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ROBERT B. BARSKY AND J. BRADFORD DE LONG

The bull and bear markets of this century have suggested that large stock market swings reflect irrational "fads and fashions." We argue instead that investors perceived shifts in the long-run rate of future growth and that stock prices are sufficiently sensitive to expectations about the future that these perceived shifts plausibly generated the swings of the twentieth century. We document that analysts often viewed as "smart money" assessed fundamentals, based on their perceptions of future economic growth, in a way that tracked decade-to-decade swings closely.

The twentieth-century course of the U.S. stock market, as plotted in Figure 1, was volatile on a month-to-month, year-to-year, and especially decade-to-decade scale.[1] Major bull and bear movements gave 10-year real percentage changes in the Standard and Poor's (S&P)

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[1] Nominal stock index values are deflated by the producer price index. The index used is a smoothed monthly version of series 6 reported in the appendix to Robert Shiller, *Market Volatility* (Cambridge, MA, 1989). The underlying nominal stock index prices are monthly average values from various issues of the *Security Price Index Record*, published by the Standard & Poor's Corporation. The S&P price index was begun in 1926; the Cowles Commission, however, extended the index before 1926 back to 1870. See Alfred Cowles, et al., *Common Stock Indices* (2nd edn. New York, 1939). We focus on twentieth-century stock prices because the pre-1900 railroad-dominated market appears to us qualitatively different from the post-1900 industrials-dominated market. There is little reason to believe that price/dividend ratios and expected dividend growth rates should bear the same relation to each other as the market shifts from being two-thirds railroads in 1890 to being two-thirds industrials in 1910. For the industrial composition of stock market indices, see Jack Wilson and Charles Jones, "A Comparison of Annual Common Stock Returns: 1871–1925 with 1926–1985," *Journal of Business*, 60 (Apr. 1987), pp. 239–58. For the rise of a market in industrial securities, see Lance Davis, "Capital Immobilities and Finance Capitalism: A Study of Economic Evolution in the United States," *Explorations in Entrepreneurial History*, 1 (Fall 1963), pp. 88–105; and Vincent Carosso, *The Morgans: Private International Bankers* (Cambridge, MA, 1987).

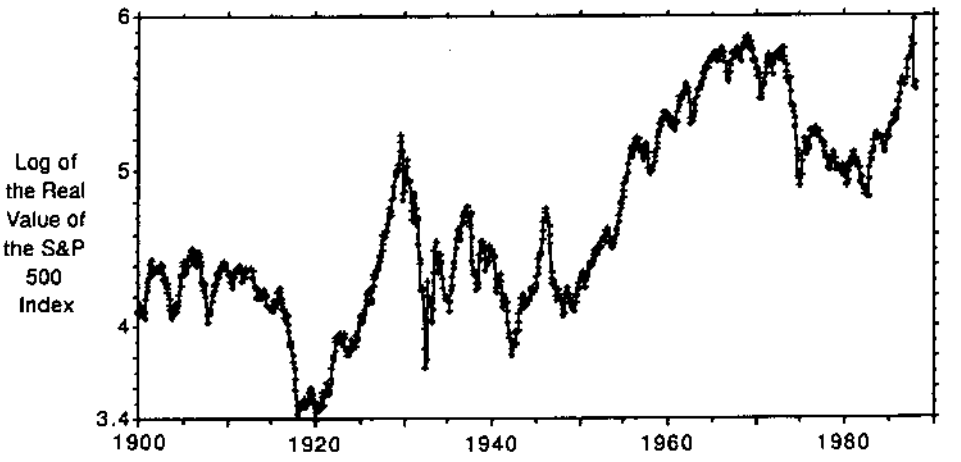

FIGURE 1

REAL UNITED STATES STOCK INDEX PRICES, 1900–1988

index a variance of 0.374—a standard deviation of more than 60 percent. By contrast, the variance of 10-year real percentage changes in national product is only 0.034. This tenfold disparity in volatility is surprising, for a broad portfolio of stocks carries ownership of a broad share of the economy. Since the productivity of the underlying assets has grown smoothly, one would expect the value of the claims to ownership of those assets traded on the stock exchange to have grown smoothly as well.[2]

Even allowing for leverage, stock prices remain volatile relative to their underlying fundamental value—the present value of the future dividends that will be paid out. Figure 2 plots the log of real January stock prices alongside the log of the ex post present value of future dividends paid, both detrended by a 30-year moving average of past dividends.[3] The present value of future dividends is nearly a constant relative to the moving average of past dividends. Major long-run stock price fluctuations, however—episodes like the major bull markets of 1949–1966 or 1921–1929 and the major bear markets of 1929–1933 or 1973–1975—are larger than and appear unconnected to fluctuations in realized fundamental values.

A view taken by observers of the stock market from John Maynard Keynes and John Kenneth Galbraith to Robert Sobel and Robert Shiller

[2] The real GNP series used is spliced together from the revised estimates of GNP in different periods made by Christina Romer and is discussed in J. Bradford De Long and Lawrence H. Summers, "How Does Macroeconomic Policy Affect Output?" *Brookings Papers on Economic Activity* (Fall 1988), pp. 433–80.

[3] Present values are calculated using a constant real discount rate of 6 percent. Figure 2 follows Shiller's "Comovements in Prices and Comovements in Dividends," in his *Market Volatility*. In Figure 2 it is assumed that the stock market's value in June 1989 accurately forecasts the present value of dividends to be paid in years after 1989.

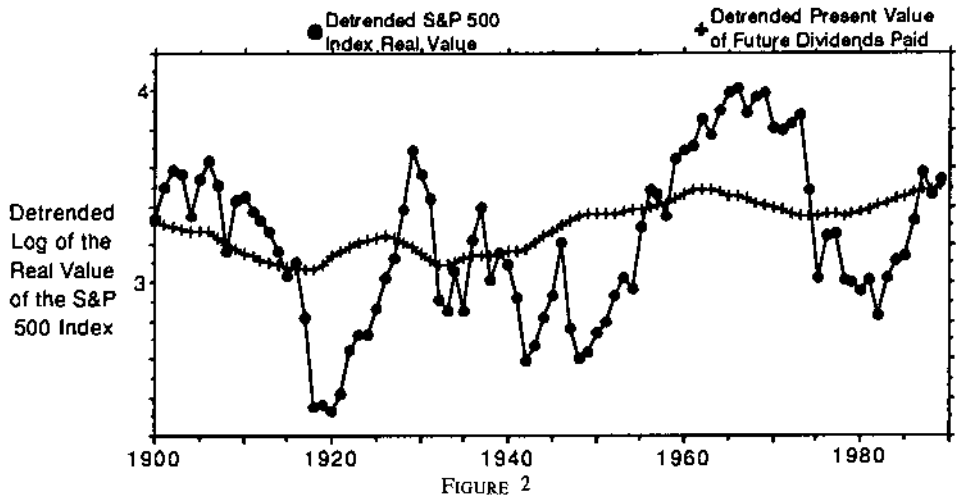

FIGURE 2

STOCK PRICES AND THE VALUE OF ACTUAL FUTURE DIVIDENDS PAID, DETRENDED BY A 30-YEAR MOVING AVERAGE OF DIVIDENDS

is that these large swings in stock prices were due to the "animal spirits" of investors. They did not reflect large shifts in the expected present value of future dividends as assessed by a cautious and far-sighted investor.[4] The stock market boomed in the 1920s not so much because of a perception of improved prospects for future earnings and dividends as because of the flow of new money into the stock market driven by the "fads and fashions" of uninformed new investors.

Sobel, for example, dismissed "fundamentalist" accounts by arguing that "had prices reflected 'realities,' the great upward move [of 1949–1966] would have begun during the war," and asserted that the post-World War II bull was not driven by good news about future growth but sprang primarily from the erosion of the memory of 1929, which had "taken on an almost mythological quality [with] Herbert Hoover . . . in the role of George III"; and secondarily from Charles Merrill's "draw[ing] . . . new capital . . . from people of moderate incomes." Merrill brought "Wall Street to Main Street—and . . . use[d] the efficient, mass-merchandising methods of the chain store to do it."[5]

An alternative view is that while irrational waves of enthusiasm or pessimism pushed stock index prices away from fundamental values in the short run (months or years), in the long run (decade-to-decade)

[4] See John Kenneth Galbraith, *The Great Crash* (Cambridge, MA, 1954); Robert Sobel, *The Big Board* (New York, 1965); John Maynard Keynes, *The General Theory of Employment, Interest and Money* (London, 1936), especially chap. 12; and Shiller, *Market Volatility*, especially the chapters previously published as "Stock Prices and Social Dynamics," *Brookings Papers on Economic Activity*, 1984 (Fall 1984), pp. 457–98 and as "Do Stock Prices Move too Much to Be Justified by Subsequent Changes in Dividends?" *American Economic Review*, 71 (June 1981), pp. 421–36.

[5] See Robert Sobel, *N.Y.S.E.* (New York, 1975), pp. 166–79.

informed investors shifted their money in response to changing fundamentals. When stocks became too expensive, careful investors reduced demand by shifting their wealth out of the market and entrepreneurs increased supply by taking more corporations public. Smart money kept the proportional differences between market prices and fundamental values from growing wider indefinitely, while shifts in fundamental valuations cumulated.[6] Shifts in fundamentals therefore accounted for a larger fraction of return variability as the horizon at which returns are examined increased. The decade-to-decade swings that made up the major bull and bear markets reflected large shifts in businesses' prospects.[7]

These conflicting interpretations of major bull and bear markets have different implications for assessing the performance of the stock market as a social capital allocation mechanism. High stock markets encourage investment. The central reason to have a stock market is that it serves as a social calculating machine that reports to firms what the market thinks of their future prospects and so governs the allocation of investment. If major swings in stock prices are driven by fads, the market is unlikely to perform well; if driven by shifts in the best guess of future cash flow prospects, the verdict may be more optimistic.[8]

The volatility of stock market indices has always been a powerful argument for the fads and fashions view. Supporters of the fundamentalist view have been hard pressed to point out the shifts in prospects that would support large bull and bear revaluations of the worth of America's corporations. As Shiller put the challenge:

> [T]he picture [our Figure 2] . . . is evidence . . . that a model that attributes all the variance of aggregate stock prices to fashions or fads is certainly at least as consistent with the data as is the efficient markets model. . . . [I]t is hard to see how a model that makes [the fundamental value of the market] roughly a trend with p [actual prices]

[6] A third view, popular among finance economists, is that stock prices always and everywhere equal the best available estimate of present fundamentals. The belief that the stock market was "the stage whereon is focused the world's most intelligent and best informed judgment of the values of . . . enterprises" and that no one has a better estimate of values than the stock market as a whole was popular in the 1920s until the crash of 1929. For example, see Joseph S. Lawrence, *Wall Street and Washington* (Princeton, 1929); Galbraith notes that after 1929 "Mr. Lawrence disappeared from Princeton. Among economists his voice was not heard again." The efficient market hypothesis did not become popular again until the 1960s.

[7] John Campbell, "Estimating the Persistence of Expected Returns" (unpublished manuscript, London School of Economics, 1989) suggests that in the United States since 1926 fads and fashions have had an expected lifetime on the order of six months, not the five to ten years required if they are to account for major bull and bear swings.

[8] Even if long swings in the stock market were primarily driven by fundamentals, sufficiently large short-run swings in stock prices could still lead to the conclusion that the economic performance of the stock market has been poor if marginal investors and firms follow short-run buy-and-sell rather than long-run buy-and-hold investment strategies. See J. Bradford De Long, et al., "Noise Trader Risk in Financial Markets," *Journal of Political Economy*, 98 (forthcoming 1990); and J. Bradford De Long, et al., "The Size and Incidence of Losses from Noise Trading," *Journal of Finance*, 44 (July 1989), pp. 681–96.

bounced around this trend by fashions or fads could ever be rejected . . . in favor of a model that says that price movements anticipated dividends. Many people . . . suppose that . . . stock price movements really do forecast dividends. . . . This might . . . have been [shown] . . . if . . . [the ex post fundamental value] moved around a lot and were substantially correlated with p [as] . . . would be expected to happen . . . if people have a lot of information about future dividend movements. If figure [2] did happen to come out that way, we could say that it presents impressive evidence for the efficient markets theory. It did not. We should not be hesitant to mention fads or fashions as the true source of the bulk of price movements that characterize the aggregate stock market.[9]

We try to answer this challenge. We argue that major bull and bear markets were driven by shifts in assessments of fundamentals; investors had little knowledge of crucial factors, in particular the long-run dividend growth rate, and their changing expectations of average dividend growth plausibly lie behind the major swings of this century.

We make our argument in two steps. First, we set out a simple model of how investors might try to forecast future dividend growth and show that if the long-run rate of future dividend growth is sufficiently uncertain, the stock market might exhibit large swings like those actually seen. Second, at least some careful investors focusing on fundamentals held expectations of future growth that validated large swings in stock prices. Some analysts whom we classify as the source of "smart money" formed forecasts that validated major market swings. We cannot disprove the hypothesis that large stock price swings have been driven by irrational fads, but we do conclude that if placed in the shoes of those past investors aiming to forecast fundamentals we would have priced the market similarly. Therefore it is very plausible to regard the large decade-to-decade swings in the past century's stock prices as a consequence of revised forecasts of fundamentals.

DETERMINING FUNDAMENTAL VALUES

An investor who expects real dividends D_t to grow in the future at a constant rate g_t and who discounts the future at a long-run real required rate of return r_t will be willing to buy stocks if[10]

$$P_t = \frac{D_t}{r_t - g_t} \tag{1}$$

Since the average price/dividend ratio over the past century is not far from 20, $r_t - g_t$ is approximately 0.05. Thus a one percentage point increase in g_t leads to a 25 percent increase in P_t/D_t. This sensitivity of equity values to expectations of the future dividend growth rate underlies our argument that we should expect to see large bull and bear swings.

[9] Robert Shiller, "Comment on Miller and on Kleidon," in Robin Hogarth and Melvin Reder, eds., *Rational Choice: The Contrast Between Economics and Psychology* (Chicago, 1987), pp. 285–315.

[10] See John Burr Williams, *The Theory of Investment Value* (Cambridge, MA, 1937).

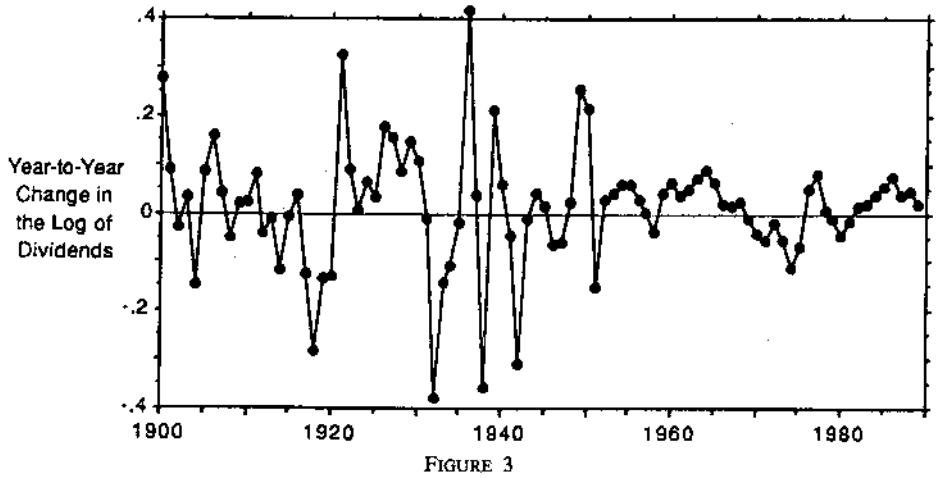

FIGURE 3

YEAR-TO-YEAR DIVIDEND GROWTH

An equivalent representation of equation 1, writing p_t and d_t for the natural logarithms of the levels of prices and dividends P_t and D_t, is

$$p_t = d_t - \ln(r_t - g_t) \tag{2}$$

We imagine that investors know the current dividend and the risk and time discount factors that they require. However, the average long-run rate of future dividend growth g_t must be estimated.

A natural way for investors to estimate expected future dividend growth g_t is to take the experience of the past and project it into the future. Such forecasts, however, should not pay a lot of attention to what the rate of dividend growth was a century before. We would be astonished if the average long-run rate of dividend growth had been the same in the Gilded Age as it is today. Forecasts reasonably take the recent past as more relevant than the distant past. A good rule of thumb is to take an average of past dividend growth rates that places more weight on the recent past, like[11]

$$g_t = (1 - \theta) \sum_{i=0}^{\infty} \theta^i \Delta d_{t-i} \qquad 0 < \theta < 1 \tag{3}$$

where Δd_{t-i} is the proportional rate of dividend growth from year $t - i - 1$ to year t.

In general, θ should be near one. Since the long-run average rate of growth shifts only slowly and most year-to-year variation in dividend

[11] John Muth, in his essay "Optimal Properties of Exponentially Weighted Forecasts," *Journal of the American Statistical Association*, 55 (Mar. 1960), pp. 299–306, showed that the forecast rule given in equation 3 would be the best that could be done forecasting from past rates of dividend growth alone as long as the rate of dividend growth is subject to independent and serially uncorrelated permanent and transitory shocks that have Gaussian normal distributions.

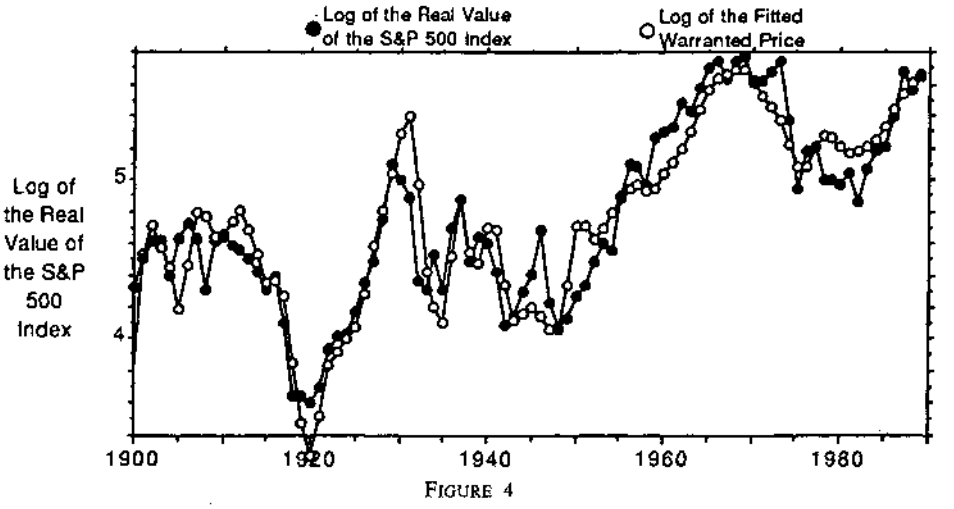

FIGURE 4

ACTUAL AND FITTED REAL STOCK INDEX VALUES

growth is transitory, the weights placed on past years should decline slowly as well. On reflection it is hard to see how an investor would forecast the long-run rate of dividend growth without using some rule of thumb like equation 3, presumably amplified by the addition of other forecasting variables. The natural way to determine what the average rate of future dividend growth will be is to look at what the average growth rate (of dividends or of the economy as a whole) has been.

As Figure 3 shows, the year-to-year rate of dividend growth has become less volatile over the course of the century as the American economy has matured. As the uncertainty associated with future dividend payments has decreased, the rate at which investors discount these future dividend payments has presumably decreased as well. It therefore seems appropriate to allow for a downward time trend in the rate of return investors use to discount future dividends r_t:

$$r_t = r_{1900} - \delta t \tag{4}$$

Our simple model of stock index prices contains three equations: equation 4 describes the possible evolution of investors' rate of discount. Equation 3 gives the rule of thumb investors use to forecast future dividend growth, and equation 2 describes how investors process their expectations of dividend growth and their rate of discount to arrive at the price at which they are willing to buy or sell stocks.[12]

Figure 4 plots actual real prices for every month alongside the prices fitted by the model for each January. The fit achieved by the model appears good (see Table 1 and Figure 4). Although formal tests of

[12] Equation 2 is used instead of equation 1 so that equal percentage deviations of prices from fitted values are counted equally in determining the fit of the model.

TABLE 1
SUMMARY STATISTICS FOR THE SIMPLE DIVIDEND-DISCOUNT MODEL

Model	Residual Variance	Estimated δ	Estimated θ
Fitted model	0.0420	0.0003	0.97
Constant estimate of dividend growth	0.0609	0.0003	1.00[a]
Constant rate of discount and constant estimate of dividend growth	0.0922	0.0[a]	1.00[a]
Variance of price around actual present value of future dividends	0.1429		

[a] Values imposed and not estimated.

Notes and sources: The model is outlined in the text. It was estimated using the extended Standard and Poor's 500 stock index and its associated dividend series as contained in appendix A of Robert Shiller's *Market Volatility* (Cambridge, MA, 1989).

hypotheses cannot be easily performed because the deviations of prices from fitted values are not independent—this year's gap between actual and fitted prices is highly correlated with next year's—the model accounts for a large share of the variance of prices about the actual present value of realized future dividends. The model accounts for 71 percent of the variance of January stock index prices about their ex post fundamental values and for more than half—55 percent—of the variance in the price/dividend ratio. About half of the variance in realized annual returns is accounted for by news about future dividend growth in our model.[13]

The estimated θ that the market appears to have used is about 0.97. This is high enough to make the market slow to change its expectations of future dividend growth. Growth during the preceding decade receives a weight of one-fourth in constructing today's estimate; years more than a decade in the past receive an aggregate weight of three-fourths. The model looks far back into the past in building its estimate of the future rate of growth of dividends, and it does not at first glance appear easy to argue that a value of 0.97 for θ is too sensitive to transitory booms and depressions to underlie a careful analysis of fundamentals.

Figure 4 shows that the long swings in stock prices can be accounted for by swings in expectations of fundamentals. If our specification of the rule of thumb used by investors in estimating dividend growth is correct, then major market movements have been closely connected to fundamentals and represent careful reassessments of the values of stocks. Our model, however, is not a complete characterization of stock prices. In our specification fundamentals change only slowly, and since monthly stock prices undergo jagged short-run fluctuations, the model

[13] On this point, see also David Cutler, et al., "What Moves Stock Prices?" *Journal of Portfolio Management*, 15 (Spring 1989), pp. 4–12.

cannot account for more than a very small fraction of the month-to-month movements.[14]

INVESTORS' EXPECTATIONS AND STOCK PRICES: BULL MARKETS

To say that over the twentieth century the stock market was very volatile in the long run is more or less equivalent to saying that the past century has seen five large revaluations of the S&P composite portfolio: five major bull and bear markets. The stock market dropped by 60 percent in real value over the 1914–1918 World War I period, rose by 500 percent in the 1920s, fell by 75 percent in the slide that opened the Great Depression, increased by 400 percent in the sustained bull market from the early 1950s to the middle 1960s, and dropped by 60 percent during the mid-1970s.

In each of these major bull and bear markets the simple rule of thumb of the previous section, with weight θ equal to 0.97, would have led careful investors to substantially revalue their fundamental-based assessments of stock market values.[15] And in fact, a number of such investors and analysts did just that. In each case they significantly revised their estimates of fundamentals and concluded that the new market levels were about right.

During and after the rapid run-up of stock prices in the 1920s the expectations held by Yale monetary economist, investor, and stock market analyst Irving Fisher were well known and have been ridiculed by many. Fisher had declared early in 1929 that stock prices had reached a "permanently high plateau." Standard histories like Sobel's see the 1920s as a decade dominated by speculation and argue that the stock market had departed far from fundamental values during the decade.[16] Such histories find Fisher, along with other economists such as Joseph Lawrence and Charles Dice, attractive targets to mock especially in view of Fisher's declaration on the eve of Black Thursday that "any fears that the price level of stocks might go down to where

[14] Campbell, "Estimating the Persistence of Expected Returns," estimates that news about future cash flows accounts for about only 30 percent of the variation in month-to-month stock returns.

[15] The 1980s have also seen a swing in stock prices larger than can be accounted for in our model. We suspect that our model's failure to fit the Reagan bull market is due to the changing role of dividends. Before 1980 cash payments to shareholders besides dividends were trivial, since 1980 they have made up a substantial part of shareholders' income. Our dividend series does not include these payments. See James Poterba, "Tax Policy and Corporate Saving," *Brookings Papers on Economic Activity* (Fall 1987), pp. 455–516.

[16] Galbraith is more cautious. He sees the rise in stock prices through the end of 1927 as largely justified by fundamentals, as does Gerald Sirkin, "The Stock Market of 1929 Revisited," *Business History Review*, 49 (Summer 1975), pp. 233–41. Joel Seligman also agrees that "overspeculation" can only be said to have begun in the spring of 1928. See Joel Seligman, *The Transformation of Wall Street* (Boston, 1982); and Eugene White, "When the Ticker Ran Late" (unpublished manuscript, Rutgers University).

it was in 1923 or earlier is not justified by present economic conditions."[17]

Shortly after the Crash, Fisher argued that the declines of October 1929 did not signal further large declines; the stock market at the end of 1929 was fairly priced given underlying fundamentals.[18] Without reference to our knowledge that the Depression had begun, his arguments for the sustainability of the January 1930 level of real stock prices appear reasonable. Fisher presented a number of reasons why investors paying the prices of stocks in January 1930 should earn acceptable returns; the 1920s had seen substantial exploitation of economies of scale resulting from mergers, the application of science and invention to industry had resulted in an acceleration of productivity growth in the 1920s, the development and application of scientific management, the shift of labor from a confrontational to a cooperative strategy of relating to management, the belief that Prohibition would decrease addiction to alcohol and increase productivity, and the increase in the rate of economic growth induced by the Federal Reserve's successful stabilization of the price level.

From any perspective except that of perfect hindsight Fisher's arguments appear reasonable. Price/dividend ratios were only a bit higher at the end of the 1920s than they had been between 1900 and 1910. Economic growth appeared strong. Although rapid growth could have been regarded as a transitional postwar phenomenon, Fisher's arguments that the systematic application of research and development to industry, the growth of scientific management, and the success of the "American system" of labor relations at taming unions and providing both high wages and high productivity had permanently raised the rate of U.S. economic growth in the 1920s seemed convincing.[19]

In retrospect, we see the "New Era" of the 1920s as brief and without foundation, but Fisher and many others thought that the economy had shifted to a new régime of rapid growth. His estimate of the long-run growth rate of the economy, and thus of dividends, was higher in 1929 than in 1924. Given this upward revision, his willingness to pay high prices for stocks does not seem surprising. And he might have been right to do so: anyone in 1956 who sold out in anticipation of the rapid end of that postwar boom made a mistake.

[17] See Sobel, *The Big Board*; Galbraith, *The Great Crash*; Charles Dice, *New Levels in the Stock Market* (New York, 1929); and Lawrence, *Wall Street and Washington*.

[18] Irving Fisher, *The Stock Market Crash—and After* (New York, 1930).

[19] An additional cause of rapid stock market growth in the 1920s may have been a general recognition that, in a turbulent time like the interwar period in which the long-run drift of the price level was uncertain, stocks were no more risky than bonds and yet promised higher expected returns. See Edgar L. Smith, *Common Stocks as Long Term Investments* (New York, 1924). The late 1920s also see the appearance of handbooks for investors that place great stress on valuing compound growth. For example, see Samuel Gould, *Stock Growth and Discount Tables* (Boston, 1931).

Fisher was not exceptional. The bull market of the 1920s had in the eyes of contemporaries ample support from the growth of the American economy.[20] Charles Dice's *New Levels in the Stock Market*, for example, argued that stock prices in the late 1920s were too low: in his view the market had not yet caught up with the ongoing triple revolutions in production, distribution, and finance that were steadily raising the fundamental value of American industry. As financial analyst George Woodruff put it, writing at the end of the 1930s:

> In 1928 and 1929 . . . the investor might read articles and books and listen to addresses, the theme of which was the new era of prosperity. . . . Now, in retrospect the prices of 1929 appear fantastic. . . . But let the investor place himself in 1928–9 and . . . blot out . . . later years. He will know . . . [i] that following World War I the United States received large shipments of gold . . . [ii] that . . . active measures were concerted . . . to forestall . . . inflation . . . [iii] that . . . the United States turned almost overnight from a debtor into a creditor [nation]. . . . And [iv] he will look back upon . . . seven years . . . of general prosperity. . . . These things together will seem to spell New Era.[21]

Even Roger Babson, the only prominent forecaster to anticipate a market break in 1929, had been bullish as late as the end of 1928 and was again bullish in 1930.[22]

Just as the 1920s were seen as a "New Era" of permanent high growth, the 1960s appeared a time in which the United States had made major steps toward solving its economic problems. Even an extremely cautious and risk-averse investor such as Benjamin Graham, who in the 1960s believed that prices in the 1920s had been unjustified, thought the economy was sound. Graham acquired his reputation by virtue of his keen eye for an undervalued company, and his firmest principle was that a prudent investor should purchase only firms with good prospects that were selling at or below liquidation value.[23] Other strategies might be

[20] A few other voices, chosen more or less at random, reaching the same conclusion are Smith, *Common Stocks as Long Term Investments*; K. S. von Strum, *Investing in Purchasing Power* (New York, 1925); William Ripley, *Main Street and Wall Street* (New York, 1927); and Kimball, Russell, and Co., *The Investment Problem—Its Solution* (Boston, 1928). After 1929 the view that the post-World War I boom would continue for a long time was easy to critique: see, for example, A. T. Miller, *What to Consider When Buying Securities Today* (New York, 1932); and Frederick Allen, *Only Yesterday* (New York, 1931). But the view found few critics before 1929.

[21] George P. Woodruff, *Investment and Speculation* (New York, 1939). The lesson Woodruff drew from the ex ante reasonableness of confidence in the "New Era" and the subsequent catastrophe of the Depression was that one could have little confidence in any fundamental-based valuation of prices, for "the rationalizing of a price level, whether it is a high one or a low one, is one of the most insidious lures . . . whenever the papers are full of a rationalizing or explaining of high prices, the investor may take it as one cue to begin selling."

[22] Galbraith, *The Great Crash*, pp. 20, 90; Roger Babson, *Business Barometers* (Wellesley, 1930); and Roger Babson, *Investment Fundamentals* (New York, 1930).

[23] See Benjamin Graham and David Dodd, *Security Analysis* (New York, 1st edn., 1934; 2nd edn., 1941); and Benjamin Graham, *The Intelligent Investor* (New York, 1954). Also see Warren Buffett's appendix to Benjamin Graham, *The Intelligent Investor* (5th edn., New York, 1987); and John Train, *The Money Masters* (2nd edn., New York, 1987).

profitable, but they were "speculation," not investment. Yet in spite of his innate caution and conservativism and his strong belief that stock markets were prone to periods of speculative overenthusiasm, he was not willing to judge the market in the early 1960s as overvalued.

Graham was of two minds in the early 1960s. Price/earnings ratios were at levels that had foretold bear markets in the past.[24] And at the end of the 1940s Graham had argued that a simple "market timing" strategy of buying when stocks were low relative to a long-run moving average of past earnings and selling when stocks rose would have outperformed a buy-and-hold strategy.[25] By 1962, however, Graham knew that any such attempt to anticipate mean reversion in stock prices would have been unprofitable in the post-World War II period; such an investor would have been out of the market while it tripled in real value. He therefore abandoned the belief that investors should be anticipating a crash, arguing instead that the situation was one of uncertainty, "old standards of valuation are no longer applicable, and new standards have yet to be tested in time." He argued that changes in the economic policy régime made it rational for investors to pay higher multiples for stocks in the 1960s than in the 1940s, 1930s, or 1920s.

> [He] believe[d] it reasonable to adopt a somewhat more generous approach to the valuation of common stocks than appeared justified in our previous edition. This conclusion is based on the assurance—not formerly present—of massive Federal intervention to prevent a serious business depression. This now appears to be a basic tenet of both political parties.[26]

In Graham's estimation, the willingness of the government to tolerate inflation in order to avoid severe depression had increased the expected long-run growth rate of the economy. Interruptions of capital accumulation and large gaps between actual and potential output like those seen in the 1930s were no longer likely. In view of this increase in the expected growth rate of the economy, a rational investor should be willing to pay a higher price/dividend or price/earnings multiple for common stocks. This point of view was common. Many analysts wrote that while "old timers say stocks selling for more than ten times earnings are overpriced . . . this view is outmoded. The proper ratio . . . [is] around fifteen or sixteen times."[27] And Babson's successors echoed

[24] See Graham, *The Intelligent Investor*; and Benjamin Graham, David Dodd, and Sidney Cottle, *Security Analysis* (4th edn., New York, 1962).

[25] Benjamin Graham and David Dodd, with the assistance of Charles Tatham, *Security Analysis* (3rd edn., New York, 1951).

[26] Graham was actually on the prudent end of commentary on the market in the early 1960s. Others urged investors to pick "stocks for the surging '60s." See Ira Cobleigh, *A Guide to Success in the Stock Market* (New York, 1961).

[27] Louis Bean, *How to Predict the Stock Market* (Washington, DC, 1962).

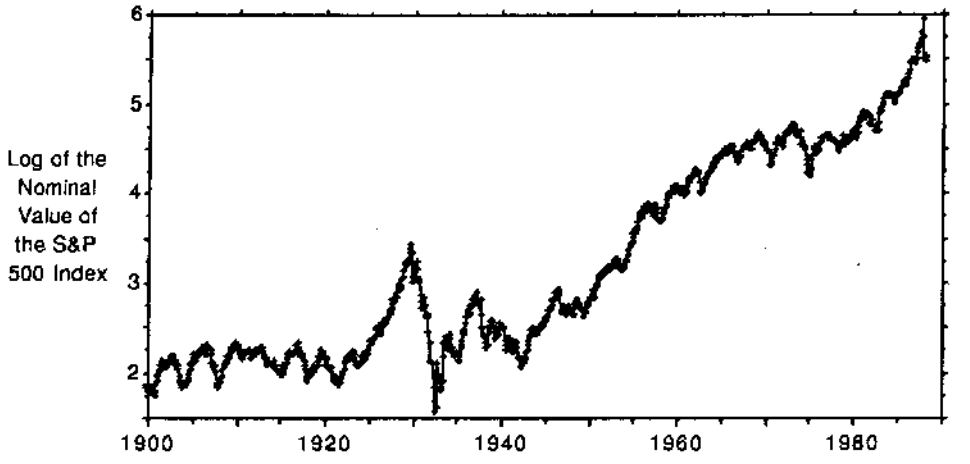

FIGURE 5

TWENTIETH-CENTURY NOMINAL STOCK PRICES

Fisher in listing seven reasons why the post-World War II "new era" would continue indefinitely.[28]

INVESTORS' EXPECTATIONS AND STOCK PRICES: BEAR MARKETS

The first of the major bear swings in the stock market was the collapse of real values during World War I. Figure 5 shows that this major swing in real values cannot be seen in the nominal stock price series. It arose entirely from the rapid inflation of World War I. Many have argued that investors during the war expected governments to substantially deflate the economy after the war.[29] Anticipated postwar deflation carries with it an expression of very high future real interest rates, and so the low real price of stocks during the war does not strike us as surprising or in need of explanation in terms of investors' expectations of future profits and dividends.

The second large bear market—the fall in the stock market during the great contraction of 1929–1933—needs no explanation. The Great Depression was an unprecedented collapse of the American economy.[30] It is difficult to say what investors' expectations should have been and how they should have valued the stock market at the bottom of the Depression. We can say little about how investors should react to economic events off the scale of previous experience.

One common response was to wonder whether the Depression heralded permanent stagnation. A common theme in investment litera-

[28] Thomas Babson and David Babson, *Investing for a Successful Future* (New York, 1959).

[29] The most recent expression of this view is Herschel Grossman, "The Political Economy of War Debts and Inflation" (NBER Working Paper 2743, 1988).

[30] See Peter Temin, *Did Monetary Forces Cause the Great Depression?* (New York, 1976); Peter Temin, *Lessons of the Great Depression* (Cambridge, MA, 1989); and Allen, *Only Yesterday*.

ture during the 1930s became the question of whether U.S. economic growth was more or less played out. As one analyst put it, a "major investment problem is presented by the question whether the United States has, after decades of dynamic expansion, reached the stage of economic maturity."[31] He concluded that it had, and that while economic maturity "does not mean that we have already ceased to grow . . . we are quite certain to grow less rapidly," in striking contrast to the New Era beliefs current only three years before.[32] Given that one major piece of the value of stocks had always been the underlying dynamic growth of the American economy, the coming of economic maturity would inevitably make stocks worth less. This mood lasted through the war.[33] One analyst in 1948 felt it necessary to "caution against the assumption that . . . secular growth . . . will necessarily find reflection in a long-term rising trend of stock prices," and forecast a gradual stock market decline over the following decade.[34] In the literature of professional economists, the same theme echoed as "secular stagnation."[35]

The final bear market—the Oil/Inflation bear market of the 1970s—is sufficiently recent to be familiar. The stock market fell steeply in response to the failure of President Richard Nixon's price control policies and to the shocks administered by the breakdown of Bretton Woods and the rise of the Organization of Petroleum Exporting Countries. During 1973 and 1974 the S&P 500 declined by 55 percent in real terms. Fundamental-based interpretations of this steep decline were common in the late 1970s. One that stressed investors' revisions of their expectations of future prospects was put forward by Andrew Tobias:

> The ability of stocks to outperform bonds—and to beat inflation—[in the pre-1973 period] . . . had much to do with America's more or less steadily improving productivity. . . . [But t]he world has changed. Resources are scarcer; foreign competition is stronger; businesses are more highly regulated . . . confidence in the future, and hence investment, is not what it was; inflation lurks. . . .[36]

As a result of this recognition that the new dimensions of political economy promised by Keynesians in the 1960s had come to an end, the market severely reduced its valuation of stock indices during 1973 and 1974.[37] As Tobias went on to argue, the fact that future growth is likely to be slow did not mean that investments in common stocks were to be

[31] Miller, *What To Consider When Buying Securities Today*.

[32] Post-1929 U.S. economic growth does not show any noticeable slackening of pace.

[33] For example, Smith, *Common Stocks as Long Term Investments*.

[34] Garfield Drew, *New Methods for Profit in the Stock Market* (Boston, 1948).

[35] See Alvin Hansen, *Economic Policy and Full Employment* (New York, 1947); and Gottfried Haberler, *Prosperity and Depression* (New York, 1958).

[36] Andrew Tobias, *The Only Investment Guide You'll Ever Need* (New York, 1978).

[37] See Walter Heller, *New Dimensions of Political Economy* (Cambridge, MA, 1965); and James Tobin and Murray Weidenbaum, eds., *Two Revolutions in Economic Policy* (Cambridge, MA, 1987).

avoided, for "the market knows all these things" and had consequently marked the prices of stocks down to levels at which they once again promised attractive long-run, albeit risky, returns.

The analysts cited—Fisher, Graham, Tobias, and the others—reassessed their own estimates of future prospects, and thus of the appropriate prices for stocks, in tandem with the major bull and bear swings of the market. They based their assessments on fundamentals, not on speculative dynamics: none of them advocated buying stocks at prices above fundamentals on the theory that someone less informed would be willing to pay even more tomorrow. To the extent that these analysts' views are representative of "smart money," the major bull and bear swings reflect shifts in the best estimate of fundamentals and not the irrational fad-driven "animal spirits" of the crowd.

Are the analysts cited representative? We cannot guarantee that they are representative smart money investors, but we can say that they are representative of those who (i) made fundamental-based as opposed to "chartist" assessments of values and (ii) wrote books on investment strategy subsequently acquired by Harvard's libraries.[38] Moreover, their judgments were shared by many of the leading economists then and now. Milton Friedman and Anna Schwartz, for example, speak of the 1920s as the "high tide of the Federal Reserve System," when economists and central bankers believed that the Federal Reserve's ability to control the money supply and the rate of interest had effectively eliminated the business cycle.[39] Popular worries that U.S. growth had been permanently derailed in the 1930s found their echo in economists' doctrines of "secular stagnation." And Graham's belief that strong growth justified high price/dividend ratios in the early 1960s is but a pale shadow of the optimism of 1960s Keynesians. If large fluctuations are driven by fashions and fads, then so are economists' forecasts. Economists, therefore, have little warrant for concluding that the stock market's performance falls short; anyone who does critique the stock market as a forecaster faces the burden of finding an alternative procedure that would have done better.

CONCLUSION

The U.S. stock market has seen five major bull and bear markets in the twentieth century. In each case, such a large revaluation of the worth of America's companies would also have been made by any investor uncertain of the possibly changing long-run dividend growth rate who estimated it by extrapolating the recent past. Such large

[38] On technical analysis, see George Goodman, "Adam Smith," *The Money Game* (New York, 1968).

[39] Milton Friedman and Anna J. Schwartz, *A Monetary History of the United States, 1867–1960* (Princeton, 1963).

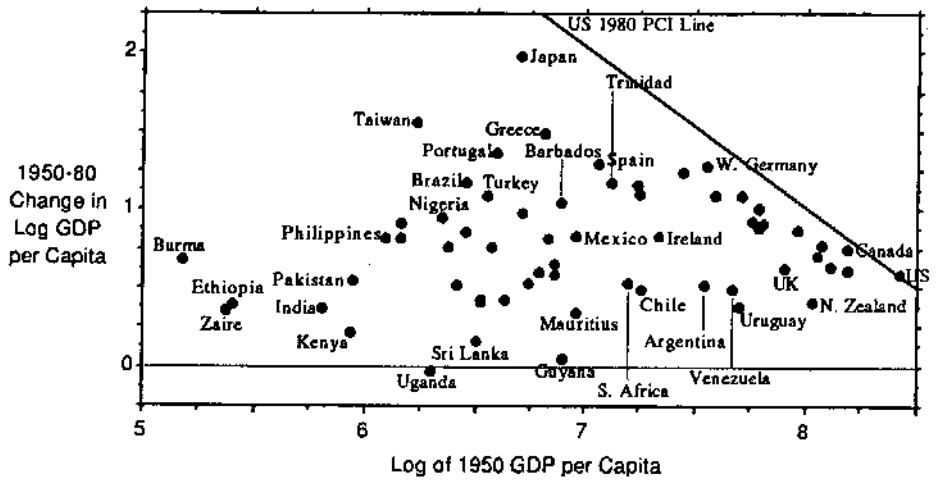

FIGURE 6

1950–1980 RATES OF PER CAPITA INCOME GROWTH FOR 62 NATIONS

revaluations were also made by investment analysts who were prominent in their day, whose acumen we respect, and who concentrated on fundamental values. Our conclusion is that major decade-to-decade stock market movements arise predominantly from careful re-evaluations of fundamentals and less so from fads or fashions.

Over the past century major market movements have been reversed more often than not. The belief that the postwar period was a "New Era" proved ex post to be correct after World War II but not after World War I. Fears of secular stagnation in the 1930s were too pessimistic in retrospect, as were fears in the late 1970s that the United States was headed for Latin American-style political gridlock and economic collapse.[40] A case can be made that the market, its analysts, and the conventional wisdom of economists overreacts, and that things are never as good as they seem in a boom or as bad as they seem in a depression.

A look at comparative economic growth over the past century, however, goes a way toward dispelling this possibility. Among the set of developed or rapidly developing nations in 1870, some—like Great Britain and Australia—have seen per capita income grow slowly; others—like Sweden, the United States, and Canada—have seen per capita income grow rapidly. The post-World War II period shows an equal spread of national growth rates. Figure 6 plots average per capita income growth rates over the 1950–1980 period for 62 countries. The differences between Uruguay and West Germany, Chile and Spain, or

[40] George Goodman, "Adam Smith," *Paper Money* (New York, 1981). Goodman, however, also accurately forecast that if the doomsday scenarios failed to come true, the 1980s "could be quite a party."

Sri Lanka and Taiwan have been much more than sufficient to drive shifts in valuation like those of the major bull and bear swings the United States has seen.[41]

Given this range of outcomes, it is understandable for investors at times to fear that whatever happened to British or Australian growth—let alone to Uruguayan—might happen here. Conversely, the tremendous surge in economic growth of the industrial revolution suggests that a further surge—an increase in per capita income growth from 2 to 2.5 percent per year, say—might be attainable with a properly managed high-pressure economy. Such fears and hopes could easily have sustained the major bull and bear swings of the past century. And the comparative growth experience of the past century suggests that such fears are not fantastic but realistic.

Our tentative conclusion—which we reach even though the New Era of the 1920s came to a rapid end and even though secular stagnation did not begin in the 1930s—is that major stock market movements arose not because investors' susceptibility to fads and fashions made the market excessively volatile, but because the future always appeared uncertain, and stock prices are extremely sensitive to expectations of what future growth will be. If this conclusion is correct, one implication is that the case against Wall Street—the belief that stock market speculation materially retards American economic growth—must focus on the short-run volatility of the market and its effect on investors' discount rates and firms' investment plans. The long-run volatility of the major bull and bear swings springs not from the poor performance of Wall Street but from unavoidable uncertainties about future economic growth.

[41] The data for Figure 6 are drawn from Robert Summers and Alan Heston, "Improved Comparisons of Real Product and Its Composition, 1950–80," *Review of Income and Wealth*, 20 (Mar. 1984), pp. 207–61.