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Bubble Logic

Or, How to Learn to Stop Worrying and Love the Bull

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Summary

A bull market, and the incentives of those who make their living from bull markets, can create its own form of logic. This book explores some of the stories that encourage the purchase or retention of stocks or mutual funds and the logic behind these stories. Some of these stories are honest attempts to explain new phenomenon, and may or may not prove true going forward. Some seem to be unintended falsehoods that come from an incomplete or lazy application of economic reasoning. Finally, some seem less well intended. The stories, and the logical analyses behind them, generally originate with Wall Street (both sell side and buy side), sometimes riding the coattails of academia, and are often readily absorbed by investors engaged in wishful thinking. Such wishful thinking has led to a stock market, and the growth/tech sector of the market in particular, that is priced so expensively that even very long-term investors will probably end up disappointed.

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I. Introduction

First, full disclosure. I am a Principal of a boutique investment manager with a value orientation. Thus, for about two years now with only brief interruption, we have had our assets handed to us. I believe that before a person rants and raves they should fully disclose that they may be typing with a jaundiced keyboard. Part of this book's thesis is that self-serving incentives often color what passes for independent analysis and research of financial markets, and since I am not immune to this bias, it would be particularly hypocritical of me not to declare my stance at the outset.

That said, my goal is to tick through many of the bromides about investing that currently are conventional wisdom on Wall Street and Main Street. Some of these popular wisdoms are explanations for new phenomenon that may or may not be true but must be critically examined. While some are correct, but misinterpreted, some are just dead wrong. While some are just benign silliness, many can prove harmful. Like in most businesses, these bromides exist largely to sell a product, in this case to sell equities. Of course, wishful thinking and the human desire for a free lunch, makes the consumer/investor very susceptible to this sales pitch. A basic theme is that although Wall Street research is made to look like independent science, and the financial media is made to look like neutral journalism, they are biased towards keeping you buying or holding common stocks. There is nothing wrong with that. That is their business. However, the investor needs to keep his eyes open. Furthermore, it is distinctly possible, and in my opinion likely, that the acceptance of these "wisdoms" has led to a stock market, and the growth/tech sector in particular, that is so expensively priced as to probably disappoint even very long-term investors.[3]

This book is meant to stimulate thought and debate, and should be taken that way. It certainly contains facts, but it also contains a healthy dose of my opinions (occasionally intentionally provocative), and I try my best to distinguish between the two. Some of the areas I address are very topical, while some apply to any era. I certainly do not claim to have all the answers. It is a lot easier to point out the fallacies in others' arguments than to figure out the answers. Still, when fallacies rule the land, somebody has to point at the naked emperor.

The book is divided into six parts. Part I is this introduction. Part II examines the properties of a long-term investment in equities, and the implication of today's high prices for this investment going forward. It is the most mathematical/technical part of the book, but is essential for examining today's stock market. Part III is lighter in tone and rigor, examining some creative ways sometimes used (and abused) to defend today's high stock prices. Part IV briefly examines growth vs. value investing. Part V encompasses several miscellaneous topics that might not fit anywhere perfectly, but clearly fit the

[3] A piece by Shawn Tulley in the January 24th, 2000 issue of Fortune actually covers some similar ground (with a similar viewpoint). As his came first, my work owes a clear debt to Mr. Tulley's article. Also, after writing most of this book, a letter to clients *(specific attribution forthcoming)* by Cambridge Associates entitled "Do the Math" was pointed out to me. This letter parallels many of the arguments of this book (including repeated exhortations to "do the math"), and some of the quotes I use are taken from this piece. I think this piece is excellent and recommend it if you can get your hands on one (and not just because of the similarity in content to my work). However, mine is funnier.

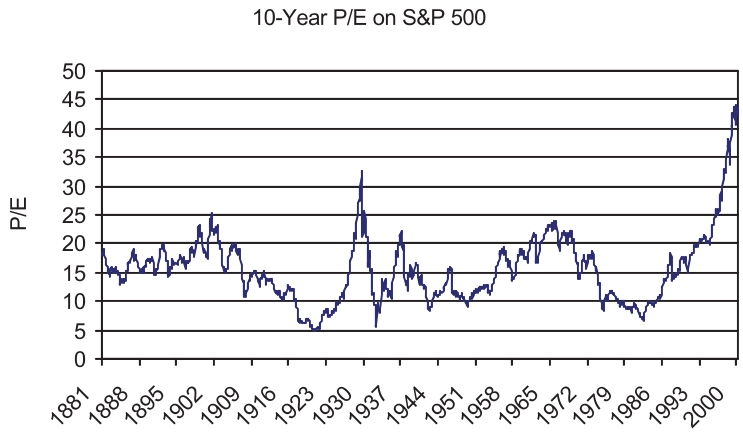
theme of bubble logic (the impact of new trading technologies, the effect of stock splits, the selectiveness of mutual fund advertising, and finally, the notion that it is "different this time"). Finally part VI concludes.

Each main part contains sub-sections that begin with a paraphrased quotation summing up the popular wisdom I am about to critically examine. Admittedly, this book is a mix of some hardcore valuation analysis, and a lighter anecdotal survey of the market. While perhaps an awkward mix at times, I argue that both are necessary to understand today's stock market. In general, the most theoretical issues are relegated to the extensive footnotes, which the interested reader can peruse to their taste. Finally, if any readers are more annoyed than amused by some of the sarcastic humor herein (especially in the second half of this book after the heavy lifting topics are done) then I do apologize. Have pity on a partially gored bear.

II. Long-term Equity Investing

"Equities Always Win Over the Long-term"

One of the most prominent ideas behind the bull market is that over any long-term horizon (let us identify 20 years as the long-term horizon) an investor cannot lose in the stock market. This belief is clearly held by many investors today. There are many sources for this belief, but perhaps the most recently influential is Jeremy Siegel's book, Stocks for the Long Run, documenting that over long periods the equity market's premium over inflation and over alternative assets like nominally risk-free cash, has been very large and consistent. Siegel's data is rock solid and correct.[4] However, let us look at a graph of some alternative data. This one comes from Robert Shiller (author of the book Irrational Exuberance) and shows the price-to-earnings ratio (P/E) of the S&P 500 for over 100 years. Note, the E in this case is the 10-year average of trailing S&P 500 real earnings, not last year's trailing earnings.[5]



[4] Siegel does not say that stocks will always win over any 20-year period. He only points out how consistently well stocks have done, but gives no silly assurances going forward.

[5] Before discussing the implications of this graph, I feel a need to defend Shiller for a moment. He has been criticized by some for using a 10-year average of real earnings as the E in P/E. The logic of this attack is that since earnings on average go up, a 10-year average of past real earnings will on average understate current earnings, and thus arrive at a larger P/E than just using last year's earnings for E. This is true. But, Shiller makes very little hay about the fact that his version of P/E is currently in the 40s while the trailing P/E over one year (for the S&P 500) is currently in the low 30s. That is not his point. His point is that comparing his series (using 10-year real earnings) to itself over time is an absolutely legitimate exercise. In fact it is a necessary one. Especially over long periods that include some true earnings depressions, short-term earnings can be very misleading (e.g., in the early 1930s there were some very distressed times when 1-year earnings dropped precipitously thus raising P/E, but in fact these were times better described by a low P/E). By using 10-year real earnings, Shiller simply restates P/E in a more stable meaningful fashion. The fact that P/Es tend to be higher in this method is immaterial. Now, the gap between Shiller's 10-year P/E and the more conventional 1-year P/E is indeed recently larger than normal (though examining the 1-year P/E graph also shows startlingly high recent prices). Again, the 10-year P/E will generally be under the 1-year P/E because earnings grow over time, and thus a 10-year average is usually below current earnings. Because the last ten year's real earnings growth has been somewhat stronger than average, this gap between the 10-year and 1-year P/E is greater than average. This does not mean Shiller's series is misleading. If one believes that this recent strong earnings growth will continue then this is a legitimate reason to argue that today's high P/E might be partly justified, but it does not make Shiller's version of the P/E any less a correct indicator of price (also, note that this view would have been exactly wrong in 1990 following 10 years of below average earnings growth).

First, it is exceedingly important to note that there is nothing magic about the long-term that makes equities pay-off so consistently, it is just math.[6] As with any volatile asset the longer the observation period, the more noise tends to cancel out and the more accurately we observe the true average return (the long-run expected or required return of equities). The long-run average equity market return vs. inflation (the real equity return), and the average equity return vs. cash or bonds (the risk premium), should be positive since investors should require a positive expected return for investing in risky or riskier assets. Thus, the twin observations, (1) that average equity returns are positive, and (2) that we become more certain of realizing a positive return over long periods, are not exciting findings, they are what we expect to find. The exciting finding has been exactly how positive these returns have been and, to a lesser extent, that deviations around the average over long periods have been somewhat smaller than we would expect. Siegel finds that the real return on U.S. equities has been about 7% over the long-term, and this is higher than most theories say it should be.[7] The gross compound return of the S&P 500 has beaten inflation in 100% of the 20-year periods from 1926-2000 (measured at overlapping monthly intervals), and has beaten U.S. T-bills in 96% of these same periods. Clearly, equities have been strong and consistent long-term performers.

Over any period, including the long-term, the return on an equity investment will be a function of the price you pay for it (let us deal with price in terms of P/E), the price at which you ultimately sell it, the dividends it throws off in between, and the earnings growth over the period.[8] The data underlying the "long-term argument for equities" rests on a period when P/Es (defined as above) averaged about 15, peaked at around 30 (not counting the latest bull market run), and examined on this same scale are now residing in the low- to mid-40s. Other versions of P/E, and in fact just about any other credible valuation measure, tells a similar story.[9] Equities historically always returned a reasonable amount (or even a superb amount) over the long-term. One reason is that they were almost always priced reasonably. To assume that this long-term consistency will now exist independent of pricing is simply to believe in voodoo. It will happen, because it has always happened is not a strong argument. Equities have gone up more than inflation (i.e., a positive real return) in all 20-year periods, and beaten cash (i.e., a

[6] Some will say indeed there is magic in long-run equity returns, namely a tendency to "mean revert." The argument states that after good (bad) periods equities tend to offer less (more) attractive expected returns, and this induces a less volatile long-term return to equities than if the stock market truly followed a random walk (with drift). However, mean reversion is not the main explanation for equities consistency over the last 125 or so years. First, there is only modest statistical evidence that such long-term mean reversion exists. Second, over the last 125 years, the high average returns of equities are far more responsible for the stock markets long-term consistency than any contribution from mean reversion. The mean reversion that does exist may be responsible for equities' 20-year variance around their high average real returns being lower than we would otherwise forecast, but this is a second order effect. The high level of the average real returns is first order. For more on this topic, please see a soon to be available paper "It's the Mean, Not the Reversion" Asness (2000). Finally, while perhaps an attractive long-term property, anyone long equities right now should pray that there is not a lot of mean reversion in stock returns.

[7] See Brad Cornell's book The Equity Risk Premium for an excellent readable review of these theories.

[8] The reinvestment income on the dividends also matters. For an excellent detailed decomposition of what drives equity returns, see Bogle "The 1990s at the Halfway Mark" (Journal of Portfolio Management, Summer 1995).

[9] Some examples of other valuation measures are the market's dividend yield, price-to-book ratio, and Tobin's Q. For a nice overview of Tobin's Q in particular, and a bearish view who's vehemence might just exceed my own, see the recent book by Andrew Smithers and Stephen Wright, Valuing Wall Street. Their book also does an excellent job of pointing out that the stock market (even over the more reasonably priced past) is not immune to periods of negative performance that, for all practical matters, would greatly impact investors with real world investing habits and time horizons (i.e., a 20-year buy-and-hold horizon is probably too long).

positive risk premium) in almost all of these periods, not because of magic, but largely because throughout the period we study they were generally priced reasonably, or even cheaply, vs. their earnings and dividends prospects. That is not necessarily the case anymore.

In an interesting recent paper (working paper, June 2000), Professors Fama and French take on the problem of estimating the market's risk premium (which they define as the expected return of the broad stock market over commercial paper). Among their other results, they find that because of high stock prices today, the expected risk premium of stocks over high quality commercial paper is now approximately ½-1½% (the range accounting for reasonable degrees of optimism or pessimism about earnings and dividend growth going forward). This compares to an average historical risk premium of about 6% from 1872-1999.

I am addressing here the simple question of whether equities will always win (beat inflation and/or short-term cash) over the long-term.[10] Fama and French's estimated equity premium of ½-1½% is an expected value. Real life always varies from expectations, and Fama and French's estimate can be thought of as the center of our future expectations, or put differently, our best guess based on current prices and growth estimates of how the future will turn out (i.e., there is a 50% chance things work out better, and a 50% chance things work out worse).[11] Put simply, the very low current expectation for equities compared to history means there is very little "cushion". If things work out slightly worse than expected, equity returns can now easily be less than commercial paper over the long-term and can even be less than inflation (i.e., negative real returns). When equities were priced for much higher expected returns they had a very large cushion against negative returns. This cushion is largely gone now.

Now, to be balanced, there might be reasons to justify today's very high prices. Long-term (not highly transitory) large increases in real earnings growth, perhaps driven by productivity growth, and the ability to ultimately turn this earnings growth into free cash flow to investors, could justify higher prices (I examine this more later). Some also argue that today's low inflation environment justifies a higher P/E.[12] However, when

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[10] This focus on positive returns is somewhat arbitrary. If over 20 years you make just a bit more than zero you are positive, but not economically much better off than making a bit under zero. However, the market has focused great attention on the question/assertion of equities' long-term infallibility as defined in this section.

[11] For technical sticklers, we are ignoring differences between means and medians, and some compounding issues. However, the intuition works fine. For excellent discussion of related mathematical issues see two books by Kritzman, Puzzles of Finance (2000) and The Portable Financial Analyst (1995).

[12] The argument states that low inflation and interest rates makes the earnings yield (the inverse of P/E) of equities more attractive vis a vis bonds. This is a difficult argument to make as it ignores the fact that presumably expected nominal growth moves with inflation. In particular, Modigliani and Cohn (Financial Analysts Journal, March/April 1979) argue that investors mistakenly make this comparison of equity yields to nominal bond yields. Furthermore, they argue that in the high inflation environment of the late 1970s this mistake (and related issues involving depreciation and liabilities) led investors to systematically undervalue the equity market (they estimated by about 50% at the time). In other words, Modigliani and Cohn rejected the idea that high nominal interest rates meant equity yields must be high (and P/Es low), and correctly forecasted the ensuing bull market. Applying their logic now obviously leads to the possibility of investors overvaluing equities today in our low interest rate, low inflation environment. Finally, Asness (Financial Analysts Journal, March/April 2000) looks at the issue empirically and finds that in fact low interest rates do support a higher than normal P/E on stocks, but only for the short-term. For long-term investors a high P/E is still very

equity prices (P/Es) are 3x their historical average and far above their prior historical maximum, the burden of proof in the debate is on those who claim they are still a low risk (or no risk) long-term investment. It is not enough to say "they always have been and thus will always be." None of what I say is a proof that equities will do poorly over the next 20 years. All I argue against here is the idea that the stock market must do well, and that the price you pay does not matter to the probability of this occurrence.[13] If equities are priced to offer considerably lower expected returns compared to history, then they are far more susceptible to negative shocks that can leave even their 20-year returns lower than short-term cash or even inflation. Returns over shorter time horizons, e.g. 10 years, that might be relevant to many or most investors, are even more threatened. Again, the cushion is substantially reduced (as is the reward even in the expected case).

Finally, let us step back for a moment. Does it fit intuition that as the world has bought into the "stocks cannot lose over the long-term" argument, investors have become price insensitive (why care about price if you cannot lose?), and thus bid up prices to the point where equities suddenly can lose over any term? It sure fits my intuition.[14] Countless times we see researchers find patterns in the stock market that have existed for a long time and then continued to work for a short time after discovery. But then, they go away as victims of their own success. That is, too much money chases the effect. The current price of the stock market seems a prime candidate to be just such a case.

"But, My Estimates of Expected Stock Returns Are Based On Solid Long-term Data"

Fama and French (and many others) find that expected stock returns going forward are lower than stock returns have been in the past. However, when making asset allocation decisions, many investors still estimate expected future returns by using a long-term average of historical returns (the most common period employed is 1926 to the present). On first examination this seems eminently reasonable. However, this suffers from an important paradox. The bull run of the last 5 years (taking us from a P/E around 20 to over 40), and even more so the last 20 years, non-trivially raises the long-term average realized return of stocks, and hence the estimate some use going forward of the expected return. However, this more than doubling in P/Es in 5 years almost assuredly reduces the expected return of stocks going forward. That is, just as users of this method are estimating a higher expected return for stocks, it is in fact lower, and lower for the precise reason they are raising their estimates![15]

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bad news. In other words Asness finds that in the short-term investors mistakenly act like stock yields should move with nominal interest rates, but in the long-term discover that they should not.

[13] A related abuse of the long-term argument for equities is when people apply it to individual equities. For example, "xyz.com might be massively overvalued but if I hold on long enough I will be fine." Siegel's work does not even begin to apply to these situations. Invest in a massively overvalued single stock and you may get lucky, but the odds are stacked against you, and having a long time horizon will not save you.

[14] For more on this issue, I would refer the interested reader to a very readable article by Jane Bryant Quinn "Wave the Bubble Goodbye." in the April 24, 2000 issue of Newsweek, and to another article by Ms. Quinn entitled "It's not Dumb to Own Bonds" subtitled "Stocks are risky even if you hold for the long term. Investors also need something safe." in the June 19, 2000 Newsweek.

[15] I will not dwell on the technical details here, but one of the main contributions of the Fama and French article cited earlier was developing a methodology to estimate expected stock returns relatively free of this bias.

Going to extremes can make this issue even clearer. Imagine all stock prices went up 100x tomorrow with no change in fundamentals.[16] Hopefully, we would all agree that paying about a 3000-4000 P/E for the S&P 500 right now would make a very poor long-term investment (wow, a P/E that even the author's of Dow 36,000 would not love). However, the historical average return on stocks would skyrocket once this 10,000% return was added. Obviously, in this case it would make little sense to use the historical average to forecast the long-term future. The historic average would be incredibly high, and the future would look incredibly poor. While far less extreme, the real-life situation today is analogous. Finally, this issue is very clear when applied to bonds. Few would think a bond's expected return has gone up if its yield falls, yet when its yield falls its price and thus historical average return rises. Stocks are really no different, but all the dust kicked up in equity analysis can obscure this highly analogous relation.

"It is Silly to Compare Today's P/Es to Those Before the Great Depression"

Some question the very act of examining a figure like the earlier long-term P/E chart. They argue that comparing today's P/E to historical averages is misleading, or more prosaically put "driving through the rearview mirror", as times are different now. Today's S&P 500 P/E (using the Shiller data) is about 44, while the historical average P/E from 1872-1999 is about 15. Critics say that it is naïve to assume that we will return to about a 15, as life is better now. As one example, the July 18th, 2000 Wall Street Journal had an interesting and thoughtful article on this topic. Quoting Jeremy Siegel from that article, "When we look back over the past century and say the average price-earnings ratio was 14 we're talking about a period that includes the Great Depression, two world wars, and the double digit inflation of the 1970s. Saying we'll go back to a 14 P/E means saying we have learned nothing about how to better manage the economy." Well, there certainly may be some truth to this observation, but let us dig a little deeper. These are the average P/Es over different periods:

Average P/Es Over Different Periods

Period	Average 10-Year P/E	Average 1-year P/E
1891-Present	15.5	14.5
1946-Present	16.6	14.9
1970-Present	16.6	15.4
1980-Present	18.5	17.0
June 2000	**43.9**	**32.2**

For balance, I show both the Shiller 10-year P/Es (that correct for significant biases in the 1-year trailing P/E), and the more traditional 1-year trailing P/E (which is also calculated from the Shiller data). Comparing recent P/Es to the longest-term average P/E is startling (43.9 vs. 15.5, and 32.2 vs. 14.5). However, this is not an artifact of including very old data. Looking at the 1946-present averages (no World Wars, no Great Depression) the

[16] If it helps to visualize this, just imagine Abby Cohen raises her recommended allocation to stocks by 5%.

comparison is hardly any different. Even looking 1980-present does not change the story much (and the current euphoric period is getting more and more weight in this shorter-term average). While memory of these cataclysmic events might have depressed P/Es even after they ended, it is certainly not the case that one needs World Wars and a Great Depression to get reasonable stock valuations. Rather, even compared to other modern times, it is today's high P/Es that are the exception not the rule.

Interestingly, in this same article, Jeremy Siegel was quoted as saying he thought reasonable P/Es for the S&P 500 might be in the range of 20-25.[17] This can be (and actually was) interpreted as bullish because 20-25 is not 15, and thus Siegel is agreeing (correctly) that it is naïve to say that we must return to the historical average. However, falling from today's 32.2 to 25.0 is a –22% return (I assume Siegel's using 1-year P/Es), and falling from 32.2 to 20.0 is a –38% return. I will examine this more later, but a fall of this magnitude for the broad market, and in all likelihood a much harsher fall in the growth/tech sector, in most circles would be labeled bearish. While I think Professor Siegel's observation is accurate (that there is no real reason we must return to historical average P/Es) and certainly interesting, it is somewhat amazing that this can be interpreted as the bullish case!

Essentially, it is true that nobody should point at the historical average and say we must get back there. That is as naïve as observing that equities have historically done well and assuming they must do well going forward. However, to summarize, two points are important. One, you do not need to include the Great Depression or a World War, to get low average P/Es. Today's high P/Es are about 2x to 3x (depending on which P/Es you use) the average P/Es measured only over the modern era (1946-present). Second, as Siegel's quote supports, today's P/Es are still dangerously above reasonable levels (not just vs. history, but from actually examining the math behind expected returns – more on how to do this later).

Finally, I would like to discuss the relevance of the Great Depression. Revisiting Siegel's quote, "Saying we'll go back to a 14 P/E means saying we have learned nothing about how to better manage the economy." Again, perhaps a 14 P/E is an extreme prediction, but it is also precarious to rest too hard on how much we have learned about the economy. Students of the Great Depression uncover tremendous parallels to today, including a belief then that we had learned a lot about managing the economy (I know this talk of ominous parallels makes me sound a bit like Hal Lindsey, but bear with me). The quotes below are all (except for the last one) from a New York Times article by Floyd Norris called "Looking Back at the Crash of 1929." The first quote is Norris describing a Times editorial from October 1929 that blasts speculators, but then assures us that the Fed will protect us from the consequences of our own folly:

[17] Siegel also mentions that perhaps the fact that we are now on the high side of this range (actually well past the high side) can be explained by the relatively good times we are experiencing, perhaps due to technological advances. However, Professor Siegel himself, in his aptly titled piece "The Shrinking Equity Premium" (Journal of Portfolio Management, Fall 1999), points out that returns to technological progress historically have gone more to workers in the form of higher real wages than to the value of companies. Quoting from his article, "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."

> … it may be useful to recall an editorial published in The New York Times in the midst of the 1929 crash, on Oct. 26. It heaped scorn on those who had participated in the "orgy of speculation" that had sent prices so high amid talk of a new era and permanently high stock prices. "We shall hear considerably less in the future of those newly invented conceptions of finance which revised the principles of political economy with a view solely to fitting the stock market's vagaries."
>
> But after blasting the speculators, The Times took a much more sanguine view of the economy's future. The Federal Reserve had "insured the soundness of the business situation when the speculative markets went on the rocks."

Sounds a lot like the current view that we have a "Greenspan Put" where the Fed will save us from a crash so we can safely trade/invest like a crash cannot happen. On the impact of technology (in the 1929 case it was radio):

> Then, as now, there was talk that an exciting new technology had rendered the old economic laws irrelevant. Then, as now, stock connected to that technology zoomed skyward, but even companies that had nothing to do with the technology saw their stock prices benefit.

Norris's list of parallels continues. Like today, pre-1929 dissenting voices were laughed at, the country was obsessed with stocks, and "dumb money" crushed "smart money":

> By 1929, such cautionary voices had been discredited, and the stock market had become a force unto itself, propelled by dreams -- and the reality -- of quick wealth. "Playing the stock market has become a major American pastime," reported The Times in a magazine article published on March 24, 1929. The article noted that the number of brokerage accounts had doubled in the past two years, and added, "It is quite true that the people who know the least about the stock market have made the most money out of it in the last few months. Fools who rushed in where wise men feared to tread ran up high gains."

Then as now, Wall Street came to the defense of stock prices. The following discusses bankers' reaction to a severe "dip" in early 1929, and the subsequent recovery from this dip that signaled to many that all was well again with the bull market (the parallels to the spring/summer of 2000 NASDAQ recovery make me start looking over my shoulder for four horsemen).

> "Responsible bankers agree," The Times quoted an unnamed broker as saying that day, after the recovery began, "that stocks should now be supported, having reached a level that makes them attractive." The responsible banker in question, it turned out, was Charles Mitchell, the president of National City Bank, a predecessor of today's Citibank. He defied the Fed, and lent out all the money the speculators wanted. Soon prices were back on their upward course. By the August peak, the Dow was 35 percent above the low reached during the March sell-off.

Responsible bankers agreed, and choosy moms chose Jif, but we all know what happened next (a tremendous crash and bear market, The Great Depression, and a full 20 years of effectively zero real return on stocks).

Finally, I must add one other quote that makes clear the parallel between today and 1929 both in abandoning traditional valuation methodology, and in assuming the Fed will bail us out of any crisis with easy money:

> Once stock prices reach the point at which it is hard to value them by any logical methodology, stocks will be bought as they were in the late 1920s – not for investment, but to be unloaded at a still higher price. The ensuing break could be disastrous because panic psychology cannot be summarily altered or reversed by easy-money policies.

Note the author's cynicism regarding whether a central bank can actually save us from an overvalued and declining market. The quote is from 1959, by Alan Greenspan.[18]

While the parallels are interesting, there are of course some things that are very different. However, this is not necessarily good news. If somebody asked me the riddle, "what's the single biggest difference between June 2000 and September 1929", I might be compelled to answer "the price." Measured using the Shiller 10-year scale today's P/E is about 43.9 vs. 32.5 in September of 1929, and measured using 1-year P/Es today's value is 32.2 vs. 20.4 in September of 1929.[19] Furthermore, at the end of September 1929, CPI inflation stood near zero, and 10-year bond yields hovered around 4%, so these crutches sometimes used to defend today's high stock prices were even lower back then. Finally, recent real earnings growth (circa early 2000) has been strong. 1-year compound growth has been about 12% (vs. a 3.5% historical average), 5-year annualized compound growth has been about 4.0% vs. a 1.9% historical average, and 10-year annualized compound growth has been 4.5% vs. a 1.5% historical average (the historical average compound growth falls with time-horizon due to the effects of volatility on compound growth). In other words, recent real earnings growth has been strong. However, in September of 1929, the relevant numbers were 18.3% for 1-year growth, 10.2% for 5-year growth, and 5.4% for 10-year growth, all better or much stronger than today. Apparently, then as now, investors were looking at recent growth, and pricing stocks as if this growth would go on forever. Only then, the growth was even stronger, and the price was not as high.

On many qualitative issues (rampant speculation, total faith in the Fed, extreme belief in new technology, Wall Street trying to jawbone a stock recovery, etc.) today seems very much like 1929. On other fronts the comparison is more favorable for today (we

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[18] This quote was taken from the Cambridge Associates piece cited earlier. Their piece also contains many other quotes and parallels for the reader who is interested in more. In particular, my favorite involves the prevalence of books in the mid and late 1920s bearing a positively eerie similarity to Siegel's Stocks for the Long Run. One, by Edgar Laurence Smith, entitled Stocks as Long Term Investments "proved" that it was close to impossible for the stock market to lose over any 15-year period. Well, I guess every bubble has its Boswell (though in fairness to Siegel he did publish the first draft of his book in 1994, a time of financial distress not a bull market, and he has recently written articles, some of which I quote here, documenting that expected equity market returns are now lower going forward).

[19] Someone really paying attention might note that the gap between the 10-year and the 1-year P/E was even larger in 1929 than today. Meaning, if Professor Shiller did his analysis in 1929, the screams that he was being unfairly bearish by using the 10-year measure would have been even louder than they are today, and of course tragically wrong.

probably live in a safer world, security regulation protects us better from outright fraud, etc.). Finally, on the pretty important issue of price, today seems significantly worse than 1929. Now, comparisons to other times are dangerous as things can and do change. I do not want to fall into the "representitiveness bias" documented by students of behavioral science where one over-relies on perceived similarities. To this end, most of the rest of this work focuses on forward looking estimates of stock market returns, not simple historical comparisons. However, while slavish devotion to history makes little sense, and similarities can be overstated, it is perhaps at least as dangerous to completely ignore the lessons of the past.

"Stock Prices are High as Investors are Willing to Accept a Lower Risk-Premium Today"

Many reasonable analysts looking at today's equity prices reach the almost unavoidable conclusion (as did Fama and French in the work cited earlier) that the equity market's current prospective expected return is quite low compared to history. However, rather than forecast a severe drop in stock prices (or a long period of price stagnation) that would restore the expected market return to more normal levels, some argue that the lower expected returns are in fact here to stay. The idea is that investors now recognize that stocks are less risky vs. other assets than previously believed, and thus should offer a lower return premium going forward, and thus have higher prices today (remember, a higher price today leads directly to lower expected returns going forward). Actually, this explanation is theoretically reasonable. It might be true, and could explain the very high valuation levels we see today. However, there are at least two giant holes in this argument.

Hole #1: Investors show no signs of accepting lower stock returns going forward. Investor surveys all point to their expected future returns being higher, not lower, than historical experience. It is hard to reconcile equity investors being happy with bond like expected returns, with the countless ads for on-line brokers implicitly promising you a private island if you will only trade with them. When compounding at ½-1½% over commercial paper it takes a long time to pay off the mortgages on those islands. In addition, the existence of inflation-protected government bonds offering about a 4% guaranteed real return, high quality municipal bonds whose tax equivalent nominal yields currently approach 10%, and very high yields on equity-like low grade bonds, makes it even more unlikely that investors would now be consciously willing to accept very low prospective returns on stocks. Apparently, it is not general risk-aversion that is low, but only risk-aversion when it comes to buying equities. Quoting Jeremy Siegel (Journal of Portfolio Management, Fall 1999), "This divergence between increased historical returns and lower future returns could set the stage for some significant investor disappointment, as survey evidence suggests that many investors expect future returns to be higher, not lower, than in the past."

Hole #2: As mentioned earlier, a large part of the long-term consistency of stock returns comes from the fact that they have historically had a high average return. If that average (or expected) return goes way down then stocks are going to have some long periods of

negative performance as their cushion is gone (see the discussion of Fama and French's findings earlier). Then, if equities can lose, they become risky again, and the circular argument that they should be priced super expensively because they have no long-term risk disappears completely.[20]

It is rational to observe that the historical equity risk premium in the U.S. has been high, and maybe conclude it has been too high.[21] And maybe, just maybe, part of the gigantic bull market we have seen is a permanent rational lowering of this risk premium. However, it strains credulity to explain the majority of this bull market as coming from equity investors now being perfectly happy to make nothing or just a bit over bonds going forward.

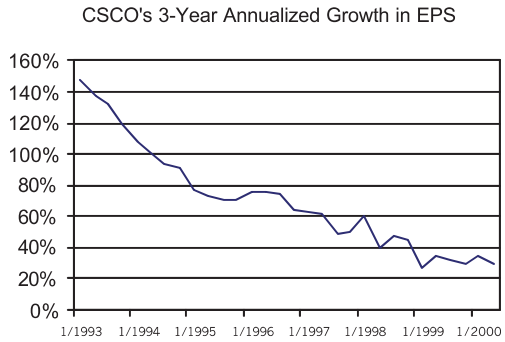
"Earnings Growth = Stock Return"

This section examines the long-term returns of companies that are growing fast, and expected to continue this pace for quite a while. I provide examples that demonstrate that the long-term expected return from investing in these companies is not even close to equal to their expected growth rate. This counters what seems to be a widely held (though thankfully not universal) view that if a company's earnings grow at 30% per year, by investing in it, you will make about 30% a year. More generally, there appears to be a strong belief held by many that to make money investing, one must invest "where the growth is." This is not true. While our general prosperity is certainly linked to the overall economies' ability to grow, this does not mean that investing in specific fast growth companies, or indices of these companies, is automatically a good idea. In fact, it should be immediately clear that any prediction of return that ignores the price you pay has to be wrong. Furthermore, if the confused belief that earnings growth = stock return is responsible for all or some of investors' current exuberance over stocks, then this misconception may be responsible for the low level of expected stock returns going forward.

Let us use an example of a specific fast growing stock. I will pick on Cisco, probably the poster child for high tech blue chips and try to determine what an investor today in Cisco can realistically (or even optimistically) expect as a long-term return.[22] As of June 2000, Cisco is trading at about a 140 P/E vs. 1-year trailing earnings. Wall Street analysts are currently forecasting (using the median IBES estimate) Cisco to grow earnings-per-share (EPS) at 30% per year for the next five years. The following graph is the actual

[20] Paul Krugman makes a similar point in a piece called "A Self-Defeating Prophesy."
[21] Even this is debatable. Some authors argue that looking at only the success of the U.S. market over the long-term biases us towards thinking the true equity premium is higher than it really is as ex post the U.S. has been the world's most successful market, and one of the few markets in continuous uninterrupted long-term existence. In fact, that the U.S. would survive at all was by no means a certainty, and probably upwardly biases historically based estimates of the expected return on U.S. equities. The technical term for this is survivorship bias. See Goetzmann and Jorion (Journal of Finance, June 1999). It is also another reason why the historical average might be a poor predictor of future stock returns.
[22] While I only pick Cisco as a very recognizable example of a general phenomenon, it should be mentioned that as of June 2000 I am short this company both personally and professionally.

annualized 3-year compound EPS growth Cisco has achieved over the last ten years or so (a 3-year period is used to smooth short-term fluctuations).[23]



Cisco is obviously a phenomenal company considering the spectacular growth rates it has generated for so long, and people who have faith in Cisco the company (not Cisco the price) are perhaps correct. However, there is a clear trend down in their EPS growth, and all economic intuition says this should occur. As a company gets bigger, and competitors gear up (both happening here in spades) it is natural for any company to slow its growth. Now, Wall Street analysts are not known for their restraint, and considering the trend above, their forecast of 30% growth going forward for another five years may be optimistic. But, for now, let us assume it is a good forecast[24]. Of course, that assumption does not mean you will earn a 30% return on your investment in Cisco. To estimate long-term expected return more assumptions are needed. I will assume that Cisco continues to outgrow the market for another 5 years after its first 5 years of 30% EPS growth, as its growth linearly declines to normal market growth rates thereafter. I assume normal growth is 6% nominal EPS growth or about 3% real growth assuming inflation stays at 3%. In other words, growth in years 6-10 is linearly declining from 30% to normal growth of 6%, and it is steady at 6% from year's 11 onward. To be clear, under these assumptions nominal growth each year is as follows (scenario (1) in the following table):

	Cisco's Growth over Different Years																	20-Year Annualized	Multiple
Scenario	Year 1-5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Year 20	IRR	Compound Growth	of GDP in 20 Years
(1)	30%	26%	22%	18%	14%	10%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	7.5%	14.5%	4.6
(2)	54%	46%	38%	30%	22%	14%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	10.0%	22.4%	17.3
(3)	30%	29%	27%	26%	24%	23%	21%	20%	18%	17%	15%	14%	12%	11%	9%	7%	9.0%	20.8%	13.3

Combined, these assumptions mean Cisco has above normal earnings growth for the next ten years. Over the full next 20 years, these assumptions lead to compound annual growth of 14.5% for Cisco, and real total EPS growth that is roughly 5x that of real GDP (assuming real GDP grows at a compound rate of 3% per year). Even for a great

[23] For our purposes, we ignore some of the issues that people valuing a company like Cisco like to fight about (e.g., the dilutive effects of options issued, the impact of the choice of accounting methodology for mergers, etc.) though these issues are probably relevant. The source for the EPS data on Cisco is COMPUSTAT.

[24] A recent study by Chan, Karceski, and Lakonishok (2000) with the working title "The Persistence in Operating Performance Growth" shows that Wall Street analysts have some power to forecast the next two years earnings growth, but even over this short period you still want to discount their optimistic forecasts as they tend to overdo it. Even worse, out further than two years, the analysts have almost no forecasting power. This is a far cry from the optimistic assumption used here that analysts are 100% correct for five full years, and even after five years are still directionally correct.

company, it is optimistic to assume such powerful long-term growth given the sea of competition. I also assume that when Cisco's growth slows they start paying dividends (or buying back shares) in line with the historic behavior of firms with comparable growth rates (and eventually settling to a 50% payout ratio, which is about the average for the S&P 500 from 1950-1999).[25] With these assumptions, and using today's price, I discount back the cash flow to investors and find a current internal rate of return (IRR) on an investment in Cisco of 7.5% (please see appendix I for a discussion of the mechanics and meaning behind discounting cash flows and calculating IRRs).[26] If all my assumptions pan out then this is the return a long-term investor should expect on their Cisco investment buying in at today's price.

Of course, while still assuming my optimistic earnings growth assumptions come true, the next question is whether a 7.5% long-term return is enough. The answer seems to be a strong no. First, for perspective, note that this IRR is not that far above today's cash and government bond yields, and probably a similar expected real return (with a lot more risk) than inflation-protected government bonds. Now, most investors would probably expect and demand a higher return on Cisco than on the broad stock market as Cisco is more volatile. Say investors demand a 3% risk premium for the market over cash (itself far lower than history, but a bit higher than the Fama-French current estimate) and 1/3 above that for Cisco. So investors should require about 4% above cash to own Cisco, or a long-term return of about 10% today. If the above assumptions are right, Cisco's IRR has to go up 2.5%. Unfortunately, if the price moved down to get us there today, Cisco would have to immediately fall about 72%.

Now, getting more aggressively optimistic on my earnings growth assumptions will make the situation better, but the assumptions have to be truly heroic to get to a 10% IRR at today's price. For instance, in scenario (2) I assume Cisco grows EPS at 54% for the next five years and then slows to normal market growth linearly by year eleven. Now, the IRR does get to 10%. However, instead of growing 5x faster than real GDP for 20 years, Cisco's real EPS now grows about 17x more than real GDP grows for 20 years.[27] Of course, besides leading to 20-year growth of mythological proportions, 54% per year

[25] To estimate each year's dividends I estimate a payout ratio and multiply by that year's earnings. The payout ratio I assume is based on the following function: payout(t) = 10% + 84% * payout(t-1)–38% * earnings growth(t). Payouts above 100% or below 0% are set to that respective boundary. This function is empirically estimated based on the annual payout ratios and growth rates of the S&P 500 through time. It captures that payout ratios are slowly mean reverting, and that payout ratios are lower (often zero) for high growth companies. The function settles to a steady state long-term payout ratio of 50% at 6% nominal growth. The results of this paper are not very sensitive to this specification.

[26] Note, there are complicated issues about uncertainty that we do not address here. I assume that Cisco's earnings evolve steadily and deterministically, and I discount the cash flow to investors from these earnings at the constant IRR that equates the present value of this cash flow to the current price. I also assume that when analysts forecast 30% annual earnings growth for Cisco, they are forecasting that Cisco's earnings in 5 years will be 1.30^5 times their earnings today (it is not fully clear what analysts' are actually forecasting). This is a different, and more aggressive, earnings growth assumption than assuming that the average growth each year is 30% (which would lead to lower future earnings as variance in per year earnings growth lowers total compound growth).

[27] Of course, optimists can also just assume that real GDP grows faster than 3% for the next 20 years. However, even assuming more aggressive growth in real GDP, the required earnings growth for Cisco is still shocking. For instance, if real GDP grows at 5% for the next 20 years, instead of 17x faster, Cisco only has to grow 12x faster than GDP to reach a 10% IRR at today's prices. We will retain the assumption of long-term 3% real GDP growth through this book, though relaxing this assumption has a minimal impact at reasonable levels. At unreasonable levels, long-term phenomenal real GDP growth can perhaps save the day (and perhaps this is what is being assumed by the market).

is also well above their growth of the last 3 years, is way above the usually optimistic Wall Street estimates, and must be sustained for five full years going forward starting from today's huge base. Instead of assuming larger then 30% EPS growth over the next five years, I can get more optimistic by assuming that Cisco's above normal growth lasts longer. For instance, in scenario (3), instead of linearly declining to normal market EPS growth by year 11, instead I assume this decline occurs more slowly lasting until year 20. In this case, Cisco's IRR goes to 9.0% (still below the required amount), and I am now effectively assuming that Cisco grows real earnings for 20 years at a compound rate 13x real GDP growth.[28]

In fact, my entire analysis may be way too kind to Cisco. Ignoring for a moment that 10% is probably an unrealistically high estimate, what if you actually told their investors that they should expect a 10% long-term return? If they believed you, I think many (perhaps most) would bolt for the door as they expect, require, and in fact demand, the 30-100% annual returns they have been receiving. It is a real paradox that many Cisco investors would laugh at you if you told them they were only going to make 10% per year going forward, yet you need exceptionally optimistic assumptions just to get to a 10% long-term expected return. Eventually, something has to give, as "long and strong" gives way to "long and wrong" ("long and strong" is one of the deeper pieces of analysis you will often find on Internet chat rooms devoted to growth stocks).

Bottom line, while rational people can disagree, I think the case against Cisco as a long-term investment is reasonably strong given today's prices. However, it is not nearly as strong as the case against the entire NASDAQ 100. The entire NASDAQ 100 looks very much like a slightly less extreme version of Cisco, and while this analysis can certainly be wrong for one company (though unlikely, Cisco could surprise us with sustained 54% growth or even more), it gets much less plausible to assume this type of long-term growth for an entire index of 100 large companies. Can it happen? Of course, anything can. Perhaps the CEOs of these 100 companies are all children of Lake Woebegone? But, we must ask whether it is rational for an entire market to be priced with this as the base case.

Let us contrast the analysis of Cisco, with analysis of an "old economy" stock like the Ford Motor Company (Ford is far from the only example, and like Cisco, is only meant as an example). Ford is assumed by Wall Street analysts to have 5-year earnings growth going forward of only 8.2%. Pretty anemic huh. However, they are also selling for a P/E vs. trailing earnings of about 8 (i.e., you pay 8x last year's earnings for Ford vs. 140x last years earnings for Cisco), and they have a current dividend yield of 4.3% (vs. a zero yield on Cisco). I make the same assumptions for Ford as for Cisco (i.e., they match Wall Street's growth expectations for 5 years, and then slow from 8.2% to 6% growth over

[28] I experimented with an alternative methodology. At the end of 20 years assume Cisco is selling for a 15 P/E and calculate the IRR over this period assuming you sell your stake then (i.e., no more infinite horizon). This methodology is much less stable, and more arbitrary, than that employed above. For instance, in our base case scenario (1) (10 year abnormal growth, 30% growth in the first 5 years) the IRR under this new method was 3.4% (vs. 7.5% in the full analysis), when assuming 54% growth for 5 years in scenario (2) the IRR was 10.5% (vs. 10.0% in the full analysis), and when assuming abnormal growth lasts for 20 years in scenario (3) the IRR was 8.5% (vs. 9.0% in the full analysis).

years 6-10, ultimately then growing at 6% in perpetuity along with the overall economy). This is scenario (1) in the following table:

	Ford's Growth over Different Years																	20-Year Annualized	Multiple
Scenario	Year 1-5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Year 20	IRR	Compound Growth	of GDP in 20 Years
(1)	8%	8%	7%	7%	7%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	12.7%	6.8%	1.1
(2)	6%	6%	5%	5%	4%	4%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	10.5%	4.1%	0.7

Instead of the 7.4% IRR I estimated for Cisco, Ford's IRR is 12.7% in the base case scenario. Remember above when I tried to find how optimistic I had to get about Cisco's earnings to get to a 10% IRR, well for Ford the question is how pessimistic I need to be to get to 10%. In scenario (2) I assume Wall Street is wrong, and instead of 8.2% Ford only grows earnings at a nominal 6% for the next 5 years, linearly slows down from 6% to 3% during years 6 to 10, and then grows at a nominal 3% from year 11 onward. These assumptions mean Ford is matching real GDP growth for 5 years, slowly declining for years 6-10 to zero real growth (or 3% nominal growth), and then staying at zero real growth forever in a presumably growing economy. Well, at these assumptions, far more pessimistic than Wall Street's assumptions, Ford's IRR is 10.5%. In other words, to get Cisco (or similarly the entire NASDAQ 100) up to an IRR of 10% I have to be far more optimistic than Wall Street, and far more optimistic than seems economically reasonable. To get Ford down to near an IRR of 10%, I have to be far more pessimistic than Wall Street. Note, I am not favoring old economy Ford over new economy Cisco based only on price while ignoring growth. I give Cisco tremendous credit for amazing growth going forward, and penalized Ford harshly for sluggish growth going forward. By doing so, I acknowledged that in a real sense Cisco is the "future" and Ford is the "past." This analysis favors Ford (by an obscene margin) over Cisco not because of a myopic focus on price, but because of simple recognition that price matters, and the right amount to pay for growth is not unbounded. In other words, at these prices, Cisco might be the "future" when it comes to earnings growth, but in all likelihood, Ford is the "future" if one cares about long-term stock returns. Again, I only use Ford and Cisco as examples of a more general market phenomenon. Any one company or even industry segment, can possibly grow more (or less for Ford) than necessary to justify today's prices, but it is much more difficult for broad indices to achieve this.

It is easy to imagine a relatively new investor getting caught up in the exuberance of buying these stocks thinking that buying companies with great current earnings growth automatically means making a lot of money. Frankly, to various degrees, investors are often explicitly or implicitly told this by Wall Street and the financial media. Criticizing this new investor would probably be too harsh. However, one can certainly criticize the legion of "licensed" strategists/analysts out there who simply ignore the math. I do not think any of the bullish strategists and analysts would remain publicly bullish on the NASDAQ 100 while simultaneously predicting substantially below 10% long-term returns. On the other hand, I do not know many who would be willing to publicly predict that the earnings of Cisco, or far more unlikely the entire NASDAQ 100, will grow at 17x real GDP over the next 20 years, or that real GDP will grow at enormous rates for an extended period of time.[29] However, with only some small wiggle room on assumptions,

[29] To put this in perspective, currently, Cisco's trailing earnings are currently about 0.04% of nominal GDP, Microsoft's are about 0.09%, and GE's are about 0.11%. At 17x real GDP growth, with real GDP growing at 3% per

that is the mathematical choice. Yet, Cisco is on almost every "must own" recommended list I see. Go figure.

Let me remind the reader again that all of the above analysis of Cisco assumed (at least) that Wall Streets' exceptionally optimistic earnings growth forecasts for the next five years do come to pass (and I added to the optimism by assuming the tremendous growth only slows gradually after year five). Even with these assumptions I still derive unacceptably low long-term expected returns. In other words, high earnings growth does not necessarily equal high long-term investment returns, and depending on the price paid, can certainly accompany low or negative returns. Let us now be more sober for a moment. What if things are not as optimistic as Wall Street forecasts? What if over the next 20 years Cisco, or the entire NASDAQ 100, posts growth rates below my very optimistic assumptions. In fact, history says this is the very likely outcome. Historically, studies have shown that the earnings of both fast and slow growing companies on average "regress to the mean" quicker than what is priced into the market, and as I mentioned earlier, Wall Street's growth forecasts tend to be optimistic, and have little historical power for forecasting horizons past one or two years. Quoting Barton Biggs of Morgan Stanley in a recent missive (June 2000),

> The big-cap, sacred-cow tech stocks in the U.S. and Europe have been nicked but not ravaged, and no one wants to take the risk of being out of them. The multiples of EBITDA, earnings and sales are so elevated on these marvelous companies that they have to be discounting compound earnings growth at 20–30% a year for at least the next five years. This would be a feat never before accomplished by companies of this size. In fact, Bernstein's studies show that, based on the history of the last 40 years, there is only one chance in about seven that a "recognized" high-growth tech stock can sustain that exalted status for five years, and only one chance in 14 for 10. "Dwell on the past and you will lose an eye. Ignore the past and you will lose both of them."

Though I am highly sympathetic to this more realistic outlook, I will not replace my optimistic assumptions with more realistic assumptions, as the IRRs I find with the optimistic assumptions are depressing enough. Suffice it to say that if growth is less than my very optimistic forecasts, given today's prices for these companies, it will be very very bad. If the world turns out wonderfully and my optimistic forecasts are attained, it is merely very bad. Finally, if one is a super optimist, perhaps it is only bad.

I do not want to shout fire in a crowded NASDAQ market, but please make sure your smoke detector is working (and check where someone might be blowing this smoke).

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year, Cisco's earnings will be about 0.70% of GDP in 20 years. In other words, in percentage terms, Cisco's earnings will be about 3x the current importance to the economy of Cisco, Microsoft, and GE combined.

"But I am A Really Long-term Investor"

It is instructive to examine my analysis[30] of Cisco further. I actually projected Cisco's growth, and valued that growth over an infinite horizon. Under my assumptions, by buying at today's price, you get an unacceptably low return over this period (I think we can all agree infinity is long-term). Often it is said that companies will "grow into their valuations" over the long-term. This is misguided. There is no concept of growing into it. Alternatively, an investor might say, "sure I see your valuation argument, but I'm young and have a long time horizon, so naturally I want growth stocks". Well, unless they are Ponce De Leon, their time horizon is less than infinity. If the price is way too high relative to the long-term prospects (even if those prospects are great) then a long-term horizon does not save you. In a very real sense, at today's prices, the world has it backward thinking that stocks are only safe if held for the long-term. If my analysis is correct, then a short-term investor may still do well (or poorly) as nobody knows what will happen in the short-term. However, if my analysis is correct, a long-term investor is in big trouble with a high probability, because in the long-term, irrational valuation loses.

"The Long-term Will Be O.K. As We Have Entered An Era of Sustained Spectacular Earnings Growth"

Unless long-term, non-transitory earnings growth is much stronger than historical experience, investors are currently faced with a difficult choice. Either they must believe that going forward the expected return on the stock market is far lower than history because market participants are generally content with this low return, or they must believe that we are going to have a significant drop in price (perhaps a quick crash, perhaps a protracted bear market) that will return prices to where expected returns are again attractive. Rather than face this uncomfortable choice there is another option, a loophole if you will. They can believe that long-term real earnings growth will be truly spectacular going forward, and thus stocks have an acceptable long-term expected return even at today's prices. In this section I examine how realistic this hope is for the S&P 500, for which we have 125+ years of data, and what it means for long-term returns. Although lack of data does not permit a similar study the situation appears even grimmer for the growth/tech sector.

The trailing 1-year P/E of the S&P 500 is now approximately 30, and the IBES median forecast of the next five years nominal earnings growth for the S&P 500 is about 17% per annum (capitalization weighting the individual median forecasts[31]). Let us assume this

[30] When I say "my analysis" I must clarify. I carry out the analysis here, but internal rates of return and discounted cash flow analysis were hardly invented by me. On the other hand, I did invent the Internet.

[31] This methodology is not perfect as capitalization weighting is not perfectly accurate for this task, but it will suffice. In fact, if all earnings were positive, I believe the right way to do this would be to weight the earnings growth rates by dollars of earnings not market capitalization. Because higher P/E firms are probably faster growers, weighting by market capitalization probably overstates the earnings growth of the entire index, and is another potential source of optimism in our approach. Unfortunately, when you hear the expected earnings growth of the market quoted by the financial media and Wall Street, while it is not clear exactly what they are doing, it is highly probably that they are using the biased high forecast. In fact, when they quote the trailing growth of the index, they most probably combine

growth occurs. Next, as in my earlier analysis of Cisco, let us assume that over the next 5 years (i.e., years 6-10) earnings growth linearly slows to ultimately reach an assumed long-term rate of 6% per year in year 11 and beyond (or about 3% real at today's approximately 3% inflation rate). Scenario (1) in the following table sums up these growth assumptions:

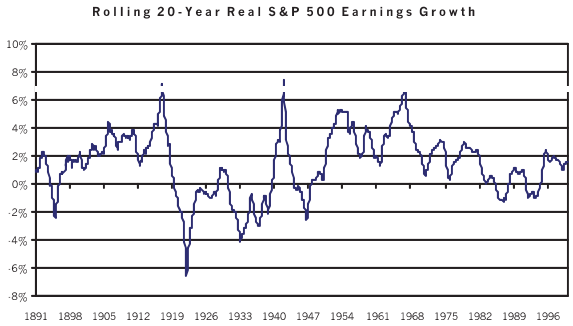
	S&P 500's Growth over Different Years																	20-Year Annualized	
	Year															Year		Compound	Multiple of GDP in
Scenario	1-5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	IRR	Growth	20 Years
(1)	17%	15%	13%	12%	10%	8%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	9.1%	10.0%	2.1
(2)	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	6.3%	4.5%	0.7
(3)	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	7.7%	6.0%	1.0

These optimistic assumptions[32] imply about a 10% nominal or 6.8% real compound per annum growth in S&P 500 earnings over the next 20 years. In turn, if this occurs, my model would estimate an IRR for the S&P 500 of just about 9%, or if inflation stays around 3%, a long-term real return of just about 6%. While a bit less than long-term historical experience, and perhaps less than investors today really expect and demand, this would still be a healthy long-term return. The next task is to see how reasonable this earnings forecast seems versus history. First, let us look at the history of real earnings growth for the S&P 500 using data from 1871-2000. The following figure plots the rolling prior 20-year compound per annum real earnings growth of the S&P 500 (the thick gray horizontal line represents 6.8% 20-year real earnings growth)[33]:

this bias with that described in a later footnote (the substitution bias where they quote the trailing growth of firms in the index today, perhaps added specifically because of recent strong earnings growth, not the firms actually in the index over the period in question). In other words, there is a large chance that the headline growth numbers we hear for the market are perilously close to gibberish (though again, it is hard to know for certain how the quoted numbers are really calculated).

[32] These assumptions are optimistic for many reasons. As mentioned earlier, historically analysts are overly optimistic with their five year growth forecasts. In addition, there is some statistical evidence that 5 year earnings growth is actually negatively autocorrelated, meaning that if earnings grow faster than trend for 5 years, all else equal we would guess slower than trend for the next five years. Thus, clearly my assumptions that the first five years match Wall Street's huge forecasts and that years 6-10 are still above normal are again, very optimistic. Other optimistic assumptions are explained in the text and other footnotes.

[33] This data series comes from Professor Robert Shiller's website. It is important to note that this data series represents the real earnings of the current S&P 500 firms each year. The 20-year growth of this series, is not the 20-year growth of the firms you would have bought at the start of each 20-year period. Since the S&P 500 replaces unsuccessful firms with successful firms, this is likely to bias the compound growth rates we calculated here to be higher than the growth rate of the actual firms in the S&P 500 at the start of each 20-year period. For instance, the July 5th Wall Street Journal (page C2) reported that last year's earnings growth for firms currently in the S&P 500 is expected to be 17% this quarter, but only 12% for the firms that comprised the S&P 500 one year ago. I do not know the extent of this bias through time, but it is yet another reason why this analysis, and in fact most public reports of the market's historical earnings growth, probably err on the side of being optimistically bullish. I should note that I am still looking into how S&P reports this data, and there is a small chance they somehow remove this potential bias in the historical data.

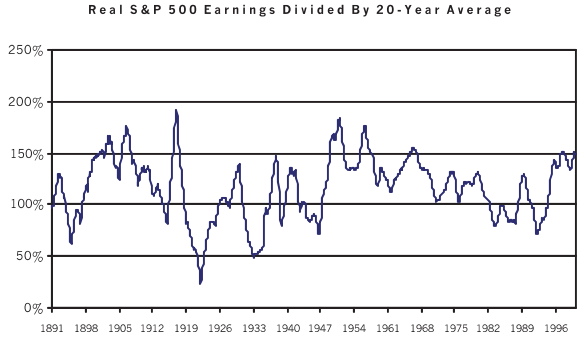


The average, maximum, and minimum, compound per annum growth rates for real S&P 500 earnings over the 1891-2000 and 1946-2000 periods are as follows:

Statistics for 20-year Growth of Real S&P 500 Earnings

1891-2000	
Compound Real Earnings Growth	1.4%[34]
Maximum Real 20-year Earnings Growth	7.5%
Minimum Real 20-year Earnings Growth	-6.6%
1946-2000	
Compound Real Earnings Growth	1.5%
Maximum Real 20-year Earnings Growth	6.8%
Minimum Real 20-year Earnings Growth	-1.3%

Going forward, the 20-year real compound growth rate implied by the prior assumptions was 6.8% per annum (the thick gray horizontal line in the graph). This means that if these assumptions pan out, the next 20 years (2001-2020) will about match the very best 20-year growth rates ever achieved. Now, what are the chances this actually occurs? Well, let us look at some more data. The following figure shows each year's real earnings divided by the average real earnings over the last 20 years:



[34] The numbers here are smaller than the numbers more commonly used as estimates of average annual real earnings growth for the stock market, since I report the average long-term compound growth not the arithmetic average growth. Variance in annual growth will cause the compound growth to be below the arithmetic average growth. For comparison, arithmetic average annual growth is around 3% over this period.

This figure can be interpreted as a measure of whether very recent earnings are strong or weak vs. the last 20 years (i.e., are we near a local high, low, or neither?). The average for this figure is 116% from 1891-2000, the maximum is 192% and the minimum is 24% (from 1946 on these figures are 123%, 184%, and 72% respectively). While not at a maximum, we can see that today's figure of 149% is impressive by historical standards. In other words, current earnings are well above their 20-year average as we have been experiencing relatively good times.

While strong current earnings growth certainly has been a good thing, it might be the case that extremely strong growth over the next 20 years is more difficult when starting from a high base, and far easier starting from depressed times. I test this hypothesis. The next table repeats the earlier table, but also includes these same statistics looking only at 20-year periods that began with earnings above the trailing 20-year average by at least 116%, and then by at least 149%. In other words, columns 3 and 4 examine only 20-year periods that started with current earnings above 20-year trend by at least an average amount (116%) and a large amount equal to today's value (149%):

Statistics for 20-year Real S&P 500 Earnings Growth

	All Periods	Starting at >116%	Starting at >149%
1891-2000			
Compound Real Earnings Growth	1.4%	0.5%	-0.6%
Maximum Real 20-year Earnings Growth	7.5%	4.0%	2.7%
Minimum Real 20-year Earnings Growth	-6.6%	-6.6%	-6.0%
1946-2000			
Compound Real Earnings Growth	1.5%	1.3%	0.9%
Maximum Real 20-year Earnings Growth	6.8%	4.0%	2.7%
Minimum Real 20-year Earnings Growth	-1.3%	-1.3%	-1.3%

The data shows that when earnings are starting from a very high base, it is much more difficult to achieve exceptional 20-year growth going forward.[35] Over the full period the maximum 20-year growth for real S&P 500 earnings was 7.5%, and 6.8% over the post-war period. Excluding the periods that started at below average earnings vs. 20-year trend (i.e., only including those 20-year periods starting with current earnings above 116% of 20-year average earnings), the average 20-year growth falls slightly, but the maximum achieved falls from 7.5% to 4.0%. This 4.0% figure is far below the 6.8% real growth on the S&P 500 we need going forward. In fact, going further and looking at column 4 on the far right, we see that when starting from as high a base as today (which occurs for about 20% of the 20-year periods historically) average real earnings growth is actually negative over the next 20 years (and only averages 0.9% post-war), and has never been greater than a maximum of 2.7%. Summarizing, achieving a 6.8% compound

[35] This result is not driven by large transitory components (real or measurement error) in one year earnings that bias that year up, and thus the next 20-year growth down. First, I lagged the earnings divided by 20-year average calculation by one year (in other words, I used one year old data on earnings divided by 20-year average earnings to decide if the current period was a high or low period) and the results were essentially unchanged. Next, I redefined this variable as the 3-year average of real earnings divided by the 20-year average, and again, results were very similar.

real growth rate going forward would match the best post-war 20-year period ever, and come very close to the best 20-year period in about 125 years. However, when starting from such a high base as today, the best 20-year real S&P 500 compound earnings growth rate for over 125 years has been only 2.7% per annum. All considered, when compared to history, compound real earnings growth over the next 20-years of 6.8% seems very unlikely. And remember, in the historically unlikely event it does occur, we only get to an IRR of just about 9% on the S&P 500.

It is worth dwelling on this a bit. Matching the best growth in history, a feat never close to attained when starting from good times, only gets you to mediocre long-term returns, almost assuredly below the inflated expectations of most investors today.

What happens if we bow to the evidence and relax these very optimistic growth assumptions? All of the analysis so far gives tremendous credence to analysts' 5 year forecasts of earnings growth, and then goes on to assume this above normal growth only slowly moves down to normal over years 6-10 (and even my assumption of what is normal is a high estimate vs. history). This is highly tenuous. For instance, Fama and French examine this issue in their work cited earlier and conclude that earnings and dividend growth are best approximated by a random walk, and thus the best guess of future growth in any year is simply long-term average growth. Similarly, Bogle (Journal of Portfolio Management, Summer 1995) advocates using the simple average earnings growth rate over the last thirty years to forecast the future. What happens if these authors are right? In other words, what happens if earnings growth going forward is not spectacular? Well, it is not pretty. Scenario (2) assumes a 1.5% percent compound real earnings growth rate (the historical average) for all future years and the IRR on the S&P 500 drops to 6.3%. Note, while it might seem pessimistic, real 20-year growth of 1.5% is above the post-war average growth rate of 0.9%, and way above the full-period average growth rate of –0.6%, when starting from very good times like today. The IRR in this scenario is below commercial paper, and below the real return available on inflation-protected government bonds. Going back to the more optimistic 3% growth rate ad infinitum in scenario (3), the IRR recovers to an anemic 7.7%. In other words, if Fama and French, and Bogle, and my historical analysis of earnings growth, have any validity, reasonably optimistic estimates of the current long-term expected return of the S&P 500 might fall between 6.3% and 7.7%. Compared to inflation-protected government bonds the risk-premium is negative or just a hair above zero. Note, I am still avoiding the more pessimistic, but historically reasonable, case that starting from such a high base as today the next 20-years will see below average earnings growth.

None of this is a proof that tremendous real earnings growth (6.8% per annum or higher) will not occur over the next 20 years. Furthermore, the evidence above has to be considered more anecdotal than statistical as we do not get to observe enough 20-year periods to make solid statistical assertions. One can certainly argue that despite the historical evidence, times are now so different that massive long-term earnings growth is possible. While this cannot be disproved, I would just mention two caveats. One, we, like everyone throughout history, have the hubris to think that the present is radically different than the past. The last 125 years have seen an incredibly impressive array of

technological advances, and all that is contained in the data above. Two, it is often difficult to remember how much things can change in 20 years. 20 years ago was 1980, high inflation and a deep recession made optimism a four letter word. 10 years ago we were just waking up to our false belief that Japan had found the answer and was going to rule the world (and own every Monet in existence). To think that because things feel (and are) very good now, we can forecast extreme unprecedented earnings growth for a full 20 years going forward, strikes me as very dicey. To make it the base case for pricing the entire stock market (and not even an exceptionally attractive base case), strikes me as very scary.