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ABSTRACT

A surprisingly large amount of commentary today marks the beginning of the dot-com bubble of the late 1990s from either the Netscape Communications initial public offering of 1995 or Alan Greenspan's "irrational exuberance" speech of 1996. We believe that this is wrong: we see little sign that the aggregate U.S. stock market was in any way in a significant bubble until 1998 or so.

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A Short Note on the Size of the Dot-Com Bubble

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Abstract: A surprisingly large amount of commentary today marks the beginning of the dot-com bubble from the late 1990s as the Netscape Communications initial public offering of 1995 or from Alan Greenspan's "irrational exuberance" speech of 1996. This is wrong: there is little sign that the aggregate U.S. stock market was in any way in a significant bubble until 1998 or so.

Introduction

Most finance economists will find this short note to be obvious and trivial. But many others will find it surprising and useful. Our message is simple: from our perspective, perhaps the most interesting thing about the late-1990s dot-com stock market "bubble" is how short it turned out to be. And yet many today—much of the conventional wisdom we hear in the financial, business, and political press—takes the bubble of the 1990s to have been much larger and longer than it in fact was.

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The Netscape Initial Public Offering

Part of the conventional wisdom dates the start of the bubble to the extraordinary excitement occasioned by the Netscape Communications, Inc., initial public offering in March 1995. Advertisements for the PBS television show Frontline’s report on the stock market and the internet—“Dot Con”—say that the show:

> … traces the rise of the bubble from the day in August 1995 when a young company called Netscape Communications went public…. Within a few hours of the market's opening on Aug. 9, 1995, Netscape's stock shot from $28 to $75 per share, closing at $58.25 at the end of its first day of trading. It was an historic—and prophetic—moment on Wall Street. "Nobody expects what happens at Netscape," says Joe Nocera, executive editor at *Fortune* magazine…. “And suddenly, if you're an investment bank, you realize that this is something that can be taken advantage of." (see Frontline (2002)).

Business commentator Maynard Patton (2005) calls the day of Netscape’s initial public offering, “Day One of the Internet Bubble.” The *New Yorker’s* John Cassidy (2002) refers to the initial IPO of the South Sea Company in 1720—the first time “bubble” was used in English in its current meaning—as “Netscape-like.” San Jose Mercury News internet columnist Dan Gillmor (2005) calls the Netscape IPO “the Big Bang of the Internet stock bubble.” CNN Insight’s Bruce Francis says that it was the “unusual high demand for Netscape's offering [that] was… the birth of a bubble.” And Forbes’s Quentin Hardy writes that it was the “Netscape IPO… [that] kicked off dot-com mania on Wall Street.”

But as of the moment of the Netscape initial public offering, the stock market was not then in a “bubble.” Even the tech-heavy NASDAQ index was not then in a bubble. Those who invested in the NASDAQ at the moment of the Netscape IPO, in August of 1995, and thereafter shadowed the index have earned real returns averaging 9.3% per year from then to November 2005. Those who invested in Netscape Communications at its closing price on its IPO date of August 9, 1995 and who held on to their stock in Netscape until the company’s absorption by AOL in 1999 earned an average real rate of return of 35% per year on their investment.

Greenspan’s “Irrational Exuberance” Speech

A second part of much conventional commentary dates the start of the dot-com bubble to sometime before Federal Reserve Chair Alan Greenspan’s December 5, 1996 “irrational exuberance” speech. Speaking before an after-dinner audience at the Washington D.C.-based American Enterprise Institute, Greenspan posed a rhetorical question: "How do we know," he asked, "when irrational exuberance has unduly escalated asset values?" Greenspan’s speech led the stock markets in Tokyo and Hong Kong to fall by 3%, the markets in Frankfurt and London to fall by 4% when they opened, and the U.S market to open down 2%. Greenspan’s words had powerful effects, either because his view of fundamental values was respected or because investors feared his rhetorical question was the prelude to a tightening of monetary policy.

Indeed, the odds are that Greenspan did believe the market suffered from irrational exuberance when he gave his December 1996 speech. As *Wall Street Journal* reporter Jacob Schlesinger (2000) reported, two days earlier:

> … having watched the Dow surge a dizzying 27% that year, Federal Reserve Board Chairman Alan Greenspan hosted a private meeting…. On one side was Abby Joseph Cohen… who came from her post at Goldman, Sachs & Co. to defend investor sanity. She methodically gave Fed governors a list of reasons why underlying economic changes justified such lofty prices in the market. On the other side were two Ivy League economists, Yale's Robert Shiller and Harvard's John Campbell, who painted a much gloomier picture, though they didn't address Ms. Cohen's comments directly. They illustrated their message of portent in 10 pages of handouts showing trends going back to 1872. The markets were destined, at best, to tread water, and possibly to crash, they warned…

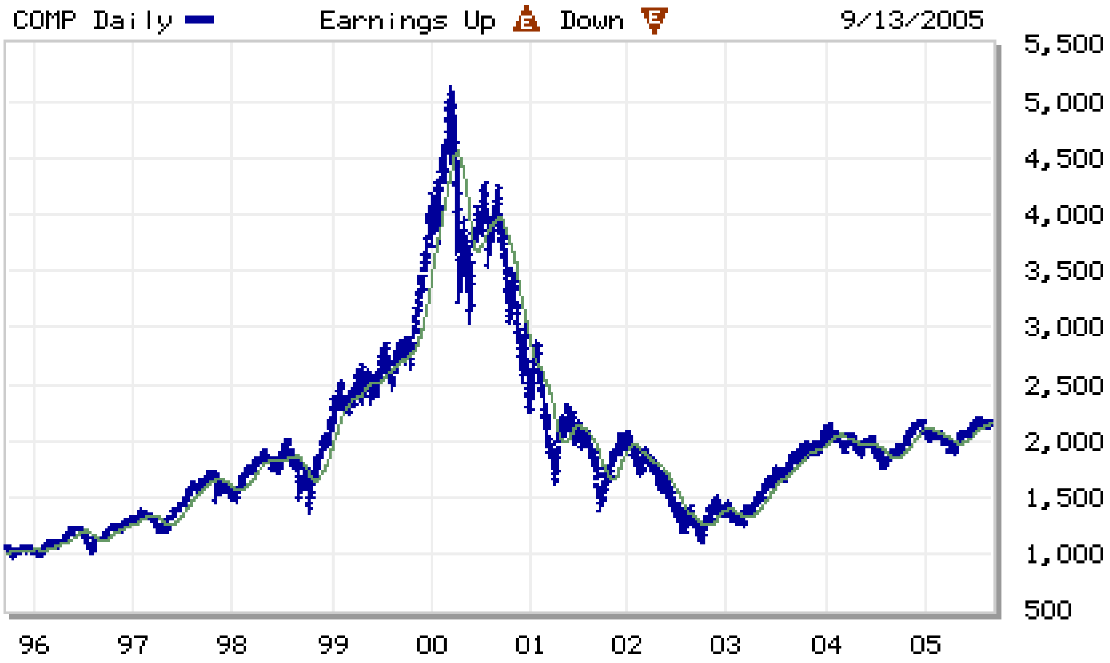
Since 1994, Schlesinger (2000) reported, Federal Reserve staff economists were forecasting that a stock market correction was likely: "Some of the economists told colleagues that they had personally gotten out of the market, and advised others to follow them into bonds. Mr. Greenspan privately shared many of these doubts…. In February 1994, for instance…. 'We partially broke the back of an emerging speculation in equities', Mr. Greenspan contentedly told his colleagues in a conference call…. 'We had a desirable effect'."

Federal Reserve Chair Ben Bernanke, at the Federal Reserve's Jackson

Hole Symposium last August, said that it was primarily “the stock market bubble which led to an unsustainably high level of economic activity and tax revenues" that was principally responsible for the improvement in America’s fiscal position in the 1990s (see Henderson (2005)). In mid-1996, Robert Shiller (1996) wrote about the long-run stock market outlook, saying that “it is hard to come away without a feeling that the market is quite likely to decline substantially in value over the succeeding ten years; it appears that long run investors should stay out of the market for the next decade,” although Shiller also warned that “the conclusion of this paper that the stock market is expected to decline over the next ten years and to earn a total return of just about nothing has to be interpreted with great caution… [dangers of\ data mining… [possibility of] structural changes… that mean that the past of the stock market is no longer a guide to the future.

Yet as of the moment of Greenspan’s speech, the NASDAQ index stood at 42% of its current value. If you had adopted a strategy of buying, holding, and reinvesting in the NASDAQ index when Alan Greenspan made his “irrational exuberance” speech, from that moment until the time of this writing at the start of October 2005, you would have realized a real return of 8.1% per year. The answer at the time to Greenspan’s question—was the stock market in late 1996 at values that had been unduly escalated by irrational exuberance—was “No.”

Figure 1: Nominal Value of the NASDAQ Index



Source: Datastream.

Table 1: Real Rates of Return for Investments in Largest High-Tech Companies since December 1996

Company	Jan 1998 Market Capitalization	Real Rate of Return
Microsoft	$156B	11.10%
Intel	$115B	1.90%
IBM	$102B	10.70%
HP	$65B	-0.35%
Cisco	$56B	10.67%
Motorola	$34B	-2.68%
Dell	$27B	33.55%
Oracle	$22B	11.68%
TI	$18B	12.64%
Sun	$15B	2.68%

Source: Datastream.

Even a year later is probably too early to date the advent of the bubble. Investing in December 1997 in the NASDAQ yields real rates of return to date of 6.4% per year. From the standpoint of today's valuations, the ten high-tech companies in America with the largest valuations as of January 1998—Microsoft, Intel, IBM, HP, Cisco, Motorola, Dell, Oracle, Texas Instruments, and Sun—appear to have been substantial bargains. The companies with the largest market capitalizations are those that are most likely to have had their values affected by "irrational exuberance": yet for six of the ten companies real returns since the beginning of 1998 have been more than ten percent per year, and for only two of the ten companies have real rates of return been negative. American high-tech was, it turns out, a good investment even as of early 1998.

There Was a Bubble

We do not want to dispute the claim that the U.S. stock market was in a serious and significant bubble in some period leading up to its peak in the late winter of 2000: there is next to nobody will deny that the stock market underwent a bubble. Let us briefly mention three facts that make us certain that the late-1990s stock market was grossly overvalued.

First, the stock market was unable to figure out that 3Com was the majority owner of Palm, and thus that 1.5 times the value of a share of Palm was a plausible floor to any rational valuation of a share of 3Com—or alternatively that 2/3 the value of a share of 3Com was a plausible ceiling to the value of a share of Palm (see Cornell (2000); Lamont and Thaler (2001)). Parent company 3Com sold three percent of its stake in Palm at Palm's initial public offering, and promised that it would spin off its remaining Pl shares by the end of 2000—with each share of 3Com owned entitling the shareholder to 1.5 shares of Palm. At the end of the first day of trading, Palm's closing price of $95.06 was not two-thirds but nearly 120 percent of 3Com's closing price of $81.81. Lamont and Thaler (2001) report that this is only one of six cases in the late 1990s in which the whole was less than the sum of the parts: the parent firm was worth less than the subsidiary it had promised to spin off. The Palm pricing anomaly lasted for more than two months.

Second, the NASDAQ index reached dizzying heights indeed as it exploded in late 1999 and more than doubled in value in the year up to its late winter 2000 peak—without there being any plausible candidate for fundamental news to support such a large revaluation of equity values.

Third, immediately afterwards came the huge and bloody bath taken by investors in the NASDAQ from February 2000 to September 2002 as it lost three-quarters of its value—again without substantial negative fundamental news. Note that the NASDAQ underwent its bath even as the long-awaited recession proved shallower than anyone had forecast, even as trend labor-productivity growth in the economy as a whole proved to have accelerated faster than even the most rabid new-economy boosters had dared to project, and even as the Federal Reserve lowered the short-term nominal interest rates it controlled far and fast. The stock market experienced a bubble.

When Did the Bubble Begin?

But how big was the bubble? And when did the late-1990s bubble begin? We propose some extremely crude yardsticks:

Begin with the observation that the world has not been kind since 2000. In 2001 we had the terror-attack on the United States by Al Qaeda, which brought the danger of widespread death and destruction materially closer. Less important, but perhaps more relevant to equilibrium stock prices, is the fact that it appears to have turned out to be more difficult to turn information and communications technology technical excellence into durable profit flows than had been expected. The major beneficiaries of high-tech innovation since 2000 have not been the workers, entrepreneurs, and financiers of Silicon Valley, but of a different ilk: think of Wal-Mart, its shareholders, and its customers (but not its workers) and those like them as the real big winners from the high-tech new economy.

Taking account of these two pieces of fundamental news relevant to stock prices that were unknown (and unknowable) in the late 1990s, we can set up our first yardstick to assess the beginning of the bubble. Because the high-tech stocks in the tech-heavy NASDAQ are risky, we would expect a rational market to price the NASDAQ to produce returns higher than the 6.5% per year in real terms that is the stock market's long-run historic average return. But we also suspect that actual returns have fallen behind rationally-expected returns.

We guess that these two factors cancel out, and that the NASDAQ was in a bubble--overvalued--when real returns from then until now have been less than the 6.5% per year we expect from stocks. This is our first yardstick.

We also propose a second, more stringent, yardstick: define a "bubble" to be a time in which subsequent returns do not match the three percent per year or so in real returns than we expect on average from long-term bonds.

And we propose a third, most stringent, yardstick: define a "bubble" to be a time in which subsequent real returns are negative.

When, according to these yardsticks, did the bubble begin?

According to both the second and third yardsticks—the more stringent ones—the bubble was remarkably short. In October 1998 the realized NASDAQ real return between then and now drops below 3% per year, and in November 1998 it drops below zero. According to these yardsticks the NASDAQ was overvalued and in a bubble for less than a year and a half before its peak in March 2000.

According to the first yardstick, the bubble was a year and a half longer. Since April 1997, cumulative real returns on the NASDAQ have lagged the 6.5% per year we expect from a diverified portfolio of stocks. Even using this yardstick, the bubble lasted for less than three years before its peak.

Should This Come as a Surprise?

We do not believe that the short duration of the dot-com stock market bubble should come as a great surprise. Macroeconomically significant bubbles are, we believe, not common and not long lasting. John Kenneth Galbraith (1954) notes that up until the second half of 1928 American stock market valuations were quite respectable (assuming, of course, a normal future—one not containing a Great Depression), and that only staring in late 1928 was speculation out of hand. (DeLong and Shleifer (1991) put an even later date to the origins of the 1929 stock market mania.) Jeremy Siegel (2002) notes that the "Nifty Fifty" growth stocks that led the bull market of the 1970s have turned out to be good investments for sufficiently patient investors: "a portfolio of Nifty Fifty stocks purchased at the peak would have nearly matched the S&P 500 over the next 26 years." Indeed, the principal macroeconomically-significant puzzle for economic theorists to be found in the stock market is not that stocks are occasionally grossly overvalued and subject to bubbles because of irrational exuberance, but rather than stock prices are so low as to generate extremely generous real stock returns.

It is the equity premium puzzle of Mehra and Prescott (2003) that is the most significant macroeconomically-relevant feature of the stock market.

And we stress that just because the dot-com bubble was of relatively short duration does not mean that it was of relatively small magnitude: the NASDAQ index today is still only 40% or so of its peak value.

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