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Between January 1980 and August 2000 American stock prices as measured by the S&P500 index rose by 1239%; over the same period the dividends on the shares underlying the index rose by only 188%, while the earnings rose by 254%. Between August 2000 and February 2003 the price index fell by 44% and, at the time of writing, some three and a half years later, the index is still some 25% below its August 2000 level, despite the fact that long term interest rates have fallen by around 100 basis points, and the fall is much greater if measured in terms of foreign currency such as the Euro. As Figure 1 shows, American stock price behavior at the turn of the millennium had all the characteristics of a classic bubble;² prices climbed much faster than dividends or earnings, particularly starting from the beginning of 1995. What caused this?

Several factors seem to have been at work, in addition to the excitement caused by the internet boom that occurred at this time. The first factor is what we might call the democratization of investment that took place during the 1990's, as individuals with little or no experience of the stock market began to invest for the first time: this democratization was in part due to changes in the provision of pensions in the US, and in part due to a change in the conventional wisdom about investment which was associated with imperfectly understood theories that had been developed by academics 30 years earlier. If individuals were poorly placed to manage their own investments, they were little better off if they committed their investments to the care of experts: there were significant agency problems in the investment management industry and conflicts of interest in the production of information about firms that were compounded by the failure of the accounting profession to adopt standards that reflected economic reality. There was also a general lack of objective discussion in the public marketplace of ideas about the elevated level of stock prices: part of this might be attributed to a failure on the part of

² Paul Samuelson suggested in March 1999 that "the US market may be in an incipient bubble". Quoted by Fisher and Statman (2002).

most of the academic community, who might have been expected to recognize that stock prices were at a level which could not be justified by reasonable expectations of future cash flows, to speak out forcefully about the sustainability of valuation levels; the investing public was also generally ill-served by the business press in the United States; interestingly, European, or at least British, financial publications appear to have had a more clear eyed view of what was happening in American capital markets. Finally, there is some evidence that required rates of return were falling during this period as well.

The Democratization of Equity Investment and the Change in the Conventional Wisdom

Between 1989 and 1998 the number of individuals in the US who owned stock, either directly, or through mutual funds, or in a self-directed retirement accounts, rose from 42.1 million to 75.8 million, while the number owning stock directly or through mutual funds (but excluding retirement accounts) rose by more than 50% from 31.5 million to 48.5 million.³

This increase in the number of participants in equity markets was accompanied by a massive increase in the scale of the equity mutual fund industry: the assets under management rose from \$870 per capita in 1989 to over \$14,000 per capita in 1999, before declining to a little over \$12,000 per capita in 2001. On the other hand, holdings of bond mutual funds grew only from \$966 per capita in 1989 to \$2887 in 1989. In other words, while bond funds roughly tripled, equity funds went up by a factor of over 14! According to the Survey of Consumer Finances, publicly traded equity roughly doubled its share of individual asset portfolios during this period.

At least two factors appear to have been responsible to this huge increase in public participation in equity markets.⁴ The first is the demise of the defined benefit pension plan. The second is the broad development of the cult of the equity, which reflected the new conventional wisdom.

³ New York Stock Exchange Fact Book.

⁴ For further analysis see Poterba (2001).

Defined benefit pension plans are typically organized and managed by employers, and promise to pay pension benefits according to a defined schedule in relation to age, number of years worked, and final salary. The important aspect of defined benefit pension plans is that the whole of the investment risk is borne by the plan sponsor who is typically the employer, and no risk is borne by the employee except in the rare case of plan default. Even then, the beneficiary is at least partially protected by the Pension Benefit Guaranty Corporation (PBGC), a federal agency that guarantees the benefits. According to the PBGC, the number of insured (defined benefit) pension plans in the U.S. dropped from about 114,000 in 1985 to just over 32,000 in 2002. The defined benefit pension plans were typically replaced by defined contribution plans in which the employer, instead of promising a final pension according to a defined schedule, makes periodic contributions to a portfolio which is managed by the employee and which is intended to provide the final retirement benefit. The major differences between defined benefit and defined contribution plans lie in *portability, management, and risk bearing*. First, since the employee owns the assets invested in the defined contribution plan, he is able to transfer them easily as he switches jobs: in contrast, an employee who switches jobs often loses all or a significant fraction of his rights to a pension under a defined benefit plan. Secondly, the assets in a defined benefit pension plan are typically managed by third party professional investment managers, and the trustees of such plans frequently employ consultants to assist them in determining an appropriate mix of assets between bonds, equities, real estate etc. Finally, in contrast to a defined benefit plan, a defined contribution plan places the whole of the investment risk on the shoulders of the plan beneficiary.

The Department of Labor reports that the assets of defined contribution pension plans rose from 81% of the assets of defined benefit plans in 1990 to 139% by the year 2000. This shift from defined benefit plans to defined contribution plans was accompanied by a massive shift in the holdings of corporate equity. From 1990 to 2000 the managers of defined benefit plans sold a total of \$371 billion of equity and equity mutual funds, while defined contribution plans increased their commitment to equity by

some \$222.2 billion.⁵ During this period households were also increasing their equity portfolios that were held either directly or through mutual funds, from \$3,311 billion to \$11,587 billion, so that the share of these assets in household portfolios rose from 13.2% in 1990 to 32.5% in 1999. Equity held through mutual funds outside defined contribution pension plans rose from 1.2% to 6.6% of household portfolios. Taking account also of the growing importance of mutual funds held within defined contribution pension plans, the share of corporate equities that was held by mutual funds rose from 6.6% in 1990 to 18.3% in 2000.

Thus the decade of the 1990's saw a huge increase in the discretionary portfolios of households that were allocated to equities. These portfolios were either direct holdings of equities, or indirect holdings through mutual funds within or outside defined contribution pension plans. The important point is that, even for the mutual funds, the asset allocation decision, the choice between equity and fixed income, was almost always in the hands of the individual investor, only the security selection decision being delegated to the portfolio manager.

At the same time as the declining role of defined benefit plans was giving individuals increasing control over the investment of their pension assets, there was developing, in a fashion that Keynes described,⁶ a new conventional wisdom about investments and equity securities that reflected in a simplified form the results of academic research over the previous half century.

In 1952 Harry Markowitz had proved that diversification is good: that it is better on the whole to purchase a well diversified portfolio of common stocks than to rely on purchasing a few 'good' stocks with which the investor is familiar. Although, not widely accepted initially,⁷ this principle gradually became a part of the conventional wisdom. Investors learned that it was best to buy portfolio of mutual funds of whose composition

⁵ The share of mutual funds, direct equity holdings and defined contribution pension wealth in household portfolios rose from 15.1% in 1990 to 37.% in 2000.

⁶ "Practical men, who believe themselves to be quite exempt from any intellectual influences, are usually the slaves of some defunct economist. Madmen in authority, who hear voices in the air, are distilling their frenzy from some academic scribbler of a few years back." J. M. Keynes, 1936.

they were largely ignorant – they learned to buy what we may call “undifferentiated stock”.

Secondly, the first comprehensive study of rates of return on common stocks in the US was completed only in 1964:⁸ it showed that an equally weighted stock portfolio realized an annually compounded rate of return of 9% over the period 1926-60, and the authors of the study observed: “that it will perhaps be surprising to many that the rates have consistently been so high.” This remark reflects the general state of ignorance about the returns to common stock at that time. In the years to follow, the high returns realized on common stocks, and the fact that in the US equities have outperformed bonds by a substantial margin over long periods of time, became common knowledge. By the 1990’s it was widely ‘known’ by the investing public that stocks have a higher return than bonds, and that the risk of stock returns falling short of bond returns over along period was very small. Jeremy Siegel, a distinguished professor at the Wharton School, even wrote a book entitled *Stocks for the Long Run* (1994) which confirmed the new orthodoxy and contained such statements as “It is widely known that stock returns on average, exceed bond returns in the long run. But it is little known that in the long run, the risks in stocks are less than those found in bonds or even bills!”.⁹ So the second element of the conventional wisdom was that long term investors should purchase common stocks. By the end of the decade this had led to even more radical claims: in *Dow, 36,000*, Glassman and Hazlett were using Siegel’s argument to suggest that since stocks were less risky than bonds they should command a lower discount rate: when this happened the Dow-Jones index would rise to the eponymous 36,000.

The third element of the conventional wisdom derived from the Efficient Markets Hypothesis. Conceived in the 1960’s, the hypothesis was at first widely acclaimed by academics but resisted by investment professionals. But no sooner had Michael Jensen (1978) proclaimed that ‘no other proposition in economics has more solid empirical support than the Efficient Markets Hypothesis’, than academics started to become more

⁷ In the 1970’s economists were puzzled that individual investors held such undiversified portfolios. See Blume and Friend (1975).

⁸ Lorie and Fisher (1964).

⁹ Such a claim of course reflects selective perception. At the time of writing the Nikkei 225 Index in Japan is 72% below the level it reached in December 1989, fourteen years earlier!

sceptical about it. In particular, Summers (1986) pointed out that many of the empirical tests which were thought to provide support for the hypothesis had no power against the economically interesting alternative hypothesis that aggregate stock prices differed from fundamental values by persistent but time-varying errors and, starting with Shiller (1981), economists began to notice that stock prices appeared to be “too volatile” given the relative stability of the underlying dividend stream. The formulation of the efficient markets hypothesis has evolved in response to such criticisms, and in its modern form allows for “time varying risk premia” and a modest degree of predictability in aggregate stock prices; while this modification makes the hypothesis consistent with the excess volatility of stock prices noted by Shiller, it comes at the expense of a watering down of the predictive content of the hypothesis, so that there is now virtually no interesting behavior of aggregate stock prices that is ruled out by the hypothesis. Nonetheless, while economists were becoming more sceptical,¹⁰ the essential message of the Efficient Markets Hypothesis, that stock prices reflect the available information, was becoming embedded in the popular consciousness; it came to be accepted that, in the common parlance, “the price is always right”. The power of the original Efficient Markets Hypothesis in shaping perceptions, and therefore in influencing actions, was captured by an article in Business Week in November 1997: in answer to the question “where do investors get the confidence to keep bidding up stock prices even after last month's warning slap?”, the author of the article replied that “investors may be buoyed by the idea that financial markets settle naturally at their proper level. Economists call this the efficient-markets theory”.

Putting together these three elements of the conventional wisdom – that stocks beat bonds - that it is optimal to buy undifferentiated stock - and that the price is always right – one arrives at the maxim: “buy undifferentiated stock whatever the price”. And that is exactly what investors did, taking the share of corporate equity held by mutual funds from 6.6% in 1990 to 18.3% in 2000.

¹⁰ None more so than the emerging group of ‘behavioral’ economists. See Barberis and Thaler (2003) for a survey.

Agency Problems in the Production and Sale of Information

Mutual funds are of course not the only medium by which investors can hold equity. Investors have a choice between managing their own portfolios and doing their own research, or delegating the tasks of information acquisition and portfolio management to an agent such as a mutual fund or pension fund manager. In either case, the financial information about firms that is required for investment decisions is ultimately produced by the firms themselves and audited by the firm's accountants. In some cases, this information is supplemented by the analyses of investment analysts who are employed either by the portfolio managers or, more often, by the brokers who assist in share transactions.

During the 1990's severe problems arose in the production of information at the firm level. This was exacerbated by deficiencies in accounting conventions, and by conflicts of interest faced by accountants and investment analysts. The result was that the underlying profitability of the corporate sector became overstated, causing investors to over-estimate, not just the current level of profits, but also their underlying rate of growth. In this circumstance, it is not surprising that stock prices rose above sustainable levels.

Profits are ultimately earned and reported by individual firms and, at the level of the firm, strong incentives to overstate profits were created by the generous distribution of executive stock options during the 1990's¹¹. While academics had generally favored the use of stock options to align more closely the interests of manager and stockholder, they had generally overlooked the fact that high powered incentives to create stockholder value are also high powered incentives to misrepresent the true state of the firm through the production of accounting statements that were at best misleading and at worst fraudulent. In addition to the misaligned incentives of corporate management in many firms, the independence of the auditors of the financial statements was frequently compromised by their eagerness to undertake valuable non-audit business for their audit

¹¹ A survey of 350 companies by William Mercer reports that the proportion using stock options rose from 63% in 1990 to 93% in 2000. Economist, January 25, 2001.

clients.¹² The result was a series of accounting scandals and earnings re-statements of which Worldcom, Tyco, Enron, and the resulting demise of Arthur Andersen are only among the more notorious episodes.¹³ The unreliability of accounting statements during this period was reflected in an unprecedented level of earnings restatements towards the end of the decade. Wu (2003) shows that, while such restatements had never exceeded 60 per year prior to 1998, in that year they rose to 96: in the following three years the numbers of restatements were 204, 163, and 153. These restatements wiped out large amounts of the profits that had been booked in the boom years.

In addition to individual malfeasance giving rise to the overstatement of profits, there were also features of the accounting rules that created systematic biases in reported profits. Important among these were the treatment of stock options whose cost appeared only in footnotes to the accounting statements and not in the income statement,¹⁴ and the treatment of the costs of defined pension plans. With respect to pension plans, accountants were caught between two competing considerations. On the one hand, their desire to ensure that all gains and losses pass through the income statement; on the other hand, the inevitable volatility in earnings that would result if the gains and losses on the assets and liabilities of corporate pension plans were to be reflected in annual earnings statements. The accounting profession's solution was a complex set of rules that allowed firms to report as pension income the *notional* earnings on their pension fund assets computed using an *assumed* rate of return.¹⁵ In the year 2001 the 50 largest defined benefit pension plans based their calculations of pension income on an assumed return that averaged 9.3%, despite the fact that the 20 year Treasury Bond Rate was well below 6% during the year. This generous assumption gave these funds earnings for accounting

¹² The Sarbanes-Oxley Act has since restricted the ability of auditing firms to offer non-audit services to their clients.

¹³ Eisenberg and Macey (2003) suggest that Andersen's record as an auditor was not significantly different from that of other large auditing firms.

¹⁴ An attempt by the Financial Accounting Standards Board to require full accounting for stock options in 1993 was quashed by strong Congressional opposition. Smithers & Co has calculated that if options had been properly accounted for at the time when they were granted, the profits of large listed companies in 1998 would have been two-thirds lower. Economist, *op.cit.*

¹⁵ This situation still obtains. In 2003 General Motors was able to increase its reported earnings by issuing bonds whose proceeds were invested in the pension fund where they earned a higher notional return than the cost of the bonds; the difference flowed through to earnings. Economist, January 22, 2004.

purposes of \$54 billion¹⁶ in a year in which, because of poor stock returns and declining interest rates that raised the present value of liabilities, the actual earnings of these pension funds was a *loss* of \$36 billion – in other words the earnings were mis-stated by around \$90 billion. In such circumstances even the government was confused about the true level of profitability of the economy.

Figure 2 plots successive estimates of corporate profits produced by the Department of Commerce for the years 1997-2000 starting from the first quarter of 2000. Major downward revisions are reflected for the years 1998-2000 and, while initial estimates for the years 1999 and 2000 suggested profits comfortably above the 1997 level, in retrospect the year 1997 represented the peak year of profits for the next five years.¹⁷ However, the S&P500 had a further 42% to rise between the end of 1997 and the end of 2000: this rise was no doubt assisted by the 25.9% increase in the reported earnings on the S&P500 index over the same period. Standard & Poor's, the independent financial research and ratings firm, responded to the confusion about the “true earnings” of companies by introducing the concept of ‘Core Earnings’ which adjusts *inter alia* for the mis-measurement of pension income and the omission of stock option expense. In October 2002 Standard & Poor’s announced that the Core Earnings for the S&P 500 Index for the 12 months ended June 2002 were \$18.48 per share, or 31% below the as-reported earnings per share (EPS) of \$26.74. The adjustment relating to the reporting of pension income amounted to \$6.54 per share, while stock option expenses accounted for a further \$5.21 per share. Thus during the peak years of the bubble, companies and their accountants systematically overstated the profitability of the corporate sector.

In addition to biases in reported earnings, there were biases also in the estimates of future earnings growth rates that were produced by investment analysts, especially by those who worked for brokerage houses belonging to investment banks that were underwriting or hoping to underwrite security issuances of the firms covered by the

¹⁶ Each 1% cut in rate would have “cost” about \$5.2 billion in accounting earnings.

¹⁷ At the time of writing nominal corporate profits for the first quarter of 2003 were estimated to be at an annualized rate of \$466 billion, well below the rate for 1997.

analysts.^{18,19} As a result, the estimated long run growth rate of earnings per share for the S&P500 produced by IBES analysts climbed steadily from around 13% in 1996-7 to around 18% by the year 2000.²⁰ At that time, in contrast, the dividend growth rate over the previous ten years had been around 2.7%, and the dividend yield was 1.2%; if the dividend growth rate were to continue at the same rate, the implied rate of return was only around 3.8%, which compared with the yield on 20 year Treasury Bonds of 5.5%.

This unwarranted optimism on the part of analysts seems to have deceived many individual investors, but not the professionals. For example, Malmendier and Shanthikumar (2003) find evidence that, despite the conflicts of interest of analysts affiliated with investment banks, individual investors ignored the affiliations of analysts in deciding whether to trade on their recommendations, while institutional investors were more circumspect. The Paine Webber Index of Investor Optimism reports the rate of return that individual investors expect to earn during the next 12 months. The mean stock market return expected by individual investors for the following year was 12.10% in December 1998, and 15.3% in December 1999.²¹ At the same time, the *Business Week* Survey of Institutional Investors reported that the mean return expectations of institutional investors for the same time periods were only 1.56%, 7.22%.^{22,23} On the other hand, survey results by Shiller²⁴ show that the fraction of institutional and individual investors who ‘think that the market is not too high’ declined by comparable

¹⁸ Analyst compensation often depended on their ability to attract investment banking business. *Economist*, “The price of atonement,” Nov. 16, 2002.

¹⁹ Michaely and Womack (1999) argue that positive analyst coverage after an equity issuance is often viewed as part of an implicit agreement between underwriter and issuer, and Krigman *et al.* (2001) report that in selecting an underwriter firms place the highest priority on research coverage. In the spring of 2002, Merrill Lynch agreed to pay \$100 million in fines after analysts’ emails denigrating the stocks of companies that they publicly recommended, were disclosed.

²⁰ Chan *et al.*(2003) document the general upward bias in analyst growth rate forecasts. Over the period 1982-1998 the median 5 year growth rate forecast was about 550 basis points above the median realized growth rate.

²¹ At this time individual investors were expecting stock returns over the next 10 years to average 19 per cent. See Poterba (2001).

²² By December 2000 the expected one year return expectations of individual (institutional) investors had risen to 10.5% (19.20). By the December 2000 survey the S&P500 had declined 11% from its peak.

²³ Welch (2000) quotes a survey of pension fund executives and other institutional investors by *Pensions and Investments* (January 12, 1998, p. 1) which reported an expected equity premium of 3%, and a 1997 Greenwich Associates survey of fund professionals which found an expected 5-year equity premium of 4%–6%.

²⁴ <http://icf.som.yale.edu>.

amounts for institutional and individual investors between October 1989 and October 1999 – from 80% to 29% for institutional investors and from 73% to 34% for individuals.

While individual investors may have been misled by the biased forecasts of investment analysts into over-estimating the prospective returns on equities, investment professionals were apparently not, and one might expect them to have cut back on their equity allocations. However, an interesting feature of the bubble years is the behavior of the asset allocations of professionally managed portfolios such as those of defined benefit pension plans: the trustees of such plans are typically advised on their asset allocations by ‘consultants’ and their portfolios of individual asset classes are managed by professional investment managers. Faced with the escalating valuations of equities in the late 1990’s and declining prospective returns, these funds might reasonably have reduced their proportional equity allocations. In fact, precisely the opposite occurred: the proportion of defined benefit pension plan asset portfolios that were allocated to equities climbed from 61% at the end of 1995 to 71% at the end of 1999. On reflection, it is easy to explain why the equity allocation did not fall. The asset allocations recommended by ‘consultants’ are typically based on simple mean-variance portfolio theory using expected returns and covariances that are based on long-run historical return data. In the 1980’s there developed a fashion for supplementing these long run ‘strategic’ asset allocations with ‘tactical’ asset allocations based on short run predictions of asset class returns. Although such strategies had performed well in the period up to and including the 1987 Crash, they performed poorly over the subsequent seven years,²⁵ making investment managers reluctant to bet on return predictions derived from simple valuation ratios such as the P/E ratio or dividend yield.²⁶ Cochrane (1999) shows that, while short run (annual) stock returns are only slightly predictable by the dividend yield, returns at five-year horizons seem to be very predictable because the dividend yield is a slow-moving variable whose predictive power adds up over long horizons. Even though the predictive power of such persistent variables increases with the forecast horizon, investment managers, whose greatest risk is the business risk of losing their clients, cannot afford to

²⁵ Philips *et al.* (1996).

²⁶ Lewellen (2003) shows that such valuation ratios have significant predictive power for returns, and Brennan and Xia (2004) discuss optimal portfolio strategies when long run horizon returns are predictable.

take bets based on long run outcomes, and consequently have incentives to ignore signs of overvaluation: it is better for them to lose their clients' money along with the crowd as the market goes down than to risk having significantly worse returns than their competitors.²⁷ It is less easy to explain why they should have increased their equity allocations during a period of increasing valuations unless perhaps as the result of a passive buy and hold strategy.²⁸

Thus, during the bubble years, firms and their accountants were inclined to overstate the profitability of the corporate sector, investment analysts were inclined to paint too rosy a picture of future prospects, and professional fund managers were for the most part prevented by their own conflicts of interest from taking positions which were appropriate given their low expectations of equity returns.

Declining Risk Premia

Thus far we have concentrated on the role of earnings and dividends, both actual and forecast. The second element in a rational model of valuation is of course the discount rate that is used to convert the expected future dividends on stock to arrive at the market price. A major component of the discount rate is the *risk premium* that investors demand to compensate them for the risk associated with holding stocks. *The risk premium* is an elusive concept that is hard to measure and, as we have seen, different classes of investor may have different expectations about the prospective returns on equities which imply different assessments of the risk premium. However, there is evidence that the risk premia in capital markets that might have been assessed by sophisticated investors were declining through the 1990's. Figure 3 presents two time series of estimated risk premia for the S&P500. Claus and Thomas (2001) use the earnings forecasts of investment analysts in a "residual income" model of equity valuation to infer the rate of return that investors were expecting for each firm in the

²⁷ For example Mercury Asset management of the UK lost a number of high profile clients and was eventually acquired by Merrill following 18 months of market underperformance as the result of its strategy of being underweight stocks in technology, media and telecoms. Economist, June 15, 2000.

index, and then aggregate these to calculate a risk premium for the index. Ilmanen (2003) follows a quite different procedure which involves projecting aggregate real earnings and inflation, and assuming a normalized dividend payout ratio: the real earnings growth rate is calculated as a weighted average of growth rates over the past 50 years while the inflation forecast is based on survey data.²⁹ Both Claus-Thomas and Ilmanen estimates show a decline in the equity premium in the second half of the 1990's. The Ilmanen estimate falls from 4.5% in 1994 to 2.0% by 2000 and then rises back to 3.5% in 2001. The Claus-Thomas estimate, which is available only up to 1998, tracks the Ilmanen estimate fairly closely and falls from 4.1% in 1994 to 2.5% in 1998. These estimates are of course heavily dependent on the particular forecasting model used for future cash flows. Therefore it is comforting to find that the decline in that these estimates of the risk premium is consistent with other evidence. Campbell and Harvey (2003) report the results of a survey of Chief Financial Officers: their median estimate of the 10 year equity premium in June 2000 is 3.9% which is close to the Ilmanen estimate of 4.8% in the same month. Brennan and Xia (2003) estimate the risk return trade-off using bond market data and their measure of the risk premium declines from an average of 0.23 in 1994 to an average of *minus* 0.51 in 2000. Poterba (2001) reports findings from the Survey of Consumer Finances that the fraction of households who are "willing to take above average risks for above average returns" rose from 9% in 1989 to 14.2% in 1995 and 18.8% in 1998. It is possible that this decline in risk aversion was both a cause and one effect of the increase in wealth associated with the stock market bubble, since there is a presumption that risk aversion declines as wealth increases. The overall picture that emerges from this evidence is one of declining risk aversion and declining risk premia during the 1990's, at least if we define the risk premium as that assessed by a sophisticated analyst.

To assess the importance of this decline in risk premia for stock prices, note that in 1994 the dividend yield on the S&P 500 was around 2.8%; by 2000 it had fallen to about 1.2% as stock prices soared. In the simple Gordon growth model the dividend

²⁸ Brennan and Torous (1999) show that buy and hold policies may be preferred to traditional rebalancing strategies.

²⁹ I thank Antti Ilmanen for providing me with his basis data.

yield is the difference between the discount rate and the growth rate of dividends. If the difference between the growth rate in dividends and the riskless interest rate is constant, then the change in the dividend yield will be equal to the change in the equity risk premium. Thus the 1.6% decline in the dividend yield between 1994 and 2000 is consistent with the 1.6% decline in the Claus-Thomas estimate of the risk premium between 1994 and 1998, and is less than the 2.5% decline in the Ilmanen estimate over the period 1994-2000. Therefore, it is possible to attribute the whole of the stock price movement to changes in dividends and changes in risk premia.

The Role of the Press and Academics

There are good commercial reasons for conducting research on individual stocks: the information gained may be sold to investors in the form of investment management services or packaged and sold with brokerage services, and the information will typically be of such a nature that an investor can take advantage of it and assess its value in the short run. Womack (1996) reports that analysts' new buy recommendations are followed by excess returns that average in excess of 5% over the following month while the returns associated with sell recommendations are even larger in absolute value. In contrast, both the cost and the economic value of analyses of the stock market as a whole are much lower. First, the analysis relies on public information so that anyone may (and many do) opine about the future of stocks – this makes such analyses plentiful, cheap (usually free) and typically without value. Secondly, as mentioned above, valuation indicators for the aggregate market such as the dividend yield have significant predictive power only at long horizons so that it is difficult to assess the value of investment advice that is based on them. Given the persistence of valuation indicators that predict asset returns, significant asset re-allocations are low frequency phenomena, and their value is hard to ascertain over short intervals. In these circumstances there appears to be a lack of serious professional advice for the investor about asset allocation.

Nevertheless, it might have been expected that, even if such experts as investment analysts and portfolio managers had special interests that prevented them from pointing out the elevated level of stock prices and the attendant low expected future returns, then

such independent experts as professors of finance and journalists would have been ready to present more objective analyses

Unfortunately, with one of two exceptions, the most notable of whom was Robert Shiller of Yale University,³⁰ academics tended to keep a low profile during the bubble years. This was, I suspect, not only on account of a natural reticence, but also because the dogma of market efficiency and its cousin, the random walk hypothesis, held many of them in thrall, and prevented them for the most part from even considering the possibility that the market might be over-valued. Clear evidence of this academic bias is apparent in the surveys of academics conducted by Ivo Welch. The first survey, which was conducted between October 1997 and February 1998, reported an average of the academics' estimates of the equity premium of 7.1%; adding this to the average level of the 10 year bond rate during this period of 5.39% (of the 3 month T-bill rate of 4.84%), one arrives at an estimated long run return on common stocks in the range of 11-13%. Since the dividend yield on the S&P500 was around 1.5% at this time, the implied dividend growth rate from a Gordon type model is in the range of 9.5% to 11.5%, which compares with historical growth rates of 5.7% for the period 1979 – 1990 and 2.5% for the period 1991 – 2000. In other words, the academics who were responding to the survey were implicitly making dividend growth rate forecasts that were implausibly high because their estimates of the equity premium were heavily influenced by the *realized* excess return on equities as calculated by Ibbotson Associates and featured in most of the leading textbooks used to teach MBA students.³¹ However, as Fama and French (2002) and others³² have noted, this realized excess return was strongly affected by the re-rating of equities that took the average dividend yield from 5.2% in 1926 to 1.2% in 2000, so that stock prices rose by a factor of 4.3 relative to dividends. When Welch repeated the survey in August 2001, after the peak of the market had passed, the average estimate of the equity premium had fallen to 5.5%; however, using the prevailing level of short and

³⁰ In addition to his book *Irrational Exuberance*, which was published just as the market peaked, Shiller and John Campbell testified before the Board of Governors of the Federal Reserve System in December 1996 about their concerns with the level of stock prices. Campbell and Shiller (1997) is based on this testimony.

³¹ It is rational to use the historical mean returns to estimate the risk premium if stock prices follow a random walk.

³² See for example Arnott and Ryan (2001).

long term interest rates and the S&P500 dividend yield of 1.3%, the implied dividend growth rate was still in the range of 7.6 - 9.2%.

Academics who did notice the decline in expected future long run returns were inclined to rationalize it in Efficient Markets terms as a decline in the risk premium *required* by investors because of improvements in investment technology that made diversification less costly, or lower capital gains taxes,³³ rather than as a sign of overvaluation. For example, in a paper that was published in the early stages of the boom, Cochrane (1997), after noting that “currently high prices are a likely signal of unusually low expected returns. It is tempting to take a sell recommendation from this conclusion.”, continues: “There is one very important caution to such a recommendation. *On average, everyone has to hold the market portfolio.....* Thus, one should only hold less stocks than the average person if one is different from everyone else in some crucial way. It is not enough to be bearish, one must be more bearish than everyone else.” How is one to determine whether one is “more bearish than everyone else”? Despite the author’s obvious disquiet at the level of stock prices, this is not exactly a clarion call to make an independent assessment of the expected returns on stock. Similarly, at a later stage in the boom, after noting the “very high level of equity prices relative to fundamentals” Siegel (1999) remarks that “This should not be construed as predicting that equity prices need fall significantly, or that the expected returns on equities are not higher, even at current levels, than those on fixed income investments.” Yet, as we have seen, individual investors seem to have had high expectations of future returns, so that there is no evidence that they had reduced their required risk premium. Few other academics seem to have been prepared to take a public position on the level of stock prices, and few of them wrote for the popular press. One exception is Jeremy Siegel who opined in a *Wall Street Journal* article on October 16, 1998, entitled “Why Stocks are Still the Investment of Choice”, that “Stocks still rate in the long run to beat bonds yielding 5% by at least one or two percentage points a year.” Of course this “one or two percentage points a year” would have made stocks the “investment of choice” only if there was evidence that investors were prepared to invest in stocks for so meagre a potential reward; if they were

³³ The tax on capital gains was cut in 1997.

not, and as we have seen, investor expectations were for much higher returns, then the only way that investors could earn returns in the future that were commensurate with their expectations would be for stock prices to fall first. By March 14, 2000 Siegel was warning readers of the *Wall Street Journal* that: “Big-cap Tech Stocks are a Sucker Bet” ; unfortunately, this sound advice was accompanied by the claim that: “The 15 non-tech stocks..look like a much safer investment.. The current P/E is just over 30...”

If academics on the whole failed to warn of excessive valuations, the American business press failed its readership even more dismally. The striking feature of most of the commentary in such publications as the *Wall Street Journal*, *Business Week* and *Fortune* was the failure to relate stock prices to the fundamentals – estimates of future dividends and expected rates of return. Fairly typical was the *Business Week* article of June 16, 1997 which, instead of providing analysis, offered its readers the following dubious lesson from recent history: “The stock market may seem like it's at Himalayan heights, but this is no time for investors to get off the mountain. ... recall that stocks looked richly valued one year and 1600 Dow points ago, and the market kept rising nonetheless.” By the end of 1999 *Business Week* was trumpeting headlines such as “Riding the Bull into 2000” or “December 1999 Stocks: A Turbocharge from Tech”. In the latter article the magazine quoted an investment strategist for one of the major banks: "Avoiding U.S. equities based solely on mean-reverting valuation arguments will be a mistake." and went on to note that “Applegate is forecasting a 13% price gain for the Standard & Poor's 500-stock index next year.” Even in April 2000 as the market began its steep decline, the magazine merely re-assured investors by quoting one notorious strategist as saying “The bull market doesn't end here.” The absence of analysis is striking but seems fairly typical of the guidance that individual investors were receiving.

In contrast, the level of analysis that readers of the *Economist* or the *Financial Times* were receiving seems to have been more sophisticated, although that may not have helped them to make money. Both publications were bearish about the US market during the late 1990's. Their bearishness was based on analyses such as that of the *FT* columnist Martin Wolf who wrote on December 16, 1998 that “ the best guess for the (equity)

premium implied at present is a mere 1.7% - assumes a dividend yield of 2.6%, a growth rate of 2.3%, and real interest of 3.2% - much smaller than the desired premium of 4%, let alone historic performance of 7%.” On November 29 1997 the *Lex* columnist of the *FT* wrote: “What sort of returns do investors in US equities expect? The answer will largely determine whether the bull market is sustainable” and then went on to argue that the current dividend yield and reasonable growth rate forecasts meant that an equity premium of 4% was unattainable, leaving the reader to determine whether investors were likely to be satisfied with that or whether the current level of the market was sustained by unrealistic expectations. By drawing attention to the relation between the risk premium that investors expected and what was attainable, these journalists were asking the critical question that most academics, shackled within the Efficient Markets paradigm, were disinclined to ask.

Thus, on the whole individual investors failed to receive commentary from the major financial publications in the US that would have helped them to arrive at a balanced assessment of the risks in the stock market during the late 1990's.

Could it Happen Again?

It is natural to ask whether such bubble is likely to recur in a developed market like that of the US. While bubbles have occurred for at least the past 400 years, it might have been hoped that improvements in information technology and the sophistication of investors, the regulation of financial markets, and the control over the economy would have prevented such an event in the modern era. I have argued that one major cause of the inflation in stock prices to unsustainable levels was a failure associated with the generation of information about the current and future profitability of firms which allowed unreasonable expectations about future stock returns to become current. This failure was compounded by the rapid rate of technological change in information technology and the difficulty of assessing its implications for future profits. Some aspects of this failure have been addressed by legislation and administrative fiat which is improving the transparency and credibility of financial statements and the independence

of auditors. However, despite efforts by the Attorney General of New York and the Securities and Exchange Commission to enhance the independence and honesty of investment research and the ethical standards of the investment management industry, the production and sale of information about individual firms is likely to face continuing problems on account of difficulty of earning a return on the sale of information because of its public good nature.

Perhaps more important for the aggregate level of prices is a broader understanding among the public of the sources of value for stocks in general. This will require the discarding of the conventional wisdom about the stock market that developed in the 1990's, and the development of an understanding among the public of what economists have called 'time-varying expected returns' and what the common investor is likely to understand as periods of over-valuation and under-valuation. Greater sophistication on the part of financial journalists would assist in this process, as would the increased involvement of financial economists in the popular media.

While it is not possible to predict short run stock price changes with any accuracy, the long run returns that investors can expect to receive can be assessed with reasonable precision. It is important that these *prospective* returns become the major part of the currency of discussion about stock prices, replacing *ad hoc* invocations of historical realized returns and price ratios without economic analysis. Elsewhere³⁴ I have suggested that the introduction of new securities with fixed lives that pay off amounts that depend on the aggregate dividends in the economy in a given year would serve to focus attention and debate on the prospective future cash flows that provide the underlying value of common stocks, and thereby help to relate aggregate stock prices more closely to fundamental values.

The importance of avoiding episodes of significant mispricing of the aggregate stock market is immense. Not only do such events cause major misallocations of capital, but major market fluctuations disrupt the lives and plans of ordinary citizens who are

³⁴ Brennan (1998).

increasingly being required to venture into the largely unknown and potentially dangerous securities markets in order to provide for their retirement income.

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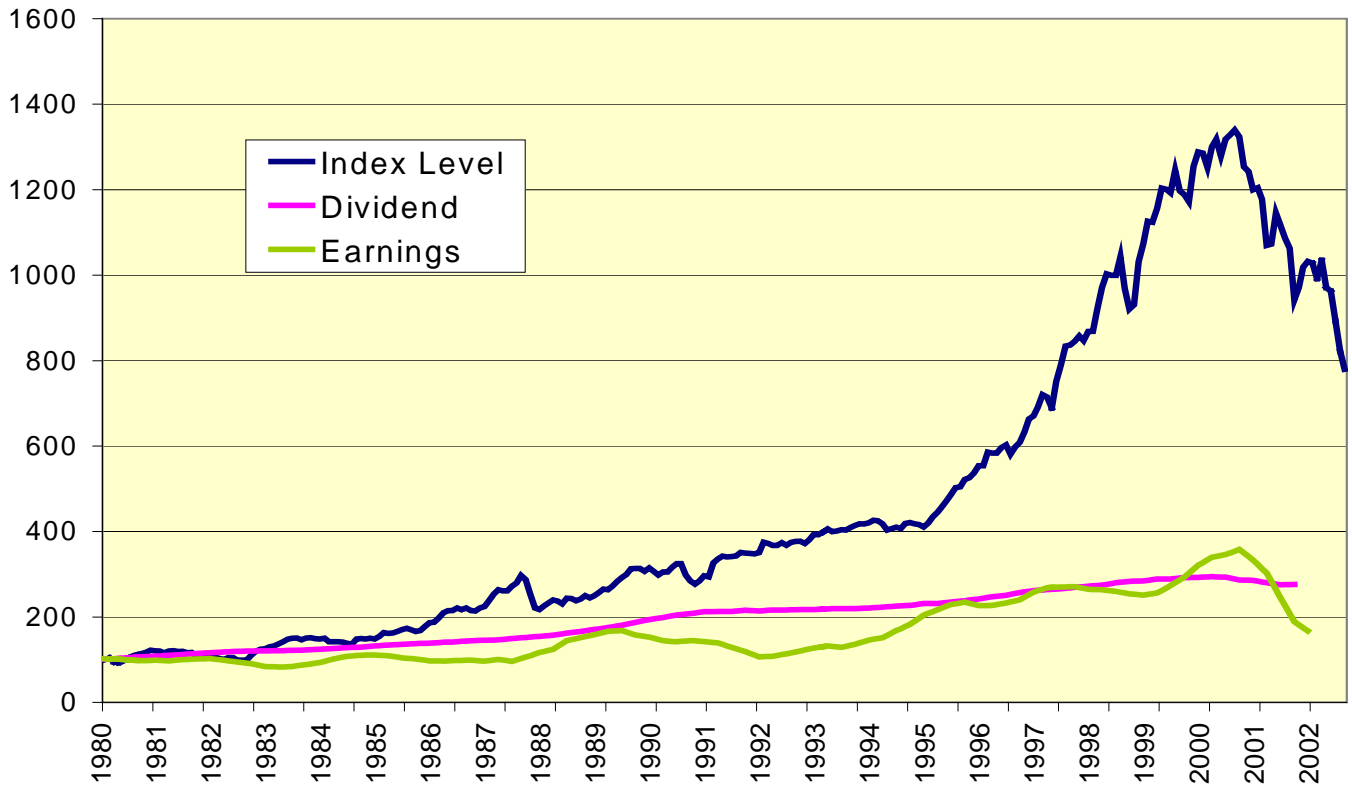


Figure 1: S&P 500 Index Level, Earnings and Dividends 1980 – 2002: 1980 =100

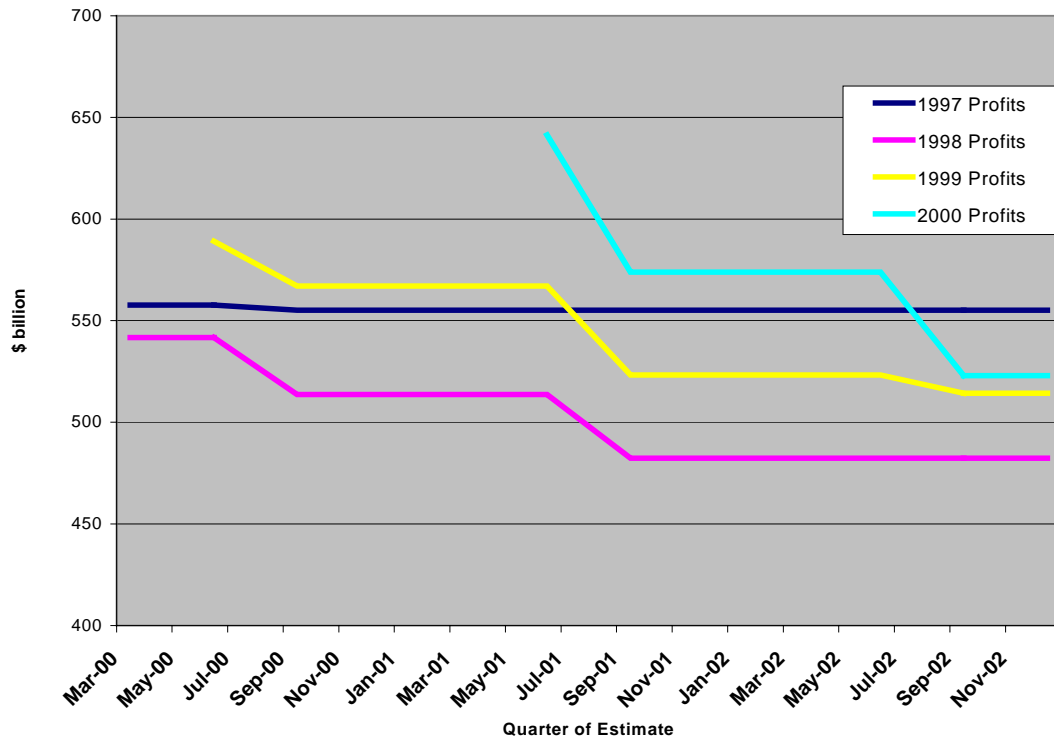


Figure 2: Estimates of Nominal After Tax Corporate Profits (\$ billion) by Quarter of Estimate

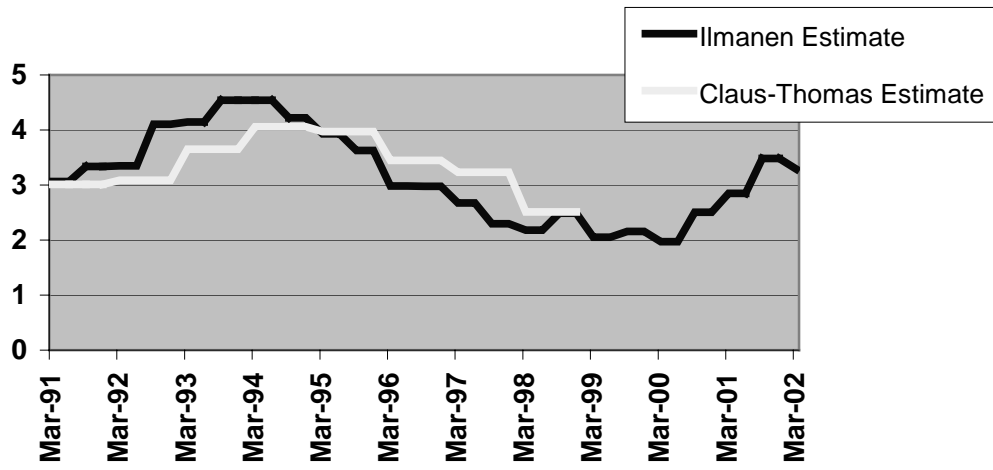


Figure 3: US Equity Premium Estimates (per cent)
1991-2002