

**Fundamental Analysis:
Lessons from the Recent Stock Market Bubble**

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A presentation to the Japanese Association of Security Analysts, on Friday October 26,
2001, in Tokyo

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The Nikkei 225 Index soared to a closing high of 38957 on December 29, 1989, a 238% gain over a five-year period. As you are undoubtedly all too aware, last month, almost 12 years later, the Nikkei 225 fell through 10000 for a loss of over 75% from the 1989 high. The stock prices of the 1980s were a bubble, and the bubble burst. The repercussions were long-term. Some claim that equity investing is rewarded in the long run, but the long run has been a long time running.

On March 10, 2000, the NASDAQ Composite Index in the United States peaked at 5060, up 574% from the beginning of 1995. On the day before the horrifying devastation of the World Trade Center in New York last month, the index stood at 1695, down 67% from the high. A bubble has burst. We wonder how long the long run will be. We are reminded that the Dow did not recover its 1929 euphoric level until 1954. And during the 1970s, after the bull market of the late 1960s, the Dow stocks returned only 4.8 percent over 10 years, and ended the decade down 13.5 percent from their 1960's high.

In January, 2000, prior to the bursting of the bubble, Alan Greenspan, Chairman of the U.S. Federal Reserve Bank spoke to the issue that was on many minds. He asked whether the boom would be remembered as “one of the many euphoric speculative bubbles that have dotted human history.” In 1999 he said, “History tells us that sharp reversals in confidence happen abruptly, most often with little advance notice.... .What is so intriguing is that this type of behavior has characterized human interaction with little appreciable difference over the generations. Whether Dutch tulip bulbs or Russian equities, the market price patterns remain much the same.”

Indeed, while the usual reference to bubbles is to Dutch tulip bulbs in the seventeenth century or the South Seas in the nineteenth century, we have had a more recent experience in U.S. markets. As recently as 1972, the pricing of the technology stocks of the day – Burroughs, Digital Equipment, Polaroid, IBM, Xerox, Eastman Kodak – looked like a bubble waiting to burst. Indeed, the pricing of other “Nifty Fifty” stocks like Coca Cola, Johnson & Johnson, and McDonalds took on the same appearance. And the bubble did burst. The Nifty Fifty average price-to-earnings (P/E) ratio of 37 in 1972 was nothing like the P/E of over 300 for the NASDAQ 100 stocks in 2000, but was considerably above the historical average of 13. How could we, within a space of only 30 years, have repeated the experience with the Nifty Fifty? Are we in danger of ignoring the lessons of history? Is this type of behavior likely to characterize each generation, as Mr. Greenspan speculates?

No doubt you have your own account of experiences in the Japanese markets. I wish to review the recent heady times in U.S. and world markets and to draw some lessons. I do so from the viewpoint of a fundamental analyst, one who believes that good analysis anchors the investor so that he or she does not get carried away with the temporary enthusiasms of the day. I am in the tradition of Benjamin Graham, the father of fundamental analysis and a Columbia University professor of an earlier generation.

The fundamentalist understands that one can pay too much for a share. Indeed, while others talk of risk in terms of volatility or beta, the fundamentalist considers that the primary risk in equity investing is the risk of overpaying for a share, or selling for too little. The fundamentalist insists that investors should not indiscriminately buy shares with the expectation of return in the long run. If investments are made without an understanding of underlying value, that long-run return is in jeopardy, as the Japanese experience of the last decade surely attests.

With this understanding, the fundamentalist develops an analysis that leads to an appreciation of underlying value. This analysis anchors the investor. It helps the investor to identify fallacies, to identify ad hoc and incomplete analysis, to appreciate a good equity research report and to reject a poor one.

Did analysts contribute to perpetuating the recent stock market bubble? In my view, a considerable amount of analysis during the bubble was suspect. I lay out here what I see as the mistakes, as a matter of historical record. My aim, however, is not just to document the poor thinking during the bubble, but to convey what good, orderly thinking about fundamental value involves – to avoid mistakes in the future.

Stock Market Bubbles

Bubbles work like a chain letter. I joined one as a teenager for fun (and not much consequence), and as an adult trying to get enough signatures to lobby for a good cause (hopefully with consequence). One letter writer writes to a number of people, instructing each to send the letter on to a number of other people with the same instruction. Letters proliferate, but ultimately the scheme collapses. If the letter involves money – each person in the chain expects to be paid by others further along the chain – the scheme is sometimes referred to as a Ponzi scheme or a pyramid scheme. A few that are early in the chain make considerable money, but most participants feel exploited.

In a bubble, investors behave like they are joining a chain letter. They adopt speculative beliefs that are then fed on to other people, facilitated in recent years by “talking heads” in the media and chat room discussions on the internet. Each person believes that he will benefit from more people joining the chain, by their buying the stock and pushing the price up. A bubble forms, only to burst as the common speculative beliefs collapse.

The popular investing style called momentum investing has features of a chain letter. Advocates of momentum investing advise buying stocks that have gone up, the

idea being that those stocks have momentum to continue going up more. What goes up must keep on going up. Indeed, this happens when speculation feeds on itself as the chain letter is passed along. Fundamentalists, however, see gravity at work. What goes up (too much) must come down. Prices ultimately gravitate to fundamentals.

Bubbles damage economies. People form unreasonable expectations of likely returns and so make misguided consumption and investment decisions. Mispriced stocks attract capital to the wrong businesses. Entrepreneurs with poor business models can raise cash too easily, deflecting it from firms that can add value for society. Investors borrow to buy paper rather than real productive assets. Debt burdens become intolerable. Banks that feed the borrowing to buy assets run into trouble. Bubble prices misprice risk, so upsetting risk sharing in the economy. And, while we have learnt something of macroeconomic management since then, the euphoria of the late 1920s and the subsequent depression of the 1930s teach us that systematic failure is possible. Too much partying produces a hangover.

Fundamental analysis cuts through the chain letter. Bubbles are based on speculative beliefs, and fundamental analysis tests those beliefs and the prices they generate. Fundamental analysis anchors the investor against the tide of fad and fashion. Furthermore, fundamental analysis enables the investor to avoid losses and to profit for the folly of others.

Analysts During the Bubble

If the U.S. stock market bubble was a chain letter, were analysts the postmen? Did analysts push stocks too much with speculative analysis?

There certainly is evidence for that proposition. During the bubble analysts were saying buy, buy, buy. In the year 2000 only 2% of sell-side analysts' stock recommendation in the U.S. were sells, according to reports. We have got somewhat jagged about the veiled language in analysts' recommendation – we are told that a hold is really a sell, for example, and unless the analyst recommends a strong buy, he really means hold when he says buy! But could analysts bring themselves to recommend only 2% sells in 2000? Only after the NASDAQ index dropped 50 percent did analysts issue sell recommendations. This is not very helpful. You'd think that, with such a drop in price, recommendations would tend to change from sell to buy rather than the other way around.

To be fair to analysts, it is difficult and dangerous to go against the tide. An analyst may understand that a stock is overvalued, but overvalued stocks can go higher, fed along by the speculation of the moment. The nature of a bubble is for prices to keep rising. So, making a sell call may be foolish in the short run. The problem becomes one of timing: when will the bubble burst? The issue calls into question what we are about and how we represent ourselves to clients. Do we write equity research reports that develop a valuation for a company, or do we speculate on where the stock price will go based of crowd behavior?

The conjectures as to why analysts might be carriers of the chain letter are probably familiar to you:

- Analysts get caught up in the speculative fever of the moment and put aside good analysis. They follow the herd.
- Analysts are afraid to buck the trend. If they turn out to be wrong when the herd is right, they look bad. If they and the herd are wrong together, they are not penalized as much. (There are big benefits to being the star analyst who makes the correct call when the herd is wrong, however.)
- Analysts rely on private information from companies, so are reluctant to make sell recommendations that offend the firms whom they cover. Those firms may cut them out of further information. Arthur Leavitt, Chairman of the Securities and Exchange Commission during the Clinton administration was most concerned about the dysfunctional incentives that such a threat might pose, a concern that led, in late 2000, to Regulation FD that forbids firms from privately communicating with analysts.
- Analysts in investment banks have a conflict of interest. They advise investors, but their firms have relationships with the firms that are being covered. So, if the investment bank is floating a share issue, they may not want their analysts issuing sell recommendations. There are supposed to be “bamboo walls” between analysts and the banking divisions, but these are porous. Investment banks make their most money in boom markets and a good deal of that from deals that they don’t want upset by a doubting analyst. As continuing fallout from the bursting of the bubble, the U.S. Congress is currently conducting hearings on this issue. Rep. Richard Baker, chairman of the hearings insists that analysts’ research reports “have become marketing brochures for firms looking to win investment-banking assignments.”
- Retail analysts have another conflict of interest. Their firms make money from commissions on share transactions, so their primary aim is to get people to trade. Transaction volume increases in bull markets fed by buy recommendations.

Analysis During the Bubble

Whatever the institutional reasons for the type of advice supplied by analysts during the bubble, a considerable amount of analysis was suspect. The following are some examples:

- Profits were dismissed as unimportant. Most internet stocks reported losses and analysts insisted at the time that this did not matter. What was important, they said, was the business model. Well, both are important: a firm has to make profits

and, even though it may have losses currently, there must be reasonable scenarios for earning profits. Indeed, pro forma fundamental analysis tests the business model.

- Commentators insisted that traditional financial analysis (of income statements and balance sheets) is no longer relevant. The new economy demands new ways of thinking, they said. But they offered no persuasive new thinking.
- Analysts appealed to vague terms like “new technology”, “web real estate”, customer “share of mind”, “network effects”, and indeed “new economy” to recommend stocks. Pseudo-science labels; sound science produces good analysis, not just labels.
- Analysts claimed that the firms’ value was in “intangible assets” (and so claimed that the firm must be worth a lot!), but didn’t indicate how one tests for the value of the intangible assets. One even saw analysts calculating the value of intangible assets as the difference between bubble prices and tangible assets of the balance sheet. Beware of analysts recommending firms because they have “knowledge capital.” Knowledge is value in this information age, but knowledge must produce goods and services, the goods and service must produce sales, and the sales must produce profits. And knowledge assets must be paid for. Inventors and engineers must be paid. Will there be good profits after paying for knowledge?
- Analysts relied heavily on non-financial metrics like page views, usage metrics, customer reach, and capacity utilization. These metrics may give some indication of profitability but they don’t guarantee it. The onus is on the analysts to show how these indicators translate into future profits.
- Analysts justified values on the basis of macro variables rather than expected future corporate profits. So they claimed that the seeming bubble prices for internet and other technology stocks were justified by the large increase in productivity from technological advances. But productivity increases do not necessarily flow to producers. Employees share in productivity gains. Competition pushes the benefits through to consumers, leaving firms with a normal rate of return, if not immediately, not too far in the future. Indeed, it seems that consumers have been the primary beneficiaries of the internet revolution, not the e-commerce startups.
- Analysts relied on financial measures above the “bottom line” earnings. Revenue growth is one, but while revenue growth is desirable, revenues must result in profits. Some firms published “pro forma” or adjusted earnings that excluded some aspects of earnings. Lynn Turner, Chief Accountant at the SEC in 2001 called these numbers E.B.S., “Everything but the Bad Stuff,” in contrast to E.P.S., earnings per share. Amazon.com has reported losses for a number of years and excludes interest expense (yes, interest expense!) from its pro forma losses. Its earnings for the June, 2001 quarter were a loss of \$168.4 million, but it reported

pro forma loss of only \$57.5 million in its press release. For its latest quarter, Cisco Systems reported pro forma earnings of \$163 million in its announcement to the press, but the earnings in its formal accounting report were only \$7 million. These pro forma numbers can be justified as better quality numbers (as indicators of earnings power in the future), but the justification must be clearly understood.

- Analysts and the market focused too much on firms beating analysts' earnings forecasts for the short term. At times, firms were penalized severely in the market for missing analysts' earnings estimates by as little as one cent. Value is based on the level of earnings, now and in the future, not on meeting estimates for a quarter of earnings.
- Analysts moved from focusing on P/E ratios and earnings growth to focusing on price-to-sales (P/S) ratios and sales growth. Sales growth is important, but sales ultimately must produce profits. With analysts' focus on price-to-sales ratios, firms began to manufacture sales through accounting practices like grossing up commissions and barter transactions in advertising.
- Analysts' forecasts of growth rates were high compared to past history. Analysts consistently maintained that companies like Nike in 1996 and Cisco Systems and Microsoft in 1998 could maintain exceptional revenue and earnings growth rates for a long time. Analysts' "long-term growth rates" (for 3 – 5 years in the future) are typically too optimistic in boom times. History says that growth rates usually decline towards average rates quite quickly.
- Some claimed, without much justification, that the large increase in stock prices was due to a decline in the risk premium for equities. Historical analysis places the risk premium for U.S. stocks between 6% and 9%, but commentators at the time insisted that it had fallen as low as 2.5%. We are unsure about how to measure the equity risk premium, making it all too easy to attribute a price increase to a decline in risk.
- Rough indicators of mispricing were ignored without justification. A P/E of 33 for the S&P 500 at the height of the bubble is a waving red flag. A P/E of 76 for Dell Computer flashes a warning. One should have good reasons to be buying at these multiples.
- Historical perspective was ignored. Cisco Systems, with a market value of half a trillion dollars, traded at a P/E of 135 in 1999. There has never been a company with a large market value that has traded with a P/E over 100.
- Comparisons between firms did not make sense. When trading at 76 times earnings of \$944 million on sales of \$12.4 billion in 1998, Dell traded at a market capitalization greater than that of General Motors who was reporting \$6.6 billion in earnings on sales of \$166.4 billion.

- Simple calculations didn't add up. The *Wall Street Journal* reported (on January 18, 2000) that, at the height of internet mania, the shares of five new online job search companies traded for a total of \$1.2 billion. Yet total online job advertising for the year was only \$52.5 million in a very competitive market, with established firms (outside this group) gaining a good share of this business on the web. At one point in 1999, internet companies traded at a market value, in total, of over \$1 trillion, but had total revenues of only \$30 billion, giving them an average price-to-sales ratio of 33. This looks high against the historical average P/S ratio of just 1. All the more so when one recognizes that these firms were reporting losses totaling \$9 billion. For \$1 trillion you could have purchased quite a number of established firms with significant profits.
- Analysts relied too much of the method of comparables. This method prices a share on the basis of multiples (such as price-to-earnings, price-to-sales, and price-to-book) of comparable firms. This method promotes pyramid schemes. In a hot IPO market, a new issue is priced on the basis of a high multiple earned by the last firm going public (perhaps with an increment rationalized by the investment banker trying to get the business), perpetuating overpricing.
- Analysts did not appreciate the quality of earnings. One can argue for high multiples in bad times because sales and earnings are depressed and likely to grow. Corresponding, one expects lower P/Es in boom times, for earnings are high and are less likely to grow, particularly those for seasoned firms. Yet P/Es were high in the bubble, even for the blue chips. More on this later.

Return to Fundamentals

These observations about poor analysis are not just reflections after the fact – Monday quarterbacking as we say in the U.S. Rather they are points that should have been appreciated at the time if one had a firm grasp on fundamentals.

Fundamental analysis cuts through the chain letter. Bubbles are based on speculative beliefs, and fundamental analysis tests those beliefs. Fundamental analysis anchors the investor against the tides of fad and fashion. I suspect that, after the 1990s, many have lost grasp on fundamental analysis techniques. They are not anchored. Remember that word *anchor* for I will come back to it again. Fundamental analysis provides the anchoring.

Fundamental analysis involves techniques but those techniques are developed from a way of thinking about how firms generate value. Good thinking is paramount. That thinking is formally capsulated in a valuation model. At the risk of being too simple, the appendix develops equity valuation models, and the understanding behind them, through the valuation of a simple savings account, an asset that we all understand. I summarize the main principles here.

- *The Dividend Paradox.* The value of a share is based on the expected dividends that the share is expected to pay, but forecasting dividends does not tell us much about value unless we are willing to forecast for a very long period in the future.
- *Free Cash Flow is a perverse valuation concept.* Discounted cash flow techniques involve forecasting free cash flow, but free cash flow, measured as cash from operations minus cash investment, does not capture value added in the short run. Firms reduce free cash flow by investing to generate value and increase free cash flow by liquidating.
- *Book Value of Equity in the balance sheet serves as an anchor.* Firms add value to book value by earning at a rate of return on book value in excess of the cost of capital. So a firm is worth its book value (that is, it has an intrinsic price-to-book ratio of one) if it is expected to earn a rate of return on book value equal to its cost of capital, and is worth a premium over book value if it is expected to earn at a rate in excess of the cost of capital. The *residual earnings valuation model*, in the appendix, provides the thinking about how to calculate an intrinsic price-to-book ratio.
- *Capitalized Earnings serves as an anchor.* Firms add value to capitalized earnings by growing earnings at a rate in excess of the cost of capital. So a firm is worth the amount of capitalized forward earnings if earnings are expected to grow at a rate, after reinvestment of dividends, equal to the cost of capital. In this case its forward intrinsic P/E ratio is equal to $1/\text{cost of capital}$. Its intrinsic forward P/E must be greater than this if earnings growth is expected in excess of the cost of capital. The *earnings capitalization growth model*, in the appendix, provides the thinking about how to calculate the intrinsic P/E ratio.

Valuation must be anchored in the book value or earnings. With this anchor, the analyst focuses on the amount of earnings a firm can deliver in the future, either through the prism of return on book value or growth in earnings. Straying from this focus leaves the analyst open to the speculative whims that produce price bubbles. An analyst who always examines value in terms of rate of return on book value or earnings growth has an anchor indeed.

Fundamental Analysis and the Analyst

The application of fundamental analysis to investing comes with a caveat. Fundamental analysis protects the investor against losses from the bursting of the bubble. It is a suitable defensive tool. It is also an offensive tool for the active investor who wishes to understand when stocks are mispriced and so benefit from prices gravitating to fundamentals. But it will not help the investor benefit from unjustified price increases as the bubble forms. The fundamentalist typically sells stocks too early in the formation of a bubble (or worse, short sells), missing out on some of the price appreciation. Or the fundamentalist can buy stocks when prices are low, only to see them move lower. Prices can go any way in the short run, according to market whim. Predicting unjustified price

increases or decreases is a matter of studying market psychology or “behavioral finance” as it has become to be called. Such an analysis is not in the fundamentalist’s tool box.

As an investment advisor, the analyst must decide where his or her comparative advantage is, where he will get an edge. Is it from understanding market psychology or in understanding the fundamentals? My only plea is that the analyst represent himself faithfully to his clients and not attempt to justify speculative beliefs, based on psychology, to the doubtful type of analysis that we saw during the recent bubble.

Fundamental analysis focuses on long-run value. I am concerned that, perhaps due to the pressures on them that I listed above, analysts focus on the short term, on near-term price movements or earnings for the next quarter. If so, they may have little interest in thorough fundamental analysis. Alas, the efficiency of our capital markets therefore suffers and we open to the disturbing consequences of bursting bubbles.

The Matter of Earnings Quality

The last point I made about analysis during the bubble has to do with understanding earnings quality. I also remarked on the use of adjusted earnings that left out all but the bad stuff. The issue of the quality of earnings is paramount. By earnings quality I mean the ability of a firm to sustain or grow its current earnings in the future. If there is some component of earnings that won’t be repeated in the future, those earnings are of poor quality. A complete analysis of earnings quality would require a lecture in itself, but here are some points to consider:

- The analyst must understand that earnings growth can be created, not only by growth in profitable business investment but also by the application of what accountants call “conservative” accounting. Conservative accounting is the practice of keeping asset values excessively low, by writing down assets, by expensing investments such as research and development, and by using rapid depreciation and amortization rates. Write-downs today imply lower earnings now but higher earnings (and thus earnings growth) in the future because of reduced future expenses. Growth, so induced, tends to attenuate quickly. It has been said that a considerable amount of earnings growth for seasoned firms in the 1990s was due to the large write-downs and successive restructuring charges in the early part of the decade. I don’t think that analysts appreciated this during the bubble. Cisco Systems, Nortel Networks, JDS Uniphase and VeriSign, to name just four companies, have recently taken massive inventory write-offs totaling \$72 billion. Expect more earnings growth for these firms.
- Earnings growth can be created by leverage. But, if borrowing is a zero net present value activity (a firm borrows at the market rate), leverage does not add value. Earnings growth created by leverage is low quality. During the late 1990s, debt increased on firms’ balance sheets, promoting e.p.s. growth. Leverage also increased because of the increased stock repurchase activity in the 1990s. Stock repurchases do not create value if they are made at fair-value. In fact, one might

conjecture that firms actually overpaid for their own stock in the late 1990s by buying at inflated bubble prices, so destroying value for shareholders.

- A fundamental principle of fundamental analysis says that, to cut across the chain letter, one should assess underlying value without reference to market prices. The problem with the method of comparables and momentum investing is that they refer to past or current comparable prices, so perpetuating the chain letter. The accounting for earnings includes price appreciations, so one has to be careful; those price appreciations may be a bubble phenomenon. Multiplying an earnings number that includes such bubble profits calculates a bubble value, so perpetuating the bubble. In the U.S., firms included gains on their pension fund assets in earnings. IBM included \$3.463 billion of such before-tax gains in its 1999 before-tax earnings of \$11.751 billion. General Electric reported \$3.407 billion of such gains. Many of these reflected the bubble. These gains certainly did not come from their core business. Gains from revaluations of land during price bubbles – such as that experienced in Japan a decade ago – and realized and unrealized gains from equity investments and currency movements are also low quality.
- The accounting for stock compensation is a pernicious feature of U.S. accounting and of the accounting in most jurisdictions. When executives and other employees are paid in cash, an expense is appropriately recorded in calculating net income. But when they are paid with stock options, an expense is rarely recorded. The value that employees receive when they exercise – the difference between the market price and the exercise price – is surely value lost from the point of view of the shareholder, for whenever shares are issued for less than market value, the existing shareholder's equity value is diluted. With the increase in stock compensation during recent years, earnings have been overstated because of the omitted wages expense. Indeed, in some cases, employees got most of the value of companies and the shareholders little, yet the accounting did not report this.
- The criticism of the accounting for stock options applies to other contingent equity claims. Dell Corporation has routinely written put options, rights to have Dell shares repurchased at a strike price. For a number of years, these options have lapsed as Dell's stock price increased, yielding gains to Dell (that were not recorded in the income statement). This year however, the stock price has dropped from over \$60 per share to \$18, leaving Dell with about \$2 billion dollars of losses on options with an average exercise price of \$44. These losses will not be recorded in Dell's financial statements. But surely shareholders have lost from the repurchase at \$44 rather than \$18.
- The analysts must always watch for earnings manipulation. Firms manipulate by changing estimates for allowances, accrued expenses and deferred revenues. They do it by temporarily reducing expenditures if those expenditures (like research and development and advertising) are expensed. Interestingly firms tend to inflate

profits with these practices during good times, to keep growth going. They tend to take write-offs in bad times, taking a “big bath” to create future growth.

There are some tricky issues involved in assessing the quality of earnings – goodwill amortization, for one. But fundamental analysis involves forecasting earnings of good quality. I believe that one cannot be an accomplished, anchored equity analyst without a reasonable understanding of accounting. And, without sound accounting principles, share markets are prone to speculative bubbles. What do you think of the quality of Japanese accounting?

Appendix

There is a basic rule in valuation: what works for equities and other securities must work for a savings account. If someone proposes an equity valuation model that does not work for a savings account, you know that there is something wrong with it. So we can illustrate misguided valuation techniques by showing that they don’t work for a savings account, or that they only work in special circumstances. And we can demonstrate sound techniques.

The Valuation of a Savings Account

Consider an account with a \$100 balance earning at a rate of 10% per annum, terminating after five years. To value the account at date 0, the analyst produces the following pro forma for the five years into the future:

A Terminal Savings Account with Full Payout

<i>Year</i>	<i>0</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
Book value	100	100	100	100	100	0
Earnings	10	10	10	10	10	10
Dividends		10	10	10	10	110
Free cash flow		10	10	10	10	110

You notice two things about this pro forma. First, it’s for a terminal investment: the balance of the account is paid out at the end of year 5. Second, the earnings of \$10 each year are withdrawn from the account, leaving \$100 in the account to earn at 10%: this is a case of “full payout.” Withdrawals are the dividends from the account. Free cash flow is cash left over after reinvesting in the account and, as there is no reinvestment of earnings in this example, free cash flow is also \$10 each year, with a final cash flow of \$110 in year 5.

As this is a terminal investment, we can value it by taking the present value of dividends, which in this case is also the present value of cash flows. The required return is 10%, so

$$\begin{aligned} \text{Value} &= 10/1.10 + 10/1.21 + 10/1.331 + 10/1.4641 + 110/1.6105 \\ &= 100 \end{aligned}$$

The rule always holds: for terminal investments, one can always discount cash flows or dividends. This is because, with a terminal investment, we always capture the final liquidating payoff. The model here is referred to, of course, as the *dividend discount model*. A similar calculation can be made by discounting the forecasted free cash flow in which case the model is referred to as the *discounted cash flow model*, well known to students of business schools. Free cash flow is always equal to dividends (for equities also) if there is no debt financing (the investment in the assets is not levered). When there is debt, discounted cash flow methods involve only a slight modification of dividend discounting; both involve forecasting of cash flows.

There are two other methods for valuing this savings account, however, and they don't involve cash flows. The depository bank accounts for the asset by preparing a bank statement that states a balance. In effect, the bank prepares a balance sheet with a book value. One can value the assets from the book value:

$$\text{Value} = \text{Book Value} = 100$$

The price-to-book ratio is one. We refer to this valuation as the *book value model*. An analyst can also value the account by forecasting one-year-ahead forward earnings rather than cash flows, and capitalizing those earnings at the rate for the required return:

$$\text{Value} = \text{Capitalized Forward Earnings} = 10/0.10 = 100.$$

The forward P/E ratio is 1/required return (that is, 10 for the 10% rate here). We refer to this model as the *capitalized earnings model*.

Businesses are going concerns. This introduces the problem that, unlike the savings account here, there is typically no liquidating payoff. But we can modify the example to consider a going concern. Suppose that this savings account is expected to continue indefinitely. The pro forma for the first five years is then as follows:

Going-concern Savings Account with Full Payout

<i>Year</i>	<i>0</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
Book value	100	100	100	100	100	100
Earnings	10	10	10	10	10	10

Dividends	10	10	10	10	10
Free cash flow	10	10	10	10	10

There is no terminal payment in year 5 as the account continues indefinitely. There is full payout every year, as before. We can value the account by discounting the dividends or cash flows. The continuing value at year 5 (or $10/0.10 = 100$) is calculated as a \$10 perpetuity.

$$\begin{aligned} \text{Value} &= 10/1.10 + 10/1.21 + 10/1.331 + 10/1.4641 + 10/1.6105 + (10/0.10)/1.6105 \\ &= 100 \end{aligned}$$

The dividend discount model and the discounted cash flow model work. The book value model and the earnings capitalization model also work. Will that always be the case?

To get closer to what an investment in equity looks like, suppose that you do not expect to withdraw anything from the account for a very long time. You want the value to accumulate in the account for the benefit of your grandchildren. The five-year pro forma in this case is as follows:

Going-concern Savings Account with No Payout

<i>Year</i>	<i>0</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
Book value	100	110	121	133.1	146.41	161.05
Earnings		10	11	12.1	13.31	14.64
Dividends	0	0	0	0	0	0
Free cash flow	0	0	0	0	0	0
Return on Book Value		10%	10%	10%	10%	10%
Growth in Earnings		10%	10%	10%	10%	10%

Here earnings each year are reinvested in the account, so free cash flows and dividends are expected to be zero. We now get to an important point: *forecasting dividends or cash flows over five years (or ten, or twenty years) won't work*. But the book value method and the capitalized earnings method still work:

$$\text{Value} = \text{Book Value} = 100$$

$$\text{Value} = \text{Capitalized Forward Earnings} = 10/0.10 = 100$$

You could, of course, get a value based on forecasted dividends or cash flows if you forecasted your grandchildren's ultimate withdrawals and discounted them back to

the present. But, to be as practical as possible, analysts want to work with relatively short forecast horizons. Forecasting cash flow for the year 2050 gives us serious problems. Forecasting the ultimate liquidation of the account two generations on requires a very long forecasting horizon and considerably more computation. It is much easier to value the asset based on the immediate book values and earnings rather than forecasting dividends 50 years hence.

Before leaving the savings account, note that the last pro forma has two lines added. The expected return on assets for this account is 10%. The expected growth in earnings is 10%. These forecast are particularly important as we come to the valuation of equities.

The Valuation of Equities

It is quite easy to see that, when it comes to equities, forecasting dividends is not going to work. Just like the no-withdrawals case for the savings account, Microsoft and many other firms “pay no dividends” (though they do have some stock repurchases). Firms in the U.S. typically pay few dividends. Indeed the average dividend yield in the U.S. has declined from 4% 20 years ago to just 1.3% now. We refer to the *dividend paradox*: the value of an equity investment is based on the expected dividends that it is likely to pay, but forecasting dividends over practical forecast periods does not help to value the equity.

It is not as easy to see that forecasting free cash flows can also be problematical. Look at the following numbers for Home Depot Inc., the successful U.S. warehouse retailer of home improvement products, from 1997 – 2001 (in millions of dollars):

Home Depot Inc.

<i>Year</i>	<i>1997</i>	<i>1998</i>	<i>1999</i>	<i>2000</i>	<i>2001</i>
Operating earnings	941	1,129	1,585	2,323	2,565
Book value, operating assets	6,722	8,333	10,248	12,993	16,419
Free cash flow	(149)	(482)	(330)	(422)	(861)

Suppose one were standing at the end of fiscal year 1996, attempting to make a forecast, and were offered a set of pro forma numbers for the five forward years, 1997- 2001 with the guarantee that these numbers would be the actual reported numbers. And suppose one had to choose between the accrual accounting numbers (forecasted operating income and net operating assets) or cash flow numbers. The choice, as with the savings account, is clear. The forecasted free cash flows are negative, so getting a valuation from forecasts for five years of cash flows is problematical indeed. Home Depot invests over and above the cash generated from operations, resulting in negative free cash flow. Those investments are likely to deliver positive free cash flows in the distant future, but an analyst wants to work with relatively short forecast horizon. The retailer, Wal-Mart

generated negative free cash flows consistently for many years up to the late 1990s. Earnings and book value look like a better thing to focus on.

To do so, think of adapting the book value model and the earnings capitalization model for the savings account to equities. First recognize that the accounting for book value and earnings in the case of business firms is not as good as that for the savings account. It is rare that we can take the book value of shareholders' equity as a measure of the value of their equity. Nor can we capitalize forward earnings in most cases. But the savings account example gives us the insight for the modifications.

Think of the book value model being modified as follows:

$$\text{Value} = \text{Book Value} + \text{Extra Value not in Book Value}$$

With the savings account, book value measures all of the value, so there is no extra value. But why does the book value measure all the value? Well, as the last pro forma for the savings account indicates, we expect a return on book value (a return on equity) equal to the required return of 10%. A fundamental principle states that, if a firm is expected to earn a return on equity equal to its required return (the cost of capital), it must be worth its book value; there is no extra value. The intrinsic price-to-book ratio must be one. Correspondingly, if one expects a return on equity greater than the required return, the firm must be worth a premium over book value; there is extra value. The intrinsic price-to-book ratio must be greater than one.

A model, the *residual earnings model*, incorporates this principle formally:

$$\text{Value} = \text{Book Value} + \text{Discounted Future Residual Earnings}$$

The extra value is determined by forecasting residual earnings and discounting it at the required return. Residual earnings is earnings for a period minus a charge (at the required return) on the book value at the beginning of the year. For year 2001, say, residual income, with a required return of 10%, is

$$\text{Residual Earnings} = \text{Earnings}(2001) - (0.10 \times \text{Book Value at the end of 2000})$$

So, if book value at the end of 2000 is \$400 million and earnings for 2001 are \$55 million, residual earnings for 2001 are \$15 million. You see that, if the earnings rate is 10% on book value, residual income is zero: there is no extra value over book value. The formal formula for the model is as follows:

$$\text{Value of Equity } (V_0^E) = B_0 + \frac{\overline{RE}_1}{r_E} + \frac{\overline{RE}_2}{r_E^2} + \frac{\overline{RE}_3}{r_E^3} + \dots$$

Here, B is book value, RE is residual earnings, and \tilde{n} is one plus the discount rate (1.10 for a required return of 10%). The valuation is for date 0 and the subscripts 1, 2, 3, ..., on the RE indicate forecast years ahead. The model is applied with continuing values at the

end of the forecast period. My recent book, *Financial Statement Analysis and Security Valuation* (Mc-Graw-Hill, 2001) lays out the full implementation of this valuation. In short, valuation involves forecasting earnings future book values (net assets) and the rate of return at which those assets are expected to earn. Just as the book value model gives the same valuation as forecasting dividends for the savings account, one can prove that the model here gives the same valuation as forecasting dividends in the very long run for equities.

The earnings capitalization model for the savings account can also be modified for equities:

$$\text{Value} = \text{Capitalized Forward Earnings} + \text{Extra Value not in Earnings}$$

For the savings account, capitalized forward earnings capture all the value, so there is no extra value. But why do earnings capture all the value? Well, as the last pro forma for the savings account shows, earnings are expected to grow at the required return of 10%. A fundamental principle states that, if earnings are expected to grow at the required return, value must be equal to capitalized earnings and the forward P/E ratio must be 1/required return (10 for a 10% required return). Correspondingly, if earnings are expected to grow at a rate greater than the required return, one must add extra value and the forward P/E ratio must be greater than 1/required return. This nothing different to saying that P/E ratios are determined by growth in earnings, where the benchmark is growth at the required return.

There is just one twist. The earnings growth must be in earnings with dividends reinvested, sometimes referred to as cum-dividend earnings growth. One gets earnings from a firm in the future from the earnings it makes but also from reinvesting any dividends that the firm pays. Look again at the case of the savings account where \$10 of earnings are withdrawn each year. Earnings do not grow in the savings account (as the assets are always \$100) but one can reinvest the dividend in another savings account to earn at 10%. So the \$10 dividends for Year 1 would earn \$1 in Year 2 if invested in another savings account, for total earnings of \$11 in the two savings accounts, and the cum-dividend growth rate would be 10%.

A model, the *earnings capitalization growth model* incorporates this principle formally. The model, developed recently by Professors Ohlson and Juettner-Nauroth at New York University states:

$$\text{Value} = \text{Capitalized Forward Earnings} + \text{Capitalized Discounted Abnormal Earnings Growth}$$

The extra value is determined by forecasting abnormal capitalized abnormal earnings growth. For year 2001, abnormal earnings growth with a required return of 10% is:

$$\text{Abnormal Earn Growth (2001)} = \text{Earn}(2001) + 0.10 \times \text{Div}(2000) - 1.10 \times \text{Earn}(2000)$$

So, if earnings for 2000 were \$12 per share and the firm paid \$2 per share in dividends, abnormal earnings growth for \$15 of earnings reported in 2001 is $\$15 + \$0.20 - \$13.2 = \2 . The formula for the valuation model is:

$$\text{Value of Equity, } V_0^E = \frac{\text{Earn}_1}{r_E - 1} + \frac{1}{r_E - 1} \left[\frac{\text{AEG}_2}{r_E} + \frac{\text{AEG}_3}{r_E^2} + \frac{\text{AEG}_4}{r_E^3} + \dots \right]$$

Here AEG is abnormal earnings growth.

Refer back to the point about anchoring a valuation. Both the residual income model and the earnings capitalization growth model have an anchor. The residual income model is anchored by the book value in the balance sheet. The earnings capitalization growth model is anchored in the earnings in the income statement. Earnings are generated by the assets that are represented by the book values. So the two approaches are complementary. In both cases, valuation is anchored in the financial statements.

For further development of financial statement based valuation models, please refer to my book, *Financial Statement Analysis and Security Valuation*, New York: McGraw-Hill, 2001.