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Robert J. Shiller: Irrational Exuberance: Second Edition

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One

The Stock Market in Historical Perspective

When Alan Greenspan, as chairman of the Federal Reserve Board, first used the term *irrational exuberance* to describe the behavior of stock market investors, the world fixated on those words.¹ He spoke at a black-tie dinner in Washington, D.C., on December 5, 1996, and the televised speech was followed the world over. As soon as he uttered these words, stock markets dropped precipitously. In Japan, the Nikkei index dropped 3.2%; in Hong Kong, the Hang Seng dropped 2.9%; and in Germany, the DAX dropped 4%. In London, the FT-SE 100 was down 4% at one point during the day, and in the United States, the next morning, the Dow Jones Industrial Average was down 2.3% near the beginning of trading. The sharp reaction of the markets all over the world to those two words in the middle of a staid and unremarkable speech seemed absurd. This event made for an amusing story about the craziness of markets, a story that was told for a time around the world.

The amusing story was forgotten as time went by, but not the words *irrational exuberance*, which came to be referred to again and again. Gradually they became Greenspan's most famous quote—a catch phrase for everyone who follows the market.

Why do people still refer to *irrational exuberance* years later? I believe that the words have become a useful name for the kind of social phenomenon that perceptive people saw with their own eyes happening in the 1990s, and that in fact, it appears, has happened again and again in history, when markets have been bid up to unusually high and unsustainable levels under the influence of market psychology.

Many perceptive people were remarking, as the great surge in the stock market of the 1990s continued, that there was something palpably irrational in the air, and yet the nature of the irrationality was subtle. There was not the kind of investor euphoria or madness described by some storytellers, who chronicled earlier speculative excesses like the stock market boom of the 1920s. Perhaps those storytellers were embellishing the story. Irrational exuberance is not *that* crazy. The once-popular terms *speculative mania* or *speculative orgy* seemed too strong to describe what we were going through in the 1990s. It was more like the kind of bad judgment we all remember having made at some point in our lives when our enthusiasm got the best of us. *Irrational exuberance* seems a very descriptive term for what happens in markets when they get out of line.

Irrational exuberance is the psychological basis of a speculative bubble. I define a speculative bubble as a situation in which news of price increases spurs investor enthusiasm, which spreads by psychological contagion from person to person, in the process amplifying stories that might justify the price increases and bringing in a larger and larger class of investors, who, despite doubts about the real value of an investment, are drawn to it partly through envy of others' successes and partly through a gambler's excitement. We will explore the various elements of this definition of a bubble throughout this book.

Greenspan's "irrational exuberance" speech in 1996 came near the beginning of what may be called the biggest historical example to date of a speculative upsurge in the stock market. The Dow Jones Industrial Average (from here on, the Dow for short) stood at around 3,600 in early 1994. By March 1999, it passed 10,000 for the first time. The Dow peaked at 11,722.98 in January 14, 2000, just two weeks after the start of the new millennium. The market had tripled in five years. Other stock price indexes peaked a couple of months later. In the years since, as of this writing, the stock market has never been so high again. It is curious that this peak of the Dow (as well as other indexes) occurred in close proximity to the end of the celebration of the new millennium: it was as if the celebration itself was part of what had propelled the market, and the hangover afterward had brought it back down.

The stock market increase from 1994 to 2000 could not obviously be justified in any reasonable terms. Basic economic indicators did not come close to tripling. Over this same interval, U.S. gross domestic product rose less than 40% and corporate profits rose less than 60%, and that from a temporary recession-depressed base. Viewed in the light of these figures, the stock price increase appears unwarranted.

Figure 1.1 shows the monthly real (corrected for inflation using the Consumer Price Index) Standard and Poor's (S&P) Composite Stock Price Index, a more comprehensive index of stock market prices than the Dow, based, since 1957, on 500 stocks rather than just the 30 stocks that are used to compute the Dow.² Inflation correction was used because the overall level of prices has been very unstable over parts of this period (the government printed a lot of money,

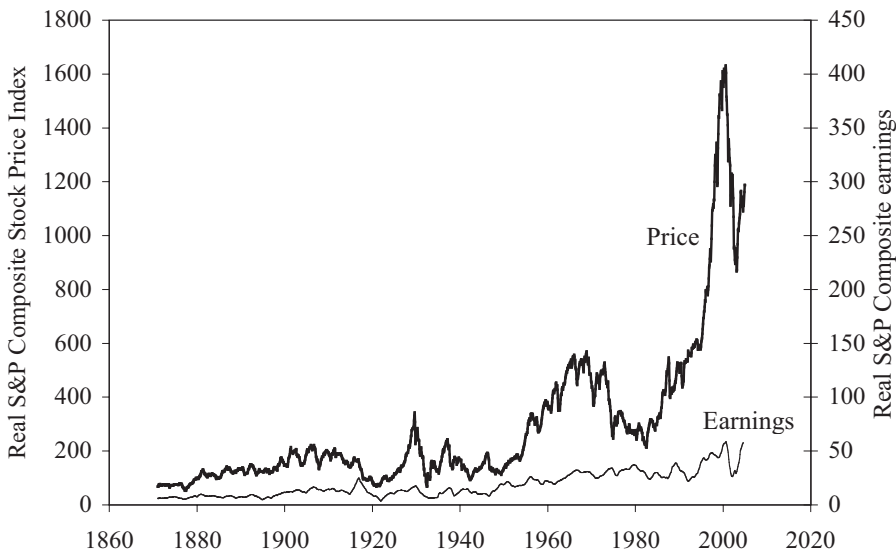


Figure 1.1

Stock Prices and Earnings, 1871–2005

Real (inflation-corrected) S&P Composite Stock Price Index, monthly, January 1871 through January 2005 (upper curve), and real S&P Composite earnings (lower curve), January 1871 to September 2004. *Source:* Author's calculations using data from S&P Statistical Service; U.S. Bureau of Labor Statistics; Cowles and associates, *Common Stock Indexes*; and Warren and Pearson, *Gold and Prices*. See also note 3.

which pushed all prices up) so that the uncorrected numbers would give a misleading impression of the real increase in the stock market. The stock prices are shown from 1871 through 2005 (upper curve), along with the total earnings (corporate profits per share) that the corporations that comprise the index made in doing their business (lower curve) for the same years.³

Large stock price increases occurred in many countries at around the same time, and the peaks in the stock markets were often roughly simultaneous, in many countries, in early 2000. Figure 1.2 shows the paths of stock prices for ten countries. As can be seen from Figure 1.2, between 1995 and 2000 the real stock market valuations of Brazil, France, China, and Germany roughly tripled, while that of the United Kingdom roughly doubled. The year 1999, the year before the peak, saw real stock price increases averaging, over these ten countries, 58%. All countries' prices went up sharply in 1999; in fact the smallest increase, occurring in the United Kingdom, was still an impressive +16%. In the course of 1999, stock markets in Asia (Hong Kong, Indonesia, Japan, Malaysia, Singapore, and South Korea) and Latin America (Chile and Mexico) all made spectacular gains. It was a truly spectacular worldwide stock market boom.

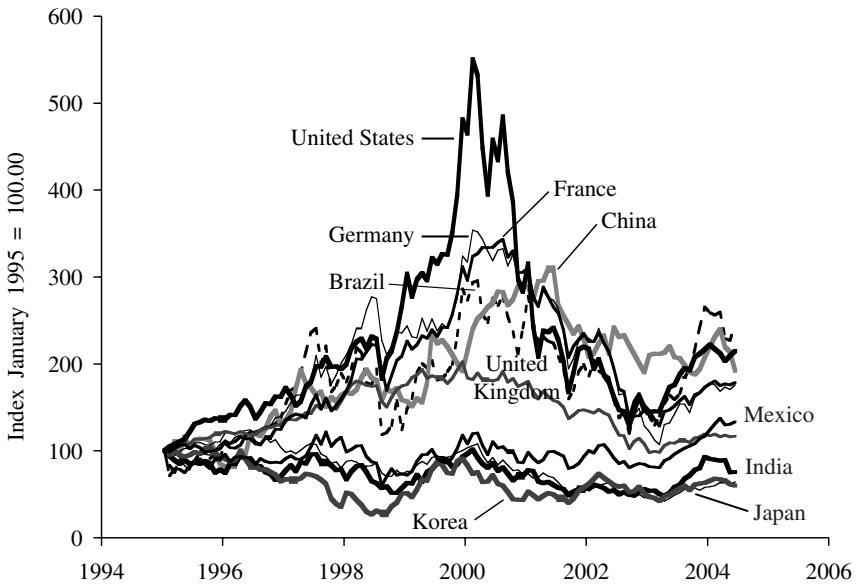


Figure 1.2

Stock Prices in Ten Countries, January 1995–June 2004

Real (inflation-corrected) monthly closing prices in Brazil (Bovespa), China (SE Shang Composite), France (CAC), Germany (DAX), India (Sensex), Japan (Nikkei), Korea (KOSPI), Mexico (Mexbol), United Kingdom (FTSE 100), and the United States (NASDAQ Composite), deflated by the monthly consumer price index for the country, all rescaled to January 1995 = 100. *Source:* Bloomberg and International Monetary Fund International Financial Statistics.

Looking back to Figure 1.1, which shows a longer history for the S&P index, we can see how differently the market has behaved recently as compared with the past. We see that the market had generally headed up ever since it had bottomed out in July 1982, until March 2000. The spiking of prices in the years 1995 through 2000 has been most remarkable: the price index looks like a rocket taking off through the top of the chart, only to sputter and crash. This largest stock market boom ever may be referred to as the *millennium boom*.⁴

The boom and crash in the stock market in the years surrounding the peak in 2000 is clearly related to the behavior of earnings. As can be seen in Figure 1.1, S&P Composite earnings grew very fast in the late 1990s before they crashed after 2000. But historically the earnings movements were generally less dramatic than the stock price movement. Earnings in fact seem to have been oscillating around a slow, steady growth path that has persisted for over a century.

No price action quite like that around 2000 has ever happened before in the entire stock market history shown in Figure 1.1. There was of course the famous stock run-up of the 1920s, culminating in the 1929 crash. Figure 1.1 reveals this boom as a cusp-shaped price pattern for those years. If one corrects for the market's smaller scale then, one recognizes that this episode in the 1920s does somewhat resemble the recent stock market increase, but it is the only historical episode that comes even close to being comparable.

There was also a dramatic run-up in the late 1950s and early 1960s, culminating in a flat period for half a decade that was followed by the 1973–74 stock market debacle. But the price increase during this boom was less dramatic than the run-up of the 1990s.

Price Relative to Earnings

Figure 1.3 shows the price-earnings ratio, that is, the real (inflation-corrected) S&P Composite Index divided by the ten-year moving average real earnings

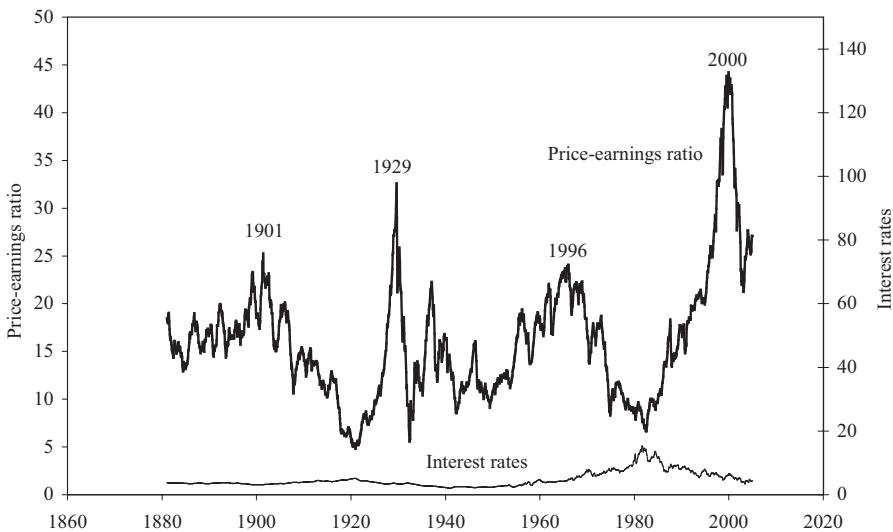


Figure 1.3

Price-Earnings Ratio and Interest Rates, 1881–2005

Price-earnings ratio, monthly, January 1881 to January 2005. Numerator: real (inflation-corrected) S&P Composite Stock Price Index, January. Denominator: moving average over preceding ten years of real S&P Composite earnings. Years of peaks are indicated. *Source:* Author's calculations using data shown in Figure 1.1. Interest rate is the yield of long-term U.S. government bonds (nominal), January 1881 to January 2005 (author's splicing of two historical long-term interest rate series).⁵

on the index. The points shown reflect monthly data, January 1881 to January 2005. The price-earnings ratio is a measure of how expensive the market is relative to an objective measure of the ability of corporations to earn profits. I use the ten-year average of real earnings for the denominator, along lines proposed by Benjamin Graham and David Dodd in 1934. The ten-year average smoothes out such events as the temporary burst of earnings during World War I, the temporary decline in earnings during World War II, and the frequent boosts and declines that we see due to the business cycle.⁶ Note again that there was an enormous spike after 1997, when the ratio rose until it hit 47.2 intraday on March 24, 2000. Price-earnings ratios by this measure had never been so high. The closest parallel was September 1929, when the ratio hit 32.6.

In 2000 earnings were quite high in comparison with the Graham and Dodd measure of long-run earnings, but nothing here was startlingly out of the ordinary. What was extraordinary in 2000 was the behavior of price (as also seen in Figure 1.1), not earnings.

Part of the explanation for the remarkable price behavior between 1990 and 2000 may have to do with the unusual behavior of corporations' profits as reflected in their earnings reports. Many observers remarked then that earnings growth in the five-year period ending in 1997 was unusual: real S&P Composite earnings more than doubled over this interval, and such a rapid five-year growth of real earnings had not occurred for nearly half a century. But 1992 marked the end of a recession during which earnings were temporarily depressed.⁷ Similar increases in earnings growth following periods of depressed earnings from recession or depression have happened before. In fact, there was more than a quadrupling of real earnings from 1921 to 1926 as the economy emerged from the severe recession of 1921 into the prosperous Roaring Twenties. Real earnings doubled during the five-year periods following the depression of the 1890s, the Great Depression of the 1930s, and World War II.

It was tempting for observers in 2000, at the peak of the market, to extrapolate this earnings growth and to believe that some fundamental changes in the economy had produced a new higher growth trend in earnings. Certainly, expansive talk about the new millennium at the time encouraged such a story. But it would have been more reasonable, judging from the cyclical behavior of earnings throughout history, to predict a reversal of such earnings growth.

The bust in corporate profits between 2000 and 2001, the biggest drop in profits in percentage terms since 1920–21, is certainly part of the story about the drop in the market. The drop certainly pulled the support out of ideas that the new high-tech economy was infallible. But there is a question of how to interpret the drop in earnings. As we shall discuss in Chapter 4, the drop in earnings could be seen in many dimensions, and in part as just an indirect consequence of the changes in investor psychology that produced the decline in the market. Part of the crash in earnings after 2000 was also just a technical accounting reaction to the stock price decline, since companies were required

by accounting rules to deduct from earnings the impairment in value of some of their stock market holdings, holdings that were far reduced in value after the crash in the stock market.

Other Periods of High Price Relative to Earnings

There have been three other times when the price-earnings ratio as shown in Figure 1.3 attained high values, though never as high as the 2000 value. The first time was in June 1901, when the price-earnings ratio reached a high of 25.2 (see Figure 1.3). This might be called the “Twentieth Century Peak,” since it came around the time of the celebration of the new century. (The advent of the twentieth century was celebrated on January 1, 1901, not January 1, 1900.)⁸ This peak occurred as the aftermath of a doubling of real earnings within five years, following the U.S. economy’s emergence from the depression of the 1890s.⁹ The 1901 peak in the price-earnings ratio occurred after a sudden spike in the ratio, which took place between July 1900 and June 1901, an increase of 43% within eleven months. A turn-of-the-century optimism, associated with expansion talk about a prosperous and high-tech future, appeared.

After 1901, there was no pronounced immediate downtrend in real prices, but for the next decade prices bounced around or just below the 1901 level and then fell. By June 1920, the stock market had lost 67% of its June 1901 real value. The average real return in the stock market (including dividends) was 3.4% a year in the five years following June 1901, barely above the real interest rate. The average real return (including dividends) was 4.4% a year in the ten years following June 1901, 3.1% a year in the fifteen years following June 1901, and -0.2% a year in the twenty years following June 1901.¹⁰ These are lower returns than we generally expect from the stock market, though had one held on into the 1920s, returns would have improved dramatically.

The second instance of a high price-earnings ratio occurred in September 1929, the high point of the market in the 1920s and the second-highest ratio of all time. After the spectacular bull market of the 1920s, the ratio attained a value of 32.6. As we all know, the market tumbled from this high, with a real drop in the S&P Index of 80.6% by June 1932. The decline in real value was profound and long-lasting. The real S&P Composite Index did not return to its September 1929 value until December 1958. The average real return in the stock market (including dividends) was -13.1% a year for the five years following September 1929, -1.4% a year for the next ten years, -0.5% a year for the next fifteen years, and 0.4% a year for the next twenty years.¹¹

The third instance of a high price-earnings ratio occurred in January 1966, when the price-earnings ratio as shown in Figure 1.3 reached a local maximum of 24.1. We might call this the “Kennedy-Johnson Peak,” drawing as it did on the prestige and charisma of President John Kennedy and the help of his vice-president and successor, Lyndon Johnson. This peak came after a dramatic bull

market and after a five-year real price surge, from May 1960, of 52%. This surge, which took the price-earnings ratio to its local maximum, corresponded to a surge in real earnings of 36%. The market reacted to this earnings growth as if it expected the growth to continue, but of course it did not. Real earnings increased little in the next decade. Real prices bounced around near their January 1966 peak, surpassing it somewhat in 1968 but then falling back, and real stock prices were down 56% from their January 1966 value by December 1974. Real stock prices would not be back up to the January 1966 level until May 1992. The average real return in the stock market (including dividends) was -2.6% a year for the five years following January 1966, -1.8% a year for the next ten years, -0.5% a year for the next fifteen years, and 1.9% a year for the next twenty years.

We see evidence in these past episodes of temporarily high prices that irrational exuberance is not a new thing, and that such episodes do not end well. We will return to a discussion of the predictive power of the price-earnings ratio in Chapter 10.

Interest Rates

Figure 1.3 includes a plot of interest rates, long-term government bond yields. Interest rates are one of the most discussed terms relating to the level of the stock market. During the stock market boom of the 1990s, it was widely noted that interest rates were falling. In fact, interest rates have been falling more or less ever since 1982, the bottom of the stock market. The idea that the decline in interest rates can explain the rise in the stock market was widely accepted during the 1990s.

The Monetary Policy Report that was submitted in conjunction with Alan Greenspan's testimony before Congress in July 1997¹² argued that there was a noticeable negative correlation between the ten-year bond yield and the price-earnings ratio since 1982. Indeed, there did appear to be a relation between interest rates and the price-earnings ratio. In fact, between the mid-1960s and the early 1980s, interest rates were rising and the price-earnings ratio was declining. Between the early 1980s and the late 1990s, when Greenspan spoke, interest rates were falling and stock prices were rising. This relation between the stock market and the ten-year interest rate came to be known as the "Fed Model." In the late 1990s and the early 2000s, it became fashionable to use the Fed Model to justify the level of the market. Indeed, with declining interest rates one might well think that stock prices should be rising relative to earnings, since the prospective long-term return on a competing asset, bonds, was declining, making stocks look more attractive in comparison. In the late 1990s it sometimes seemed that one heard reference to the Fed Model almost ad nauseam on the television business shows.

However, the evidence for the Fed Model is rather weak.¹³ Over the whole period shown in Figure 1.3, there was not a strong relation between interest rates and the price-earnings ratio. In the Great Depression, interest rates were unusually low, which, by the Fed Model, would imply that the stock market should have been very high relative to earnings. That was not the case.

Interest rates continued to decrease after the peak in the market after 2000, and then we saw the opposite of the predictions of the Fed Model: both the price-earnings ratio and the interest rates were declining. Since this happened, one has heard a lot less about the Fed Model.

Although interest rates must have some effect on the market, the behavior of the stock market is not just a predictable reaction to interest rates. There is a lot more going on in the stock market, and a lot more for us to try to understand about its behavior. We will return to interest rates in Chapter 10.

Worries about Irrational Exuberance

I thought in 2000 that most people I met, from all walks of life, were puzzled over the apparently high levels of the stock market. It seemed that they were unsure whether the market levels made any sense, or whether they were indeed the result of some human tendency that might have been called irrational exuberance. They seemed unsure whether the high levels of the stock market might have reflected unjustified optimism, an optimism that might have pervaded our thinking and affected many of our life decisions. They seemed unsure what to make of any sudden market correction, wondering if the previous market psychology could ever return.

Even Alan Greenspan seemed unsure. He made his “irrational exuberance” speech two days after I had testified before him and the Federal Reserve Board that market levels were irrational, but a mere seven months later he reportedly took an optimistic “new era” position on the economy and the stock market. In fact, Greenspan was always very cautious in his public statements, and did not commit himself to either view. In the public exegesis of his remarks it was often forgotten that, when it comes to such questions, even he did not know the answers.

Years after the 2000 peak of the market, the market is down significantly, but still is very high by historical standards. The news media are tired of describing the high levels of the market, and discussion of these levels is usually omitted from considerations of market outlook. And yet, deep down, people know that the market is still highly priced, and they are uncomfortable about this fact.

Lacking answers from our wisest men, many are inclined to turn to the wisdom of the markets to answer our questions, to use the turns of the stock market as fortune tellers use tea leaves. But before we begin assuming that the market is revealing some truth about this new era, it behooves us to reflect on

the *real* determinants of market moves and how these market moves, in their effects, filter through the economy and our lives.

Many of those real determinants are in our minds. They are the “animal spirits” that John Maynard Keynes thought drove the economy.¹⁴ These same animal spirits drive other markets, such as the real estate market, to which we now turn as another case study of speculative behavior, before we begin our analysis of the causes of such behavior in Part I of this book.