

Theoretical Foundations II

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Historically, high P/Es have led to low returns and low P/Es have led to high returns. So, with today's market at historically high P/Es, there is a real need for rescue. This discussion examines three possible ways in which the market might be saved from decline: high and sustained real earnings growth (which is highly unlikely), low interest rates (which help only in the short term), and investor acceptance of lower future rates of return. The last possibility boils down to a choice between low long-term returns forever and very low (crash-type) returns followed by more historically normal returns. The research presented here found some support for the prescription that investors should accept a 6–7 percent nominal stock return, but evidence indicates that investors do not actually think they are facing such low returns.

My talk does not fit neatly into the category of “theoretical foundations,” which makes sense; after all, someone who runs a hedge fund is not going to have much to add to the theoretical foundations that underlie our musings about the equity risk premium, certainly not in this crowd!

My first set of data is intended to be an icebreaker. As a beginning, **Figure 1** plots the S&P 500 Index's P/E from 1881 to 2001. From those data, I created seven P/E buckets, or ranges, covering the 1927–2001

period. For each of the buckets, I calculated the median real annualized stock market return for the following decade and the worst return for any decade. **Table 1** provides the results for each range. We can argue about statistical significance, but these numbers are pretty striking. The infallibility of stocks is typically drawn from a 20-year horizon, so I have cheated by using a 10-year horizon. But the infallibility still exists when stocks are bought at low valuation ratios.

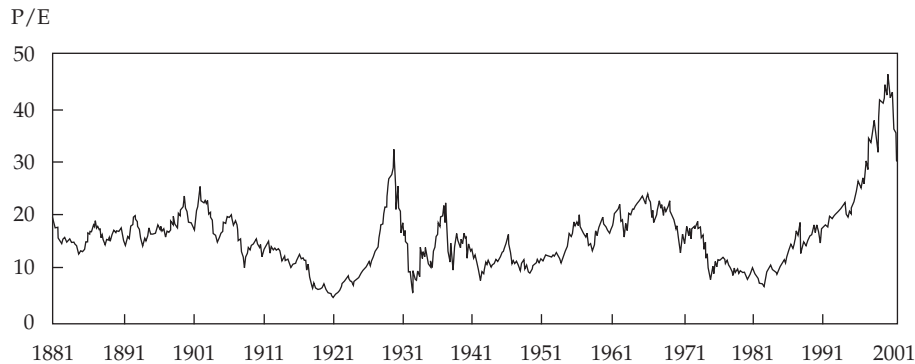
The note “Here Be Dragons” is a caution about what might happen with those P/Es of 32.6 to 45.0. It is a saying (similar to “Terra Incognita”) once used on old maps for areas not yet visited. The highest P/E, about 45, was reached in 2000. We don't know what the next 10 years will bring. We still have another eight and a half years to go, but for the one and a half years we have recently visited, the return realization is fitting the chart nicely.

The relationship between starting P/E and subsequent return is potentially exaggerated because much of the strong relationship comes from P/E reversion. What if P/Es did not change?

Figure 2 presents some input into the relationship if P/Es were constant. In the figure, trailing 20-year real S&P earnings growth is plotted for the past 110 years. For this period, annualized real earnings growth averaged 1.5–2.0 percent fairly consistently. Those people who actually still assume 10 percent nominal returns on stocks should recognize that such a return would require 5–6 percent real earnings growth over the next 10–20 years. Such growth has happened only a few times in history, and it has happened only after very depressed market conditions, which we are not really experiencing now, certainly based on the last 10 years. With a 2 percent real earnings growth forecasted, a long-term buy-and-hold investor in the S&P 500 can expect to earn 6–7 percent nominal returns.

What Can Save the Stock Market?

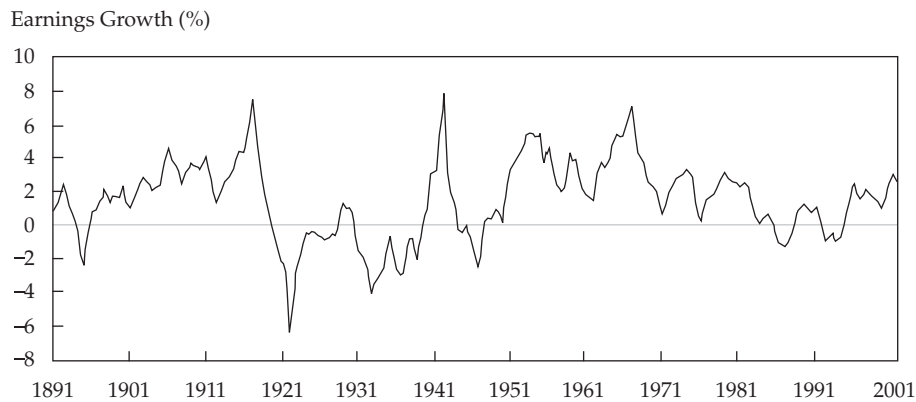
I envision a bad 1920s-type serial in which the villain has tied the stock market to the railroad tracks and a

Figure 1. Historical P/E of the S&P 500, 1881–2001

Note: P/E was calculated as the current price divided by the average of earnings for the past 10 years adjusted for inflation.

Table 1. Real Stock Market Return in the Next 10 Years for Historical P/E Ranges of the S&P 500, 1927–2001 Data

P/E Range (low to high)	Median Return (annualized)	Worst Return (total)
5.6 to 10.0	11.0 %	46.1 %
10.0 to 11.7	10.6	37.3
11.7 to 14.1	10.0	4.1
14.1 to 16.7	9.0	-19.9
16.7 to 19.4	5.4	-23.1
19.4 to 32.6	-0.4	-35.5
32.6 to 45.0	Here Be Dragons!	

Figure 2. S&P 500 Trailing 20-Year Real Earnings Growth, 1891–2001

Note: Earnings growth is annualized.

voice-over is pleading, “What can save stocks?” This question is going to be the organizing principle for my presentation today. I am going to concentrate on three things that could save stocks, although other answers

may be possible. One is sustained high real earnings growth—“high” meaning better than the historical average. The second, a Wall Street favorite, is the so-called Fed model, in which the U.S. Federal Reserve

lowers interest rates and supports high P/Es. The third is a simple hero—investor acceptance of lower future rates of return in the long term.

HIGH EARNINGS GROWTH. First, something we all probably know: Only if the future brings extra-special, super-high earnings growth are very high starting P/Es justified. For each level of P/E at the start of a 10-year period except very low P/Es (when returns are always on average strong), decades with stronger earnings growth also experienced stronger average stock returns, and even when P/Es were high, if earnings growth came in very high, returns were on average strong. This analysis, however, gives us an *ex post*—not a predictive—measure. If we see extraordinarily high growth in real earnings after 2001, we will probably see high real equity returns. However, the question is: What reason do we now have to be optimistic that such abnormally high earnings growth will occur?

One reason is that higher productivity and technological advancement could create high earnings growth. I think this development is unlikely. Historically, most productivity benefits accrue to workers and consumers, not necessarily to earnings:

Optimists frequently cite higher growth of real output and enhanced productivity, enabled by the technological and communications revolution, as the source of this higher growth. Yet the long-run relationship between the growth of real output and *per share* earnings growth is quite weak on both theoretical and empirical grounds. (Siegel 1999, pp. 14–15)

So, the first hurdle to believing in high earnings growth is to believe the productivity numbers, and the second is to believe earnings will benefit.

Now, let's look at the empirical data. In **Table 2**, I show the historical relationship between P/E at the beginning of a period and subsequent average 10-year real earnings growth for 1927–2001. The numbers in the 16 quadrants, or 16 buckets, are actual realized real earnings growth over rolling 10-year periods.

Each number corresponds to a range of starting P/Es and a range of starting earnings retention rates. Historically, when both the starting P/E and the retention rate are high, the real earnings growth rate is low. On May 30, 2001, the P/E of the S&P 500 was 27.3 and the retention rate was 65.3 percent, which today puts us in the bottom right bucket, so the dragons are off to the right. This position is not promising for saving stocks.

We can interpret Table 2 further. The second way stocks could experience future high earnings growth is through market efficiency. The idea is that in an efficient market, high current P/Es will lead to higher earnings growth because the market must be right. I like this approach. I wish it were the case, but I don't think the data support it well. Table 2 shows no relationship between starting P/E and future earnings growth. In fact, P/E does a lousy job of predicting earnings growth. I will go further. It does no job. In fact, the data show that higher P/Es have not led to higher real earnings growth going forward and lower P/Es have not led to lower growth. The joint hypothesis of constant expected returns and market efficiency should lead to P/Es predicting growth, but the hypothesis doesn't hold, at least in the data.

Finally, Table 2 sheds light on the third reason we might now expect high earnings growth: the idea that high cash retention (low payout ratios) leads to strong growth. Table 2 indicates, however, that the retention rate at the beginning of a period has been *inversely* related to the subsequent 10-year growth in earnings. The impact of the retention rate is incredibly, astronomically backward. Rob Arnott and I have struggled with this phenomenon. We haven't found this impact to be intuitive—it is not a forecasted result—but we do have a few *ex post* theories as to why higher retention rates might lead to lower real growth rates. I'll share three of them quickly.

The first reason relates to company managers. The general idea is that companies retain a lot of cash

Table 2. Average 10-Year Real Earnings Growth, 1927–2001 Data

Starting P/E	Retention Rate (%)				
	Negative to 37.7	37.7 to 44.4	44.4 to 50.3	50.3 to 63.9	63.9 →
5.9 to 10.4	4.1 %	2.5 %	2.2 %	–0.3 %	
10.4 to 13.8	4.3	2.5	2.4	0.6	
13.8 to 17.2	3.3	2.5	1.7	–0.4	
17.2 to 26.3	4.3	2.7	0.8	–0.6	
26.3 →					The Dragons Are Here!

to finance projects for behavioral reasons such as empire building. If the cash is for projects, managers are not doing a good job with the cash; they tend to pursue and overinvest in marginal projects, which is reflected in the future lowered growth rates of the company. If this is the explanation, the telecom boom in the late 1990s is going to be the poster child for empire building for all eternity.

Another theory, less plausible in my opinion, is that managers have information that the market doesn't have. It is generally accepted that companies are loath to cut dividends. So, the theory goes that when a company's managers pay high dividends, the market perceives that those managers must have such positive information about the company's prospects that they know they will not have to cut dividends in the future. When managers pay high dividends, they are optimistic because they have information unknown in the market. When managers do not pay high dividends, they must be nervous. So, retention of earnings may reflect a desire by managers to smooth dividends.

The third explanation is that Rob and I are doing something wrong. We have each double-checked our approach and the data repeatedly, but when you get a wacky result, for intellectual honesty, you still have to admit the possibility. That is why I mentioned the dragons, because we are off the charts and into uncharted territory.

If history repeats and higher P/Es and higher retention rates lead to lower real earnings growth and if Rob and I are not making an error, the future does not bode well for real earnings growth.

LOW INTEREST RATES. The second possible way stocks can be saved is low interest rates. **Figure 3** compares the P/E (or the "absolute" value of the S&P 500) with the earnings yield on the S&P 500, E/P, minus the 30-year U.S. T-bond yield, Y (or the "relative" value of the S&P 500); Panel A graphs these indicators for the past 20 years. As you can see, P/E has certainly fallen from its peak in 1999 but is still at the high end of the 20-year range. The equity yield minus the bond yield is one version of the Fed model. In that model, a high value is an indication of good news for the equity market, but for P/E, a high value indicates bad news for the market. Using the Fed model, the situation does not look that bad in 2001; the market is above average on earnings yield minus bond yield.

The same information, but stretching back to 1927, is presented in Panel B of **Figure 3**. The line for earnings yield minus bond yield is pretty lackluster over the period. When stocks were far cheaper in relation to bonds, stocks used to be bought for their

dividend yield; this chart uses earnings yield, but the difference is not really important. As Panel B shows, if Wall Street had a little bit longer perspective, such as looking back to 1927 rather than just 20 years, even the Fed model, or the relative value of the equity market, does not look great.

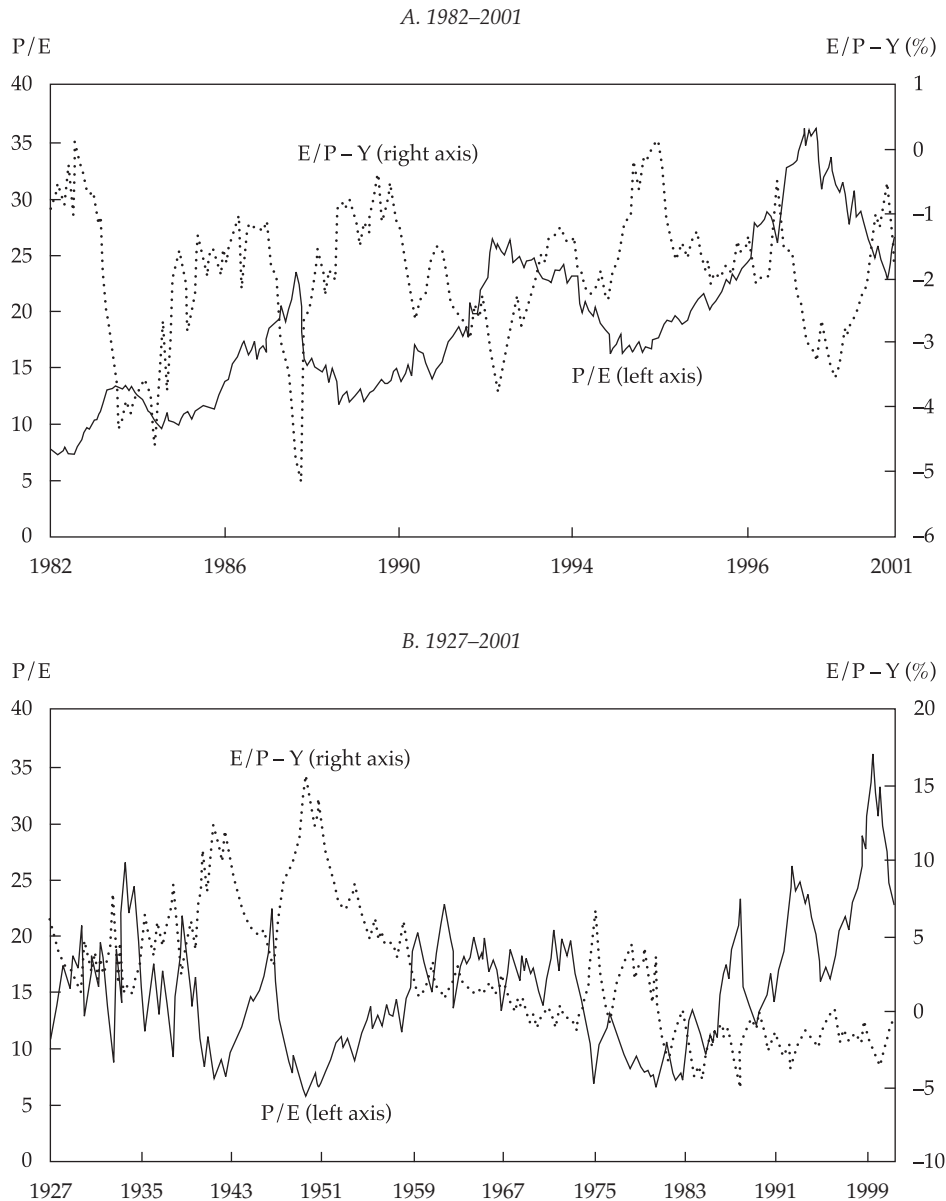
Forgetting the data, note that the Fed model has little theoretical standing. Nominal earnings growth does correlate nicely with expected inflation over time. A lot of confounding biases, such as depreciation methods, accounting choices, and different inflationary environments, affect the P/E calculation (see Siegel 1998). But by and large, the net of those biases is not clear. What does appear fairly clear, however, is that the market does not seem to understand that if you write down the expected return of a stock (dividend yield plus earnings growth), then if inflation and interest rates fall and earnings growth drops along with them, the P/E does not have to change. I think you understand the concept, but it is an idea I have to explain to most people, and I encourage you to do the same. People believe P/Es have to move with interest rates, and they are probably wrong, or at least overstating the relationship.

Figure 4 shows a plot of the S&P 500's realized 20-year volatility divided by the bond market's 20-year realized volatility against the relative yield of the stock market for 1950 to 2001.¹ I chose 20 years because I think of 20 years as a generation, so the ratio plotted from the *x*-axis reflects what a generation thinks in terms of how risky stocks are versus bonds. This ratio is a very robust indicator for each five-year period, up to 30 years. The *y*-axis is the earnings yield on the S&P 500 minus the 10-year bond yield. Whenever you look at long-term autocorrelated relationships like this, you have to carry out many, many robustness tests. This ratio survived every test we came up with.

Note that the *y*-axis is not stock yields; it is stock yields *minus* nominal bond yields. The market clearly does trade on interest rates in the short term. Not many models have a high R^2 at forecasting short-term (less than a one-year horizon) market performance. One indicator that is less pathetic than most in this regard is deviation from the fitted [linear (normal)] line in **Figure 4**. However, for longer horizons, such as forecasting the next 10-year real stock return, neither the bond yield nor the volatility measures matter. P/E alone forecasts the real stock return. So, an investor with a short horizon cares a lot about this line, but an investor with a long horizon doesn't.

¹ Figure 4 is similar to Figures 7 and 8 in Asness (2000b). In that article, Figure 7 goes back to 1871 and forward to mid-1998 and Figure 8 goes back to 1881 and forward to mid-1998.

Figure 3. S&P 500 “Absolute” and “Relative” Value



Note: S&P 500 P/E and E/P; 10-year T-bond yield.

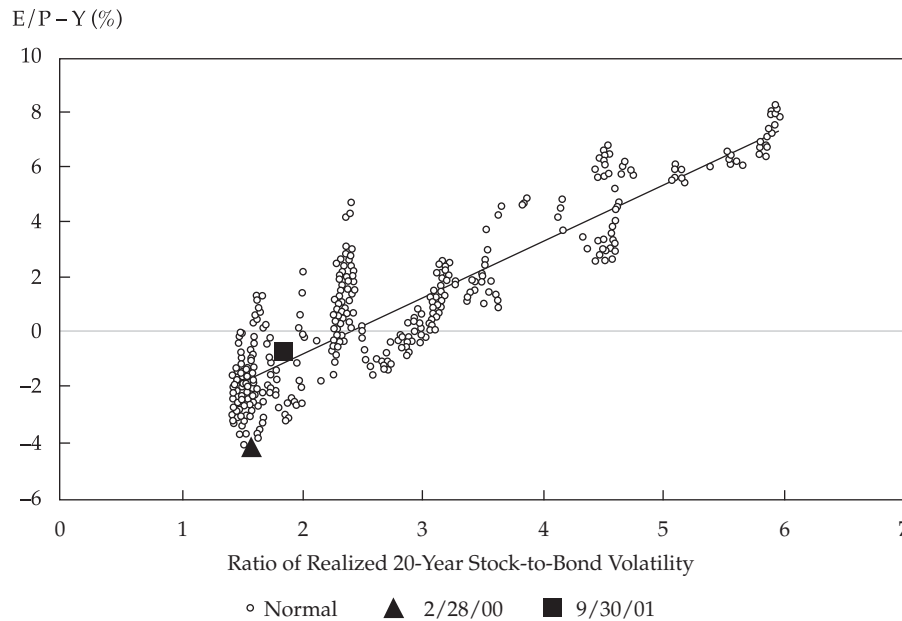
I have marked on Figure 4 where we were on February 28, 2000, and on September 30, 2001. On February 28, 2000, short-term traders could not be saved by anything; the solid triangle is well under the line. Stocks were yielding much less than they had historically—even given unusually low volatility and unusually low interest rates relative to the historical average.

The September 2001 mark in Figure 4 indicates that stock performance doesn't look too bad over the very short term. Short-term investors tend to trade on

this relationship—that is, trade on the idea that eventually the market moves back to the line for behavioral reasons. Note that this relationship is behavioral because it is based on errors—which does not change what the equity risk premium is in the long term. Over the short term, it is the deviation of E/P from the line that counts; over the long term, it is only the actual E/P that counts.

ACCEPTANCE OF LOW RETURNS. Now for the third possible hero that might save the stock

Figure 4. Stock versus Bond Valuation, 1950–2001



Note: S&P 500 E/P; 10-year T-bond yield.

market: Are investors willing to accept low stock returns? Have they understood the idea that future returns will be low, as so many of us have discussed. A ton of “strategists” will give explanations of why high P/Es are supportable, but then they will follow the explanations with the expectation of 10–12 percent stock returns anyway. That reasoning is questionable to say the least. The first part is believable; no one can say that a 1–2 percentage point return over bonds is bad. But you cannot have your cake and eat it too. Or as I like to say when it comes to Wall Street investors, they cannot have their cake and eat yours too.

What if investors haven’t yet realized the conundrum of expectations versus reality? Surveys exist—Campbell Harvey is going to present his survey data [see the “Implications for Asset Allocation, Portfolio Management, and Future Research” session]—that indicate respondents are expecting very high equity returns. Survey data are not always the most reliable, but the data report that the high return expectations are out there. I talk to a lot of pension plans, and not many of them are using assumptions as low as 6–7 percent nominal returns or a 1 percent real equity return over bonds. And investors who plan to retire at 38 because they expect to get a 5 percent equity risk premium and 7 percent real stock returns forever are going to wake up at 62 out of money.

Are investors rationally accepting the low equity risk premium, or are a lot of people still trying to buy lottery tickets?² Many have shown that Wall Street’s growth expectations are ridiculously optimistic, but investors seem to still believe them. So, Rob and I examined a strategy based on these expectations. We formed a portfolio for a 20-year period that was long high-growth stocks and short low-growth stocks (based on Wall Street’s estimates). **Figure 5** shows the rolling 24-month beta of that long–short portfolio from December 1983 to September 2001. For a long time, the beta was mildly positive, but for the past few years, it has been massively positive. It is a dollar long, dollar short 0.5 beta. Figure 5 says that every rally for the past several years has occurred because the high-expected-growth stocks were crushing the low-expected growth stocks. And every market sell-off has been a result of the opposite occurring. Does this pattern indicate rational acceptance of the low equity risk premium or the buying of lottery tickets?

Conclusion

Broad stock market prices are still well above those of most recorded history (and of all history excluding 1999–2000 and just before the crash of 1929). Unless a miracle happens, we must prepare for very low returns as compared with history. In the end, the market offers two choices: low long-term expected

² See Statman (2002).

Figure 5. Rolling 24-Month Beta of Long–Short Portfolio, December 1983–September 2001



Note: Except for 2001, dates are as of December.

returns in perpetuity or very bad short-term returns with higher, more normal expected returns in the long run. My personal opinion: Do the events of

1999–2001 strike anyone as a group of rational investors embracing and accepting a permanently low risk premium? If so, I missed it on CNBC.