80 countries in 2023

USA	**9,5%**	Greece	**15,0%**	Peru	**14,9%**
Spain 2023	**10,1%**	Hong Kong	**10,6%**	Phillipines	**13,9%**
Andorra	**11,8%**	Hungary	**16,7%**	Poland	**13,4%**
Argentina	**57,7%**	Iceland	**13,4%**	Portugal	**11,6%**
Australia	**10,0%**	India	**15,5%**	Qatar	**9,6%**
Austria	**9,5%**	Indonesia	**14,9%**	Romania	**16,6%**
Belgium	**10,2%**	Ireland	**9,6%**	Russia	**27,6%**
Bolivia	**20,1%**	Israel	**10,8%**	Saudi Arabia	**12,0%**
Bosnia	**21,1%**	Italy	**11,1%**	Serbia	**18,1%**
Brazil	**21,5%**	Japan	**7,1%**	Singapore	**8,2%**
Bulgaria	**11,5%**	Kenya	**28,7%**	Slovakia	**10,9%**
Canada	**9,5%**	Korea, (South)	**9,3%**	Slovenia	**11,2%**
Chile	**11,8%**	Kuwait	**8,8%**	South Africa	**18,1%**
China	**12,8%**	Latvia	**8,9%**	Sweden	**7,5%**
Colombia	**20,6%**	Lithuania	**8,9%**	Switzerland	**7,4%**
Costa Rica	**18,4%**	Luxembourg	**8,9%**	Taiwan	**8,1%**
Croatia	**12,4%**	Malaysia	**11,7%**	Tanzania	**23,0%**
Czech Republic	**10,9%**	Mexico	**16,0%**	Thailand	**11,1%**
Denmark	**9,0%**	Mongolia	**26,8%**	Turkey	**32,7%**
Dominican Rep.	**19,2%**	Morocco	**13,2%**	Uganda	**26,2%**
Ecuador	**34,5%**	Mozambique	**27,7%**	Ukraine	**53,3%**
Egypt	**29,3%**	Netherlands	**8,7%**	United Arab Emirates	**10,1%**
Estonia	**8,4%**	New Zealand	**10,9%**	United Kingdom	**9,8%**
Ethiopia	**32,2%**	Nigeria	**30,5%**	Uruguay	**17,7%**
Finland	**9,4%**	Norway	**9,2%**	Venezuela	**64,3%**
France	**9,0%**	Pakistan	**35,8%**	Vietnam	**14,8%**
Germany	**8,2%**	Panama	**15,4%**		

2. Changes from 2015 to 2018, 2019, 2020, 2021, 2022 and 2023

Tables 5 and 6 compare the results of the 2023 survey with the results of the surveys published in 2015, 2018, 2019, 2020, 2021 and 2022.

Table 5. Km [Required return to equity (market): RF + MRP)]
Averages of the surveys of 2023, 2022, 2021, 2020, 2019, 2018 and 2015

	average Km (RF + MRP)						
	2023	**2022**	**2021**	**2020**	**2019**	**2018**	**2015**
USA	9,5	8,3	7,3	7,5	8,3	8,2	7,9
Spain	10,1	8,8	7,4	7,6	8,1	8,8	8,1
Argentina	57,7	58,3	41,6	29,6	25,0	23,2	35,5
Australia	10,0	9,7	9,0	10,3	9,3	9,7	9,1
Austria	9,5	7,6	6,5	7,1	7,4	8,2	8,5
Belgium	10,2	7,2	6,5	7,1	7,4	7,8	6,8
Brazil	21,5	20,1	14,2	12,7	15,4	15,7	16,5
Canada	9,5	8,5	7,5	7,5	8,3	8,7	8,2
Chile	11,8	13,1	10,2	10,2	10,5	10,2	10,4
China	12,8	12,6	9,0	9,8	11,5	10,1	12,6
Colombia	20,6	16,5	13,8	14,5	13,9	15,4	12,1
Czech Rep.	10,9	10,1	7,8	8,2	8,7	8,5	7,4
Denmark	9,0	7,2	6,5	7,0	7,2	7,6	6,8
Finland	9,4	7,0	6,5	7,5	7,3	7,6	6,9
France	9,0	7,6	6,6	7,0	7,2	7,5	7,1
Germany	8,2	6,9	6,4	6,6	6,8	6,7	6,6
Greece	15,0	8,2	7,8	19,1	19,7	20,6	29,3
Hungary	16,7	11,6	10,4	10,5	11,9	11,5	9,4

India	15,5	12,5	12,9	11,8	14,8	14,7	15,8
Indonesia	14,9	13,2	12,9	13,9	16,2	15,6	16,4
Ireland	9,6	7,3	6,6	7,9	7,4	8,1	6,8
Israel	10,8	8,7	6,8	7,8	8,4	7,7	6,1
Italy	11,1	7,7	7,0	7,5	7,9	8,4	6,9
Japan	7,1	6,4	5,7	7,1	7,2	6,0	6,5
Korea (South)	9,3	9,7	8,3	8,1	9,1	8,8	8,5
Mexico	16,0	14,8	12,2	13,7	15,4	15,3	12,3
Netherlands	8,7	7,5	6,7	7,5	7,3	7,5	7,7
New Zealand	10,9	9,5	8,0	8,6	8,9	8,9	9,5
Norway	9,2	7,5	7,2	7,0	7,4	8,1	6,9
Peru	14,9	13,3	11,1	10,7	13,1	12,6	11,2
Poland	13,4	9,7	8,2	9,0	9,7	9,4	7,9
Portugal	11,6	7,8	8,2	8,7	10,1	10,4	7,3
Russia	27,6	20,0	13,8	13,7	16,8	16,5	17,1
South Africa	18,1	16,4	15,1	14,6	16,4	14,5	15,9
Sweden	7,5	7,4	8,4	7,1	7,4	8,9	6,5
Switzerland	7,4	7,2	5,3	7,0	7,3	8,0	6,5
Thailand	11,1	10,1	9,5	10,2	11,3	12,4	16,0
Turkey	32,7	33,6	27,2	21,2	20,8	18,0	17,1
UK	9,8	8,5	6,9	6,9	8,3	7,5	7,3
Uruguay	17,7	12,7	11,3	15,2	12,8	13,6	10,7
Venezuela	64,3	58,8	60,2	34,5	36,3	28,6	23,1

Table 6. Market Risk Premium (MRP) and Risk Free Rate (RF) (%)
Averages of the surveys of 2023, 2022, 2021, 2020, 2019, 2018 and 2015

	Av. 2023		Av. 2022		Av. 2021		Av. 2020		Av. 2019		Av. 2018		Av. 2015	
	RF	MRP	RF	MRP	RF	MRP	RF	MRP	RF	MRP	RF	MRP	RF	MRP
USA	3,8	5,7	2,7	5,6	1,8	5,5	1,9	5,6	2,7	5,6	2,8	5,4	2,4	5,5
Spain	3,5	6,6	2,1	6,7	1,0	6,4	1,3	6,3	1,7	6,4	2,1	6,7	2,2	5,9
Argentina	29,6	28,1	28,4	29,9	24,2	17,4	12,3	17,3	10,1	14,9	9,3	13,9	12,6	22,9
Australia	3,8	6,2	3,4	6,3	2,6	6,4	2,4	7,9	2,8	6,5	3,1	6,6	3,1	6,0
Austria	2,7	6,8	1,8	5,8	0,6	5,9	0,9	6,2	1,3	6,1	2,0	6,2	2,8	5,7
Belgium	3,8	6,4	1,4	5,8	0,6	5,9	0,9	6,2	1,2	6,2	1,6	6,2	1,3	5,5
Brazil	12,2	9,3	10,3	9,8	6,5	7,7	4,8	7,9	7,2	8,2	7,3	8,4	9,0	7,5
Canada	3,5	6,0	2,8	5,7	1,9	5,6	1,8	5,7	2,5	5,8	2,9	5,8	2,3	5,9
Chile	4,9	6,9	5,7	7,4	3,9	6,3	3,6	6,6	4,2	6,3	4,1	6,1	3,9	6,5
China	4,2	8,6	3,9	8,7	2,8	6,2	3,1	6,7	4,0	7,5	3,8	6,3	4,5	8,1
Colombia	11,6	9,0	9,8	6,7	6,9	6,9	6,3	8,2	6,2	7,7	6,7	8,7	3,8	8,3
Czech Rep.	4,3	6,6	4,1	6,0	2,0	5,8	1,8	6,4	2,4	6,3	2,6	5,9	1,8	5,6
Denmark	2,9	6,2	1,4	5,8	0,7	5,8	0,9	6,1	1,2	6,0	1,6	6,0	1,3	5,5
Finland	3,2	6,2	1,4	5,6	0,6	5,9	1,0	6,5	1,1	6,2	1,7	5,9	1,2	5,7
France	3,0	6,0	1,3	6,3	0,8	5,8	0,8	6,2	1,2	6,0	1,6	5,9	1,5	5,6
Germany	2,5	5,7	1,2	5,7	0,6	5,8	0,8	5,8	1,1	5,7	1,4	5,3	1,3	5,3
Greece	4,1	10,9	1,6	6,6	0,9	6,9	6,4	12,7	4,3	15,4	4,8	15,8	15,0	14,3
Hungary	8,3	8,4	4,9	6,7	3,3	7,1	3,1	7,4	4,0	7,9	3,6	7,9	0,6	8,8
India	7,1	8,5	5,6	6,9	5,6	7,3	4,8	7,0	6,5	8,3	6,8	7,9	7,4	8,4
Indonesia	6,9	8,0	5,5	7,7	5,9	7,0	6,3	7,6	7,2	9,0	6,8	8,8	7,5	8,9
Ireland	2,9	6,7	1,5	5,8	0,7	5,9	1,3	6,6	1,4	6,0	1,6	6,5	1,3	5,5
Israel	3,9	6,9	2,7	6,0	1,1	5,7	1,5	6,3	2,0	6,4	1,9	5,8	0,9	5,2
Italy	4,0	7,1	1,7	6,0	1,0	6,0	1,3	6,2	1,6	6,3	2,3	6,1	1,5	5,4
Japan	1,1	6,1	0,5	5,9	0,5	5,2	0,9	6,2	1,1	6,1	0,3	5,7	0,7	5,8
Korea (South)	2,9	6,4	3,7	6,0	2,4	5,9	2,0	6,1	2,5	6,6	2,4	6,4	2,3	6,2
Mexico	8,3	7,7	7,4	7,4	5,8	6,4	5,4	8,3	7,1	8,3	6,8	8,5	4,3	8,0
Netherlands	3,0	5,6	1,3	6,2	0,9	5,8	1,6	5,9	1,3	6,0	1,7	5,8	1,8	5,9
New Zealand	4,7	6,3	3,8	5,7	2,0	6,0	2,4	6,2	3,0	5,9	3,1	5,8	2,9	6,6
Norway	3,4	5,8	1,7	5,8	1,8	5,4	1,2	5,8	1,4	6,0	2,4	5,7	1,4	5,5
Peru	6,5	8,4	6,4	6,9	4,3	6,8	3,7	7,0	5,6	7,5	5,3	7,3	4,0	7,2
Poland	6,1	7,2	4,0	5,7	2,7	5,5	2,4	6,6	3,1	6,6	3,4	6,0	2,7	5,2
Portugal	3,4	8,2	1,6	6,2	1,4	6,8	1,6	7,1	2,6	7,5	3,2	7,2	1,6	5,7
Russia	9,4	18,2	5,8	14,2	5,7	8,1	5,9	7,8	8,3	8,5	7,8	8,7	7,4	9,7
South Africa	9,4	8,7	9,1	7,3	8,1	7,0	6,7	7,9	8,0	8,4	7,6	6,9	8,2	7,7
Sweden	1,9	5,7	1,4	6,0	0,9	7,5	1,0	6,1	1,3	6,1	1,8	7,1	1,1	5,4
Switzerland	1,7	5,6	1,4	5,8	0,1	5,2	0,9	6,1	1,1	6,2	1,1	6,9	1,1	5,4
Thailand	3,0	8,1	3,1	7,0	2,2	7,3	4,5	5,7	3,1	8,2	3,5	8,9	8,7	7,3
Turkey	14,4	18,3	22,6	11,0	17,7	9,5	10,9	10,3	11,2	9,6	10,3	7,7	7,8	9,3
UK	3,9	6,0	2,4	6,1	1,3	5,6	1,1	5,8	2,1	6,2	2,0	5,5	2,1	5,2
Uruguay	8,3	9,3	5,4	7,3	4,2	7,1	6,1	9,1	4,4	8,4	5,3	8,3	3,6	7,1
Venezuela	34,8	29,5	32,7	26,1	40,4	19,8	11,4	23,1	12,6	23,7	11,7	16,9	3,5	19,6

3. Previous surveys

2008	http://ssrn.com/abstract=1344209
2010	http://ssrn.com/abstract=1606563; http://ssrn.com/abstract=1609563
2011	http://ssrn.com/abstract=1822182; http://ssrn.com/abstract=1805852
2012	http://ssrn.com/abstract=2084213
2013	http://ssrn.com/abstract=914160
2014	http://ssrn.com/abstract=1609563
2015	https://ssrn.com/abstract=2598104
2016	https://ssrn.com/abstract=2776636
2017	https://ssrn.com/abstract=2954142
2018	https://ssrn.com/abstract=3155709
2019	https://ssrn.com/abstract=3358901
2020	https://ssrn.com/abstract=3560869
2021	https://ssrn.com/abstract=3861152
2022	https://ssrn.com/abstract=3803990

2023	https://ssrn.com/abstract=4407839

Welch (2000) performed two surveys with finance professors in 1997 and 1998, asking them what they thought the Expected MRP would be over the next 30 years. He obtained 226 replies, ranging from 1% to 15%, with an average arithmetic EEP of 7% above T-Bonds.[3] Welch (2001) presented the results of a survey of 510 finance and economics professors performed in August 2001 and the consensus for the 30-year arithmetic EEP was 5.5%, much lower than just 3 years earlier. In an update published in 2008 Welch reports that the MRP "used in class" in December 2007 by about 400 finance professors was on average 5.89%, and 90% of the professors used equity premiums between 4% and 8.5%.

Johnson et al (2007) report the results of a survey of 116 finance professors in North America done in March 2007: 90% of the professors believed the Expected MRP during the next 30 years to range from 3% to 7%.

Graham and Harvey (2007) indicate that U.S. CFOs reduced their average EEP from 4.65% in September 2000 to 2.93% by September 2006 (st. dev. of the 465 responses = 2.47%). In the 2008 survey, they report an average EEP of 3.80%, ranging from 3.1% to 11.5% at the tenth percentile at each end of the spectrum. They show that average EEP changes through time. Goldman Sachs (O'Neill, Wilson and Masih 2002) conducted a survey of its global clients in July 2002 and the average long-run EEP was 3.9%, with most responses between 3.5% and 4.5%.

Ilmanen (2003) argues that surveys tend to be optimistic: *"survey-based expected returns may tell us more about hoped-for returns than about required returns"*. Damodaran (2008) points out that *"the risk premiums in academic surveys indicate how far removed most academics are from the real world of valuation and corporate finance and how much of their own thinking is framed by the historical risk premiums... The risk premiums that are presented in classroom settings are not only much higher than the risk premiums in practice but also contradict other academic research"*.

Table 4 of Fernandez et al (2011a) shows the evolution of the Market Risk Premium used for the USA in 2011, 2010, 2009 and 2008 according to previous surveys (Fernandez et al, 2009, 2010a and 2010b).

The magazine *Pensions and Investments* (12/1/1998) carried out a survey among professionals working for institutional investors: the average EEP was 3%. Shiller[4] publishes and updates an index of investor sentiment since the crash of 1987. While neither survey provides a direct measure of the equity risk premium, they yield a broad measure of where investors or professors expect stock prices to go in the near future. The 2004 survey of the Securities Industry Association (SIA) found that the median EEP of 1500 U.S. investors was about 8.3%. Merrill Lynch surveys more than 300 institutional investors globally in July 2008: the average EEP was 3.5%.

A main difference of this survey with previous ones is that this survey asks about the **Required** MRP, while most surveys are interested in the **Expected** MRP.

4. Expected and Required Equity Premium: different concepts

Fernandez and F. Acín (2015) claim and show that Expected Return and Required Return are two very different concepts. Fernandez (2007, 2009b) claims that the term "equity premium" is used to designate four different concepts:

1. **Historical** equity premium (HEP): historical differential return of the stock market over treasuries.
2. **Expected** equity premium (EEP): expected differential return of the stock market over treasuries.

[3] At that time, the most recent Ibbotson Associates Yearbook reported an arithmetic HEP versus T-bills of 8.9% (1926–1997).

[4] See http://icf.som.yale.edu/Confidence.Index

3. **Required** equity premium (REP): incremental return of a diversified portfolio (the market) over the risk-free rate required by an investor. It is used for calculating the required return to equity.
4. **Implied** equity premium (IEP): the required equity premium that arises from assuming that the market price is correct.

The four concepts (HEP, REP, EEP and IEP) designate different realities. The **HEP** is easy to calculate and is equal for all investors, provided they use the same time frame, the same market index, the same risk-free instrument and the same average (arithmetic or geometric). But the **EEP,** the **REP** and the **IEP** may be different for different investors and are not observable.

The **HEP** is the historical average differential return of the market portfolio over the risk-free debt. The most widely cited sources are Ibbotson Associates and Dimson *et al.* (2007).

Numerous papers and books assert or imply that there is a "market" EEP. However, it is obvious that investors and professors do not share "homogeneous expectations" and have different assessments of the **EEP**. As Brealey et al. (2005, page 154) affirm, *"Do not trust anyone who claims to know what returns investors expect".*

The **REP** is the answer to the following question: What incremental return do I require for investing in a diversified portfolio of shares over the risk-free rate? It is a crucial parameter because the REP is the key to determining the company's required return to equity and the WACC. Different companies may use, and in fact do use, different **REPs**.

The **IEP** is the implicit REP used in the valuation of a stock (or market index) that matches the current market price. The most widely used model to calculate the IEP is the dividend discount model: the current price per share (P_0) is the present value of expected dividends discounted at the required rate of return (Ke). If d_1 is the dividend per share expected to be received in year 1, and g the expected long term growth rate in dividends per share,

$$P_0 = d_1 / (Ke - g), \text{ which implies: } IEP = d_1/P_0 + g - R_F \quad (1)$$

The estimates of the IEP depend on the particular assumption made for the expected growth (g). Even if market prices are correct for all investors, there is not an IEP common for all investors: there are many pairs (IEP, g) that accomplish equation (1). Even if equation (1) holds for every investor, there are many *required* returns (as many as expected growths, g) in the market. Many papers in the financial literature report different estimates of the IEP with great dispersion, as for example, Claus and Thomas (2001, IEP = 3%), Harris and Marston (2001, IEP = 7.14%) and Ritter and Warr (2002, IEP = 12% in 1980 and -2% in 1999). There is no a common **IEP** for all investors.

For a particular investor, the **EEP** is not necessary equal to the REP (unless he considers that the market price is equal to the value of the shares). Obviously, an investor will hold a diversified portfolio of shares if his EEP is higher (or equal) than his REP and will not hold it otherwise.

We can find out the REP and the EEP of an investor by asking him, although for many investors the REP is not an explicit parameter but, rather, it is implicit in the price they are prepared to pay for the shares. However, it is not possible to determine the REP for the market as a whole, because it does not exist: even if we knew the REPs of all the investors in the market, it would be meaningless to talk of a REP for the market as a whole. There is a distribution of REPs and we can only say that some percentage of investors have REPs contained in a range. The average of that distribution cannot be interpreted as the REP of the market nor as the REP of a representative investor.

Much confusion arises from not distinguishing among the four concepts that the phrase *equity premium* designates: Historical equity premium, Expected equity premium, Required equity premium and Implied equity premium. 129 of the books reviewed by Fernandez (2009b) identify Expected and Required equity premium and 82 books identify Expected and Historical equity premium.

Finance textbooks should clarify the MRP by incorporating distinguishing definitions of the four different concepts and conveying a clearer message about their sensible magnitudes.

5. Conclusion

Most previous surveys have been interested in the Expected MRP, but this survey asks about the Required MRP.

This paper contains the statistics of a survey about the Risk-Free Rate (**RF**) and the Market Risk Premium (**MRP**) used in 2023 for **80 countries**. We got answers for 102 countries, but we only report the results for countries with more than 6 answers.

This survey links with the *Equity Premium Puzzle*: Fernandez et al (2009), argue that the equity premium puzzle may be explained by the fact that many market participants (equity investors, investment banks, analysts, companies…) do not use standard theory (such as a standard representative consumer asset pricing model…) for determining their Required Equity Premium, but rather, they use historical data and advice from textbooks and finance professors. Many investors still use historical data and textbook prescriptions to estimate the required and the expected equity premium.

EXHIBIT 1. Mail sent in March 2023

Survey Market Risk Premium and Risk-Free Rate 2023

We are doing a **survey** about the **Market Risk Premium** (MRP or Equity Premium) and **Risk-Free Rate** that companies, analysts, regulators and professors use to calculate the **required return on equity** in different countries.

I would be grateful if you would kindly answer the following 2 questions. No companies, individuals or universities will be identified, and only aggregate data will be made public. I will send you the results in a month.

Best regards and thanks,

Pablo Fernandez. Professor of Finance. IESE Business School. Spain.

2 questions:

1. The Market Risk Premium that I am using in 2023
for USA is: ______%
for__________ is: ______ %
for__________ is: ______ %

2. The Risk-Free rate that I am using in 2023
for USA is: ______ %
for __________ is: ______ %
for __________ is: ______ %

EXHIBIT 2. Some comments and webs recommended by respondents.

Equity premium: http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/ctryprem.html
http://www.market-risk-premia.com/market-risk-premia.html
http://www.marktrisikoprämie.de/marktrisikopraemien.html

US risk free rate: http://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yieldYear&year=2015

risk free rate: http://www.basiszinskurve.de/basiszinssatz-gemaess-idw.html
http://www.econ.yale.edu/~shiller/
http://www.cfosurvey.org/pastresults.htm
http://alephblog.com/

I'm not much use for you because I don't add a market risk premium to a risk free rate to get a basic equity rate of return. Many years ago, I took your lessons to heart and stopped using any sort of build-up method, principally because it is backwards looking. Instead, I rely on the Pepperdine survey, along with my understanding of how investors think and my best judgement of the risks of a particular asset. I have not found any better way to do this.

Islamic Development Bank works under development mandate and therefore does not follow market based premium on pricing, and uses its internal costs as benchmark. In short, all of our member countries are given financing at the same pricing.

Our commercial bank can invest overnight funds in our excess balance account with the U.S. Federal Reserve Bank at 2.5%. Our overall cost of funds is 0.2%, yielding a spread of 2.3%. Our leverage ratio (equity/assets) is 9.63%. Hence, our pre-tax risk-free rate is 23.88% of equity. Our target is to earn a net interest margin (interest income less interest expense as a percentage of earning assets) of 4.00%, which yields a targeted asset yield of 4.2%, or 43.61% of equity.

Market risk premium = actual equity return - risk free rate

I want to explain the unusually high risk premium I am using in the US market (7%). In my opinion, the way that costs whether they be raw materials, labor, interest etc. process through the economy differently than a simple "add on" cost. I believe that as any cost increase requires a greater capital base to hold inventory or to produce goods and services, that the pass through is not just the actual cost but the cost plus an increment for a return on the greater capital base. Accordingly, the "cost" of money with interest rates so low is more likely than not to be higher in the future. Labor also with unemployment so low is more likely than not to be higher in the future. Therefore although I do not see traditional commodity inflation and labor costs have been unusually stable for this unemployment level, I believe the probability is higher of an increase than a decrease. Thus I have a higher than would be expected market risk premium to address the direction I think the pressures will move on the discount rate. Conversely, If wrong on the upward pressures on capital returns; it would likely be due to slowing global growth and/or trade disruption of longer duration. In that event I again want a higher discount rate to reflect that greater risk potential. Interesting times we live in.

I do not use a MRP or a RF rate for three reasons:
1) I am retired.
2) I do not accept their validity.
3) The "new normal" makes no economic or financial sense.

I am an academic in a public university – I don't know of any University discount rate.

"The subject who is truly loyal to the Chief Magistrate will neither advise nor submit to arbitrary measures." Junius

Prima de riesgo que utilizo en España: diferencia de rentabilidad que ofrece el bono español respecto al alemán. Tipos de interés sin riesgo: los extraídos día a día del boletín de deuda pública española en operaciones de compra-venta al contado.

I don't value companies on this basis. I prefer to use price to earnings ratio.

In the Netherlands there is a discussion with the fiscal authorities. A lot of valuation experts use the MRP from your Survey. The Fiscal authorities accept that but want consequently also the use of the Rf from your survey. There is a lot of discussion when we use a normalized adjusted Rf.

Por tipo de interés sin riesgo se entiende en el corto plazo, pe 3 meses, al tipo de interés interbancario al plazo correspondiente para el área de referencia. En caso del euro, sería el EURIBOR y en caso de EEUU el Libor USD. Hablando de riesgo soberano USA y Alemania son considerados Benchmarks, por lo que su prima de riesgo es 0 y por tanto se les considera que son libres de riesgo. (Excepto entre ellos cuando se habla de riesgo entre EUR y USD) Por ello, cuando hablamos de prima de riesgo de un país, pe. España, hablamos del diferencial de tipos que hay el bono español con el de Alemania, tomando el mismo plazo. Normalmente se utiliza el plazo estándar del 10 años.

Sigo las recomendaciones de Credit Swiss Global Investment Return Yearbook, en este caso, 2018, con un 3,5% de PRM. No me gustan las recomendaciones de Damodaran, cuando incluye un riesgo país a España mayor que el de, creo, Perú o Ecuador, El tipo de interés sin riesgo que utilizo es, para España, el de el bono alemán a 10 años, según leo es de 0,17%, aunque Credit Swiss, creo recordar utiliza otro....el de EEUU es de 2,73%.

The risk free rate is determined on the historical present value-equivalent base interest rates on the basis of a series of payments increasing with the selected growth rate over a period of 1,000 years. For the calculations, the spot rate from year 30 to year 1,000 is updated constantly based upon the valuation date.

Germany

Risk free rate	0.9%	20 y Bund	Investing.com/rates-bonds/germany-20-year-bond-yield (1-1-2018)
Adjustment	1.8%	Credit Suisse	Credit Suisse Global Investment Source book and Yield book 2016 – Range of estimated long term real rate government bonds 1900-2015 - globally diversified
Risk free rate Adjusted	**2.7%**		

I don't use the market risk premium. I use a hurdle rate of return and won't invest in investments that don't achieve that hurdle. I aspire to a 25% rate of return on my investments but will generally settle for 15%.

I use the relevant rate from each country/currency "risk-free" yield curve to discount the respective expected future cash flow: V0 = CF1/(1 + Rf1 + risk prem)^1 + CF2/(1 + Rf2 + risk prem)^2 + ... + CFt/(1 + Rft + risk prem)^t

The Rf that I am using in 2019 for USA is: 10 year historical average, US Treasuries 20-year notes.

I use the US Equity premium of Damodaran to avoid explanations or justifications to clients.

We only use ROS (Return on Sales).

Rf: 3%, of which 2% is a premium for the risk of manipulation of the interest rate market operated by the ECB with the Quantitative Easing.

Al tener limitación nacional al hacer inversiones, debemos emplear un tipo de interés sin riesgo alto. Al operar en mercados muy consolidados, con pocos operadores y con fuertes barreras de entrada, la prima de riesgo de mercado es muy alta.

En anteriores encuestas intenté ofreceros un tipo orientativo pero estos últimos años, después de la "experimentación" de tipos, de diferentes QE con tipos negativos... sólo tengo una certeza, que ya hemos comentado en muchas ocasiones: es muy difícil, o de dudosa utilidad, establecer un tipo de interés sin riesgo. Porque ¿Es normal que la Deuda Griega pague menos que la Deuda de USA? ¿Emisiones de Deuda del gobierno argentino a periodos larguísimos? ¿Deuda alemana o suiza en tipos negativos?...
Respecto a establecer una tasa que sirva como referencia, mantendría dos premisas: 1) El horizonte de inversión (una Tasa de referencia con el mismo plazo); 2) La seguridad en las estimaciones de los flujos de caja futuros del proyecto o inversión: en caso de menor confianza o duda en las estimaciones, mayor tasa de Descuento
Como norma, siempre tenemos en cuenta que la Renta variable ha sido en periodos muy largos el activo más rentable y, por tanto, a muy largo plazo es el Activo de "Menor riesgo"

Fascinating results. It is always interesting how investors and fund managers interpret the risk free rate of countries who have a negative prevailing long-term bond rate.

I am sure you that you are analysing the data and asking more questions that data can answer. It´s time to improve theory! I hope you will advance on it.

In my DCF valuation I use a global perspective of the marginal investor hence a global MRP.

I match rf with currency/inflation of cash flows being discounted and do not rely too much on current interest rates due to imperfections in the market. The MRP is made consistent with the level of interest rate I use in my model (E(Rm)-Rf) end end up with 6%

For equities we use a 10% as a cost of opportunity independently of the level of interest.

Rf: average last 5-year 10 year Treasury

I would like to help you with these two questions, but the problem is that in no any literature sources or analytical reports I met the calculation of Market Risk Premium and Risk Free rate for Uzbekistan.

The risk free rate that I use depends upon the timing of the future cash flows. I refer to the interest rate swap market and the US treasury market for starters. These days, one has to bear in mind currency volatility as that has a bigger effect on PV than market cost-of-capital.

We use the same Market Risk Premium for any country: 5,75% (source: Damodaran). Only Rf changes.

I am happy that you are asking the second question, because it accounts for what I consider to be a historical anomaly in the reply to the first question. I've concluded that the ERP was recently 3-4 percent. But I think US monetary policy (the various "QE" programs) have in the past couple of years distorted the traditional relationship between expected total market returns and the risk free rate. QE has been driving the US Treasury rate down, while the expected total market return has held steady, leading to a larger than usual market risk premium. This higher market risk premium is not a sign of higher market equity risk, but of the perverse impact of aggressive monetary policy.

For the US in 2015: MRP: 14% (as US equities are even more highly priced than last year).

Interest rates are artificially well below historic levels. Thus, bonds and equities values are artificially inflated.

I do not use "canned" rates applicable for a whole year. The rates I use are time-specific and case-specific, depending on conditions prevailing as of the valuation date.

I must confess I am still surprised with the rates suggested that are at the upper bound of respondent answers.

One hint: It might make sense to ask more precisely about the premium before/after personal income tax. For Germany the premium would differ and I am not sure how people would interpret the question.

The Risk-Free Rate we use is based on rates published by the Federal Reserve. We use the 20 year rate, currently 2.73%. The Equity Risk Premium we use is based on Duff & Phelps Annual Valuation Handbook.

For foreign countries, I generally look at it in dollar terms and assume that purchasing power parity held; hence, I'd use US rates. If I had to do it in a foreign currency, I would use the local 10-year treasury for the risk-free rate. I would use the US equity risk premium, adjust for inflation to real terms, and then adjust for foreign inflation to put it in local nominal terms.

USA. MRP 6.4% - essentially bloomberg/ibbotson number. RF 10 year U.S. treasury yield.

Exijo un mínimo de un 15% de retorno neto de impuestos a cualquier acción, independientemente de su nacionalidad.

No existe un activo libre de riesgo en absoluto. Y menos en estos distorsionados entornos debido a la intervención de los bancos centrales. En mi modesta opinión, creo que nunca sido tan riesgosa la renta fija como lo es ahora.

No creo especialmente en el modelo de CAPM y prefiero usar una cifra basada en el sentido común.