CHAPTER 13 CORPORATE-FINANCING DECISIONS AND EFFICIENT CAPITAL MARKETS

Assigned problems are 5, 8, 10, 11, 12, 14, 16, and 22.

I. Introduction to Market Efficiency

A Description of Efficient Capital Markets

Prices in informationally efficient capital or financial markets should reflect all *available* information. An important consequence of market efficiency is that investments in publicly traded financial securities, such as stocks and bonds, are *zero* NPV investments (as opposed to the assumed positive NPVs of most real or productive assets). Investors should expect to earn a fair or *normal* return that is consistent with the risk (defined by CAPM or APT) of the security. Companies should expect to receive a fair price when they issue securities.

Current prices should represent a fair and unbiased forecast or estimate of the true, intrinsic, or *fundamental* value of the firm, i.e., the Present Value of all future expected cash flows. If this were **not** the case, we would find many instances where security prices were systematically **biased**, i.e., either consistently underpriced or overpriced.

Some reasons why market efficiency is a critical issue and concept:

1. It affects the price that the firm will receive for any new stocks and bonds that it may issue. Also, if a firm can sell new stock that is overvalued, it is perhaps likely to do such.
2. It affects the cost of capital or required rate of return on securities. The cost of capital affects the capital budgeting or new capital expenditure decisions.
3. If you want to link management compensation to stock price or shareholder value, then it is especially important that the stock price be representative of the true value of the firm, i.e., stockholders want a stock price that is fair and unbiased.
4. An asset's price should be driven by unbiased estimates of future cash flows and the true systematic risk associated with the cash flows. If this were not the case, investors would be able to earn returns that are inconsistent with the true level of risk of an asset. Portfolio managers are very interested in any mispricing in the stock market. A mispriced stock would be thought of as cash lying in the street waiting for someone to pick it up.

Normal *versus* Abnormal Returns

If financial markets are not efficient, then strategies would exist that can systematically earn **above *normal*** or **below *normal* returns**, referred to as *abnormal* returns. However, in order to actually calculate any abnormal return for any given asset, we first need some **Asset Pricing Model** such as the **Arbitrage Pricing Theory** or **Capital Asset Pricing Model** that gives us an estimate or idea of what the normal or expected return to that asset should have been.

Abnormal Return = Actual Return observed – Expected Return

The *expected* or *normal* return of the asset is based on: (1) the stock's level of risk and (2) what actually happened with the relevant systematic or macroeconomic source(s) of risk. For example, in a CAPM world, if the overall market goes down, the stock under investigation would likely also have gone down in price.

Reaction of Stock Price to New Information

In an efficient market, prices respond **instantaneously** to *new* and *material* information and **fully reflect** that information. **Delayed responses** (under-reaction) and **overreaction** to new information would suggest that markets are inefficient. Next, we look at three information sets and the corresponding level or form of market efficiency.

II. Information and Forms of Efficient Market Hypothesis (EMH)

Three information sets are used to describe the EMH. Note that set 1 is a subset of 2 and that both 1 and 2 are subsets of 3. Each set corresponds to one form of the EMH as discussed below.

1. Historic stock prices and other market related information (e.g., trading volume, etc.)
2. Publicly available information (this also includes all historical market information)
3. All information relevant to a stock (both public and private information)

Three forms of Efficient Market Hypothesis or EMH

1. **Weak form efficiency**: asset prices already reflect all *historical* market related trading information such as past prices, returns, trading volume, or trends in volume or prices. Most tests show that this information cannot be used to generate or earn abnormal returns after adjusting for risk. This makes sense because this information is available at almost zero cost. If the market is weak-form efficient, then *technical analysis* or *chart reading* should not produce abnormal returns. Stock prices should closely follow a *random walk*.

   Individuals have an unfortunate tendency to look for patterns or trends, even in random series.[1] Take a good look at the four graphs on page 10 of these notes. Two of the graphs are actual performance of the U.S. market for a 10-year period, and the other two are computer generated from a random walk model (an upward trend of 10% per year with 20% annual standard deviation). See if you can tell which graphs are real!

2. **Semi-strong form efficiency**: asset prices already reflect all information that is *publicly* available, i.e., earnings, dividends, analyst forecasts, expectations of the future, etc. Most tests show that material public announcements are accompanied by an immediate change in price. In a semi-strong efficient market, the market's reaction to new and material information should be both *instantaneous* and *unbiased*, i.e., without any systematic pattern of over or underreaction. **In addition, the market should only react to the extent that new information differs from what had been expected**. Semi-strong efficiency also means that

[1] The problem is that perhaps people have an incomplete concept of what randomness should look like. A random walk in stock prices is essentially an overall upward trend with a noise term that produces a variation around the overall upward trend.

most financial analysis work or *fundamental analysis*, based on using public information, should not work.

Opportunities may occasionally exist that produce above normal or *excess* returns. However, after the information or strategies become known to the public, they should no longer produce excess returns; e.g., the *January effect* in small stocks has vanished. Also, a talented investment analyst might still be able to beat the market, provided that he/she is able to consistently interpret information better than the competition can.

3. **Strong form efficiency**: asset prices already reflect all *private* and *public* information. We know that *inside* information is very valuable to anyone that chooses to (illegally in most cases) act upon this information, so the market is certainly not strong form efficient.

Implications of The Semi-Strong Form Market Efficiency:

- Stock prices are expected to increase over time, but future returns are expected to be consistent with the systematic risk.
- Investments in financial assets are expected to be ZERO Net Present Value. This means that you should expect to earn an average future return that is determined by the systematic risk of the investments.
- What if no one performed security analysis? Then the first person that becomes an analyst will find countless mispriced assets and trading rules that earn excess or abnormal returns. Such profitable opportunities would certainly lead to many more individuals entering the analyst field. Competition will quickly begin to eliminate most of the mispriced assets.
- Due to intense competition, it will become difficult to earn abnormal returns. The marginal benefit of analysis will just equal the marginal cost of analysis for the average analyst or investor.
- It thus follows that individuals should be exceedingly suspicious of anyone that advertises some investment technique that earns abnormal returns. If the method really works, then any rational person would keep the technique undisclosed![2] This holds for the weak-form market efficiency as well, as many attempt to sell methods for technical analysis.

III. The Evidence for Market Efficiency:

- Are markets *strong form* efficient? Certainly not.
- Are markets *weak-form* efficient? Evidence strongly suggests yes. *Random* successes look appealing, but most tests are not supportive of trading strategies that use market related data.

[2]After all, how many industrial corporations prefer to give away their patents, knowledge, or other proprietary information that generates NPV? Given that industrial firms don't give away these items of knowledge, it follows that successful trading methods or strategies won't be disclosed either.

- Are markets *perfectly* **semistrong efficient**? No. The recent bubble in internet/technology stocks is a somewhat obvious example of prices not reflecting their fundamental value.
- Are markets *largely* **semistrong efficient**? Yes, based on most of the evidence, especially for event studies and mutual fund performance.

However, there are many reported *anomalies* in stock prices. Do these anomalies represent actual mispricings that an astute portfolio manager can convert into abnormal returns (ARs)? No, for the most part. Perhaps they once worked, before they became public knowledge. Also, what might produce *apparent* or *measured* abnormal returns on paper might be difficult to actually implement using actual money.

Tests of the EMH fall under three major categories:

1. Tests for random walk in stock prices
2. Event Studies
3. Performance of professional investors

All these tests compare observed stock returns against returns predicted by the EMH, controlling for systematic risk. We first need to understand what any stock's *normal* returns should look like, based upon its level of risk. Therefore, tests of the EMH are joint tests of market efficiency and the asset pricing model (e.g. the CAPM or APT) used to estimate systematic risk.

Tests of the Weak Form EMH (do prices follow a Random Walk?)

Tests for *serial correlation* are often used to test the weak form EMH.

Positive serial correlation: above (below) normal returns are followed by subsequent above (below) normal returns, otherwise referred to as momentum.

Negative serial correlation: above (below) normal returns are followed by subsequent below (above) normal returns, otherwise referred to as reversals in returns.

Both positive serial correlation and negative serial correlation would imply violations of the weak form EMH if they are found to exist and also if they are economically significant after accounting for transactions costs. The majority of empirical evidence is **consistent** with the weak form EMH.

Tests of Semi-strong Form Efficiency

Event studies look at stock price reaction to new information released to the public. Delayed responses or overreaction to new public information implies a violation of the semi-strong form EMH. There is a little mixed empirical evidence from event studies, but efficiency is generally supported.[3] In addition, the problem of jointly testing the underlying asset pricing model and market efficiency is still unresolved, i.e., first you need to know what the normal returns should

[3] Research that reports market inefficiencies tend to get reported, while those that support market efficiency are not as exciting. If you perform 20 studies of events that have no *actual* abnormal returns, on average one of them will by pure chance report *spurious* abnormal returns that are statistically significant at the 5% level. That study would be exciting, while the other 19 are not interesting.

look like before any inference can be made concerning market efficiency. Also, always remember that the true asset pricing model is not known.

Mutual fund performance studies compare the return on *actively* managed mutual funds to returns on a *passive* broad-based index mutual fund, e.g., a mutual fund that only attempts to match the S&P 500 or Willshire 5000 indices. Since trading on insider information is illegal, most active fund managers have to rely on public information to formulate their investment strategies. The majority of mutual fund studies find that most active mutual fund managers do *not* outperform passive index funds, supporting the semi-strong form EMH.

The Value Line Investment Survey publishes information about stocks that have broad investor interest. Value Line ranks stocks on a scale from 1 to 5. The stocks ranked 1 and 5 are expected to have the best and worst future performance, respectively. Research has shown that, *on paper*, the 1 ranked stocks have indeed outperformed the 5 ranked stocks. However, the two mutual funds that Value Line manages have actually *underperformed* the market, even though they use the Value Line ranking system in formulating their investment decisions. Apparently, what looks great on paper cannot always be implemented to generate above normal returns.

Some Contrary Views of the EMH

Size: Studies have shown that small firms (measured by market capitalization) earn higher returns than large firms after adjusting for systematic risk (Beta CAPM risk in these studies). One controversy on this finding is whether a correct or properly specified asset pricing model was used to adjust for systematic risk. Returns cannot be said to be above or below normal when you don't have a good idea of what the "normal" returns should look like.

In any case, small firms do not constitute much value in the overall market. Of all the publicly traded firms in the U.S., the largest 10% of firms make up around 85% of the total value of the U.S. stock market. The smallest 10% of firms make up only about 0.3% of the overall market value. Even the smallest 30% of firms only make up about 2.5% of the overall market value.

Temporal Anomalies: Researchers discover several stylish facts (patterns) in stock returns, implying that stock prices do not follow a random walk. However, these findings are not strong evidence against the EMH because these patterns cannot be exploited to earn abnormal profits after accounting for transaction costs. Furthermore, one of these patterns (negative average return on Mondays) has disappeared recently.

Value versus Glamour: This is the latest battleground for the EMH. Several studies show that public information (the ratio of book value of equity to market value of equity or BV/MV) can be used to select stocks that produce abnormal returns. If the finding is not driven by risk, then a challenge to the EMH exists. The verdict on this topic is still not in.

Long-term studies: Many studies, beginning in the early 1990s suggested that the market does not completely or fully react to major corporate events, and *long-term* (1 to 5 year) abnormal returns exist. This evidence of long-term *anomalies* following IPOs, stock splits, dividends, stock repurchase announcements, etc. is controversial. The IPO underperformance study by Ritter (1991) is well known and cited in the textbook. Misspecified asset pricing models are the

likely cause of most of these findings. More recent studies that use improved asset pricing methods or models have explained or resolved many of these long-term anomalies.

Implications For Corporate Financial Managers

1. Can financial managers "fool" investors?

   Early studies find that stock prices do not react to changes in accounting methods, unless cash flow is affected. These findings are consistent with the semi-strong form EMH and suggest that restating financial accounting performance or methods is unlikely to increase value unless it can also decrease taxes, bankruptcy costs, or agency costs. However, well-known recent scandals at Enron, Worldcom, and Tyco, etc., illustrate that managers can sometimes fool the public and investors with deceptive financial accounting practices, but only for so long before the bubble bursts. Perhaps a firm can fool the market only once!

2. Can financial managers "time" security sales?

   The market usually reacts negatively to an announcement of a sale of new common stock. However, early *long-term* studies found that theses firms have negative abnormal returns in following years (firms that repurchase equity had positive abnormal returns in following years). These findings suggest that managers "time" equity sales and repurchases correctly. These studies are controversial and have been largely resolved in recent years.

IV. Speculative Bubbles:

Sometimes asset prices tend to reach elevated levels (sort of like Alan Greenspan's 1996 quote of "irrational exuberance") that are highly inconsistent with fundamental value. Prices of stocks, particularly in a certain industry or sometimes in an entire market, appear to be priced at a level that is far above what would be considered to be a fair price that is based upon risk and realistic expected future cash flows. There is what some call the "bigger fool" theory. Someone might have felt like a "fool" for buying Cisco Systems stock in early 2000, but they were hoping that an even more foolish person would soon come along and pay an even higher price. This, of course, can only continue so long before prices eventually crash.

In each case of a speculative bubble, asset prices rise to high levels that cannot be sustained. The prices cannot be justified by the asset's future cash flows, investors begin to realize this, and prices come crashing down and eventually converge around the fundamental price.

Some instances of what are thought to be speculative bubbles in the past include the following:

1. Dutch tulip bulb mania of the early 1600s. A classic case of people turning away from their normal productive activities in order to chase the bubble of rising tulip bulb prices.

2. South Sea bubble of the early 1700s in Britain.

3. Electric related stocks in the 1880s (yes, this was once new, exciting, and overpriced).

4. U.S. stock market of the late 1920s. Crash began in October 1929 and prices fell for the next 3 years. Take a look at Radio Corporation of America (RCA) stock during this period. RCA was the "new economy" stock of its era.

5. "Tronics" boom of the early 1960s. U.S. electronic stocks experienced a bubble.

6. "Nifty Fifty" craze of the early 1970s. A bubble in large market capitalization *growth* stocks, e.g., IBM, Xerox, McDonalds, Polaroid, Disney, Sony, etc. These were thought of as Blue Chip stocks that would always be prudent investments for a portfolio, almost regardless of the price paid, since these firms had a history of excellent corporate performance. Price-to-Earnings or P/E ratios of these large company stocks were 60 to 80, while the P/E for the rest of the market was around 15. However, no large company can ever grow at a future rate that justifies a current P/E of 60 to 90. This is a classic case of "good company, bad stock", in which the firm has a bright future, but its stock is simply overpriced (such as the much later case of Cisco Systems in 2000). The Nifty Fifty stocks were hard hit in the recession of 1973 to 1974, typically losing 70 to 80% of their value.

7. Japanese stock and real estate bubble of the late 1980s. Nikkei 225 index almost hit 40,000 on the last trading day of 1989. There was no way to justify these prices, which came at a time when Japanese corporate profitability was actually *declining*. Two years later in 1992 the Nikkei was below 14,000, and even in early 2003, it was below 8000. At the bubble's peak, the appraised value of all real estate in metropolitan Tokyo exceeded that of the *entire* United States.

8. Internet and dot.com bubble of 1999 and 2000, accompanied by the idea that we had entered into the "New Economy", i.e., the "rules" had changed. New industries are often difficult to assess or evaluate and often can be prone to irrational speculation. New industries go on to be part of everyday life, but several have experienced a bubble during their infancy.

During any bubble, many believe that "this time it's different and the old rules no longer apply". Such an attitude was certainly true of the Internet bubble. During the Internet bubble one would actually repeatedly hear and read that the "old methods" of stock valuation (essentially discounted Free Cash Flow to Equity) no longer worked in the "New Economy"!

The bubbles represent deviations from fundamental or true value and thus represent a violation of market efficiency. However, in each case, the mispricing was eventually corrected in the marketplace. A major downside is that a bubble also represents a temporary misallocation of resources in the economy. The economic slowdown during 2000 and recession of 2001, following the collapse of the Internet/technology bubble, is no mere coincidence.

The figures on page 9 illustrates the before and after phases of the Japanese stock market bubble (the Nikkei 225 index) and the Internet bubble (showing the Nasdaq Composite Index, Philadelphia Internet Index, and Cisco Systems stock). The technology laden Nasdaq Composite Index reached 5000 at the peak of the Internet bubble. The figures on page 10 illustrate the U.S. stock market bubble and the RCA (radio) bubble of the late 1920s.

SUPPLEMENT TO CHAPTER 13: SHORT SALES AND SOME REASONS FOR LIMITS TO ARBITRAGE

The CAPM model assumes *homogeneous expectations* among investors. This is not as critical as the fact that both the CAPM and APT assume that there are no constraints to the *short selling* of stock.

Optimists can enter the market in a stock by purchasing the stock (a *long* position).

Pessimists can enter the market in a stock by short selling the stock. Of course, the stock must be borrowed from an equity lender so that the stock can be sold (shorted). There are various regulatory and institutional short selling constraints. Sometimes lenders can't be found (usually for smaller firms). Other examples are:

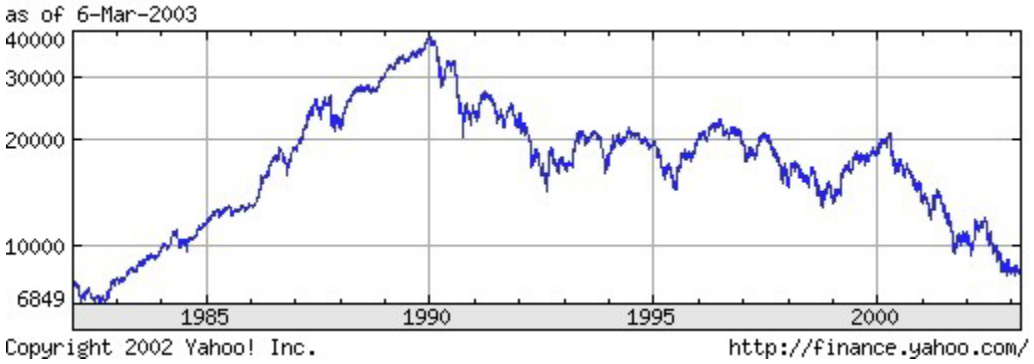
- Either the short seller or the seller's broker must pay the equity lender a loan fee for loaning out the stock to be shorted. Some stocks can become expensive to borrow due to the loan fee. Loan fees are variable and are driven by the supply of shares and the demand to short.
- There is always a *recall* risk to holding a short position. The short position can only be held as long as the shares can be borrowed. If the equity lender cannot maintain this position, then the short seller must buy the shares in the market and return them.
- The existence of exchange traded put and call options for a common stock will likely alleviate the problems posed by short sale constraints, as options can serve as a close substitute for short selling.

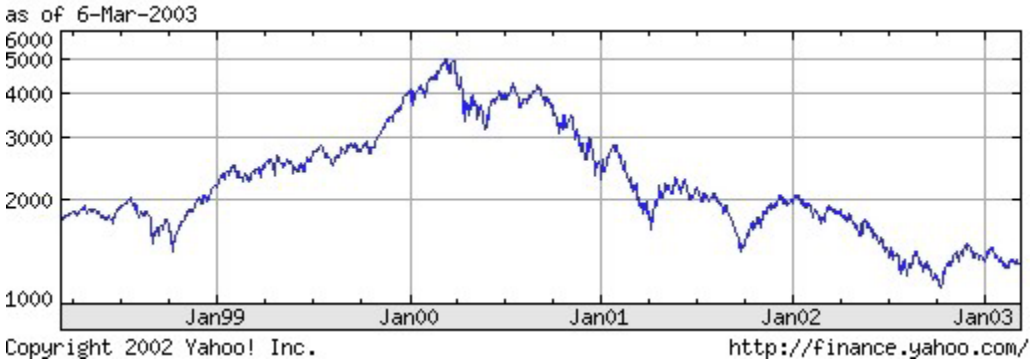
Now consider that investors and analysts usually *disagree* about the fundamental value of most stocks. Therefore, we can say that *dispersion of opinion* or differences in opinion exist among investors in the market. This can be referred to as *valuation uncertainty*. In any case, expectations are not homogeneous.

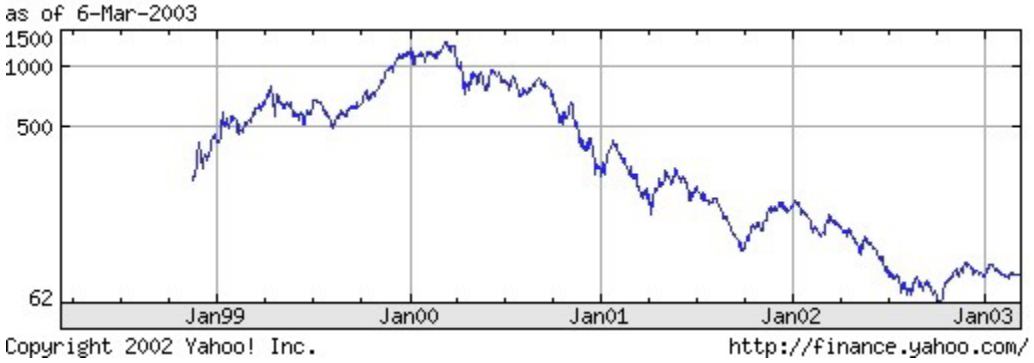
Ed Miller (Journal of Finance, 1977) argues that, in the presence of high short sale constraints, those stocks having a high investor/analyst dispersion of opinion will tend to become *overpriced*. This is because optimists now drive the price, while the pessimists cannot all render their opinion due to frictions in short selling additional shares. As the difference of opinion becomes larger, so will the overpricing of the stock. Note that this theory can perhaps provide some explanation for *speculative bubbles*. Recent and current research document that these stocks have strongly tended to *underperform* (around 1% underperformance per month) during the following 12 months.

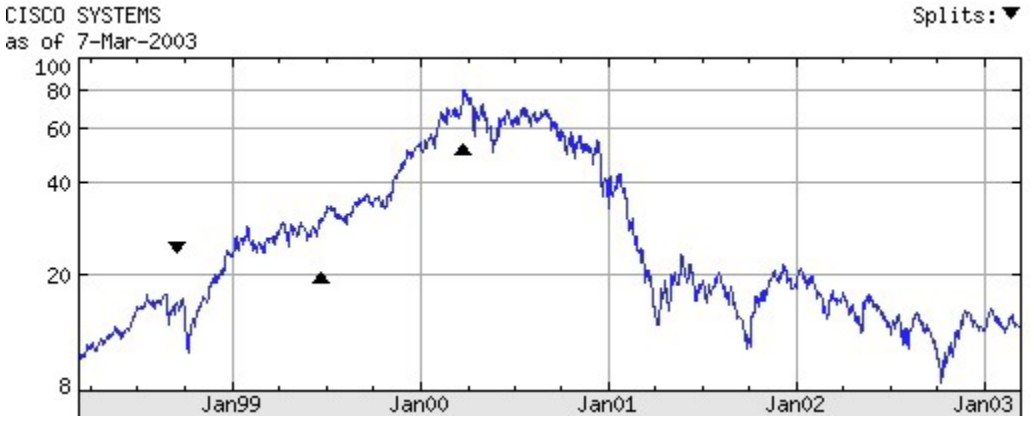
For stocks with high dispersion of opinion but having few or no short sale constraints, e.g., shares can be easily borrowed and/or exchange traded options exist, no overvaluation should exist for these shares since pessimists can easily render their opinion on these stocks.

Examples of Speculative Bubbles. The first is the Japanese stock market bubble of the late 1980s. The next three illustrate the Tech/Internet/dot.com bubble of 1999 and 2000: shown are the Nasdaq Composite Index, the Philadelphia Stock Exchange Internet Index, and Cisco Systems common stock. All of these graphs are from http://finance.yahoo.com and are reproduced for educational instruction purposes.

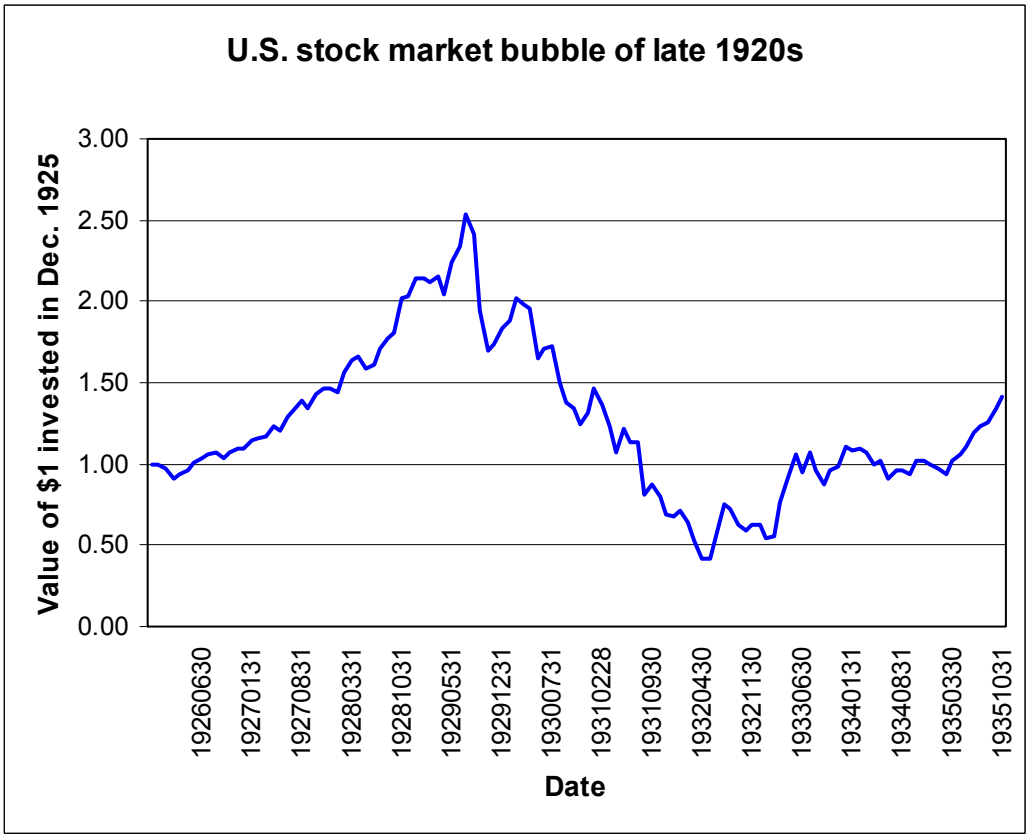


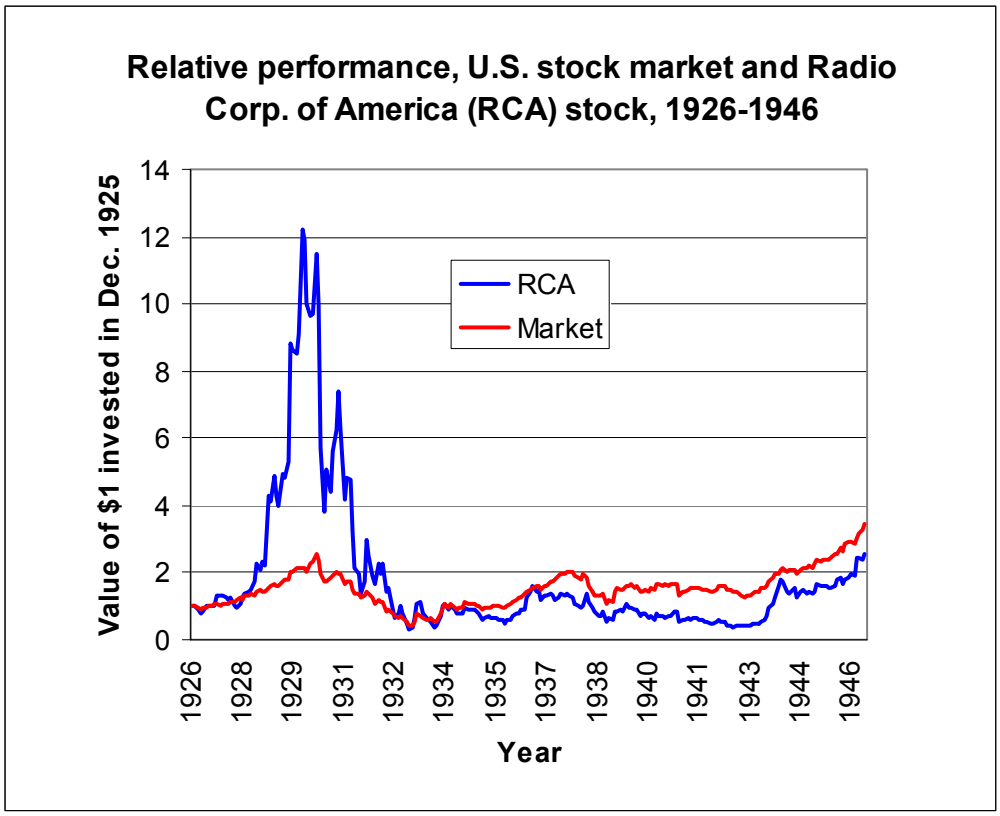






More Examples of Speculative Bubbles. The U.S. stock market bubble of the late 1920s and the RCA bubble (radio bubble) of the late 1920s.





Ramdom versus real: It can be difficult to discern the actual stock market from a series of randomly generated numbers. Two of these four graphs are actual U.S. stock market performance for a 120 month period. The other two are a random walk process generated with the Microsoft Excel random number generator (normal distribution). Can you tell which two are real and which two are fake?