JAMES M. POTERBA
Massachusetts Institute Technology

ANDREW A. SAMWICK
Dartmouth College

Stock Ownership Patterns, Stock Market Fluctuations, and Consumption

THE BULL MARKET of the last year has raised the total value of corporate stock in the United States by nearly a trillion dollars. While many analysts have tried to explain or interpret the recent movements of the stock market, there has been less attention to the link between rising stock prices and real economic activity. How are the gains from an increase in share prices distributed across households? What fraction of these gains accrues to a small set of wealthy investors? How do rising stock prices affect consumer spending?

The standard textbook treatment of aggregate consumption holds that consumption depends on labor income and financial wealth.[1] The marginal propensity to consume out of wealth is typically taken to be approximately 0.04 per year. In this framework, the wealth effect of a stock market rally should have an important stimulative effect on consumption. Although this view neglects some potentially important factors that might also affect consumption directly (notably, the possibility that stock prices may rise as a result of a decline in real interest rates),

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1. See, for example, Dornbusch and Fischer (1994).

many economic forecasters embrace the textbook view. For example, a recent Wall Street research report explains that "as long as asset prices are rising, the risk of a significant drop in consumer spending is small," and notes that the rising number of stockholders has "made real economic activity more tied to the performance of financial assets than ever before."[2]

This paper describes the changing pattern of stock ownership during the last three decades, investigates whether changing ownership patterns have, in fact, altered the links between stock values and consumption, and explores the "wealth effect" of stock price fluctuations. At the outset it is important to recognize that an increase in consumer spending following a rise in share prices could be attributable to either of two factors. First, stock prices may rise in anticipation of strong economic activity, including consumer spending. The role of share prices as a leading indicator is well documented. In this case changes in stock market values are not a *source* of subsequent changes in consumption, but merely an indicator that subsequent changes are expected. A second, and not necessarily exclusive, link between stock prices and consumption is the wealth effect; that is, changes in share values cause changes in consumption by relaxing the resource constraints that households face. Over long horizons, there must be such a wealth effect; we consider whether there is also an important wealth effect on consumption at horizons of one to four quarters. It is difficult to distinguish between the leading indicator and causative views of the relationship between share prices and consumption because this requires identifying autonomous movements in share prices that are not attributable to changing expectations of future dividends or interest rates.

This paper presents new evidence on the association between share price movements and consumption. It summarizes the changes in consumption that have typically followed substantial changes in stock market values, and presents several tests directed at disentangling the leading indicator and wealth effect views. If the leading indicator view is correct, the pattern of consumption changes following stock price fluctuations should be independent of the distribution of stock ownership and there is no reason to expect different consumption responses from households that do and do not own corporate stock. This paper presents

2. Shulman, Usem, and Brown (1995).

empirical tests of both of these propositions. It finds little evidence of an important wealth effect of share prices on consumption. The strong positive correlation between consumption growth and lagged stock market returns, therefore, appears to be primarily due to the leading indicator feature of stock price movements.

We begin by placing the 1995 stock market increase in context. We report on the evolution of price-to-dividend and price-to-earnings ratios, Tobin's q, and the ratio of stock market value to GDP during the post–World War II period. Some of these measures, notably Tobin's q, suggest that the stock market of 1995 is at a postwar valuation high. Others, notably the price-to-earnings ratio, suggest a less extreme situation.

We next investigate the fraction of stock market capital gains that accrue directly to individual investors, in contrast to gains that accrue to them indirectly, through financial intermediaries such as defined benefit pension plans or life insurance companies. A range of recent behavioral models of consumption suggest that the marginal propensity to spend out of different types of assets depends not only on their risk and return characteristics, but also on the way in which they are held.[3] Households may exhibit lower marginal propensities to spend out of capital gains on assets that are held in retirement plans than on assets that are held directly.

Popular discussions sometimes note that the fraction of corporate stock owned by households has declined during the postwar period and is currently less than 50 percent.[4] In fact, the principal postwar trend has been away from direct individual stock ownership and toward indirect ownership through various financial intermediaries. This paper reanalyzes the widely cited Flow of Funds data of the Federal Reserve Board that show households owning less than 50 percent of outstanding shares. Combining individual ownership of equities through mutual funds, defined contribution pension plans, and other financial intermediaries, it is apparent that individuals have direct control over nearly two-thirds of outstanding corporate stock.

To describe the changing incidence of stock ownership we examine

3. Thaler (1994) provides a summary of this literature.

4. See, for example, "Individuals Lose Market Share," *New York Times,* July 18, 1995, p. D21, and "Small Investor Continues to Give Up Control of Stocks," *Wall Street Journal,* May 11, 1992, p. C1.

data from the 1962 Survey of Financial Characteristics of Consumers, and the 1983 and 1992 Surveys of Consumer Finances. While share ownership patterns changed relatively little between 1962 and 1983, there has been a substantial increase in the prevalence of share ownership during the last decade. This growth is the result of rising rates of indirect share ownership. The fraction of stock held by the largest stockholders, those in the top 0.5 percent of the distribution of equity investors, has also declined during this period.

To develop evidence that can distinguish between the leading indicator and the wealth effect views of how share prices affect consumption, the paper explores the correlation between stock returns and the composition of consumer spending. If there is a wealth effect, positive stock returns should increase the share of consumption accounted for by luxury goods. We consider aggregate data on several categories of consumption that are disproportionately purchased by high-income households, including "upper luxury" vehicles, and find little evidence that luxury spending rises in the wake of rising stock prices.

The paper considers whether changing patterns of stock ownership affect the linkages between consumption and stock market fluctuations. The leading indicator view suggests that ownership patterns should not affect this relationship, while the wealth effect at least admits the possibility. We explore the effect of changes in stock prices, as well as changes in the dividend-to-price and earnings-to-price ratios, on various measures of consumption.[5] We recognize that stock prices and consumption are jointly determined, and simply try to describe the typical pattern of economic activity following substantial stock price movements. Our results suggest that changes in stock prices have significant predictive power for future consumption spending. A permanent stock price rise of 17 percent (roughly the same magnitude as the price increase in the first six months of 1995) forecasts an increase of about 1.1 percent in consumption in mid-1996, relative to what it would otherwise have been. Increases in consumer spending on new automobiles and other durables would be particularly large.

We find little evidence to suggest that the shift from direct to indirect ownership of corporate stock has altered the link between stock price

5. Fama (1981), Fischer and Merton (1984), and Barro (1990) also estimate reduced-form equations measuring the predictive power of stock price movements for various macroeconomic aggregates.

fluctuations and consumption spending, and more generally, little evidence of an important wealth effect on consumption. Since the time-series variation in the pattern of corporate stock ownership yields tests with low statistical power, we also use household survey data from the Panel Study of Income Dynamics to compare the correlation between stock market fluctuations and growth in consumption for stockholders with direct and indirect holdings. We find some evidence that the consumption of individuals who hold stocks through thrift plans, such as 401(k)s, 403(b)s, and ESOPs, is more sensitive to stock price movements than the consumption of those who do not hold any stock; but once again, the available tests have low power.

We do not find any evidence that the effect of share prices on consumption depends on the source of stock price movements. This is somewhat surprising, given the substantial body of research in financial economics suggesting that price fluctuations that change the value of the dividend-to-price or earnings-to-price ratios are often reversed over a period of several years.

Recent Stock Market Fluctuations in Perspective

The stock market has climbed to record heights in the last year. In the six months after the Dow Jones Industrial Average first reached the historic four thousand level on February 23, 1995, it climbed another seven hundred points. And before the end of 1995, the Dow index had closed at well above five thousand. Between January 1 and June 30, 1995, the Standard and Poor's 500-stock index (S&P 500) rose by nearly 17 percent.[6] Although the news media have depicted the recent bull market as unprecedented, recent returns are not extraordinary. In twenty of the sixty-eight years between 1926 and 1993, the real return on stocks of large corporations exceeded 20 percent. In five of those years the real return exceeded 40 percent.[7]

To provide background for analyzing the aggregate effects of stock price movements, table 1 presents several summary statistics. The first column shows the real value of the S&P 500 in units comparable to its

6. We calculate this as $\ln(539.4/455.2) = 0.1697$, which we approximate as 17 percent.

7. These statistics are based on Ibbotson Associates (1994).

Table 1. Real Value of the Stock Market, 1955–95

Units as indicated

Year	*Real value of S&P 500*[a]	*Percentage change in real S&P 500*	*Real value of corporate stock*[b]
1955	253.4	. . .	1,643.5
1956	251.9	−0.6	1,712.1
1957	212.6	−15.6	1,479.9
1958	277.1	30.3	2,039.2
1959	300.7	8.5	2,169.8
1960	285.3	−5.1	2,134.7
1961	358.0	25.5	2,710.7
1962	308.5	−13.8	2,339.0
1963	359.3	16.5	2,719.3
1964	402.8	12.1	3,105.6
1965	431.8	7.2	3,459.7
1966	370.1	−14.3	3,005.0
1967	420.8	13.7	3,687.8
1968	449.0	6.7	4,200.4
1969	361.8	−19.4	3,374.7
1970	338.7	−6.4	3,164.8
1971	361.2	6.6	3,597.0
1972	413.9	14.6	3,978.3
1973	307.1	−25.8	2,875.5
1974	193.5	−37.0	1,730.4
1975	239.3	23.7	2,158.4
1976	269.2	12.5	2,721.8
1977	226.2	−16.0	2,271.9
1978	212.5	−6.0	2,191.9
1979	210.4	−1.0	2,293.7
1980	231.5	10.1	2,662.2
1981	197.1	−14.9	2,265.5
1982	213.8	8.4	2,471.2
1983	242.9	13.6	2,837.1
1984	233.8	−3.7	2,631.3
1985	283.9	21.4	3,232.3
1986	336.8	18.6	3,743.8
1987	312.6	−7.2	3,604.9
1988	343.5	9.9	3,849.9
1989	413.8	20.5	4,522.7
1990	367.8	−11.1	3,949.7
1991	421.8	14.7	5,279.8
1992	459.6	9.0	5,763.2
1993	478.4	4.1	6,352.0
1994	455.2	−4.9	6,048.8
1995[c]	539.4	18.5	7,167.8

Source: Data on the S&P 500 and the CPI-U are from Data Resources Inc. The real value of corporate stock is from the Federal Reserve, Flow of Funds Accounts.

a. Real S&P 500 is benchmarked for June 1995. Earlier values are computed using the average S&P index for each December and the CPI-U.

b. Billions of 1994 dollars.

c. Entries for 1995 relate to June; the real value of corporate stock for this year is the authors' estimate.

1994 value. The second column presents the real annual percentage change in the index. This column does not correspond to the return on the market because it excludes income from dividends. It confirms that there have been other years with returns comparable to those in 1995. The third column shows the real value of corporate shares at the end of each year, in 1994 dollars, as reported in the Flow of Funds accounts. Real equity values increased by more than $1.1 trillion in the six months ending June 30, 1995.[8]

While the increase in share prices during the last year is not unprecedented, some measures of stock market valuation do suggest that the stock market is currently at a post–World War II high. Table 2 reports four different valuation measures. The first column shows the ratio of the market value of corporate stock to GDP. On June 30, 1995, this ratio was 1.039, a level that has been exceeded only once since the early 1950s, in 1968. It has more than doubled in just over ten years. The table records one previous move of similar magnitude, when the ratio doubled between the early 1950s and the early 1960s.[9]

The second column of table 2 shows the year-end price-to-earnings ratio for the S&P 500; this ratio is also plotted in figure 1. Price-to-earnings ratios do not suggest that stocks are currently at historic highs. The recent stock price rise has coincided with rapidly increasing corporate earnings, so that while the price-to-earnings ratio in mid-1995 (16.3) is above its postwar average value, it is substantially lower than at the end of 1991 (26.2) or of 1992 (22.8). Since late 1991 share prices have increased by nearly 30 percent, while earnings have more than doubled. Because earnings fluctuate substantially from year to year, it can be helpful to construct alternative valuation measures that divide share prices by a moving average of real earnings. We do this with a ten-year arithmetic average of real earnings for the S&P 500. The

8. The change in the market value of equity during any period reflects the change in the value of the shares that were outstanding at the beginning of the period *plus* the value of any new shares issued during the period. If firms are issuing substantial amounts of new equity, changes in the market value of stock can overstate the rate of share price appreciation. In each quarter of 1994 and in the first two quarters of 1995, however, nonfinancial corporations were net repurchasers of shares, so this concern does not apply.

9. A similar pattern emerges if we consider the market value of corporate equity plus an estimate of the market value of corporate debt, which is computed by capitalizing corporate interest payments by the BAA bond rate, relative to GDP.

Table 2. Relative Measures of Corporate Share Values, 1947–95

Units as indicated

Year	*Market value of shares/GDP*[a]	*Price-to-earnings ratio*[b]	*Price-to-dividend ratio*[c]	*Tobin's q*
1947	. . .	9.5	18.0	0.437
1948	. . .	6.6	16.0	0.396
1949	. . .	7.2	14.8	0.418
1950	. . .	7.2	13.8	0.475
1951	. . .	9.7	16.7	0.510
1952	0.470	11.1	18.3	0.483
1953	0.450	9.9	17.2	0.452
1954	0.628	13.0	22.5	0.656
1955	0.709	12.6	24.1	0.756
1956	0.723	13.7	23.6	0.742
1957	0.625	11.9	21.6	0.593
1958	0.834	19.1	30.0	0.819
1959	0.851	17.7	31.5	0.830
1960	0.832	17.8	29.3	0.808
1961	0.989	22.4	35.1	0.954
1962	0.820	17.2	29.4	0.832
1963	0.908	18.7	32.0	0.942
1964	0.981	18.6	32.8	1.056
1965	1.006	17.8	32.8	1.080
1966	0.838	14.5	27.9	0.897
1967	1.000	18.1	32.4	1.070
1968	1.090	18.0	34.1	1.111
1969	0.868	15.9	28.4	0.846
1970	0.820	18.0	28.9	0.778
1971	0.880	17.9	32.3	0.828
1972	0.899	18.4	37.0	0.835
1973	0.633	12.0	27.0	0.575
1974	0.399	7.7	18.4	0.319
1975	0.481	11.3	24.2	0.390
1976	0.578	10.8	25.5	0.470
1977	0.460	8.7	19.6	0.371
1978	0.421	7.8	18.5	0.343
1979	0.456	7.3	18.1	0.350
1980	0.542	9.2	21.1	0.413
1981	0.459	8.0	18.0	0.336
1982	0.504	11.1	20.3	0.360
1983	0.541	11.8	23.2	0.417
1984	0.478	10.1	21.4	0.387
1985	0.570	14.5	25.8	0.472
1986	0.637	16.7	29.6	0.556
1987	0.593	14.1	27.0	0.574
1988	0.614	11.7	27.2	0.617
1989	0.713	15.5	30.0	0.761
1990	0.631	15.5	26.7	0.733
1991	0.839	26.2	32.2	1.068
1992	0.885	22.8	34.5	1.264
1993	0.955	21.3	36.8	1.361
1994	0.877	15.0	34.4	1.268
1995[d]	1.039	16.3	39.2	1.467

Source: Market value of stock is from Federal Reserve, Flow of Funds Accounts. Price-to-earnings and price-to-dividend ratios are from Data Resources Inc. Tobin's *q* is from the *Balance Sheets for the U.S. Economy*.

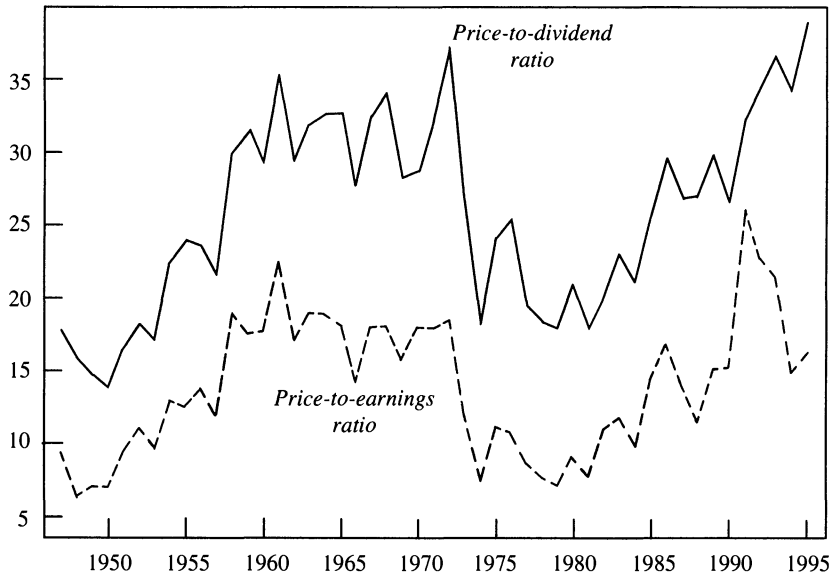
a. The market value of corporate stock (year-end value) divided by the fourth-quarter GDP for each year.

b. The price-to-earnings ratio for the S&P 500, averaged for the last month of each calendar year.

c. The price-to-dividend ratio for the S&P 500, averaged for the last month of each calendar year. The price-to-dividend ratio is the market value of equity in nonfinancial corporations divided by the replacement cost of their net assets, net of debt outstanding.

d. Tobin's *q* for June 1995 is estimated by the authors.

Figure 1. Price-to-Earnings and Price-to-Dividend Ratios for the S&P 500, 1947–95



Source: Data Resources Inc.

resulting $P\text{-}E_{avg}$ ratio is 22.3 at the end of June 1995, up from 9.8 in 1980, 11.9 in 1985, and 15.7 in 1990. The June 1995 value is higher than any year-end value in the 1990s, although it is not the highest value recorded in the postwar period; it reached 23.3 at the end of 1965.[10] Nevertheless, this valuation indicator suggests that stock prices are high, relative to historical patterns.

The rise in corporate earnings is evident in the national income accounts where corporate profits adjusted for capital consumption and inventory valuation have increased as a share of GNP from 5.6 percent in 1991 to 7.2 percent in 1994. The rate of return on tangible assets has also increased. Table 3 presents recent estimates of a standard measure of the pretax rate of return on the tangible assets of nonfinancial cor-

10. The values of P/E_{avg} for the early 1990s are as follows: 1990 = 15.7, 1991 = 18.4, 1992 = 20.3, 1993 = 21.2, and 1994 = 19.9.

Table 3. Rates of Return to Nonfinancial Corporate Capital, 1947–95[a]

Percent

Year	*Unadjusted rate*	*Cycle-adjusted rate*
1947	11.0	. . .
1948	12.4	11.4
1949	10.8	10.9
1950	12.6	12.4
1951	12.8	11.5
1952	10.9	9.4
1953	10.3	8.8
1954	9.6	9.6
1955	11.9	11.2
1956	10.3	9.5
1957	9.4	8.6
1958	8.1	8.6
1959	10.1	9.9
1960	9.3	9.1
1961	9.3	9.8
1962	10.5	10.4
1963	11.3	11.2
1964	11.9	11.6
1965	13.1	12.4
1966	12.9	11.9
1967	11.6	10.6
1968	11.3	10.2
1969	10.0	8.8
1970	8.0	7.6
1971	8.4	8.5
1972	8.6	8.6
1973	8.5	8.0
1974	6.7	6.6
1975	7.0	8.5
1976	7.4	8.4
1977	7.8	8.5
1978	7.8	8.0
1979	6.9	6.9
1980	5.8	6.6
1981	6.0	7.0
1982	5.2	7.2
1983	6.0	8.1
1984	7.4	8.3
1985	7.2	8.0
1986	6.8	7.4
1987	7.5	7.8
1988	8.1	7.9
1989	7.7	7.5
1990	7.6	7.5
1991	7.4	7.9
1992	7.9	8.8
1993	9.1	9.7
1994	10.2	10.3
1995	10.3	10.2
Averages		
1950–59	10.6	10.0
1960–69	11.1	10.6
1970–79	7.7	8.0
1980–89	6.8	7.6

Source: National Income and Product Accounts of the United States (NIPA) and *Balance Sheets for the U.S. Economy*.

a. The return is computed as the ratio of pretax profits for the nonfinancial corporate sector, with the capital consumption adjustment and inventory valuation adjustment, plus net interest payments by nonfinancial corporations, divided by an estimate of the midyear value of the tangible assets held by these corporations. The value for 1995 is based on two quarters of profits and interest payouts, and an estimate of nonfinancial corporations' tangible assets as of March 31, 1995.

porations.[11] In addition to the rate of return shown in the first column, the table also reports a business cycle–adjusted rate of return. To construct the adjusted return, we first regress the rate of return on the civilian unemployment rate (*RU*), using a first-order serial correlation correction with an autocorrelation coefficient, ρ. This yields the following equation (with standard errors in parentheses):

$$\underset{}{\text{Return}} = \underset{(0.010)}{0.124} - \underset{(0.0013)}{0.0052}(RU_t), \quad \hat{\rho} = \underset{(0.085)}{0.845}.$$

We then compute fitted values at the sample average unemployment rate of 5.61 percent.[12] The adjusted and unadjusted series are plotted in figure 2.

The unadjusted rate of return rose nearly 3 percentage points between 1991 and 1994, and while the rate of return in 1994 and 1995 is not as high as it was throughout the 1960s, it is higher than at any point in the last twenty-five years. The change in the cycle-adjusted return between 1992 and 1994 is less dramatic than that of the unadjusted series, but still suggests an increase of 1.5 percentage points.[13]

In spite of this sharp increase in earnings, corporate dividends have not risen during the last few years. The third column of table 2, and also figure 1, shows the price-to-dividend ratio on the S&P 500. This reaches 39.2 at the end of June 1995, the highest year-end value during the postwar period. Values of the price-to-dividend ratio in excess of 30 have been recorded only a few times during the last forty years: in the late 1950s and early 1960s, in the late 1960s, and in the mid-1990s.

One potential explanation of rising price-to-dividend ratios is a grow-

11. This measure of the rate of return was analyzed by Nordhaus (1974) and Feldstein and Summers (1977). For a discussion of alternative measures of the rate of return, and of the effective tax rate on corporate earnings, see Feldstein, Dicks-Mireaux, and Poterba (1983).

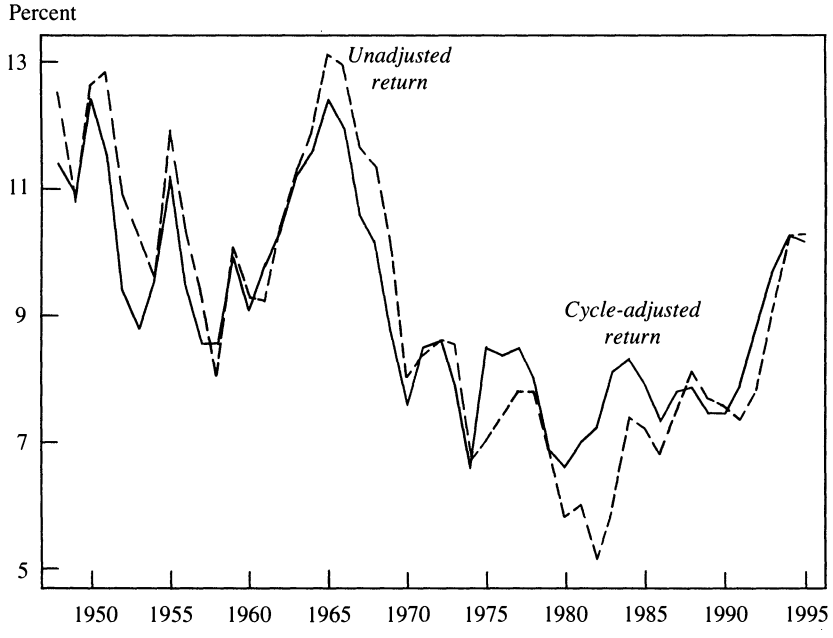
12. Adding a time trend to this equation does not change the coefficient on *RU*. The time coefficient, −0.00051 (0.00034), provides weak support for a secular decline in the corporate profit rate.

13. We have also estimated the cycle-adjustment equation, using the dummy variable *DUM94&95* to allow for a shift in the level of profits in 1994 and 1995. The results are:

$$\underset{}{\text{Return}} = \underset{(0.010)}{0.123} - \underset{(0.0013)}{0.0052}(RU) + \underset{(0.0088)}{0.0073}(DUM94\&95), \ \hat{\rho} = \underset{(0.086)}{0.842}.$$

If we also include a time trend, the coefficient on the trend is −0.00067 (0.00031), and the coefficient on *DUM94&95* rises to 0.0136 (0.0093).

Figure 2. Return to Capital for Nonfinancial Corporations, 1948–95



Source: Authors' calculations using data from National Product and Income Accounts of the United States (NIPA) and *Balance Sheets for the U.S. Economy*.

ing reliance on nondividend alternatives for returning cash to shareholders, such as share repurchases and cash purchases of stock in other companies. Repurchases, which historically had been very limited, became an important source of cash payout during the mid-1980s. Their importance declined in the late 1980s and early 1990s, and although it has increased in the last two years, it has not reached the level of the mid-1980s.[14]

Table 4 tracks the role of nondividend cash payouts over the last fifteen years and suggests that these payouts cannot explain the recent rise in price-to-dividend ratios. The first column in table 4 shows the ratio of all cash payouts to cash dividends for nonfinancial corporations. This ratio, which was very close to one at the beginning of the 1980s, rose above 2 in the mid-1980s. It declined in the early 1990s, and has

14. Bagwell and Shoven (1989) describe the growth of share repurchases in the 1980s, and the tax incentives for repurchases rather than cash dividends.

Table 4. Dividends and Other Cash Payouts for Nonfinancial Corporations, 1980–95

Year	*Total cash payouts/cash dividends*[a]	*Price/dividend*[b]	*Price/total cash payouts*[c]
1980	0.993	21.1	21.2
1981	1.488	18.0	12.1
1982	1.204	20.3	16.8
1983	1.109	23.2	20.9
1984	2.285	21.4	9.4
1985	2.334	25.8	11.0
1986	2.409	29.6	12.3
1987	2.238	27.0	12.0
1988	2.712	27.2	10.0
1989	2.312	30.0	13.0
1990	1.602	26.7	16.7
1991	1.169	32.2	27.5
1992	1.080	34.5	31.9
1993	1.154	36.8	31.9
1994	1.462	34.4	23.5
1995[d]	1.206	39.2	32.5

Source: Data on dividend payments for nonfinancial corporations are from NIPA, table 1.16. Data on gross share purchases are from the Federal Reserve Board. The price-to-dividend ratio is from Data Resources Inc.

a. Total cash payouts divided by cash dividends is the ratio of dividend payments plus gross share purchases by nonfinancial corporations, including both share repurchases and shares bought in corporate control transactions, to dividend payments by nonfinancial corporations.

b. The price-to-dividend ratio for the S&P 500.

c. Price divided by total cash payouts equals the price-to-dividend ratio (column two) divided by the ratio of total cash payouts to cash dividends (column one).

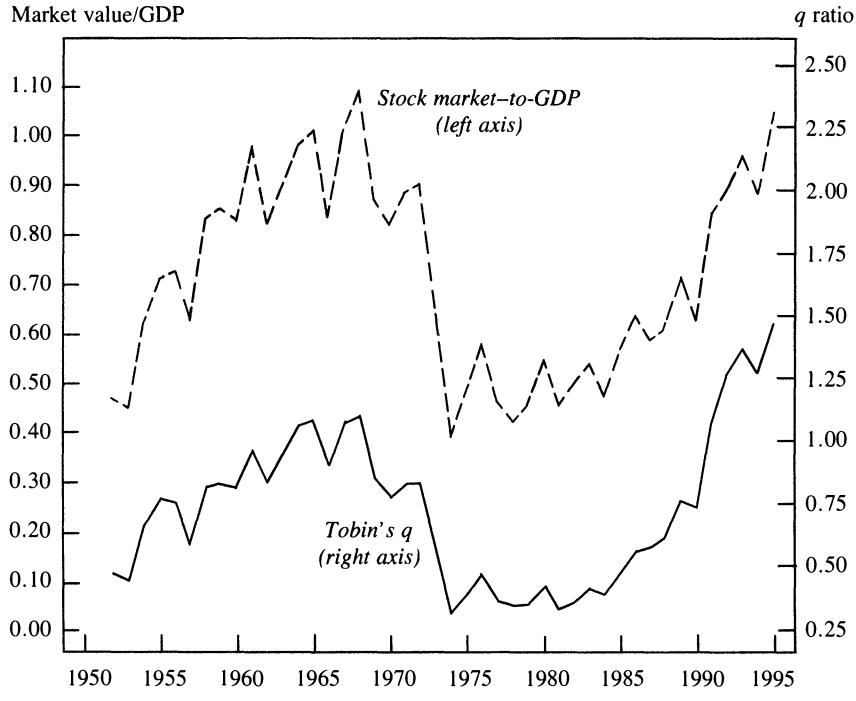
d. Values for 1995 are estimates based on data for the first two quarters; price divided by dividends and price divided by total cash payouts are as of June 30, 1995.

ranged between 1 and 1.5 in recent years. The second and third columns present the price-to-dividend ratio and the price-to-total cash payout ratio, respectively, for the S&P 500. They show an even more rapid increase in share prices relative to total cash payouts than in share prices relative to dividends over 1988–95, because nondividend cash payouts have declined relative to cash dividends during the mid-1990s.

The fourth column of table 2, as well as figure 3, shows Tobin's q ratio for nonfinancial corporations; that is, the ratio of the market value of their equity to the replacement cost of their tangible assets, net of outstanding debt.[15] This ratio, which falls below 0.40 for a number of

15. This ratio is computed by the Federal Reserve Board and published in the *Balance Sheets for the U.S. Economy,* June 8, 1995, table B104, p. 37. Tangible assets include plant, equipment, and residential structures, the replacement values of which are estimated by the Commerce Department using a perpetual inventory method with adjustment for changing prices of investment goods, inventories, and land. The market value of land is estimated by the Federal Reserve Board. The book value of debt is

Figure 3. Stock Market–to-GDP Ratio and Tobin's *q*, 1952–95



Source: Authors' calculations using data from Federal Reserve, Flow of Funds Accounts.

years between the mid-1970s and the early 1980s, is 1.27 at the end of 1994, and 1.47 at the end of June 1995.[16] The change in *q* over 1990–95 is unusual. The only comparable percentage change, a decline of more that 50 percent over a two-year period, took place between late 1972 and late 1974, the period of the first oil embargo. Moreover, the recent values are the highest recorded for *q* during the postwar period.

There are good reasons for suspecting that "average" *q* measures,

subtracted from this estimate of asset replacement cost. This measure of *q* suffers from several limitations, notably, the failure to compute the market value of debt and the absence of any correction for the present-discounted value of future tax shields, as implemented by Summers (1981). These factors are unlikely to result in large changes in the short-run movements in *q*.

16. Revisions to the Flow of Funds that are expected on December 15, 1995 will reduce the estimated market value of equity in nonfinancial corporations, thereby reducing the estimate of *q* for recent years. The rise in the value of *q* in 1994–95, relative to other recent years, will not be affected.

such as those in table 2, are poor measures of relative value for some types of firms. Bronwyn Hall's extensive study of the market value and replacement cost of corporate assets in the 1980s makes it possible to illustrate this.[17] At the end of 1987, when the aggregate value of q was 0.574, many high-technology and high-growth stocks exhibited qs that were many times greater than the aggregate, as the following informal table shows:

Company	*Average* q, *December 1987*
Coca-Cola	2.89
Compaq	2.65
IBM	1.53
Intel	2.79
Kodak	1.53
Motorola	1.59

If a rising fraction of firms' high-value assets is intangibles such as patents, specialized workforces with particular human capital attributes, or brand loyalty, rather than property, plant, and equipment, q will rise on this account. In addition, noise will enter q measurements as an increasing fraction of corporate earnings is generated overseas, since the replacement cost of foreign assets is probably measured with more error than that of domestic assets.[18]

The market value of equity relative to GDP has increased more slowly than Tobin's q during the recent stock market rise. This implies a decline in the ratio of tangible corporate assets to GDP. At the end of 1994 the replacement cost of tangible assets for the nonfinancial corporate sector was 0.77 times GDP. This value was more than 20 percent below the value of the ratio at the end of 1989 (1.016), and 40 percent below the value in the early 1980s (1.23 in 1982). From the end of World War II until 1973 this ratio fluctuated between 0.86 and 0.96. It rose between 1974 and 1982, and has been declining since.

It is difficult to distill a simple conclusion from table 2. While price-

17. The q values shown below are drawn from the research and development database described and analyzed in Hall (1993).

18. Hines (1991) documents the rising share of international earnings for U.S. nonfinancial corporations.

to-earnings ratios are not unusually high at present, other measures of stock price valuation are at, or near, historical highs. To determine whether current stock prices can be justified by fundamentals is beyond the current project.[19] Table 2 does suggest, however, that in assessing the macroeconomic consequences of stock price movements, it may be important to distinguish between stock price fluctuations that are associated with movements in the price-to-earnings or price-to-dividends ratios and those that are not.

A number of recent studies suggest that variations in the earnings-to-price ratio are correlated with prospective stock market returns, and one concludes that "shocks to [stock] prices holding dividends constant are almost entirely transitory."[20] Sharp increases in either the price-to-earnings or the price-to-dividends ratio, other things equal, are associated with lower prospective returns. If households view differently increases in share prices that are not supported by increases in dividends or earnings and those that are, these two types of share price movement might have divergent effects on consumption.

Aggregate Trends in the Ownership of Corporate Stock

All corporate stock is ultimately owned by individuals. With the exception of shares held by foreigners (currently about 5 percent of the total), U.S. equities represent net worth of U.S. citizens. Yet if individuals adjust their consumption more in response to fluctuations in the price of shares that they own directly than in response to shares that they hold through financial intermediaries or in accounts that are dedicated to retirement saving, then the way in which stock prices affect real economic activity may depend on stock ownership patterns.[21]

19. One of the authors, having concluded in French and Poterba (1991) that fundamental factors could explain why Tokyo's Nikkei stock index was approximately 39,000 in 1989 (high real estate values for corporate land made Tobin's q for Japanese shares nearly one), is hesitant to venture again into analyzing stock market fundamentals!

20. Cochrane (1994, p. 241). Campbell and Shiller (1988a, 1988b) present closely related evidence on earnings-to-price and dividends-to-price ratios and stock returns.

21. Behavioral models suggest that the form in which shares are held, and even the particular record-keeping convention that is applied to them, may affect the magnitude of the wealth effect on consumer spending (see, for example, Thaler, 1994). Because

Differential transactions costs associated with different types of equity accounts, such as penalty taxes for early withdrawals from IRAs or 401(k)s, can also induce divergences in the consumption response to capital gains on stock held different ways. Accumulation in accounts that are "off-limits" may not lead to the same spending response as increases in the value of directly held assets that can be tapped for current consumption. Investment through this type of account has become particularly important in recent years. In the first eight months of 1995, more than two-thirds of the cash inflows to leading mutual fund managers were directed to funds held in retirement plans. Retirement plan assets now represent nearly one-third of all mutual fund assets.[22]

For some categories of indirect stock ownership, the link between a current capital gain and benefits to the indirect individual holders is complicated. Consider the example of equity held by a state and local government retirement plan, a defined benefit plan for the retirement of state and local employees. Individuals as taxpayers are the ultimate beneficiaries of gains in the value of this pension fund's holdings, since higher asset values imply that future tax burdens can be lowered and will still fund future pension liabilities. Yet individuals may not be aware of the increase in the value of their locality's pension portfolio, and they may not be confident enough that their future taxes will decline to raise consumption in response to such gains.[23] The perceived change in net worth may be quite different for changes in the value of stock owned directly, or stock owned through mutual funds that continually provide information on net asset value.

Before considering whether changes in stock ownership patterns have affected the link between share prices and consumer spending, it is helpful to summarize the postwar history of individual stock ownership. The standard claim that individual investors now account for less than half of equity ownership in the United States is based on data from

individual investors receive quarterly statements from mutual funds and other financial intermediaries, they may be more aware of their gains on these investments than on direct stock investments that require initiative to evaluate.

22. Ellen E. Schultz, "Tidal Wave of Retirement Cash Anchors Mutual Funds," *Wall Street Journal*, September 27, 1995, p. C1.

23. There is an inconclusive literature on the extent to which unfunded state and local government pension liabilities are capitalized into house values (see Epple and Schipper, 1981).

the Federal Reserve Board's Flow of Funds accounts.[24] These data show "household" ownership of corporate stock declining from nearly 90 percent in the 1950s to less than 50 percent in the mid-1990s.

Although widely used, the Flow of Funds data do not measure what many analysts think they measure. They do not apply to listed equity on stock exchanges but rather, to a broader concept of corporate equity, including stock in closely held companies.[25] Moreover, they do not describe holdings of individual investors but rather, of a group of economic actors, the "household sector," which includes nonprofit institutions.

The entry for household sector holdings in the Flow of Funds table for corporate equity balances also excludes equity held through mutual funds, defined contribution pension plan accounts, and other financial products, such as variable annuities. These forms of individual equity ownership are allocated to other sectors in the Flow of Funds, and as they have become more important in the last decade, the potential for misinterpretation of the household sector data has grown. The growth of institutional holdings does not necessarily imply that shocks to stock market values now have smaller effects on individual net worth than in previous periods.

Table 5 summarizes the Flow of Funds data on the share of outstanding equity held by various classes of investors. The household sector is shown in the first column.[26] The column for mutual funds combines ownership by open-end and closed-end investment companies, and that for pension funds includes private pension funds as well as state and local government retirement systems. The pension fund column includes both defined contribution plans, in which the plan participants have distinct accounts that change in value along with the price of the underlying assets, as well as defined benefit plans, which promise particular benefit streams to retirees as a function of their age, years of service, and wage history at retirement.

24. See, for example, Blume and Zeldes (1993) and Friedman (1996).

25. The total market value of corporate stock in the Flow of Funds exceeds that on the NYSE, AMEX, and NASDAQ. The value of closely held shares at the end of 1994 was approximately $1.2 trillion.

26. The sharp decline in the share of equity held by households between 1968 (81.9 percent) and 1969 (69.1 percent) is due to the creation of a separate Flow of Funds category for bank personal trusts, which accounted for 10.5 percent of equity holdings in 1969.

Table 5. Stock Ownership Shares, Unadjusted Flow of Funds, 1952–94

Percent

Year	Households[a]	Pension funds[b]	Mutual funds[c]	Foreign	Insurance companies[d]
1952	89.7	1.1	3.1	2.2	3.4
1953	88.6	1.5	3.5	2.2	3.6
1954	89.3	1.4	3.3	2.2	3.3
1955	88.6	2.1	3.3	2.2	3.1
1956	88.6	2.3	3.5	2.2	2.9
1957	87.5	2.8	3.9	2.2	3.0
1958	87.6	3.0	4.0	2.1	2.8
1959	86.8	3.5	4.3	2.2	2.8
1960	85.8	4.0	4.6	2.2	2.9
1961	85.7	4.4	4.6	2.2	2.9
1962	84.7	4.8	4.8	2.2	3.1
1963	84.2	5.2	4.9	2.2	3.0
1964	84.1	5.5	4.9	2.1	3.0
1965	83.8	5.9	5.0	2.0	2.9
1966	83.0	6.4	5.2	1.9	3.0
1967	81.7	6.6	5.3	3.1	2.8
1968	81.9	6.8	5.3	3.0	2.8
1969	69.1	8.1	5.5	3.1	3.1
1970	68.0	9.2	5.2	3.2	3.3
1971	65.9	10.5	5.5	3.1	3.7
1972	64.1	11.5	5.1	3.5	4.3
1973	60.4	12.8	5.1	3.8	5.1
1974	56.1	15.2	5.4	4.0	5.7
1975	56.7	16.5	4.9	4.2	5.2
1976	61.8	14.7	4.1	3.7	4.8
1977	59.0	16.3	3.9	4.2	5.2
1978	56.9	18.5	3.7	4.2	5.5
1979	58.7	18.1	3.4	4.1	5.4
1980	60.9	17.4	3.1	4.2	5.1
1981	59.0	18.7	2.9	4.5	5.5
1982	56.1	21.3	3.3	4.7	5.7
1983	53.5	22.9	4.1	5.0	5.7
1984	51.4	24.6	4.6	5.2	5.7
1985	51.3	24.8	5.0	5.3	5.5
1986	50.6	25.4	6.1	6.1	5.0
1987	49.8	25.5	6.9	6.3	5.2
1988	48.8	26.8	6.5	6.5	5.2
1989	48.0	27.2	7.0	6.6	5.0
1990	48.6	27.0	7.1	6.3	5.0
1991	50.8	26.2	7.7	5.6	4.4
1992	51.4	25.8	8.7	5.5	4.0
1993	49.7	25.6	11.5	5.5	4.0
1994	47.7	25.7	13.6	5.4	4.2

Source: Federal Reserve, Flow of Funds Accounts.

a. Household category includes ownership by nonprofit institutions.

b. Pension funds include private and government plans.

c. Mutual funds include closed-end as well as open-end investment companies. Entries are based on the total amount of corporate stock held by mutual funds.

d. Insurance companies include both property and casualty, and life insurance companies.

To estimate the share of corporate stock that individuals hold either directly or indirectly, we make five adjustments to the Flow of Funds household sector data:

—We subtract the equity holdings of nonprofit institutions. Experimental data presented in the Flow of Funds accounts show that the equity holdings of nonprofit institutions averaged 15.7 percent of the household sector's equity holdings during the period 1987–92. Therefore we multiply the Flow of Funds household sector equity value by 0.843 in each year between 1952 and 1994 in order to remove these holdings.

—We add stock held by bank personal trusts, since individuals are the beneficiaries of all of these accounts.

—We add equity held in defined contribution pension plans. At the end of 1993, private pension plans held $1,075 billion in corporate stock, of which $481 billion was held in defined contribution plans. Since individuals are the owners of these accounts, we attribute this equity to them. The share of private pension fund equity assets held in defined contribution plans has increased from just over a quarter at the beginning of the 1980s to nearly a half in the mid-1990s.

—We add equity held in variable annuity reserves at life insurance companies. Variable annuities, which have been one of the most rapidly growing insurance products of the last decade, provide a means for individuals to defer taxes on capital income, at the price of insurance loads and some limitations on investment options and withdrawal provisions. Total assets held in variable annuity accounts have grown from $47.7 billion at the end of 1991 to $176.4 billion at the end of 1994, and nearly three-quarters of variable annuities are invested in stock.[27]

—We add household ownership of open- and closed-end mutual funds that invest in corporate stock. Individuals are the ultimate owners of most mutual fund shares. At the end of 1994, 66.2 percent of mutual fund shares were allocated to households in the Flow of Funds. Another 13.2 percent were allocated to bank trust departments, which we aggregate with households. Given the growth in mutual fund holdings of corporate equity over time, it is increasingly important to recognize this channel for individual equity ownership.[28]

27. Gentry (1994) and Poterba (1995b) discuss the growth of variable annuities.

28. Retirement accounts comprise about two-thirds of household mutual fund hold-

The magnitude of each of these corrections to household equity ownership is shown for the end of 1994:[29]

	Percent of total corporate stock outstanding
Flow of Funds household sector	47.7
less nonprofit holdings	(7.5)
plus bank personal trusts	2.7
plus pension plan assets	7.7
plus variable annuity accounts	2.0
plus mutual fund holdings	11.0
equals adjusted individual holdings	63.7

The net effect of these adjustments is to raise substantially the fraction of corporate equity that is attributed to individuals. Rather than suggesting that individuals hold less than half of all corporate stock, the modified calculations suggest that individual investors hold two-thirds of outstanding stock, either directly or through a fiduciary.

Table 6 shows these adjustment terms for the period 1952–94; figure 4 plots the adjusted and unadjusted time series for individual stock ownership. The adjustments change the trend in stock ownership patterns. The secular decline in the share of equity owned by individuals that emerges in the first column of table 6 is not supported by the data on individual direct and indirect ownership. In the expanded definition, individual ownership declines from 75 percent of the market in 1970 to just over 60 percent in the late 1980s, but then starts to rebound. It has grown by more than 3 percentage points during the last four years of the period. This is largely the result of the diffusion of tax-deferred

ings. At the end of 1994, household ownership of mutual funds totaled $1,066 billion. Data from the Investment Company Institute show that $361 billion of this was held in IRAs, $161 billion in 401(k) plans, $76 billion in other defined contribution pension plans, and $98 billion in 403(b) plans.

29. One of the changes that is due to be incorporated in the December 1995 revision of the Flow of Funds accounts involves some reallocation of variable annuity assets between the mutual fund and insurance company sectors. The current Flow of Funds procedure includes variable annuity equity assets in both the mutual fund and insurance sectors, and consequently subtracts these assets *twice* from total equity outstanding in computing household equity holdings. Adding back variable annuity assets, as described in the text, corrects for this. The revision is also expected to decrease the amount of stock held by corporate pension plans.

Table 6. Stock Ownership Shares, Adjusted Flow of Funds, 1952–94

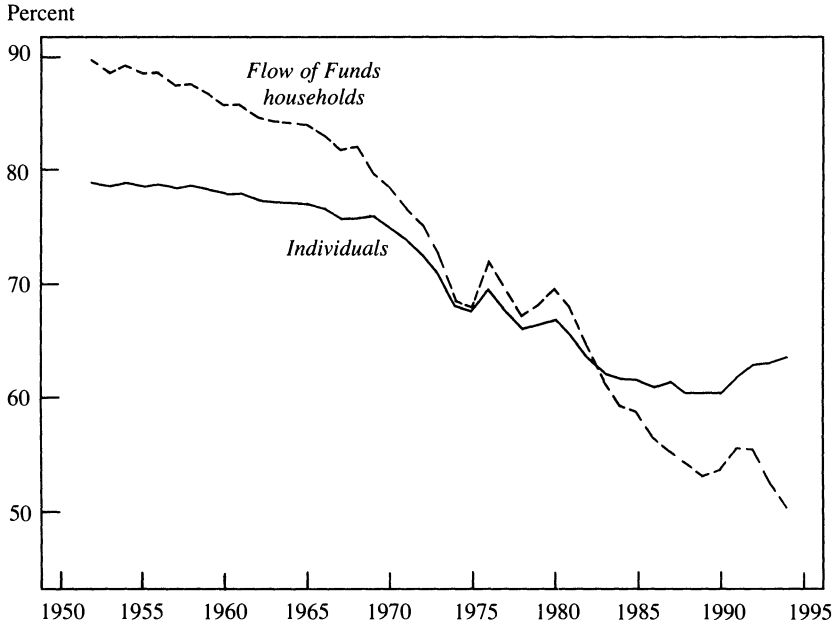
Percent

Year	*Flow of Funds household ownership*	*Nonprofits*	*Bank personal trusts*	*Mutual funds*[a]	*Defined contribution pensions*	*Variable annuities*	*Individuals*
1952	89.7	14.1	0.0	3.1	0.3	0.0	79.0
1953	88.6	13.9	0.0	3.5	0.4	0.0	78.6
1954	89.3	14.0	0.0	3.3	0.4	0.0	79.0
1955	88.6	13.9	0.0	3.3	0.6	0.0	78.6
1956	88.6	13.9	0.0	3.5	0.6	0.0	78.8
1957	87.5	13.7	0.0	3.9	0.8	0.0	78.4
1958	87.6	13.8	0.0	4.0	0.8	0.0	78.7
1959	86.8	13.6	0.0	4.3	1.0	0.0	78.4
1960	85.8	13.5	0.0	4.6	1.1	0.0	78.0
1961	85.7	13.4	0.0	4.6	1.2	0.0	78.0
1962	84.7	13.3	0.0	4.7	1.3	0.0	77.4
1963	84.2	13.2	0.0	4.8	1.4	0.0	77.2
1964	84.1	13.2	0.0	4.8	1.5	0.0	77.1
1965	83.8	13.2	0.0	4.8	1.6	0.0	77.1
1966	83.0	13.0	0.0	5.0	1.7	0.0	76.7
1967	81.7	12.8	0.0	5.2	1.7	0.0	75.8
1968	81.9	12.9	0.0	5.1	1.7	0.0	75.8
1969	69.1	10.9	10.5	5.3	2.0	0.0	76.1
1970	68.0	10.7	10.4	5.0	2.3	0.0	75.0

1971	65.9	10.3	10.7	5.2	2.5	0.0	74.0
1972	64.1	10.1	11.0	4.9	2.7	0.0	72.6
1973	60.4	9.5	12.0	4.7	3.0	0.1	70.8
1974	56.1	8.8	12.7	4.9	3.5	0.1	68.4
1975	56.7	8.9	11.5	4.4	3.8	0.1	67.7
1976	61.8	9.7	10.3	3.6	3.4	0.1	69.6
1977	59.0	9.3	10.6	3.4	3.7	0.2	67.7
1978	56.9	8.9	10.4	3.3	4.3	0.2	66.2
1979	58.7	9.2	9.6	3.0	4.2	0.2	66.5
1980	60.9	9.6	8.8	2.6	4.1	0.2	67.0
1981	59.0	9.3	8.8	2.6	4.3	0.3	65.8
1982	56.1	8.8	8.3	2.8	5.0	0.3	63.7
1983	53.5	8.4	7.9	3.6	5.2	0.3	62.2
1984	51.4	8.1	7.9	4.0	6.2	0.4	61.7
1985	51.3	8.1	7.3	4.5	6.2	0.4	61.6
1986	50.6	7.9	5.9	5.5	6.4	0.5	61.0
1987	49.8	7.8	5.6	6.1	7.1	0.7	61.5
1988	48.8	7.7	5.5	5.7	7.5	0.7	60.6
1989	48.0	7.5	5.4	6.1	7.7	0.8	60.5
1990	48.6	7.6	5.4	6.0	7.1	0.9	60.5
1991	50.8	8.0	4.8	6.5	7.1	0.8	61.9
1992	51.4	8.1	4.0	7.2	7.5	0.9	63.0
1993	49.7	7.8	2.9	9.3	7.8	1.2	63.2
1994	47.7	7.5	2.7	11.0	7.7	2.0	63.7

Source: Federal Reserve, Flow of Funds Accounts.
a. Mutual fund data differ from those in table 5 because table 6 includes only funds owned by households.

Figure 4. Share of Stock Owned by Households, 1952–94



Source: Authors' calculations using data from Federal Reserve, Flow of Funds Accounts.

saving plans, particularly tax-deferred 401(k)s and 403(b)s, through the employed population.

These adjustments to the Flow of Funds data are necessary for understanding the potential consumption effects of an increase in share values in the "mental accounts" framework. A key concern in this context is the degree to which individuals recognize capital gains on equities as a potential basis for higher consumption. The adjusted measures of individual stock ownership may also be important for gauging the significance of "noise traders" in security markets.[30]

For other issues concerning stock ownership, however, these corrections may not be relevant, and the standard view that individuals own less than half of corporate stock may be appropriate. Since corporate stock held through mutual funds or defined contribution pension plans is voted by the fiduciaries, not by the individuals who are the beneficial

30. Shleifer and Summers (1990) describe models of financial market equilibrium with noise traders and explore their allocative effects.

holders of these shares, the rise of indirect ownership may have altered the balance of power within corporations.

The factors that explain the evident trend away from direct ownership of corporate stock and toward ownership through financial intermediaries are not well understood. Tax considerations actually encourage direct ownership of shares. Individuals can more efficiently invoke tax strategies that realize capital losses and defer capital gains if they own shares directly, rather than through a mutual fund. Tax incentives may explain part of the growth of corporate pensions. By investing through 401(k) plans and defined contribution pension plans, individuals can defer taxes on both capital gains and dividend income. Many households hold equity only in these tax-deferred forms. A countervailing incentive is the opportunity for greater diversification that is afforded by mutual funds, relative to purchases of securities in individual companies. Further work is needed to understand the other factors in the financial services marketplace that have led investors away from direct stock holding.

Evolving Patterns of Individual Stock Ownership

One of the salient features of stock ownership is its concentration among a subset of the population. In light of the higher historical average return on stocks than on other investment assets, the substantial number of households that hold no equity represents a puzzle in the analysis of portfolio behavior.[31] Holdings of corporate stock are more concentrated than most other components of net worth. This may be important for understanding the consumption effects of rising share prices, and it is also a key input to standard analyses of "who gains or loses" from share price fluctuations. Because the changing roles of direct and indirect stock ownership may be associated with shifts in the distribution of stock holdings, we interrupt our analysis of aggregate trends to present summary information on the changing cross-sectional pattern of equity ownership.

We use data from the 1962 Survey of Financial Characteristics of

31. Haliassos and Bertaut (1995) provide a recent survey of the related literature. They and King and Leape (1984) present careful econometric treatments of the incidence of stock ownership.

Consumers, and the 1983 and 1992 Surveys of Consumer Finances (SCF) to summarize individual equity ownership during the last three decades.[32] The Survey of Consumer Finances is a stratified random sample of U.S. households, administered by the Federal Reserve Board. Designed to gather detailed information on assets, liabilites, and demographic characteristics, it has been conducted every three years since 1983. In recognition of the highly skewed distributions of many types of financial and real assets, the survey oversamples high-income households. Each SCF contains an area-probability sample, which is a stratified random sample of households chosen from the population at large, and a stratified random sample of households drawn from a set of high-income tax returns. Both samples are surveyed using the same questionnaire. In 1983, 438 of the 4,103 SCF households were from the high-income sample, compared with 1,450 of 3,906 in 1992.[33]

The present analysis focuses primarily on the 1983 and 1992 Surveys of Consumer Finances because in these two years the specific goal of the SCF was to provide a detailed cross-sectional sample of wealth holdings.[34] In this respect, the intermediate surveys are less useful. The 1986 SCF merely reinterviewed the 1983 sample and was not as complete in its gathering of stock and pension data as the previous survey.[35] In 1989, one of the priorities was to establish a panel with the 1983 survey. The design of the 1983 and 1992 surveys was not encumbered by considerations of preserving a panel data set.[36]

Table 7 reports the number and percentage of households owning stock in 1962, 1983, and 1992. Both for households with any stock holdings and households with stock holdings greater than $2,000, successive rows of the table contain progressively more comprehensive

32. A systematic survey of trends in share ownership in the early postwar period may be found in Blume, Crockett, and Friend (1974). Projector and Weiss (1966) describe the 1962 Survey of Financial Characteristics of Consumers.

33. Kennickell and Starr-McCluer (1994).

34. The 1983 survey instrument and sample are described in Avery, Elliehausen, and Kennickell (1988), while the 1992 survey is described in Kennickell (1995).

35. See Heeringa, Connor, and Woodburn (1994).

36. Curtin, Juster, and Morgan (1989) compare different wealth surveys, and conclude that only the SCF has enough high-income households to permit tabulations of detailed asset categories. Avery, Elliehausen, and Canner (1984) and Avery and Elliehausen (1986) tabulate basic results from the 1983 SCF. The 1992 data are summarized in Kennickell and Starr-McCluer (1994). Antoniewicz (1995) describes the link between SCF data and aggregate data from the Flow of Funds accounts.

Table 7. Stock Ownership, 1962, 1983, and 1992[a]

Units as indicated

Investment form and household category	*Number of households (millions)*			*As percentage of all households*		
	1962	*1983*	*1992*	*1962*	*1983*	*1992*
Any stock holdings						
Publicly traded	10.0	16.0	17.0	17.2	19.1	17.8
Plus mutual fund	11.1	16.9	21.1	19.0	20.1	22.0
Plus IRA/Keogh account	. . .	19.7	26.8	. . .	23.5	28.0
Plus 401(k) plan	. . .	23.2	31.8	. . .	27.7	33.2
Plus all defined contribution plan	. . .	27.9	35.7	. . .	33.2	37.4
Stock holdings > $2,000[b]						
Publicly traded	7.3	11.5	12.4	12.6	13.7	12.9
Plus mutual fund	8.3	12.3	16.3	14.3	14.6	17.0
Plus IRA/Keogh accounts	. . .	14.4	21.5	. . .	17.1	22.5
Plus 401(k) plan	. . .	16.8	24.8	. . .	20.0	25.9
Plus all defined contribution plan	. . .	20.7	28.0	. . .	24.6	29.3
Total	57.9	83.9	95.6	. . .	. . .	. . .

Source: 1962 Survey of Financial Characteristics of Consumers and the 1983 and 1992 SCFs.

a. Some equity holdings may still be omitted from the analysis because the SCF does not provide detailed information on equity held in trusts for which the respondent is a beneficiary, or in variable annuity accounts. For 1983, we have imputed the share of mutual fund holdings that are accounted for by equity mutual funds. The SCF questionnaire for that year did not collect information on the type of mutual fund investors held. We therefore divide reported 1983 mutual fund assets between stock and bond mutual funds on the basis of the relative proportions of these funds in the 1989 SCF.

b. 1992 dollars.

measures of stock ownership. The first row focuses on direct holding of shares in publicly traded companies. The second row also includes stock held indirectly through mutual funds. The third row adds shares held in IRAs or Keogh accounts. The fourth row adds shares held through tax-deferred saving plans, such as 401(k)s. Finally, the fifth row adds equity held in defined contribution pension plans.[37]

The upper panel of table 7 shows that the number of households owning stock increased between 1962 and 1983. Institutional changes and data limitations only permit calculations for two definitions of

37. Some equity holdings may still be omitted from the analysis because the SCF does not provide detailed information on equity held in trusts for which the respondent is a beneficiary, or in variable annuity accounts. For 1983, we have imputed the share of mutual fund holdings that are accounted for by equity mutual funds. The SCF questionnaire for that year did not collect information on the type of mutual fund investors held. We therefore divide reported 1983 mutual fund assets between stock and bond mutual funds on the basis of the relative proportions of these funds in the 1989 SCF.

ownership in 1962: directly held stock, and stock held either directly or through mutual funds. Neither IRAs, nor 401(k) plans, nor Keoghs existed in 1962, and since the Survey of Financial Characteristics of Consumers did not collect information on detailed pension plan attributes, there is no information on equity held through defined contribution pension plans.

The percentage of households with direct stock ownership declined between 1983 and 1992, while the percentage with indirect holdings increased. By 1992 direct holders of corporate stock accounted for less than half of all equity holders. While 37.4 percent of all households owned stock either directly or through an intermediary, only 17.8 percent of households reported direct stock holdings. For all but the most limited measure of stock ownership (direct holdings) the data show an increase in the incidence of stock ownership between 1983 and 1992. The percentage of households that own stock either directly or through mutual funds, for example, rises from 20.1 to 22.0 percent. The share of households holding equity under the most expansive definition increased by 4.2 percentage points, from 33.2 to 37.4 percent.[38]

The first part of table 7 indicates the total number of households with any exposure to stock price fluctuations. For analyzing consumption decisions, however, it may be more appropriate to focus only on those households with substantial exposure, as defined by an absolute level of equity holding.[39] When the definition of stockholders is limited to only those individuals with at least $2,000 invested in stocks in 1992, the fraction of households categorized as stock owners declines to 12.9 percent, and the extended measure of ownership falls to 29.3 percent. Thus roughly 8 percent of households own some corporate stock, but less than $2,000 worth. Stock price fluctuations are not likely to have large absolute effects on the net worth of these households, although given the low levels of asset holdings for many households, the proportionate effects of stock price movements may be substantial.[40]

38. SCF staff report some concern that some closely held stock was classified as publicly traded stock in the 1983 SCF, thereby overstating the number of households owning traded stock and understating the growth of shareholdings between 1983 and 1992.

39. All monetary amounts in our analysis of the Survey of Consumer Finances are given in 1992 dollars.

40. Poterba, Venti, and Wise (1994) present data on the distribution of financial asset holdings for households in which the head is approaching retirement age.

One of the reasons for exploring the disaggregate pattern of stock ownership is to provide some information on the marginal propensities to consume out of wealth for stockholders. An important dimension for such analysis is stockholder age. Table 8 presents information on stock ownership by the age of household head for 1983 and 1992.[41] Households in which the head is over the age of sixty-five hold more than 40 percent of the publicly traded stock held by individuals in 1992 (almost 50 percent in 1983). The highest probability of owning stock occurs in the years immediately preceding retirement.

Table 8 illustrates the dramatic growth of indirect stock holdings. In 1983, for example, 17 percent of households in the 45–54 group hold stock only indirectly. By 1992, this percentage has grown to 28 percent. The comparable statistic for the households of those aged from thirty-five to forty-four rises from 20 to 24 percent. Comparing the entries in the middle and right panels of table 8 suggests that the critical growth has taken place in mutual fund and IRA or Keogh holdings. Including indirect holdings has a larger effect on the estimated rate of stock ownership for households with younger heads than for those with older ones. In 1992 the proportion of households in the 35–44 group that own shares directly is only 20 percent, compared with 44 percent that own stock directly or indirectly. The increase in the probability of ownership is smaller (18 percent to 27 percent) for households with heads over the age of sixty-five.

To link the disaggregate information on stock ownership to the discussion of consumption and stock price fluctuations, the information in table 8 can be used to compute the age distribution of capital gains on corporate stock. The market value of corporate stock was $6,048.8 billion at the end of 1994, and it increased by $1,119 billion between December 1994 and June 1995. Since 63.7 percent of outstanding equity was held in forms that we define as providing individual control over these assets, individuals therefore received a capital gain of $713 billion. The distribution of this gain by age is as follows:

41. Bosworth, Burtless, and Sabelhaus (1991) and Attanasio (1994) present information on age-specific saving rates. This paper uses the following convention for selecting a head of household. When the survey respondent is part of a married couple, the head is the spouse with higher wage, salary, or self-employment income. If neither spouse reports labor income, the head is the older spouse.

Table 8. Distribution of Stock Ownership by Age, 1983–92

Percent

Survey year and age of household head	*Percent of all households*	*Publicly traded stock*			*Publicly traded, mutual fund, and IRA/Keogh*			*Publicly traded, mutual fund, IRA/Keogh, and defined contribution plan*		
		Percent who own stock	*Percent of stock owners*	*Percent of stock owned*	*Percent who own stock*	*Percent of stock owners*	*Percent of stock owned*	*Percent who own stock*	*Percent of stock owners*	*Percent of stock owned*
1992 survey										
Under 25	5.21	4.57	1.33	0.05	6.52	1.21	0.06	10.39	1.45	0.06
25–34	20.76	13.23	15.40	4.28	21.28	15.76	4.44	35.61	19.78	5.13
35–44	22.98	20.21	26.05	17.01	30.69	25.16	16.75	44.06	27.09	16.97
45–54	16.42	20.48	18.87	18.07	35.57	20.84	19.93	48.63	21.37	24.50
55–64	12.84	22.06	15.89	19.24	37.10	16.99	22.39	43.29	14.87	22.63
Over 65	21.80	18.36	22.46	41.36	25.79	20.05	36.43	26.46	15.43	30.71
1983 Survey										
Under 25	6.61	9.95	3.45	0.26	12.36	3.47	0.24	17.20	3.42	0.31
25–34	22.57	13.14	15.55	2.15	16.94	16.26	2.20	30.23	20.54	3.00
35–44	20.42	20.41	21.86	6.83	24.72	21.47	7.37	40.50	24.90	9.13
45–54	15.57	22.28	18.19	16.16	28.07	18.59	16.07	39.04	18.30	17.94
55–64	15.45	23.03	18.65	25.36	30.47	20.02	25.10	38.78	18.03	26.47
Over 65	19.38	21.94	22.30	49.24	24.49	20.19	49.01	25.37	14.80	43.14

Source: 1983 and 1992 SCFs.

Age of household head	*Billions of dollars*
< 35	37
35–45	121
45–54	175
54–64	161
65+	219

The key conclusion from this calculation is that the majority of wealth changes from stock market fluctuations accrue to households with older heads.[42]

Some have argued that households with younger heads benefit indirectly when share prices rise because they will receive substantial bequests from the current elderly. This could even stimulate higher consumption among households that do not hold stock. Ultimately, the young will receive in bequests any assets that are not consumed by elderly. Yet to develop this argument in more detail, we consider the timing of expected bequests. We use actual mortality tables to compute the expected percentage of corporate stock that will be bequeathed to younger generations over various horizons.[43] The results suggest that bequests are not a critical factor in the near term. We estimate that over the next five years 5.7 percent of corporate stock will be bequeathed. Over a fifteen-year horizon the share is 24.4 percent, and over twenty-five years, 45.3 percent. These calculations do not suggest that younger generations will soon receive a large fraction of outstanding equity through this channel, but it is notable that the expected bequest of equity during the next fifteen years is comparable to the amount of equity currently held by households with heads under the age of forty-five.

The concentration of stock ownership, as well as its age distribution, can affect the linkage between stock price fluctuations and consumption

42. We can translate this into a consumption metric with the crude assumption that households exhibit marginal propensities to consume out of wealth equal to $1/(T - \text{age})$, where T is expected age at the end of life. We set $T = 80$, assume that all households heads over age sixty-five are age seventy-two, that all those under age thirty-five are age thirty, and that the households in the other age brackets are all at the bracket midpoint. This implies a "predicted" consumption response of $45 billion (6.3 percent) to the $713 billion share price increase.

43. For married couple households that own stock, we define a bequest as occurring when both members of the couple have died. The average mortality tables may understate life expectancy for stockholders, since age-specific mortality rates are negatively correlated with wealth.

spending. The skewed nature of ownership underpins the view that consumption adjustments by the small set of substantial stock owners cannot have detectable effects on aggregate consumer spending. Table 9 describes the concentration of share ownership with information from the 1962 Survey of Financial Characteristics of Consumers and the 1983 and 1992 SCFs. The results confirm well-known cross-sectional patterns, but suggest new conclusions about trends. In 1983 the 0.5 percent of stock owners with the largest equity portfolios, including both direct and indirect holdings, owned 55.1 percent of total stock. In 1992, this group held only 36.8 percent. The households in this top 0.5 percent group in 1992 had at least $800,000 in equities. The next 0.5 percent of stockholders had equity portfolios worth between $500,000 and $800,000 in 1992, and held 10.3 percent of all equity.

The degree of concentration is even greater if attention is limited to directly held, publicly traded stock. Over 66 percent of directly held stock was held by the 0.5 percent of stock owners with the largest holdings in 1983. This percentage had declined to 58.6 percent by 1992. Comparison between the entries for "all equity" and "nonpension equity" in table 9 suggests that growing participation in defined contribution pension plans has been less important than growing investment in mutual funds and the expansion of tax-deferred retirement saving vehicles, such as IRAs, in reducing the concentration of equity ownership among the wealthiest owners.[44]

Table 9 permits comparisons of inequality in equity holdings, nonequity financial asset holding, and net worth, in 1962, 1983, and 1992. Because some of the variables that we use to construct net worth in 1992 are not available in the 1962 data, and vice versa, we report two variants of 1983 wealth inequality for comparison with 1992 and 1962, respectively. We then focus on pairwise comparisons across years. The calculations for the 1983 data, on the basis of 1962 definitions, are shown in the last two columns of table 9.

The comparison between 1962 and 1983 suggests relatively little change in the concentration of equity ownership. The share of publicly traded stock held by the 0.5 percent of households with the largest stock

44. Some assets that are accumulated in defined contribution pension plans may appear as assets in IRAs, if these pension assets have been "rolled over" in a lump sum distribution. For information on the importance of such rollovers, see Poterba, Venti, and Wise (1995).

Table 9. Stock Ownership Concentration Ratios by Asset and Income Categories, 1962, 1983, and 1992

Percent

Survey year and population percentile	1992 definitions							1962 definitions	
	All equity	*Non-pension equity*	*Publicly traded stock*	*Nonequity financial assets*	*Total net worth*	*Housing equity*	*Total family income*	*Nonequity financial assets*	*Total net worth*
1992 survey									
Top 0.5	36.78	43.93	58.57	21.96	21.68	10.48	9.71	. . .	. . .
Next 0.5	10.28	10.52	11.74	6.99	6.89	5.30	3.87	. . .	. . .
Next 4.0	29.93	29.03	24.18	27.54	24.37	21.57	16.05	. . .	. . .
Next 5.0	12.39	10.76	4.62	15.24	13.77	15.04	11.34	. . .	. . .
Next 10.0	7.82	5.28	0.88	14.57	14.10	19.55	15.68	. . .	. . .
Remaining 80	1.80	0.49	0.00	13.70	19.20	28.07	43.35	. . .	. . .
1983 survey									
Top 0.5	55.06	62.28	66.21	28.40	23.74	8.74	7.62	33.02	22.39
Next 0.5	10.80	12.35	11.76	7.21	7.12	4.22	3.16	8.15	6.28
Next 4.0	21.76	18.47	17.38	23.13	22.86	19.02	13.20	24.45	21.31
Next 5.0	6.82	4.74	3.58	13.15	12.12	13.93	10.51	12.61	12.05
Next 10.0	4.54	2.09	1.07	13.49	13.08	19.62	15.92	11.43	14.31
Remaining 80	1.02	0.08	0.00	14.62	21.08	34.48	49.60	10.33	23.65
1962 survey									
Top 0.5	. . .	59.49	63.29	. . .	. . .	6.05	6.45	35.05	23.47
Next 0.5	. . .	12.17	11.78	. . .	. . .	3.19	2.86	5.43	7.13
Next 4.0	. . .	22.29	20.40	. . .	. . .	17.71	11.46	22.82	20.77
Next 5.0	. . .	4.90	3.77	. . .	. . .	15.98	10.04	13.49	12.38
Next 10.0	. . .	1.16	0.75	. . .	. . .	23.66	15.95	12.27	14.16
Remaining 80	. . .	0.00	0.00	. . .	. . .	33.41	53.25	10.94	22.10

Source: 1962 Survey of Financial Characteristics of Consumers and the 1983 and 1992 SCFs.

portfolios in 1962 was 63.3 percent, compared with 66.2 percent in 1983. Total nonpension equity also became only slightly more unequal between 1962 and 1983. Thus the substantial decline in the inequality of nonpension equity between 1983 and 1992 (from 62.3 percent held by the top 0.5 percent to 43.9 percent) represents a significant departure from the trend of the previous period. The data show that between 1983 and 1992, the share of equity held by the top 0.5 percent of the stock-holding population declined, while that of households with stock portfolios in the ninetieth to ninety-ninth percentiles increased substantially. The share of directly held stock accounted for by households in the eightieth through ninetieth percentiles declined slightly, while the fraction of total equity holdings attributed to this group increased.

The central message of table 9 is that more than one-third of the gains or losses on corporate stock accrue to the roughly half a million households with the largest equity holdings, and another 40 percent of the gains accrue to the 4.5 million households with the next largest equity stakes. If the linkage between stock returns and consumption turns on directly held equity, then the concentration of holdings is even more dramatic: nearly 60 percent of the capital gains on directly held corporate stock accrue to the half a million households with the largest portfolios of corporate stock.

Table 9 also presents distributions of nonequity financial assets, real assets such as owner-occupied real estate, and total net worth. These tabulations use the data and sample weights that underlie the first published tabulations from the 1992 data set.[45] The sample weights are subject to revision in the final version of the data set for public use. With the exception of owner-occupied real estate, the share of each of these asset categories held by very wealthy households declines between 1983 and 1992.[46] The seventh column in table 9 shows the income distribution in 1983 and 1992 as computed from the Survey of Consumer Finances. It shows a growing share (from 7.6 percent in 1983 to

45. Kennickell and Starr-McCluer (1994). The tabulations are subject to revision because the final version of the 1992 Survey of Consumer Finances was not available when this study was conducted. The data underlying the reported tabulations contain no missing values, but use a preliminary sample weight to construct the asset distributions.

46. Our net worth calculations, and most others directed at measuring the inequality of wealth, exclude the actuarial present-discounted value of defined benefit pension benefits. Including these benefits would probably reduce the share of net worth held by the most wealthy households.

9.7 percent in 1992) of family income accruing to households in the top 0.5 percent of the income distribution, and a substantial decline (from 49.6 percent in 1983 to 43.4 in 1992) in the share of income reported by the bottom 80 percent of the distribution.[47] This finding, and the growing concentration of housing equity, is important in showing that the diminishing inequality of equity holding is not simply an artifact of the Survey of Consumer Finances data set, nor of our computational algorithms. Net worth is distributed more unequally than income, nonequity financial assets are distributed more unequally than net worth, and equity holdings are distributed less equally than nonequity financial assets.

The finding that the fraction of corporate stock and of net worth held by the top 0.5 percent and top 1 percent of the distribution *declined* between 1983 and 1992 contrasts with recent studies of wealth inequality that suggest that the inequality of financial asset holdings increased during the period 1983–89.[48] The result is striking, given the rise in share prices during this period and the unequal distribution of share ownership. An increase in the relative value of an asset that is distributed less equally than net worth should increase the inequality of net worth; in principle, it is even possible for the distribution of each component asset to become more equal while the distribution of net worth becomes less equal, with such asset price changes.[49]

47. Levy and Murnane (1992) describe and discuss recent changes in the U.S. income distribution.

48. Wolff (1994, 1995) reports the changes in wealth inequality between 1983 and 1989. These studies adjust the SCF data to align the total reported assets with aggregate totals in the Flow of Funds accounts. Because the SCF totals are typically below those of the Flow of Funds, these corrections inflate the amount of each asset held by each household that reports it. They do not change the set of households who have a given asset, nor the inequality within asset categories, although they can affect the measured inequality of broader composite measures of financial assets or net worth.

49. Consider an economy with two assets, A and B. Households in the top 1 percent of the wealth distribution own s_A and s_B percent of these assets respectively. The market value of asset A is V_A and that of B is V_B. Let $w_A = V_A/(V_A + V_B)$ and $w_B = V_B/(V_A + V_B)$. The percent of net worth held by the richest 1 percent of households is $s_A w_A + s_B w_B$. Assume that A is distributed less equally than B, such that $s_A > s_B$. At a different date, the top 1 percent of households hold s_A' and s_B' percent of A and B, respectively. Assume $s_A' < s_A$ and $s_B' < s_B$. It does not follow that net worth is more equally distributed. If $w_A' > w_A$, wealth could still be more equal at the second date then the first. In the simple case of $s_B' = s_B$, the inequality of net worth rises if $s_A'/s_A > s_B/s_A + (1 - s_B/s_A)(w_A/w_A')$. If $s_B/s_A = 0.25$, and asset A appreciates 50 percent, so that $w_A/w_A' = 0.67$, then the inequality of net worth will rise for any s_A'/s_A above 0.75.

To assess the contribution of rising share prices to inequality, we estimate the change in the inequality of net worth between 1983 and 1992 that would have resulted only from changes in asset prices.[50] We adjust the reported 1983 values of corporate stock holdings and closely held businesses by the real appreciation of the Standard and Poor's Composite Share Price Index, and the value of owner-occupied housing by the real change in the Commerce Department's price index for constant-quality homes. The resulting shares of net worth are as follows:

Wealth percentile	*Actual 1983 (percent)*	*Predicted 1992 (percent)*	*Actual 1992 (percent)*
Top 0.5	23.74	25.63	21.68
Next 0.5	7.12	7.70	6.99
Next 4.0	22.86	23.11	24.37
Next 5.0	12.12	11.71	13.77
Next 10.0	13.08	12.10	14.10
Remaining 80.0	21.08	19.75	19.20

Thus the actual share of wealth holdings by the most wealthy households in 1992 was substantially less than the extrapolation of the 1983 wealth distribution would have predicted. Ceteris paribus, the relative rise in corporate stock prices would have contributed to increasing inequality. Other changes, however, were more important than asset price changes in generating changes in the distribution of equity holdings and net worth; in particular, the diffusion of substantial stock holdings to households near, but not at, the top of the wealth distribution.

The difference between these findings and others showing rising inequality appears to be due to our reliance on 1992, rather than 1989, data. When we apply our methods to the 1989 SCF data, we find rising wealth inequality between 1983 and 1989. Our estimates suggest that the share of total net worth held by the 0.5 percent of households with the highest net worth increased from 23.7 percent to 26.1 percent between 1983 and 1989. This makes the decline from 26.1 percent in

50. Weicher (1995) explores the effect of rising share prices on net worth inequality during the period 1983–89 and concludes that favorable stock returns did not substantially exacerbate inequality at that time, because they were paralleled by rising real estate values.

1989 to 21.7 percent in 1992 all the more striking. A critical question is whether the change in wealth inequality recorded by the 1989 and 1992 Surveys of Consumer Finances is a reliable indicator of actual changes in the U.S. wealth distribution.[51]

The asset distribution among the households with highest net worth in 1983, 1989, and 1992 raises some questions about the data from the 1989 SCF. Among the top 0.5 percent of households, for example, the share of net worth held in corporate stocks was 21.2 percent in 1983, 8.0 percent in 1989, and 14.4 percent in 1992. The share of net worth in closely held businesses was 34.6 percent, 42.1 percent, and 38.4 percent in these years, respectively. At a minimum, the negatively correlated fluctuations in the shares of these two assets suggests that there may be some misclassification of closely held equity in some years. It is not clear whether this could have any effect on the measured inequality of net worth, but it could affect the inequality of component assets, such as corporate stock.

The 1989 and 1992 Surveys of Consumer Finance both show a decline in the share of net worth held by the 80 percent of households with the lowest net worth. This group's share of net worth fell from 21.1 percent in 1983 to 19.2 percent in 1992. The gain in net worth share for households between the eightieth and ninetieth percentiles in the wealth distribution was approximately half of the decline for the lowest 80 percent of households. A key conclusion to emerge from table 9 is that there have been nontrivial recent changes in the distribution of wealth among the households that are high in the net worth distribution.

To complete the disaggregate analysis of stock ownership, we consider the income and nonequity wealth holdings of households that own stock.[52] Tables 10 and 11 provide summary information on these dimensions of stock ownership, drawn from the 1983 and 1992 SCFs. They show a strong positive relationship between income, financial assets other than equity, and the probability of stock ownership.

51. Even though the SCF is the best available data source on the distribution of wealth, the small number of high-wealth households on which the SCF results are based still makes these tabulations potentially sensitive to outliers. Analysis of the 1983–89 SCF panel might provide further information on the changing patterns of asset holdings between these years.

52. Poterba (1995a) presents more detailed information on the characteristics of stockholders.

Table 10. Distribution of Stock Ownership by Family Income, 1983 and 1992

Percent

Survey year and income of household head	*Percent of all households*	*Publicly traded stock*			*Publicly traded, mutual fund, and IRA/Keogh*			*Publicly traded, mutual fund, IRA/Keogh, and defined contribution plan*		
		Percent who own stock	*Percent of stock owners*	*Percent of stock owned*	*Percent who own stock*	*Percent of stock owners*	*Percent of stock owned*	*Percent who own stock*	*Percent of stock owners*	*Percent of stock owned*
1992 survey										
Under $15,000	27.93	5.08	7.95	4.56	7.72	7.69	4.21	10.02	7.49	3.80
$15,000–$25,000	17.97	9.93	10.01	2.36	16.66	10.68	3.29	23.59	11.34	3.27
$25,000–$50,000	28.13	18.47	29.15	19.26	31.26	31.37	18.59	44.85	33.76	18.39
$50,000–$75,000	13.38	27.35	20.53	15.16	45.94	21.93	15.25	64.56	23.12	16.74
$75,000–$100,000	5.51	41.90	12.94	8.76	58.22	11.43	11.15	67.08	9.88	12.10
$100,000–$250,000	5.90	46.50	15.39	20.78	65.23	13.73	22.11	75.26	11.89	22.97
Over $250,000	1.19	60.50	4.03	29.11	75.07	3.18	25.40	79.29	2.52	22.72
1983 survey										
Under $15,000	26.04	4.87	6.65	0.85	5.85	6.48	0.83	7.36	5.77	0.80
$15,000–$25,000	19.75	13.06	13.53	2.25	15.22	12.78	2.31	22.82	13.57	2.26
$25,000–$50,000	32.20	19.62	33.13	6.28	24.69	33.81	6.92	39.95	38.73	9.08
$50,000–$75,000	13.88	32.00	23.28	9.39	41.73	24.63	10.14	57.25	23.92	12.63
$75,000–$100,000	3.82	46.85	9.37	6.51	58.23	9.45	6.64	69.10	7.94	7.28
$100,000–$250,000	3.66	57.98	11.13	24.12	66.48	10.35	25.02	75.17	8.28	24.89
Over $250,000	0.65	85.23	2.90	50.60	90.04	2.49	48.14	91.52	1.79	43.06

Source: 1983 and 1992 SCFs.

Table 11. Distribution of Stock Ownership by Value of Nonequity Assets, 1983 and 1992

Percent

Survey year and value of assets	*Percent of all households*	*Publicly traded stock*			*Publicly traded, mutual fund, and IRA/Keogh*			*Publicly traded, mutual fund, IRA/Keogh, and defined contribution plan*		
		Percent who own stock	*Percent of stock owners*	*Percent of stock owned*	*Percent who own stock*	*Percent of stock owners*	*Percent of stock owned*	*Percent who own stock*	*Percent of stock owners*	*Percent of stock owned*
1992 survey										
None	10.52	0.75	0.44	0.11	1.07	0.40	0.08	4.49	1.26	0.08
$0–$5,000	35.65	7.92	15.83	4.32	12.51	15.91	4.23	21.58	20.58	4.20
$5,000–$10,000	10.02	14.80	8.32	4.65	27.29	9.75	4.56	38.95	10.44	4.76
$10,000–$25,000	13.84	17.56	13.63	4.08	37.45	18.49	5.75	49.64	18.39	6.94
$25,000–$50,000	10.50	24.84	14.63	8.33	39.69	14.87	9.02	52.97	14.89	11.03
$50,000–$100,000	8.19	32.40	14.89	9.48	50.57	14.78	10.88	62.01	13.60	12.02
$100,000–$250,000	7.01	48.45	19.04	25.56	61.09	15.27	23.36	65.88	12.35	22.43
Over $250,000	4.27	55.18	13.21	43.47	69.14	10.53	42.12	74.31	8.49	38.55
1983 survey										
None	10.36	0.69	0.38	0.00	0.69	0.31	0.00	1.41	0.44	0.01
$0–$5,000	36.77	7.22	13.92	1.08	9.82	15.36	1.21	19.46	21.54	2.50
$5,000–$10,000	11.29	17.04	10.09	1.16	22.66	10.88	1.30	35.37	12.03	2.01
$10,000–$25,000	15.88	24.40	20.33	4.62	30.19	20.39	5.92	44.57	21.31	7.16
$25,000–$50,000	10.15	31.53	16.78	6.26	40.11	17.31	6.86	49.63	15.16	7.39
$50,000–$100,000	7.94	38.52	16.05	9.13	43.62	14.74	9.41	57.00	13.63	10.98
$100,000–$250,000	5.34	50.95	14.27	16.36	59.38	13.50	16.85	64.63	10.40	16.88
Over $250,000	2.26	69.06	8.19	61.38	78.10	7.51	58.45	80.65	5.49	53.07

Source: 1983 and 1992 SCFs.

Table 10 shows that in 1992, 61 percent of households with a family income of more than $250,000 owned stock directly. The probability of direct or indirect stock ownership was 79 percent for this group. Both of these probabilities were much higher a decade earlier; in 1983 the probability of direct or indirect equity ownership for a household with an income of $250,000 (in 1992 dollars) was 92 percent. In 1992 approximately 23 percent of corporate stock was owned by households with family incomes of more than $250,000; another 23 percent was held by households with incomes between $100,000 and $250,000. Thus consumption decisions by these households play an important part in linking stock price fluctuations to overall consumer spending. However, table 10 also shows the rising equality of share ownership. In 1983, households with family incomes of $100,000 and above (in 1992 dollars) held 75 percent of all directly held equity; that share had declined to 50 percent by 1992.

Table 11 presents similar information on the nonequity financial assets of the households that own corporate stock. Publicly traded stock is the most unequally distributed equity measure that we consider; 43 percent of directly held stock is owned by households with nonequity financial asset holdings above $250,000. The comparison between 1983 and 1992 again reveals a substantial increase in ownership of stock at lower wealth levels, consistent with the previous data on the family incomes of stock holders. On the most expansive definition of equity holdings, which includes equity in defined contribution plans as well as shares held through financial intermediaries, 27 percent of corporate stock is held by households with less than $50,000 in other financial assets, and 34 percent by those with nonequity financial assets between $50,000 and $250,000 in 1992.

The conclusion that emerges from this analysis of the cross-sectional data is that stock ownership has become more equal over time, but remains highly concentrated. The proposition that equity capital gains accrue to only a small set of households is not supported by the data, since 37.4 percent of households owned some corporate stock in 1992. The concentration of stock holdings nevertheless implies that a small subset of the population (about 5 percent of all households) receives roughly three-quarters of the capital gains and losses associated with stock price movements.

Stock Market Fluctuations and Consumption

To analyze the relationship between stock market returns and consumption, we test whether the stock market has a causal wealth effect on consumption, or is simply a leading indicator that forecasts future changes in consumer spending.[53] We consider the effect of rising stock prices on consumption outlays in several steps. We begin by summarizing the time series relationship between stock price changes and subsequent consumption fluctuations. The difficulty of interpreting these time-series relationships is illustrated by reference to the consumption effects of the stock market crashes of 1987 and 1929. We then study four issues that are motivated by the foregoing discussion of share ownership patterns. First, we examine whether stock price fluctuations affect the composition of consumption spending, in terms of "luxury goods" that are disproportionately consumed by high-income households and all other goods. Second, we use household survey data to investigate whether consumption by households that own stock is more closely correlated with changes in share prices than is consumption by nonstockholding households. Third, we investigate whether the changing pattern of direct versus indirect stock ownership affects the relationship between stock market fluctuations and movements in consumption spending. Specifically, we test whether stock price changes in the early postwar years had greater predictive power for consumption growth than analogous fluctuations in more recent years, when individual direct stock ownership has represented a smaller share of total market capitalization. Fourth, we explore whether changes in share prices that are associated with changes in dividends (that is, price fluctuations with a constant dividend-to-price ratio) have different effects on consumption spending than fluctuations that are not supported by dividend movements.

Aggregate Statistics

We begin by regressing the growth rate in real per capita consumption ($\Delta \ln c_t$) on lagged changes in real share prices, $\Delta \ln P_{t-1}$:

53. This leading indicator view closely resembles the "passive informant" hypothesis that Morck, Shleifer, and Vishny (1990) develop with respect to stock price movements and investment spending. Detailed evidence on the predictive power of stock returns as leading indicators may be found in Stock and Watson (1990).

Table 12. Aggregate Consumption Spending and Stock Price Fluctuations[a]

Dependent variable	*Constant*	*One quarter lagged change in real stock price*	*Four quarter sum of lagged changes in stock price*	$\bar{R}^2$
Total consumption	0.0037	0.031	. . .	0.068
	(0.0011)	(0.008)		
	0.0036	. . .	0.064	0.101
	(0.0011)		(0.014)	
Consumption of durables	0.0017	0.139	. . .	0.058
	(0.0057)	(0.041)		
	−0.0011	. . .	0.290	0.091
	(0.0057)		(0.076)	
Consumption of nondurables	0.0021	0.032	. . .	0.065
	(0.0011)	(0.008)		
	0.0023	. . .	0.054	0.070
	(0.0011)		(0.015)	
Consumption of services	0.0055	0.007	. . .	0.009
	(0.0008)	(0.006)		
	0.0056	. . .	0.025	0.015
	(0.0008)		(0.010)	

Source: Authors' regressions based on data from NIPA.

a. Each row reports estimates of the coefficient α_1, or $\sum_{i=1}^{4} \alpha_i$, from an equation of the form $\Delta \ln c_t = \alpha_0 + \alpha(L)\Delta \ln P_{t-1} + \epsilon_t$. All equations are estimated from 1947:3 to 1995:2, and include seasonal dummy variables. Standard errors are shown in parentheses.

$$(1) \qquad \Delta \ln c_t = \alpha_0 + \alpha(L)\, \Delta \ln P_{t-1} + \epsilon_t.$$

We consider equations with only the most recent lagged stock price change on the right-hand side, as well as equations with a fourth-order lag polynomial, $\alpha(L)$. We estimate equations using seasonally adjusted quarterly data from the second quarter of 1947 to the second quarter of 1995.[54]

Table 12 presents the results of estimating equation 1 for several broad consumption aggregates. The results in the first row, for total consumption with only a single lagged stock return, suggest that stock

54. Fischer and Merton (1984) report some results for consumption growth as a function of lagged stock returns. Hall (1978) finds that lagged stock market returns are the only variable known at the beginning of each quarter with predictive value for future consumption changes.

market fluctuations forecast increases in real consumption outlays. A 10 percent rise in real stock prices predicts an increase in real per capita consumption of approximately 0.3 percent.[55] Further lagged changes in share prices also have predictive power for consumption growth. The second row of table 12, which also relates to total consumption, shows the sum of the coefficients on the four lagged values of stock price changes. Four quarters after a stock price increase the cumulative change in aggregate consumption is 0.064, more than twice the first-quarter effect.[56]

In order to consider the predictions that stock price fluctuations make for various categories of consumption, table 12 also presents results with one lagged value and four lagged values of $\Delta \ln P_{t-1}$ for each of the three major subcategories of consumption: durables, nondurables, and services. The results in the lower rows of table 12 show that stock price changes predict the largest percentage change in spending for consumer durables. A 10 percent increase in share prices predicts an increase in durable outlays of 1.4 percent in the first quarter, and 2.9 percent after four quarters. Rising stock prices predict a proportionate increase in durable outlays that is between four and six times larger than that for nondurables, which, in turn, is several times larger than the increase in the consumption of services.

To avoid the simultaneity in contemporaneous stock returns and consumption growth, the results in table 12 focus on the change in consumption beginning in the quarter *after* a change in stock prices. This may result in underestimating the total change in consumption that is predicted by a stock price change, although the use of quarterly data should mitigate this problem. We have explored the sensitivity of our findings to the inclusion of contemporaneous stock market returns. In an equation like that in the second row of table 12, where the sum of the coefficients on four lagged stock market returns is 0.064 (0.014), the current stock market return has a coefficient of 0.011 (0.007).

55. We test for the possibility that stock price increases are associated with proportionally different changes in subsequent consumption than stock price decreases, but find no evidence of such an effect.

56. In equations not reported here, we also include four lagged values of the real consumption growth rate in the specification. Only one of these values enters with a statistically significant coefficient, and the predicted long-run effect of stock price growth on consumption is very similar to that from the equation in the second row of table 12.

The coefficients on the lagged stock market returns remain virtually unchanged with the addition of the current return to the specification. The largest contemporaneous correlation is between stock returns and nondurable consumption; the correlation with outlays on durables is negative.

The point estimates in table 12 suggest that the 17 percent increase in share prices between December 1994 and June 1995 predicts an increase in total consumption of 1.09 percent, and an increase in durable consumption of 4.9 percent, after four quarters. Since total durable spending in 1994 was $591.5 billion and total consumption was $4,628.4 billion, this corresponds to a $29 billion increment to 1995 durable outlays and a $50.4 billion increase in total consumption. Since a 17 percent rise in share prices translates into just over $1 trillion of wealth creation, the predicted change in consumption spending is approximately 0.05 times the change in net worth.[57] Thus the conclusion that emerges from these consumption growth equations, which exclude many potential control variables, is very similar to that of traditional aggregate consumption function analysis. The open question is whether these results reflect the stock market's role as a leading indicator, or whether they are partly due to a wealth effect associated with stock price fluctuations.[58]

Consumption and the Stock Market in 1987 and 1929

In spite of the long tradition of modeling aggregate consumption as a function of labor income and household net worth, there appears to be some reluctance to apply this model to the analysis of the consumption effects of large stock market movements.[59] This is particularly

57. One component of the link between stock price fluctuations and consumption involves the "target saving" of defined benefit pension plans. When share prices rise, corporations do not need to contribute as much to their pension plans to cover prospective pension liabilities. This diminishes the flow of contributions to these plans. In the national income accounts these contributions are classified as personal saving. Bernheim and Shoven (1988) discuss this linkage between asset prices and saving in more detail.

58. The ideal test for distinguishing these views would study the reaction of consumption to autonomous changes in stock prices, changes that were not explained by revisions to expectations about future cash flows or discount rates. Morck, Shleifer, and Vishny (1990) attempt a related test in their analysis of how the stock market affects investment.

59. Ando and Modigliani (1963) is the seminal paper on the empirical modeling of

evident in discussions about the economic effects of the stock market crashes in 1987 and 1929.

The stock market crash of October 1987 provides a valuable opportunity to study the effect of stock price fluctuations on consumption spending, and to review the economic analysis of this effect. As a result of the crash, real share prices declined by nearly 30 percent from their peak in August 1987. In evaluating the potential effect of such a price change on consumer spending, the report of the Presidential Task Force on Market Mechanisms concluded that "it is unlikely that a direct wealth effect along the straightforward lines usually described stands behind . . . the observed relationship between stock price movements and aggregate-level consumer spending."[60] This statement was based on the fact that most households do not own stock and that among those that do, the distribution of ownership is highly concentrated, as well as on the view that those who do own substantial stock have enough wealth to insulate their consumer spending from short-run shocks.[61] Popular accounts noted that the feared collapse in consumption had failed to materialize in the months after the crash, and surveys indicated that most consumers had not adjusted their spending patterns in response to the crash.[62]

Two important features of the 1987 stock market crash were the short duration of the stock price increase that preceded it and the rebound in share prices in the quarter after the crash. The growth path of both total and durable consumption, as well as the pattern of stock market returns, for the seven quarters centered on the October 1987 stock market crash is shown below:

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aggregate consumption as a function of labor income and net worth. Blinder and Deaton (1985) provide a recent discussion of aggregate consumption functions.

60. U.S. Presidential Task Force on Market Mechanisms (1988, p. VII-2).

61. Mankiw and Zeldes (1991) note that households that report owning stock in the Panel Study of Income Dynamics account for 32 percent of total food consumption in this database. Because the budget share of food is smaller for high-income, high-wealth households than for lower-income households, the fraction of total consumption accounted for by stockholders is presumably greater than this.

62. In a *Business Week*–Harris poll, 85 percent of respondents indicated that the crash did not affect their finances. By that time some macroeconomic forecasters had also revised downward their view of the "wealth effect" of stock prices on consumption. (See Karen Pennar, "It's Almost As If It Never Happened—Almost," *Business Week,* April 18, 1988, pp. 56–59.)

		Per capita growth	
Quarter	*Log change in stock price*	*Total consumption*	*Durables*
1987:1	14.8	−0.002	−0.067
1987:2	1.9	0.010	0.032
1987:3	4.6	0.007	0.033
1987:4 (crash)	−29.0	−0.003	−0.034
1988:1	9.1	0.015	0.047
1988:2	0.6	0.004	0.002
1988:3	−2.3	0.005	−0.010

The stock price increases in the three quarters before the crash were reversed by the crash, but stock prices finished 1987 only 7.7 percent below their value a year earlier. The stock market rally in the first quarter of 1988 left the market above its value in January 1987.

The informal table above shows that per capita consumption growth was slightly negative, and that growth in spending on durables was substantially negative, in the quarter of the crash.[63] Including indicator variables for the fourth quarter of 1987 and the first quarter of 1988 in the regression equations for total consumption outlays reported in table 12 yields coefficient estimates, with standard errors in parentheses, of −0.0096 (0.0073) and 0.018 (0.008), respectively. Thus the first quarter of 1988 experienced more rapid consumption growth than would have been predicted by simple models with four lagged quarterly values of stock returns. We cannot reject the null hypothesis of no unusual effect on total consumption in the fourth quarter of 1987.[64] For durables, the patterns are slightly different. The effect of the fourth quarter of 1987 is negative, but the coefficient for the first quarter of 1988 is 0.071 (0.042). Expenditure on durables did decline in the quarter of the stock market crash, but it was unusually strong during the first quarter of 1988, given the decline in share prices. The data thus suggest that the

63. Dornbusch and Fischer (1994) note that consumption grew slowly after the crash and use this as evidence in support of a wealth effect on consumption.

64. The models in table 12 relate consumption growth to lagged returns. Since the stock market crash occurred only three weeks into the fourth quarter of 1987, it is plausible to expect unusually low consumption growth in this quarter. While the coefficient estimate on the dummy variable for the fourth quarter of 1987 confirms this, we are unable to reject the hypothesis that consumption growth in this quarter is explained by the model that excludes current returns.

1987 stock market crash had a smaller negative effect on consumption growth than the regression equations in table 12 would have predicted.[65]

The events of 1929 and the early 1930s provide another opportunity to study the effect of stock price fluctuations on consumption. The data for this period are less detailed than for 1987, and the strength of the conclusions that can be drawn is correspondingly lower. Calculations that assume a stable marginal propensity to consume out of wealth suggest that the wealth effect of the 1929 crash on consumer spending should have been small, both because the stock market accounted for a relatively small share of household net worth, and because the marginal propensity to consume out of wealth appears to have been small during the interwar period.[66] Household spending on durables declined more than that on nondurables, which remained robust until 1932.[67] Thus it appears that the effect of a stock price decline on consumers, through the wealth effect, was muted.

Stock Returns and Spending on Luxury Goods

We investigate whether stock price fluctuations affect consumer spending through a wealth effect by examining whether stock returns forecast changes in the composition of consumer spending. We use the Consumer Expenditure Survey published by the Bureau of Labor Statistics to identify several groups of goods that are disproportionately consumed by high-income households that are likely to own stock, and

65. Birinyi and Miller (1987) conclude that the evidence that stock market fluctuations cause consumption changes is weak at best. They find a very weak association between the prices of New York City condominiums and changes in stock market values, despite the fact that this is a luxury consumption item that might be demanded by stock owners. This evidence is similar, in spirit, to our tests for whether stock market fluctuations affect the share of luxury consumption, discussed below.

66. A constant marginal propensity to consume out of wealth is a specialized result that obtains, for example, when a consumer maximizes a time-separable utility function with per-period utility given by $\ln(C)$. More generally, the marginal propensity to consume out of wealth depends upon the available rate of return.

67. Temin (1976) discusses the effect of the 1929 stock market crash on consumption. Romer (1990) draws particular attention to the role of consumer uncertainty in depressing consumption of household durables. Wigmore (1985) examines the behavior of the earnings and share prices of companies in various sectors of the economy and notes the relatively stable earnings of retailers until 1932. Durables producers, notably automobile companies, experienced sharp downturns in profits and share prices much sooner after the crash.

Table 13. Consumption of Luxuries and Antiluxuries

Units as indicated

Consumption category	*Consumption share of $70,000 + households*[a]	*Spending ratio, $70,000 + households to $20,000–$30,000 households*[a]	*Consumption share by category*
Total consumption	0.236	1.85	1.000
Luxuries			
New automobiles	0.314	3.10	0.023
Education[b]	0.308	3.24	0.023
Other Lodging	0.369	3.69	0.003
Entertainment[c]	0.337	3.44	0.004
Household services	0.296	2.76	0.003
Anti-Luxuries			
Rented dwellings	0.045	0.25	0.037
Tobacco products	0.099	0.54	0.008

Source: The consumption share of the highest-income households and the spending ratio are from the Consumer Expenditure Surveys for 1991–93, as reported in U.S. Bureau of Labor Statistics (1994). Consumption share by category is from NIPA for 1994.

a. Households are allocated to income groups on the basis of pretax income.

b. Education is the NIPA personal consumption category for "education and research."

c. Entertainment is the sum of the NIPA personal consumption categories for admission to "motion picture theaters," "legitimate theaters and opera," and "spectator sports."

test whether the share of these goods in aggregate consumption rises after stock prices increase.[68] Anecdotal evidence suggests a very strong market for some luxury products in 1995, possibly related to the rise in share prices.[69]

Table 13 presents the results of this analysis of consumption patterns. It reports both the share of spending on particular items that is accounted for by households with annual before-tax incomes of $70,000 and above (the value at which income in the Consumer Expenditure Survey is top-coded) and the ratio of spending by this group to spending by households with before-tax income between $20,000 and 30,000. For example, households with incomes of $70,000 and above account for 31.4 percent of spending on new cars, while they account for 23.6 percent of spending on all goods.

Table 14 reports the results of estimating consumption share equations that are designed to evaluate whether increases in share prices tilt

68. U.S. Bureau of Labor Statistics (1994).

69. See Laura Bird, "Tired of T-Shirts and No-Name Watches, Shoppers Return to Tiffany and Chanel," *Wall Street Journal*, September 6, 1995, p. B1.

Table 14. Consumption of Luxuries and Antiluxuries and Stock Price Fluctuations[a]

Dependent variable	*One quarter lagged change in stock price*	*Four quarter sum of lagged changes in stock price*
Luxuries		
New automobiles	0.250	0.627
	(0.103)	(0.193)
Education	−0.022	−0.041
	(0.012)	(0.024)
Other lodging	−0.007	0.011
	(0.041)	(0.082)
Entertainment	−0.086	−0.128
	(0.056)	(0.109)
Household services	−0.000	0.019
	(0.033)	(0.065)
Antiluxuries		
Rented dwellings	−0.026	−0.051
	(0.007)	(0.015)
Tobacco products	−0.018	−0.071
	(0.024)	(0.046)

Source: Authors' regressions based on data from NIPA.

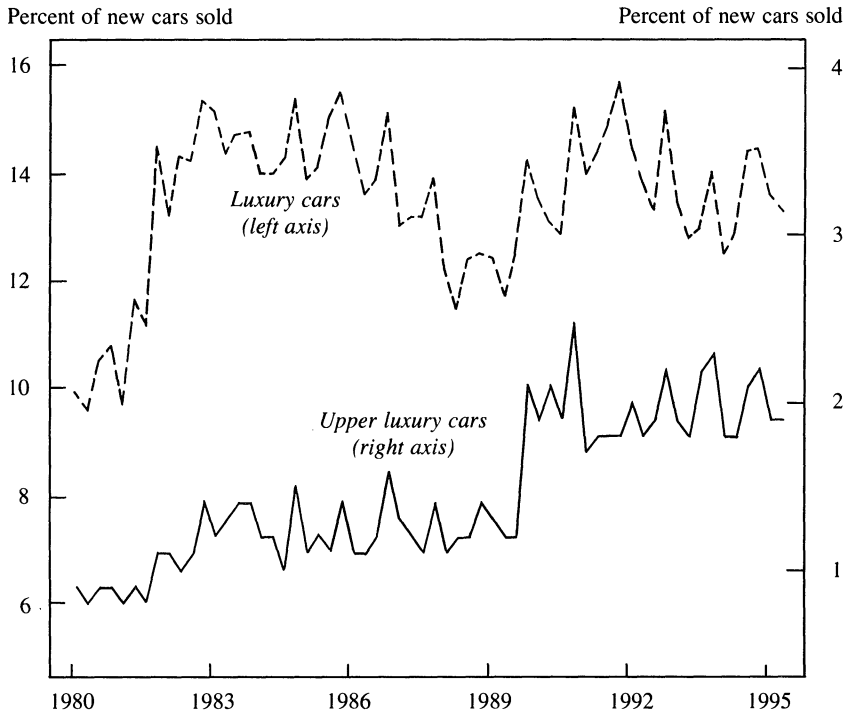
a. The estimated equation is of the form $\ln(L_t/C_t) = \alpha_0 + \alpha_1 [\ln(L_{t-1}/C_{t-1})] + \alpha_2(\Delta \ln P_{t-1}) + \epsilon_t$, where L_t denotes luxury (or antiluxury) consumption and C_t denotes aggregate consumption spending. All equations are estimated from 1959:1 to 1995:2, with the exception of the equation for new automobiles, which is estimated from 1947:2 to 1995:2. All equations include seasonal dummy variables. Standard errors are shown in parentheses.

the composition of consumption toward goods that are consumed by higher-income, stockholding households. The first row considers spending on new cars. A 10 percent rise in share prices in the current quarter is predicted to raise spending on new cars as a fraction of total consumption by 2.5 percent in the next quarter, and by 6.3 percent after four quarters.[70] After four quarters, a 20 percent rise in share prices, similar to the rise in the first half of 1995, would raise spending on new cars from 2.3 percent to 2.6 percent of total spending.

Whether these findings for new car sales reflect the operation of a wealth effect or simply the stock market's forecast of strong consumer demand can be evaluated by considering the relative demand for different types of automobiles. *Ward's Automotive Yearbook* allocates new

70. One difficulty with interpreting these results is that automobile manufacturers and the firms that supply them with components comprise a nontrivial fraction of total stock market value. If investors foresee an increase in new car sales, stock prices may rise as a result.

Figure 5. Luxury Car Sales, 1980–95



Source: Authors' calculations based on data from Ferris (1995). See text for classifications.

cars to several different categories, one of which is termed "luxury."[71] This includes most cars with prices above $25,000 in 1994, and many with prices below this level. Of 8.99 million cars sold in 1994, 1.22 million were classified as luxury cars. Further, the "upper luxury" category, which accounted for 0.17 million cars in 1994, consists of only fifteen models, including BMWs in the 5-, 6-, and 7-series, three Jaguars, and Mercedes E- and S-class cars. The households who purchase these vehicles are almost surely in the wealth category where stock ownership is prevalent, and many are likely to have substantial equity portfolios. Figure 5 shows both luxury and upper luxury cars as a percentage of new car sales for the period 1980–95.

To study the effect of share prices on luxury car purchases, we

71. Ferris (1995).

estimate a regression equation for the luxury fraction of new car sales in each quarter. If share price changes affect consumer spending through a wealth effect, then stock returns should affect positively the fraction of new car sales that are classified as luxury vehicles. We estimate this relationship for the period between the first quarter of 1980 and the second quarter of 1995:2, for which the Ward's data were available. The regression equation, which includes unreported seasonal indicator variables, is as follows (with standard errors in parentheses):

$$\ln(luxury_t/allcar_t) =$$
$$\underset{(0.130)}{-\ 0.283} - \underset{(0.098)}{0.084}(\Delta \ln P_{t-1}) + \underset{(0.064)}{0.821}[\ln(luxury_{t-1}/allcar_{t-1})],$$
$$\bar{R}^2 = 0.763.$$

These results do not support the existence of an important wealth effect. The unreported seasonal coefficients suggest that purchases of luxury cars reach their highest share of all vehicles in the fourth quarter of each year; on average, they account for a 14.5 percent greater share of total vehicle sales in the fourth quarter than in the first quarter, and 5.4 percent more in the fourth quarter than in the third quarter.

We estimate a similar equation for the share of upper luxury cars in the mix of automobiles sold, with the following results (standard errors are in parentheses):

$$\ln(upp\ lux_t/allcar_t) =$$
$$\underset{(0.244)}{-\ 0.223} + \underset{(0.046)}{0.017}(\Delta \ln P_{t-1}) + \underset{(0.056)}{0.900}[\ln(upp\ lux_{t-1}/allcar_{t-1})],$$
$$\bar{R}^2 = 0.824.$$

While stock prices are positively correlated with the upper luxury fraction of new vehicle sales, the effect is not statistically significant. These results also provide little support for the wealth effect, as opposed to the leading indicator, explanation of the correlation between stock returns and future consumption growth.

The results for the other luxury items that we consider are consistent with the findings for luxury cars. The regression coefficients on each consumption category are shown in table 14. We cannot reject the null hypothesis that stock price changes do not predict any change in the share of aggregate consumption accounted for by education, hotel and motel spending, domestic services, and entertainment spending. In

most cases the standard errors on the estimates are large, admitting large positive or negative effects, but the point estimates are not supportive of wealth effects.

The two "antiluxuries" considered at the bottom of table 14 provide more support for the proposition that stock returns affect the composition of consumption. Rising share prices are associated with a decline in the share of rental housing in total consumption, and exert a weak negative effect on the share of tobacco spending. Thus, overall, this analysis of luxury goods produces mixed results.

Stock Prices and Consumption: Household-Level Evidence

Aggregate data appear to have limited power to resolve whether stock returns exert a significant wealth effect on consumption. An alternative source of information on this issue is household survey data. One of the standard problems with basing such analysis on household surveys, however, is the absence of data sets that collect information on both household portfolio holdings and consumption. The Panel Study of Income Dynamics (PSID), which collects information during the first few months of each year, is one survey that does contain both types of data, although direct information on consumption is limited to outlays on food. In an important study designed to help resolve the "equity premium puzzle," Gregory Mankiw and Stephen Zeldes stratify PSID households into those that own stock and those that do not, and then compute the correlation between growth in per capita food consumption and excess returns on the stock market for the two groups.[72] The results suggest that this correlation is substantially higher for those who own stock than for others. These results could be due to differences between stockholders and nonstockholders that are unrelated to share ownership, per se, but they at least raise the possibility that stock returns affect consumption through wealth effects.

We revisit the Mankiw-Zeldes analysis, but introduce three modifications. First, in addition to considering growth in food consumption, we analyze a broader measure of total consumption. Jonathan Skinner shows that information on rent payments and house value, as well as spending for food at home and away from home, can be used to obtain

72. See Mankiw and Zeldes (1991).

a proxy for total household consumption for PSID households.[73] While food consumption alone explains only 26 percent of the variation in total consumption from the Consumer Expenditure Survey, a consumption proxy including house value and rental payments explains 72 percent. Thus it seems possible to substantially improve upon food consumption as an indicator of household consumption. Second, we exploit information that has been released since Mankiw and Zeldes's study, notably, additional years of consumption data. Third, we use PSID information on participation in pension plans and employer thrift plans to identify households that are likely to have only indirect holdings of corporate stock. While direct ownership of traded equity and mutual funds cannot be distinguished in the PSID, the distinction between those with such equity holdings and those with equity in 401(k) plans, 403(b) plans, or defined contribution pension plans is relevant for our analysis of direct versus indirect stock holdings.[74]

We follow previous work in defining the sample for analysis.[75] In particular, we exclude PSID families who were part of the 1968 poverty subsample, families that are living with other families (which makes it difficult to distinguish consumption outlays), family-years in which the identity of the household head or the head's spouse changed, and family-years in which any component of consumption was top-coded. Our sample spans the period 1970–92, but because the PSID did not collect information on food consumption in 1973, 1988, or 1989, it excludes the years 1973, 1974, 1988, 1989, and 1990.

We stratify PSID households along three dimensions. The first is whether or not they report ownership of corporate stock or mutual funds. We distinguish between households with different levels of direct equity ownership, defining as "stockholders" those with any corporate stock, those with more than $1,000 in corporate stock, and those

73. Skinner (1987) develops this broader consumption measure and explores its statistical properties.

74. The PSID survey asks households whether they own "any shares of stock in publicly held corporations, mutual funds, or investment trusts, including stocks in IRAs."

75. We follow the sample selection and data definition rules described in the appendix to Mankiw and Zeldes (1991) and Zeldes (1989). When we test for differences in the correlation between consumption growth and stock returns for households that hold stock and those that do not, we obtain results that are broadly similar to those of Mankiw and Zeldes for the sample period that they consider.

with more than $10,000 (in 1984 dollars). The second dimension is whether the head of household or the head's spouse participates in a thrift plan; and the third is participation in a pension plan.[76] We then consider the correlation between the year-to-year growth of the Skinner consumption aggregate and stock market returns for groups of households with different combinations of direct equity holdings, thrift plans, and pension coverage. While the previous analysis focused on quarterly time-series data and related changes in consumption to lagged stock market returns, because the PSID data are annual we now focus on contemporaneous changes in share prices and consumption.[77]

Table 15 presents the results of our analysis. The upper panel reports results for growth in food consumption, while the lower panel is concerned with growth in the Skinner consumption index.[78] When we use the Skinner index, we find small differences in the correlation between growth in consumption and stock returns for stockholders and nonstockholders. For each classification of stock ownership, however, the correlation is greater for those who are classified as stockholders than for those who are not. With the Skinner index, only one of these differences, that for stockholders with more than $10,000 in equity, approaches significance under conventional statistical tests. Most of the findings for food consumption, in the upper panel, are also imprecise. It is disturbing that many of the correlations between the growth rate of the Skinner consumption index and excess stock returns are negative. This appears to be due to the nonfood components of the index, since

76. The PSID only collects detailed information on pension plan characteristics for workers over the age of forty-five. For younger workers, it does not distinguish between defined benefit and defined contribution plans. Therefore we can only use an indicator variable for "pension plan participant," recognizing that this includes some defined benefit plan participants with no equity stake along with equity holders through defined contribution plans.

77. We have estimated the correlation between current consumption growth and lagged stock returns for the PSID households and find that the resulting correlations are indistinguishable from zero. This is due to our choice of sample period; a similar result emerges from annual national accounts data for the PSID sample years, even though our findings in table 12 show that, over a longer period, quarterly national accounts data suggest a positive correlation between changes in stock price and consumption growth.

78. The differences in the correlations between stock returns and growth in food consumption for stockholders and nonstockholders parallel those in Mankiw and Zeldes (1991). Our results from the longer PSID sample period yield less statistically significant differences in these correlations than those found by Mankiw and Zeldes.

Table 15. Correlation of Consumption Growth and Stock Returns for Stockholders and Nonstockholders[a]

Correlation

Consumption measure and stock ownership category	*Criterion for classification as a "stockholder"*		
	Stock value > 0	*Stock value > 1,000*	*Stock value > 10,000*
Per capita food consumption			
Nonstockholders	0.120	0.076	0.078
Without thrift plan	0.058	0.077	0.063
With thrift plan	0.350	0.049	0.226
Without pension plan	0.059	0.071	0.044
With pension plan	0.143	0.047	0.080
Stockholders	0.125	0.214	0.286
Without thrift plan	0.190	0.133	0.226
With thrift plan	0.043	0.261	0.314
Without pension plan	0.148	0.134	0.339
With pension plan	0.089	0.205	0.232
Per capita Skinner consumption index			
Nonstockholders	−0.125	−0.146	−0.126
Without thrift plan	−0.208	−0.178	−0.182
With thrift plan	0.218	−0.010	0.048
Without pension plan	−0.217	−0.191	−0.202
With pension plan	−0.004	−0.090	−0.052
Stockholders	0.011	0.068	0.219
Without thrift plan	0.081	0.042	0.269
With thrift plan	−0.095	0.094	0.097
Without pension plan	0.055	0.026	0.226
With pension plan	−0.012	0.092	0.187

Source: Authors' calculations based on data from the PSID.

a. Each entry reports the correlation of a measure of consumption growth with return on the stock market for PSID households in each category, as described in the text. The sample period is 1970–92, excluding 1973, 1974, 1988, 1989, and 1990. Stockholders are defined by the criteria at the column heads. The standard error of each calculation may be computed as $\sqrt{(1 - \rho^2)/16}$, where 16 denotes the degrees of freedom; these standard errors are approximately 0.25 for each entry.

the correlation between food consumption growth and excess returns is positive.

The results with respect to indirect stock ownership are suggestive, but not conclusive. For both food consumption growth and the Skinner index of consumption growth, and for most definitions of stock ownership, those who have thrift plans exhibit greater correlation between consumption growth and stock returns than those who do not have thrift plans. Similarly, those with pension plans, some of which are defined contribution plans, also exhibit a higher consumption growth correla-

tion than those without such plans.[79] These results are consistent with the notion that even indirect stock holding matters in household consumption planning, but they do not reject the null hypothesis of no effect. Moreover, some of the patterns are difficult to explain. For two of the three definitions of stock ownership, in the Skinner index, those in thrift plans exhibit weaker consumption growth correlations than those who are not.

The results of this analysis are stronger than the findings using aggregate data, but they are still not conclusive. Stock returns are more closely correlated with the consumption growth of households that own stock than of those that do not. The PSID data do not, however, have enough power to distinguish between the view that only direct stock ownership matters and the possibility that direct and indirect stock ownership have similar effects on consumption growth. The results are consistent with the presence of a wealth effect, but they do not provide definitive support for one. There is only weak evidence that the consumption growth of those with larger stock portfolios is more closely correlated with stock market fluctuations than is the consumption of those with small portfolios.

Share Ownership and the Consumption–Stock Price Nexus

The third broad issue that we consider concerns the effect of changing stock ownership patterns on the link between stock returns and consumption. We study this question by interacting the lagged stock return variable in equation 1 with two measures of the fraction of corporate stock held by households.[80] The first measure, which corresponds to direct individual ownership, is the ratio of stock ownership for the Flow of Funds household sector (excluding nonprofit holdings) to the total market value of shares outstanding. This time series declines substantially during the postwar period, from 72.3 percent in 1960, to 51.3 percent in 1980, to 40.2 percent in 1994. We amend equation 1

79. These findings emerge for two of the three definitions of stockholders: those with any equity and those with stock worth more than $10,000.

80. We also test the subsample coefficient stability of the equations reported in table 12, dividing the sample before and after the first quarter of 1970, and before and after the first quarter of 1985. We cannot reject the null hypothesis of constant coefficients for any of the consumption categories; this foreshadows our weak results for the trending share ownership variables.

to include lagged stock price changes as well as the lagged price change interacted with the direct share ownership measure, $SHARE1_{t-1}$:

$$(2) \quad \Delta \ln c_t = \alpha_0 + \alpha_1(\Delta \ln P_{t-1}) + \alpha_2(SHARE1_{t-1})(\Delta \ln P_{t-1}) + \epsilon_t.$$

Because $\Delta \ln P_{t-1}$ and $SHARE1_{t-1}(\Delta \ln P_{t-1})$ are collinear variables, we also estimate equations that only include the interaction term.[81]

In addition, we estimate equation 2 with a variable that captures direct as well as indirect share ownership ($SHARE2_t$) in the interaction term. $SHARE2_t$ is the percentage of corporate stock owned by individuals directly or through bank personal trusts, mutual funds, and defined contribution pension plans. The time series for $SHARE2_t$ is shown in the last column of table 6. This time series declines more gradually over the postwar period than *SHARE1*. In 1970 *SHARE2* was 75 percent, and by 1994 it had fallen to 63.7 percent.

The results of estimating equation 2 are shown in table 16. The first row shows an equation relating consumption growth to lagged stock returns without any allowance for share ownership effects. The second row shows the effect of including the interactive term with $SHARE1_t$. The coefficient on the lagged stock price change is negative, and that on the interaction term is positive and roughly twice as large as the coefficient on the stock price change in the first row. The collinearity of these two variables makes it impossible to reject the hypothesis that either α_1 or α_2 in equation 2 is equal to zero, although we reject the hypothesis that these coefficients are jointly zero. The third row presents an equation that includes only the $SHARE1_t(\Delta \ln P_{t-1})$ variable and shows that the explanatory power of this variable alone is greater than that of the lagged stock price variable alone.[82]

The fourth and fifth rows in table 16 show results parallel to those in the second and third rows, with $SHARE2_t$ instead of $SHARE1_t$ in the interaction terms. The findings are similar to those for $SHARE1_t$; the interaction term is the more important in the specification with both variables and it has a positive effect on consumption, whereas the

81. Including a trending variable such as $SHARE1_{t-1}$ as a separate regressor in these equations does not affect the results because there is little trend in the rate of consumption growth.

82. A nonnested hypothesis test of the model with $SHARE1_t(\Delta \ln P_{t-1})$ as the dependent variable, against the model with $\Delta \ln P_{t-1}$, does not permit us to reject either hypothesis in favor of the other.

Table 16. Regressions of Consumption on Stock Prices for Alternative Stock Ownership Share Variables[a]

Stock ownership share variable	*Constant*	*Lagged change in real stock price*	*Ownership share × lagged change in real stock price*	$\bar{R}^2$
None				
	0.0047	0.030	. . .	0.098
	(0.0005)	(0.007)		
Direct individual stock ownership				
	0.0047	−0.003	0.060	0.098
	(0.0005)	(0.031)	(0.055)	
	0.0047	. . .	0.056	0.104
	(0.0005)		(0.012)	
Expanded individual stock ownership				
	0.0047	−0.064	0.136	0.102
	(0.0005)	(0.069)	(0.099)	
	0.0047	. . .	0.045	0.103
	(0.0005)		(0.010)	

Source: Authors' regressions based on consumption data from NIPA. Share prices and ownership are the authors' calculations based on data in Federal Reserve, Flow of Funds Accounts.

a. The dependent variable is total consumption. Each row corresponds to an estimate of an equation of the form $\Delta \ln c_t = \alpha_0 + \alpha_1(\Delta \ln P_{t-1}) + \gamma_2(SHARE1_{t-1})\Delta \ln P_{t-1} + \epsilon_t$. All estimates correspond to the period from 1947:2 to 1995:2, representing 193 quarterly observations. The values of *SHARE1* and *SHARE2*, that replaces *SHARE1* in the foregoing equation, are defined on the basis of data from the Flow of Funds Accounts for the period from 1952:4 to 1994:4; they are extrapolated at either end of the sample. All equations include seasonal dummy variables. Standard errors are shown in parentheses.

lagged share price term alone has a negative coefficient. Yet the collinearity problems remain. On balance, the results do not support the view that changing patterns of stock ownership alter the link between share price fluctuations and consumption.[83]

The Forecasting Power of Stock Returns, Dividend Movements, and Earnings Movements

A final aspect of the linkage between stock returns and consumption concerns whether the *source* of stock price fluctuations affects the predictive power of stock returns for future consumption growth. Given

83. One way to develop additional tests of whether stock ownership patterns affect the wealth effect of stock prices on consumption would be to analyze data from different countries. In Japan, for example, the fraction of shares held directly by individuals is substantially lower than that in the United States.

the evidence that fluctuations in the price-to-dividend and price-to-earnings ratios predict future stock returns, implying that increases in stock prices that are not associated with rising dividends are more likely to be transitory than similar price changes backed by dividend fluctuations, there might be differences in the predictive effects of different stock market shocks.

To explore whether fluctuations in share prices, dividends, earnings, or some combination of these variables have the greatest predictive power for consumption spending, we augment equation 1, for the simple case of $\alpha(L) = \alpha_1$, with the lagged change in dividend payments for the stocks in the S&P 500, $\Delta \ln D_{t-1}$:

$$\Delta \ln c_t = \alpha_0 + \alpha_1(\Delta \ln P_{t-1}) + \gamma_1(\Delta \ln D_{t-1}) + \epsilon_t. \tag{3}$$

If share price fluctuations predict the same change in future consumption regardless of their source, then γ_1 should equal zero. If stock prices only predict changes in consumption when prices move while the price-to-dividend ratio remains constant, then γ_1 should be positive and α_1 should be indistinguishable from zero.

Table 17 shows the results of estimating equation 3, with dividend growth rates and also lagged earning growth rates in the specification. The estimates suggest that changes in stock prices predict similar changes in consumption, regardless of their source. The equations that include lagged dividend growth provide no support for the view that dividend fluctuations can predict future consumption growth. We cannot reject the null hypothesis that changes in real dividends have no predictive power for future consumption growth, and the estimated coefficient on real share prices is virtually unaffected by including real dividends in these equations. These results are insensitive to our choice of consumption aggregate.

The results with lagged earnings growth are more difficult to interpret. For two of the four broad consumption categories, total consumption and spending on durables, the lagged earnings growth variable enters with a positive coefficient that is statistically significantly different from zero at roughly the 10 percent significance level. Controlling for earnings growth does not reduce the coefficient on the lagged change in real stock prices, but actually raises this coefficient in all specifications. As a further test of these results, not shown here, we have estimated models with four lagged values of real stock price changes and

Table 17. Linkage between Consumption Spending, Stock Price Fluctuations, Dividends, and Earnings[a]

Dependent variable	*Constant*	*Lagged stock price*	*Lagged dividends*	*Lagged earnings*	$\bar{R}^2$
Total consumption	0.0045	0.030	0.002	. . .	0.071
	(0.0005)	(0.007)	(0.021)		
	0.0044	0.032	. . .	0.015	0.081
	(0.0005)	(0.007)		(0.010)	
Consumption of durables	0.0070	0.137	−0.008	. . .	0.046
	(0.0030)	(0.041)	(0.113)		
	0.0063	0.146	. . .	0.100	0.062
	(0.0029)	(0.041)		(0.056)	
Consumption of nondurables	0.0022	0.032	0.013	. . .	0.074
	(0.0006)	(0.008)	(0.021)		
	0.0021	0.033	. . .	0.010	0.076
	(0.0006)	(0.008)		(0.011)	
Consumption of services	0.0059	0.008	0.001	. . .	−0.001
	(0.0004)	(0.006)	(0.016)		
	0.0058	0.008	. . .	0.005	0.001
	(0.0004)	(0.006)		(0.008)	

Source: Authors' regressions based on consumption data from NIPA. Stock prices, dividends, and earnings are the authors' calculations based on data in Federal Reserve, Flow of Funds Accounts.

a. Each row reports estimates of the coefficients in the equation $\Delta \ln c_t = \alpha_0 + \alpha_1(\Delta \ln P_{t-1}) + \gamma_1(\Delta \ln D_{t-1}) + \epsilon_t$, or this equation with E_{t-1} replacing D_{t-1}. All estimated correspond to the period from 1947:3 to 1995:2, representing 192 quarterly observations. Dividends denotes the real value of dividend payments to shares in the S&P 500; earnings denotes the analogous measure of earnings for these firms. Standard errors are shown in parentheses.

four lagged values of real earnings growth. The results do not support the notion that earnings fluctuations are an important determinant of consumption growth. The sum of the coefficients on the four lagged stock return terms is positive and statistically significantly different from zero. The sum of the coefficients on lagged earnings, however, is negative and statistically insignificantly different from zero. Thus the evidence seems to suggest that share price increases have similar effects on consumption, regardless of their source.

We follow a separate strategy to identify the effects of shocks to discount rates and to expected cash flows on consumption growth. We estimate a first-order autoregression for the price-to-dividend ratio and define the residuals from this equation as estimates of the shock to discount rate expectations.[84] For the period from the second quarter of

84. This procedure follows the suggestion of Fama and French (1988, p. 20), who

1947 to the second quarter of 1995, this autoregression generates an estimated coefficient of 0.961 (0.021) on the lagged value of the dividend-to-price ratio (D/P). We then include the value of $[(D/P)_{t-1} - 0.961(D/P)_{t-2}]$ in regression equations analogous to those in table 12. The results suggest that it is not possible to distinguish the effects of discount rate shocks and cash flow shocks with the available data. For example, the estimated equation for total consumption (with standard errors in parentheses) is

$$\Delta \ln c_t = \underset{(0.001)}{0.004} + \underset{(0.016)}{0.013}(\Delta \ln P_{t-1}) - \underset{(0.003)}{0.004}[(D/P)_{t-1} - 0.961(D/P)_{t-2}],$$
$$\bar{R}^2 = 0.0719.$$

The imprecision of the coefficient estimates makes it difficult to argue that shocks to expected returns are more or less important than shocks to cash flow in predicting future consumption growth.

Conclusions and Future Directions

This paper documents substantial changes in the aggregate and cross-sectional patterns of corporate stock ownership during the postwar period. There has been a gradual but significant trend toward greater ownership of equity through mutual funds and thrift plans (for example, 401(k)s, ESOPs, and 403(b)s) and defined contribution pension plans. In each of these cases direct individual ownership has been replaced by indirect ownership through a financial intermediary. The rise of IRAs, thrift plans, and other related institutions has led to an increase in stock ownership during the most recent decade, substantially reversing a decline during the previous two decades.

We explore the implications of growing ownership by intermediaries for the effect of stock price fluctuations on consumer spending. We find clear evidence that changes in share prices portend growth in consumer spending, and particularly large growth in outlays on consumer durables. We then try to distinguish between two alternative explanations

argue that "the unexpected component of D/P can be interpreted as a (noisy) measure of the shock to expected returns."

for this finding. The first is the view that stock returns are a leading indicator, reflecting news that suggests a prospective increase in consumption before the change actually occurs. The second is the traditional wealth effect of asset market fluctuations, which suggests that higher stock prices should lead to an increase in consumer spending.

We investigate the effect of stock returns on the share of consumption that is devoted to luxury goods, and also use household-level data from the Panel Study of Income Dynamics to study the correlation between consumption growth and stock returns for households that own corporate stock and those that do not. We do not find any pronounced effects of stock price fluctuations on the mix of luxury and nonluxury consumption within the following year. This evidence casts doubt on the short-run importance of wealth effects associated with stock price movements.[85] We do not find any evidence that changing patterns of share ownership have altered the relationship between stock price fluctuations and consumption, even though such effects might be expected in some behavioral models of saving and consumption.

These findings represent a challenge to the traditional model of the aggregate consumption function that is found in many macroeconomic textbooks.[86] The logic of budget constraints suggests that stock market rallies that increase household wealth must be reflected either in higher consumption during the lifetimes of current stockholders, or in greater bequests. It is possible that consumption responds gradually to increases in stock market wealth, and that our focus on fluctuations in consumption within a year of stock price movements does not capture these effects. It is also possible that the effect of stock price fluctuations on consumption operates through channels other than a direct wealth effect, for example by altering "consumer confidence." More generally, our findings suggest the need to develop better data, and possibly better models, for the determination of consumption spending by high-wealth households.

While our primary focus is on testing for wealth effects, we also investigate the links between the predictive power of changes in stock

85. It is still possible that cash realizations of past gains affect current consumption outlays, as suggested in Poterba (1991).

86. In many ways, they parallel the findings of Morck, Shleifer, and Vishny (1990) that the stock market's role in predicting investment movements is largely due to its role as a passive informant of future developments.

prices, dividends, and earnings for future consumption growth. Substantial evidence suggests that changes in share prices that are not associated with changes in dividends are transitory, yet we find find no evidence that consumption evolves differently after increases in share prices associated with dividend increases than after changes associated with discount rate movements.

Our analysis focuses on a relatively limited set of household responses to higher stock prices and leaves many issues for further research. We have not considered the possibility that higher share prices lead to changes in labor supply, for example, to earlier retirement by those nearing retirement age. Rising share values that lead to increases in household net worth may also trigger changes in occupation, such as leaving paid employment and striking out as an entrepreneur.[87] Furthermore, the influence of consumer confidence on spending decisions is poorly understood.

Some of the most important issues that arise from changing stock ownership patterns, and which our tests have not addressed, concern the effect of ownership structure on the performance of asset markets. If the switch from direct individual ownership to indirect stock ownership through a small set of financial intermediaries alters the way in which investors respond to new information or to past stock returns, then it could have significant implications for many aspects of macroeconomic performance, including capital availability and market volatility.[88] Many discussions of noise trader models in financial economics implicitly portray individual investors as poorly informed traders who may be affected by fads or other investment trends, and professional money managers as arbitrageurs who trade against this group. Exploring these issues requires information on how institutional investors differ from individual investors along a range of dimensions; much of the core research remains to be done.

87. Holtz-Eakin, Joulfaian, and Rosen (1994) present empirical evidence suggesting that the decision to become self-employed is sensitive to changes in net worth, in their case, the receipt of a bequest. Samwick (1995) summarizes the available evidence on the effects of financial assets on retirement decisions.

88. Friedman (1996).

Comments and Discussion

Andrei Shleifer: James Poterba and Andrew Samwick have written a fascinating paper in the growing literature on the (nonexistent) effects of the stock market on real economic activity. Although they produce many nice results, I will focus only on certain points.

The paper begins by showing how high U.S. stock prices are in mid-1995, relative to traditional measures of fundamentals, such as the book value of assets or dividends. Despite their striking evidence, the authors do not conclude that the stock market is overvalued. I might be less cautious. At the peak of almost every financial bubble, theories have been advanced to explain why assets prices were not, in fact, excessively high. In Japan in the mid-1980s, some people argued that the economy would continue to grow at 8 percent per year forever, thus justifying stock prices that were about to fall by half. In the United States, Irving Fisher argued that the stock prices had "reached a new and higher plateau" shortly before the crash of 1929. Before the demise of Drexel, Burnham, Lambert and the collapse of junk bonds, Michael C. Jensen argued that the corporate organizational form was obsolete, and ready to be replaced by leveraged buyouts financed by debt. In the Florida land bubble of the 1920s, William Jennings Bryan argued that much of American population was going to move to Florida. The list can be expanded to suggest that plausible theories are usually advanced to justify asset prices that seem excessive, based on historical averages, and that typically, these plausible theories prove to be wrong.

In what is perhaps the most important contribution of the paper, Poterba and Samwick document persuasively that most American equi-

ties are owned by wealthy old people. This section strongly suggests that understanding the effects of the stock market on real economic activity would require focusing on the habits of these people. Unfortunately, the data used in the paper do not specifically address the behavior of the wealthy elderly. Nor does the paper address the implications of this evidence for economic policies that have the potential to increase both equality and economic growth, such as selectively cutting social security and medicare benefits.

The most interesting theoretical question that the paper poses is whether the stock market affects real economic activity. Answering this question is difficult since, to the extent that the stock market is correlated with the net present value of future cash flows to equities, it will forecast future economic activity without really affecting it. Indeed, earlier studies of investment have concluded that the stock market looks more like a passive predictor than a significant determinant of investment.[1] Poterba and Samwick ingeniously address the closely related question of whether the wealth increases resulting from stock market movements affect consumption. Their strongest test uses the earlier result that the wealthy own a very high fraction of equities, and examines the effect of stock price movements on the consumption of luxuries, such as upper luxury cars. By and large, their evidence shows that stock price movements do not affect the consumption of luxuries disproportionately. This, as well as most of the other evidence presented by Poterba and Samwick, is inconsistent with the importance of the wealth effect and consistent with the earlier findings on investment. In the short run, at least, the stock market is a sideshow for consumption as well as investment. The good news, of course, is that if stock prices fall from their 1995 heights, the economy need not follow.

Robert J. Shiller: In much of the discussion of the stock market, dating back many years, there has been a sense that it is meaningful to present the observed relation between stock prices and macroeconomic aggregates such as consumption in very simple terms, that it is possible to discover very simple hypotheses about the relation of the market to the macroeconomy. James Poterba and Andrew Samwick present two such

1. See, for example, Blanchard, Rhee, and Summers (1993) and Morck, Schleifer, and Vishny (1990).

hypotheses and endeavor to find out whether there is any basic truth in either of them. According to the wealth effect hypothesis, there is a causal link from the stock market to consumption: when people see stock prices rise, they feel richer and so, consume more. For this reason, an increase in the stock market will cause future consumption to increase. According to the leading indicator hypothesis, the causality works in reverse: from information that consumption will increase in the future (thereby improving the business situation) to the stock price increase. Poterba and Samwick intend to distinguish between these two hypotheses; they are very imaginative and resourceful and provide a large amount of relevant information.

One problem is that these two different hypotheses are not really different. When choosing how much to consume, people are at the same time choosing how much of their resources to put into savings vehicles, such as the stock market, instead. They make the two decisions at the same time, and the outcome is both the level of consumption and the level of the stock market. How can it be meaningful to specify the direction of causality?

Poterba and Samwick never completely explain the two causality hypotheses, and it is not clear that the extreme hypotheses really make any sense. Could it possibly be meaningful to say that there is, ultimately, no wealth effect from the stock market on consumption; that is, that if people were given more stock, they would not consume more? In particular, would this make sense over long periods of time? Could it possibly be meaningful to say that, ultimately, the stock market has no tendency to function as a leading indicator of consumption; that is, that if it were announced that people would be forced to consume less (for example, through taxes), there would be no effect on the stock market? Apparently the authors are not seriously proposing either of these extreme hypotheses, but are trying to determine which hypothesis is more useful for understanding the observed correlation between year-to-year movements in the stock market.

One interpretation of how they are trying to distinguish between the two different directions of causality is that they are trying to learn something about lengths of lags. For example, the wealth effect hypothesis could be counted as wrong, as they note in their conclusion, if people take longer than one quarter (the forecasting horizon in much of this paper) to adjust their consumption to their current wealth. If that

is what Poterba and Samwick are exploring here, it is not really best described as an issue of causality.

Another interpretation is that they are saying that it might be meaningful to suppose that there is a single direction of causality if two different groups of people are making the two decisions, to consume and to invest in stocks. By framing the issues in this way, Poterba and Samwick take account of some very important facts about the U.S. economy that many theorists wish they did not have to confront in building their models, and the more abstract theorists almost always ignore: that much of the investing is done by institutional investors, and that a large proportion of the stocks are held by a small, wealthy segment of the population.

There might be evidence suggesting something akin to the leading indicator hypothesis if the tendency toward institutional ownership of stocks had proceeded to such an extent that all stocks were held in pension funds managed by professionals. The "mental compartment" theory of H. M. Shefrin and Richard Thaler could imply that individuals put their institutionalized investments into a certain mental category that is off-limits for current consumption, even if they actually are able to get at them, and therefore are psychologically committed to leaving their consumption decisions to the institutional investors.[1] The Shefrin-Thaler theory derives from the notion that people find it difficult to limit their consumption; saving is a little like dieting. People find that it is easiest to control themselves if they follow simple rules of thumb (analogous to dieters swearing off sweets altogether). In addition, retired people might never consume their accumulated wealth, but instead bequeath it to the next generation. Then, conceivably, there might not be a wealth effect; consumers might not react to stock market values. The lack of response in domestic consumption to the domestic stock market would be even clearer if institutional investors diversified all around the world, so that a country's wealth did not correspond to the value of its stock market. If that were the situation today, then there would, indeed, seem to be some merit to the extreme leading indicator hypothesis. When deciding their allocations between stocks and bonds in various countries and other investments, institutional investors might react to information about future consumption in the home country of

1. See Shefrin and Thaler (1988).

the companies, where they tend to sell their products, and thereby make the stock market a leading indicator; but there would be virtually no reverse causality, from the stock market in a country to consumption in that country, operating through the consumers themselves.

As Poterba and Samwick so carefully document, there is only an element of truth to the premise that control of stock market investments has been turned over to people other than consumers. Most U.S. stocks are still held by U.S. citizens, not foreigners. Moreover, much of the increased concentration of holdings of stocks is in the form of mutual funds that people are able to cash in and thus, control. It is probable that people do not put mutual fund investments in a very different mental category from direct investments in stocks.

There might also be evidence suggesting some version of the leading indicator hypothesis if the wealthy subset of the population that holds stocks is very different from the general population whose consumption dominates in the consumption figures. Then the profits of the companies that represent the stock market would be tied to the future consumption of the population at large, and therefore the market ought to take account of information about this. But the future consumption that responds to the market through the wealth effect would be the consumption of wealthy people.

Poterba and Samwick carefully show that the concentration of stock holdings does, indeed, remain in a few wealthy hands: they conclude that about three-quarters of all stocks are currently held by only 5 percent of the population. Moreover, they provide evidence on the consumption of the wealthy from data on expenditures on luxury goods. The fact that their regressions fail to find any predictive power of the U.S. stock market on domestic luxury car sales does seem to suggest that the wealth effect is not a strong one; if there was a rapid stock market wealth effect anywhere, it would be on luxury car sales. (However, the coefficient of the stock market is not significantly negative, and it is unclear how large a coefficient should be expected from these rather vaguely defined hypotheses.)

Poterba and Samwick carry the evidence for the leading indicator hypothesis further by using Skinner's method of deriving a consumption aggregate for groups of households that hold stocks. But the Skinner proxy seems more than a little questionable. He creates his proxy from the Consumer Expenditure Survey, by fitting a cross-sectional regres-

sion of total consumption on food consumption, house value, and rental payments. The fitted value of this regression can then be generated using the panel data from the PSID. But it does not seem appropriate to use quarterly changes in such a variable as a proxy for quarterly change in consumption. Short-run changes in house values and rents are not, themselves, changes in the consumption of housing services, since the housing stock is fixed in the short run. Skinner argues that this same predictive equation fits equally well using cross-sectional data from both the 1972–73 and the 1983 Consumer Expenditure Surveys; but this is an interval of a decade, not a quarter. In any event there is, in effect, only one out-of-sample observation—1983—to test the stability through time of the Skinner relation.[2]

Poterba and Samwick also report some interesting consumption function estimates with which they attempt to uncover an interaction effect between the share of households investing in stocks and the stock market price. Unfortunately, as they themselves point out, the multicollinearity in these regressions prevents them from drawing any strong conclusions.

Overall, Poterba and Samwick conclude that their evidence is more in accord with the leading indicator than the wealth effect hypothesis. While there is nothing definitive about this statement, they are probably on the right track; their most convincing evidence is their regressions of luxury good consumption, such as luxury cars, on stock market returns. Interpreting this denial of the wealth effect hypothesis as an indication that people may respond very sluggishly to changes in the stock market, Poterba and Samwick may be right to say that their results suggest that the rapid effect of the stock market on consumption allegedly represented in the consumption functions of some macroeconomic models might, in fact, be spurious. I suppose that it is plausible that wealthy people do not adjust their consumption behavior rapidly to change in the stock market; they may, for example, tend to think of the stock market as mean-reverting and so, not react to it much until a lot of time has gone by.

Still, Poterba and Samwick's models of the consumption function are only suggestive, and many other confounding factors could be brought to bear, possibly changing their conclusions. Those who work

2. Skinner (1987).

in the macroeconometric model tradition would include several other variables besides the stock market in their regressions. For example, in Ray Fair's model the consumption equations also include disposable income, the mortgage interest rate, the value of the stock of housing (as part of a broader wealth measure), the stock of consumer durables (in durables consumption), and age (baby boom) variables, as well as lagged consumption. He finds all of these to be statistically significant in his estimation of U.S. consumption equations for the period 1954–93, and achieves an R^2 of well over 0.99 in explaining the level of consumption.[3] From this perspective, Poterba and Samwick's results might partly be due to the omission of certain variables in the consumption model, or the failure to take account of simultaneous equation effects. Thus it would be risky to try to infer much from such simple consumption relations.

Much recent literature on consumption has suggested theoretical reasons for using some very simple models. The empirical literature on stock prices and consumption has been heavily influenced by Euler equation methods, which are based on first-order conditions for a hypothesized maximization problem. These methods do suggest simpler relations than the complicated consumption functions used by the macroeconomic model builders. For example, it is not necessary to include the interest rate in the model of consumption and stock prices because this variable does not appear in the usual Euler equation for stock prices. But the hypotheses under consideration here do not seem to fit into the appropriate maximization framework. Poterba and Samwick are not estimating Euler equations, since the stock price change that they include in their regressions is lagged, rather than contemporaneous.

General Discussion

Several participants discussed the theory and evidence behind the idea that changes in stock price cause changes in consumption. Benjamin Friedman noted that estimates of the traditional Modigliani wealth effect suggest that for every dollar of change in aggregate wealth, aggregate consumption changes by about 5 cents within a year. To

3. See Fair (1994).

gauge how reasonable that estimate looks when applied to changes in stock prices, he suggested looking at stock ownership in terms of three distinct groups. The top 0.5 to 1 percent of stockholders hold very large amounts of stocks and are unlikely to adjust their consumption appreciably over short time horizons. The lower 80 percent of the population owns a negligible amount of stocks and so would be unaffected by stock price changes in the short to medium term. This leaves the remaining 19 percent, who own noticeable amounts of stock, to account for virtually all the change in aggregate consumption predicted by the aggregate wealth effect. Friedman regarded such a concentrated change in consumption as implausible. Gregory Mankiw, however, argued that the marginal propensity to consume of those in the top 20 percent of the population should be expected to be high because these people are in older households and so, in a life-cycle framework, would be predicted to consume a large proportion of incremental wealth.

John Shoven pointed out another possible response to stock price changes related to the concentration of ownership among older, high-income, households. These individuals might spend their windfall by bringing forward their retirement, a form of consumption that lies outside the consumption measures in the paper. Shoven suggested looking for real effects of changes in stock prices by examining the correlation between stock prices and labor force participation for this group of consumers. He added that another effect of the recent runup in stock prices might be found in the reduced saving of the defined benefits sector of the pension industry. Andrew Samwick agreed with the importance of Shoven's point about retirement behavior and suggested extending it to examine the effect of the stock market on new business startups and entrepreneurial activity more generally.

Robert Hall noted that the life-cycle model of consumption could accommodate the fact that consumption did not react to the 1987 stock market crash. If the utility function has an elasticity of intertemporal substitution of zero, people simply consume out of current income. Interpreting a stock market crash as an increase in the discount rate that is applied to future earnings, two effects on consumption exactly offset each other, so that there is no consumption response. With the discount rate rising and the stock market falling, the product of the two, which can be thought of as the underlying flow of value from stock ownership, remains the same. Thus Hall suggested that the consumption response

to the 1987 stock market crash can be seen as a natural experiment providing evidence that, in the life-cycle framework, the elasticity of intertemporal substitution should be near zero rather than one.

Members of the panel suggested alternative approaches to looking at the consumption response to stock price changes and discussed possible extensions of the paper. Hall questioned the paper's focus on the predictive effect of lagged stock price changes on consumption when the life-cycle model suggests that the entire wealth effect is contemporaneous. Christopher Sims agreed, and added that the econometric work in the paper fell in some unclear middle ground between testing theories, such as the life-cycle model, and attempting to find optimal forecasting relations. He suggested testing the simple stochastic life-cycle model, with its contemporaneous effects of wealth on consumption, to see just how it performs in explaining the data. Because this model relates consumption to total wealth, it would be necessary to examine whether other components of total wealth are systematically related to stock wealth, a possibility that might improve the performance of the model. As for forecasting, Sims noted that serious forecasters used many variables, some of which might be correlated with stock prices, and that the forecasting value of stock prices alone was of limited interest. Allen Berger underlined the need for making the measure of wealth more comprehensive by noting that the large swings in the debt-to-equity ratios of companies may occur at the same time as their stock price is changing. He advocated checking whether the estimation results are robust to including the value of debt along with equities. Sims observed that equity costs were an incomplete measure of a company's cost of capital. He noted that other natural measures of the cost of capital might move in the same way or in an off-setting direction to stock prices. Margaret Blair observed that the shares of output going to labor and capital have not been constant over time, and that some part of the runup in stock prices in recent years can be attributed to an increase in the capital share. This shift away from labor should be expected to hold down the consumption of the 80 percent of the population that owns little or no stock, creating a negative correlation between consumption and stock prices on this account.

Anil Kashyap suggested using consumption and stock market data from Japan to supplement the paper's analysis based on U. S. data. The spectacular rise and subsequent collapse of the Japanese market should

provide ample variation from which to identify any consumption response to stock price changes. He conjectured that evidence from Japan would support the view that the stock market is a sideshow and has little effect on people's consumption decisions.

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