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***STOCK OWNERSHIP PATTERNS, STOCK MARKET
FLUCTUATIONS, AND CONSUMPTION***

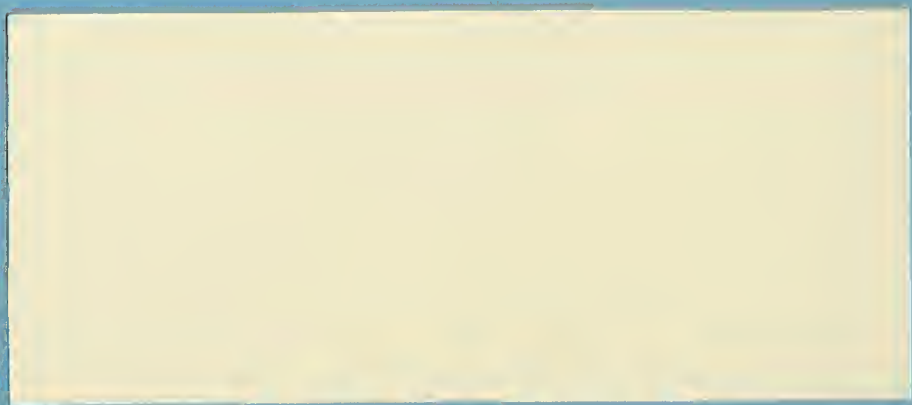
**James M. Poterba
Andrew A. Samwick**

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Oct. 1995

**massachusetts
institute of
technology**

**50 memorial drive
cambridge, mass. 02139**



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FLUCTUATIONS, AND CONSUMPTION

James M. Poterba
MIT and NBER

Andrew A. Samwick
Dartmouth College and NBER

October 1995

ABSTRACT

The market value of corporate stock in the United States increased by nearly one trillion dollars between December 1994 and July 1995. This paper explores the distribution of the stock ownership, and hence the gains from the stock price rise, and what the rise in stock prices implies for consumer spending. It begins by noting the substantial change in the pattern of stock ownership during the postwar period. Individual investors, who directly held most corporate stock in the early 1950s, have gradually replaced their direct stock holdings with indirect holdings through mutual funds, pension funds, and other financial intermediaries. It then documents the substantial predictive power of stock price fluctuations for future consumption growth, and considers two potential explanations for this relationship. The first, or "leading indicator," view, holds that the stock market responds to news that suggests consumption will rise in the future. This does not suggest any causality between stock price changes and subsequent consumption movements. An alternative and not necessarily exclusive view, the "wealth effect," holds that higher stock prices raise consumption by raising household net worth, and thereby expanding consumption opportunity sets. We test for the importance of the wealth effect by studying the effect of stock price changes on the share of consumption devoted to luxury items, and we test for effects of changing stock price ownership patterns on the link between stock price fluctuations and consumption growth. We find virtually no evidence to support important wealth effects associated with stock price changes. We also explore whether the source of stock price fluctuations, in particular fluctuations that are related to changes in dividends or earnings rather than to changes in discount rates, affects the predicted change in consumption that follows a stock price change.

We are grateful to Rochelle Antoniewicz, William Brainard, John Campbell, Joel Dickson, Jerry Hausman, Greg Mankiw, Tom Morley, George Perry, Chris Probyn, James Shapiro, Martha Starr-McLuer, Robert Shiller, Andrei Shleifer, David Shulman, Chris Sims, David Wilcox, and participants in the Brookings Panel meeting and at a seminar at the Federal Reserve Board, for helpful discussions, to Alex David for data on share repurchases, and especially to Arthur Kennickell for assistance with the 1992 Survey of Consumer Finances. This research was supported by the National Science Foundation.

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 stock market's recent movements, 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 consumption¹ holds that consumption depends on labor income and financial wealth. The marginal propensity to consume out of wealth is typically taken to be approximately .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, notably the possibility that stock prices may rise as a result of a decline in real discount rates, which might also affect consumption directly, 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

¹See for example Dornbusch and Fischer (1994).

²Shulman (1995).

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," the possibility that changes in share values cause changes in consumption by expanding households' resource constraints. Over long horizons, such a wealth effect must be operative; we consider whether it also has an important effect on consumption at horizons of one to four quarters. It is difficult to distinguish between the leading indicator and causative view of the relationship between share prices and consumption, because doing so requires identifying autonomous movements in share prices that are not attributable to changing expectations of future dividends or discount 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 increases 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, then the pattern of consumption changes following stock price fluctuations should be independent of the distribution of stockownership, and there is no reason to expect differential consumption responses by households that do and do not own corporate stock. This paper presents empirical tests of both of these propositions. We find little support for an important wealth effect of share prices on consumption. The strong positive correlation between consumption growth and lagged stock market returns therefore appears due primarily 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-earnings ratios, Tobin's q , and the ratio of stock

market value to GDP during the postwar 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-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 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 they are held.³ Households may exhibit lower marginal propensities to spend out of capital gains on assets held in retirement plans than on assets held directly.

Popular discussions sometimes note that the fraction of corporate stock owned by households has declined during the postwar period and is presently below fifty percent.⁴ In fact, the principal postwar trend has been from direct individual stock ownership to indirect ownership through various financial intermediaries. We re-analyze the widely-cited Flow of Funds data that show households owning less than fifty percent of outstanding shares. We combine individual ownership of equities through mutual funds, defined contribution pension plans, and other financial intermediaries, and find that individuals have direct control over at least two thirds of outstanding corporate stock.

To describe the changing incidence of stock ownership, we examine data from the 1962 Survey of Financial Characteristics of Households, and the 1983 and 1992 Surveys of Consumer Finances. While share ownership patterns changed relatively little between 1962

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

⁴See the accounts in the New York Times, 18 July 1995 p.D21, or Wall Street Journal 11 May 1992 for examples.

and 1983, there has been a substantial increase in the prevalence of share ownership during the last decade. Recent shareownership growth is the result of rising rates of indirect share ownership. The fraction of stock held by the largest stockholders, those in the top one half of one percent of the distribution of equity investors, has also declined during this period.

To develop evidence that can distinguish between the two views of how share prices affect consumption, we explore the correlation between stock returns and the subsequent mix of consumer spending between luxury items and all other goods. An operative wealth effect should imply that positive stock returns increase the share of consumption accounted for by luxury goods. We consider aggregate data on several categories of consumption that are purchased disproportionately by high-income households, including purchases of "upper luxury" vehicles, and find little evidence that luxury spending rises in the aftermath of rising stock prices.

We next consider 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 this possibility. We explore the effect of changes in stock prices, as well as changes in the dividend-price and earnings-price ratio, 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 17% stock price rise, one of roughly the same magnitude as the price increase in the first six months of 1995, forecasts an increase in

⁵Fama (1981), Fischer and Merton (1984), and Barro (1989) also estimate reduced form equations measuring the predictive power of stock price movements for various macroeconomic aggregates.

consumption by about 1.1% in mid-1996 relative to what it would otherwise have been. The stock market increase forecasts particularly large increases in consumer spending on new autos and other durables.

We find little evidence to suggest that the shift from direct to indirect ownership of corporate stock has altered the link between stock price fluctuations and consumption spending, and little evidence more generally of an important wealth effect on consumption. Unfortunately, the time-series variation in the pattern of corporate stock ownership yields tests with low statistical power. To address this limitation, we also use household survey data from the Panel Survey of Income Dynamics to compare the correlation between consumption growth and stock market fluctuations 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 finding is somewhat surprising, given the substantial body of research in financial economics that suggests price fluctuations that change the value of the dividend-price or earnings-price ratio are reversed over a period of several years. We conclude with a brief summary of our findings and a discussion of topics for further work.

1. 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 4000 level, it climbed

another 700 points. Between January 1 and June 30, 1995, the Standard and Poor's 500 rose nearly 17%.⁶ Although the news media has depicted the recent bull market as historic, 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 twenty percent. In five years, the real return exceeded forty 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 Standard and Poor's 500 Index, measured in 1994 dollars. 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. The entries in column two confirm the presence of other years with returns comparable to those in 1995. The third column shows the real (\$1994) value of corporate shares at the end of each year, as reported in the Flow of Funds accounts. Real equity values increased by more than 1.1 trillion dollars in the six months ended 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-war high. Table 2 reports four different valuation measures. The first column shows the ratio of the market value of corporate stock to gross domestic product. On June 30, 1995, this

⁶We calculate this as $\ln(539.4/455.2) = .1697$, which we approximate as 17%.

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

⁸The 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, then changes in the market value of stock can overstate the rate of share price appreciation. In each quarter of 1994 and the first two quarters of 1995, however, nonfinancial corporations were net repurchasers of shares, so this concern does not apply.

ratio was 1.039, a level that has been exceeded only once (in 1968) since the early 1950s. This ratio has more than doubled in just over ten years. The table records one previous move of similar magnitude, between the early 1950s and the early 1960s, when the ratio doubled.⁹

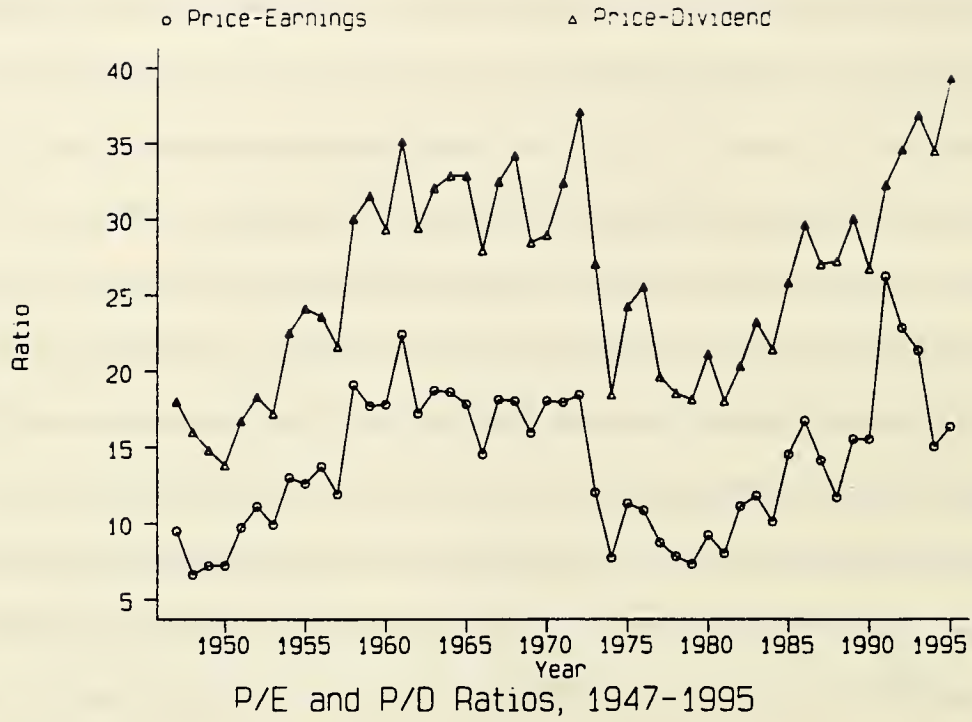
The second column shows the year-end price-earnings ratio for the S&P 500 Stock Index; it is also plotted in Figure 1. P/E ratios do not suggest that stocks are currently at historic highs. The recent stock price rise has coincided with rapidly increasing corporate earnings, so that while the price-earnings 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 1992 (22.8). Since late 1991, share prices have increased by nearly 30%, while earnings have risen almost 80%. 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 did this with a ten-year arithmetic average of real earnings for the S&P 500. The resulting ratio of P/E_{avg} was 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 1990s¹⁰, although it is not the highest value recorded in the postwar period. This measure of P/E_{avg} reached 23.3 at the end of 1965. 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% in 1991 to 7.2% in 1994. The rate of return on tangible assets has also increased. Table 3 presents recent estimates of a standard measure of the pretax

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

¹⁰The values of P/E_{avg} for 1990-1994 are 15.7, 18.4, 20.3, 21.2, and 19.9, respectively.

Figure 1



rate of return on the tangible assets of nonfinancial corporations.¹¹ In addition to the rate of return shown in the first column, the table also reports a cycle-adjusted rate of return. To construct the adjusted return, we first regress the rate of return on the civilian unemployment rate, using a first-order serial correlation correction with an autocorrelation coefficient ρ . This yields

$$\text{Return} = 0.124 - 0.0052 * \text{RU}_t \quad \rho = .845$$

$$(0.0099) \quad (0.0013) \quad (.085)$$

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

The unadjusted rate of return rose nearly three 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 1989 and 1994 is less dramatic than that for the unadjusted series, but still suggests an increase of 1.7 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 Figure 1, shows the price-dividend ratio on

¹¹This 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, Poterba, and Dicks-Mireaux (1983).

¹²Adding a time trend to this equation changes the coefficient on RU to -.00521. The time coefficient, -.00051 (.00034), provides weak support for a secular decline in the corporate profit rate.

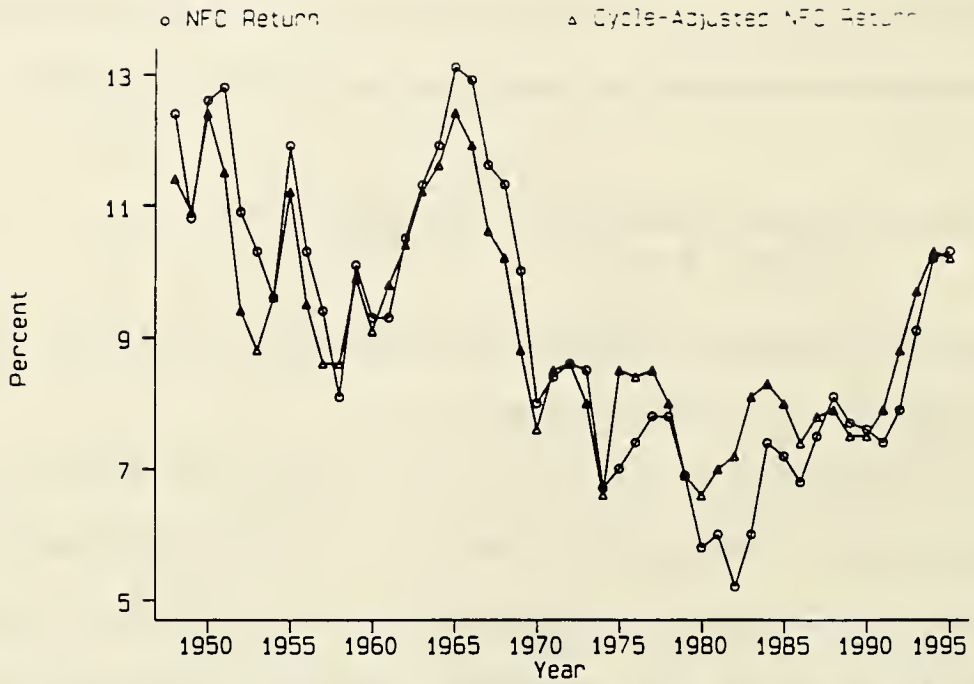
¹³We have also estimated the cycle-adjustment equation allowing for a shift in the level of profits in 1994 and 1995. The results are:

$$\text{Return} = .123 - .005 * \text{RUC} + .007 * \text{DUM94\&95} \quad \rho = .842.$$

$$(.010) \quad (.001) \quad (.009) \quad (.086)$$

If we also include a time trend, the coefficient on the trend is -.00067 (.00031), and the coefficient on DUM94&95 rises to .0136 (.0093).

Figure 2



Return to Capital: Nonfinancial Corporations, 1948-1995

the S&P 500, which reached 39.2 at the end of June, 1995. This value is higher than at the end of any year during the post-war period. Values of the price-dividend ratio in excess of thirty have been recorded only a few times during the last forty years: in the early 1960s, in the late 1960s, and then in the recent stock price increase.

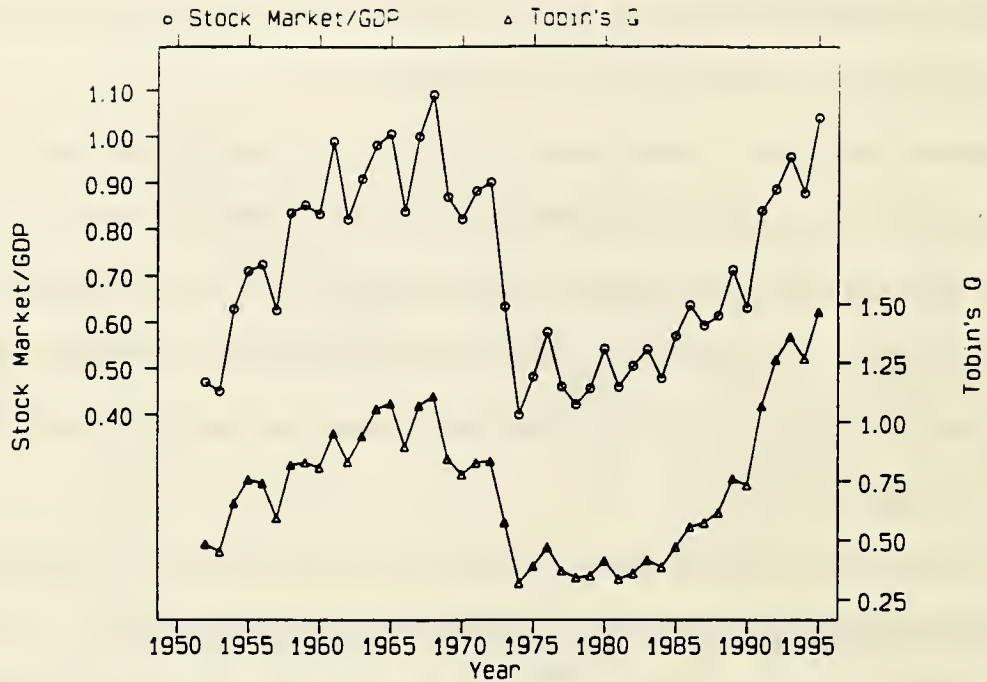
One potential explanation of rising price-dividend ratios is a growing reliance on non-dividend alternatives, such as share repurchases and cash purchases of stock in other companies, for returning cash to shareholders. Repurchases, which were historically very limited, became an important source of cash payout during the mid-1980s. Their importance declined in the late 1980s and early 1990s, and then increased, but not to the level of the mid-1980s, in the last two years.¹⁴

Table 4 tracks the role of non-dividend cash payouts over the last fifteen years, and suggests that these payouts cannot explain the recent rise in price-dividend ratios. The first column in Table 4 shows the ratio of all cash payouts to cash dividends for nonfinancial corporations. This ratio, which began the 1980s very close to unity, rose to more than two in the mid-1980s. It declined in the early 1990s, and has ranged between 1 and 1.5 in recent years. The second and third columns show the price-cash dividend ratio, and the price-total cash payout ratio, for the S&P Composite Index. The ratios in the third column show an even more rapid increase in share prices relative to total cash payouts than in prices relative to dividends, because non-dividend 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, the ratio of the market value of their equity to the replacement cost

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

Figure 3



Stock Market/GDP and Tobin's Q, 1952-1995

of their tangible assets net of outstanding debt.¹⁵ This ratio, which fell to below .40 for several years in the late 1970s, was 1.27 at the end of 1994, and 1.47 at the end of June 1995.¹⁶ The recent change in q is unusual by historical standards. The only comparable percentage change is between late 1972 and late 1974, the period of the first oil embargo, when q declined by more than .50 during a two year period. The recent values are the highest recorded values of q during the postwar period.

There are good reasons for suspecting that "average q " measures such as those in Table 2 are poor measures of relative value for some types of firms. An 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 .574, many high technology and high-growth stocks exhibited q 's many times greater than the aggregate. Several illustrations are provided below:

<u>Company</u>	<u>Average q Value, December 1987</u>
Coca-Cola	2.89
Compaq	2.65
IBM	1.53

¹⁵This ratio is computed by the Federal Reserve Board and published in the Balance Sheets of the U.S. Economy. 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 investment good prices, inventories, and land. The market value of land is estimated by the Federal Reserve Board. The book value of debt is 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 presented discounted value of future tax shields as in Summers (1981). These factors are unlikely to result in large changes in the short-run movements in q .

¹⁶Revisions to the Flow of Funds that are expected in December 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 by the revision.

¹⁷The q values shown below are drawn from the R&D Master File described and analyzed in Hall (1993).

Intel	2.79
Kodak	1.53
Motorola	1.59.

If a rising fraction of firms' high-value assets are intangibles, such as patents, specialized workforces with particular human capital attributes, or brand loyalty, rather than the property, plant, and equipment, q may become increasingly difficult to interpret. In addition, an increasing fraction of corporate earnings are also generated overseas, and the replacement cost of foreign assets is probably measured with more error than the replacement cost 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 twenty percent below the ratio five years earlier (1.016 at the end of 1989), and forty percent below the value in the early 1980s (1.23 in 1982). During the postwar period prior to 1973, this ratio fluctuated between .86 and .96. It rose between 1974 and 1982, and has been declining for the period since then.

It is difficult to distill a simple conclusion from Table 2. While P/E ratios are not unusually high at present, other measures of stock price valuation are at or near historical highs. Conclusions about whether current stock prices can be justified by fundamentals are beyond the current project.¹⁹ Table 2 does suggest, however, that it may be important to

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

¹⁹One 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 was nearly one), is hesitant to venture again into analyzing stock market fundamentals!

distinguish between stock price fluctuations that are associated with movements in the P/E or P/D ratio, and fluctuations that are not, in assessing the macroeconomic consequences of stock price movements.

A number of recent studies suggest that variations in the earnings-price ratio are correlated with prospective stock market returns, and one concludes that "shocks to [stock] prices holding dividends constant are almost entirely transitory (Cochrane, 1994, p.241)."²⁰ Sharp increases in the P/E or P/D ratio, other things equal, are associated with lower prospective returns. If households view increases in share prices that are not supported by increases in dividends or earnings differently from those that are, this could result in divergent effects on consumption from these two types of share price movements.

2. 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 five percent of the total, all U.S. equities represent net worth of U.S. citizens. Yet the form of individual equity ownership may affect the impact of share price fluctuations on household behavior. 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 causal channel by which stock prices affect real economic activity may depend on stock ownership patterns.²¹ Differential transactions costs associated with

²⁰Campbell and Shiller (1988, 1989) present closely related evidence on E/P, D/P, and stock returns.

²¹Behavioral models, developed for example in Thaler (1994), suggest that the form in which shares are held, and even the record-keeping convention applied to them, may affect the magnitude of the wealth effect on consumer spending. Because mutual funds and other financial intermediaries mail their investors quarterly statements, individuals may be more

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," as many people view their IRAs or other tax-deferred saving plans, 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 these accounts 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 mutual 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 will imply that future tax burdens can be lowered while still funding 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 which continually

aware of their gains on these investments than on direct stock investments that require action to evaluate.

²²Schultz (1995).

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

provide information on net asset value.

Before considering whether changes in stock ownership patterns have affected the link between share prices and consumer spending, we 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 States²⁴ is based on data from the Federal Reserve Board's Flow of Funds Accounts. These data show "household" ownership of corporate stock declining from nearly 90% in the 1950s to less than 50% today.

Although widely used, the Flow of Funds data do not measure what many analysts think they do. 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, by a group of economic actors (the "household sector") that includes individuals as well as nonprofit institutions.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, through defined contribution pension plan accounts, and through 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.

²⁴See for example Blume and Zeldes (1994) and Friedman (1995).

²⁵The 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.

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 private plans column includes both defined contribution (DC) plans, in which the plan participants have distinct accounts that change in value along with the price of underlying assets, as well as defined benefit (DB) plans, which promise particular benefit streams to retirees as a function of their age, years of service, and wage history at retirement.

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:

(i) We subtract the equity holdings of nonprofit institutions from the Flow of Funds household sector. Experimental data presented in the Flow of Funds accounts shows the equity holdings of nonprofit institutions for the period 1987-1992. Nonprofit holdings average 15.7% of the household sector's equity holdings during this period, so we multiply the Flow of Funds household sector equity value by .843 in each year between 1952 and 1994 when we need to remove these holdings.

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

(iii) We add equity held in defined contribution pension plans to the household sector holdings. At the end of 1993, when private pension plans held \$1075 billion in corporate stock, \$481 billion was held in these plans. Since individuals are the owners of these

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

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 half in the mid-1990s.

(iv) 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

(v) Finally, 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% of mutual fund shares were allocated to households in the Flow of Funds, with another 13.2% 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

The magnitude of each of these corrections to household equity ownership, at the end

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

²⁸Retirement accounts comprise roughly two thirds of household mutual fund holdings. At the end of 1994, household ownership of mutual funds totalled \$1066 billion. Data from the Investment Company Institute show that \$361 billion of this total was held in Individual Retirement Accounts, \$161 billion was in 401(k) plans, \$76 billion was in non-401(k) defined contribution pension plans, and \$98 billion was in 403(b) plans.

of 1994, are shown below.²⁹ All entries are percentages of total corporate stock outstanding:

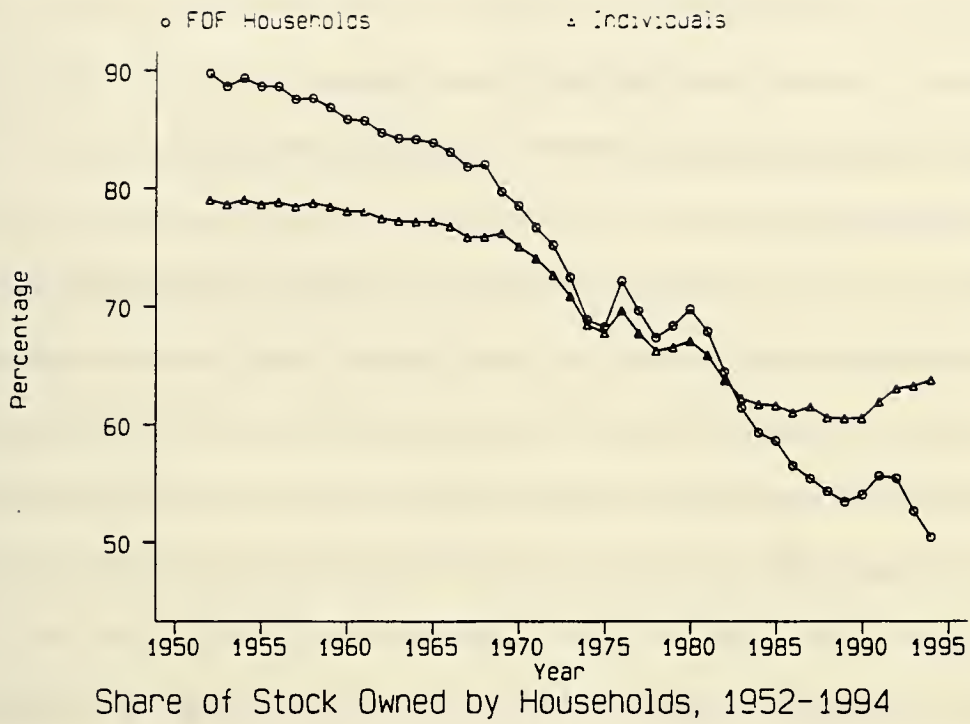
Flow of Funds Household Sector	47.7%
- Nonprofit Holdings	(7.5)
+ Bank Personal Trusts	2.7
+ Pension Plan Assets	7.7
+ Variable Annuity Accounts	2.0
+ Mutual Fund Holdings	11.0
Adjusted Individual Holdings	63.7%

The net effect of these adjustments is to substantially raise 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 1952-1994; 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. Individual ownership on our expanded definition declines from 76% of the market in 1970 to just over 60% of the market in the late 1980s, but then rebounds. It has grown by more than three percentage points during the last four years. This is largely the result of the diffusion of tax-deferred saving plans, particularly tax-deferred saving programs such as 401(k)s and 403(b)s, through the employed population.

²⁹One of the revisions that is due to be incorporated in the December 15, 1995 revision of the Flow of Funds accounts will involve 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. The correction presented in the text, adding back variable annuity assets, corrects for this. The December 1995 Flow of Funds revision is also expected to decrease the amount of stock held by corporate pension plans.

Figure 4



The 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 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 incline individuals toward direct ownership of shares. Individuals can more efficiently invoke tax planning 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 only hold equity in these tax-deferred forms. A countervailing incentive is the opportunity for greater diversification that is afforded by mutual funds relative to the purchase of securities in individual companies. Further work is needed to

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

understand the other factors in the financial services marketplace that have led investors away from direct stock holding.

3. Evolving Patterns of Individual Stock Ownership

One of the salient features of stock ownership is its concentration among a sub-set of the population. In light of the higher historical average return on stocks than on other investment assets, the substantial number of households who 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 role of direct vs. 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 Households, and the 1983 and 1992 Surveys of Consumer Finances, to summarize individual equity ownership during the last three decades.³² The Survey of Consumer Finances (SCF) is a stratified random sample of U.S. households administered by the Federal Reserve Board. It is designed to gather detailed information on assets, liabilities, and demographic characteristics. Beginning in 1983, the SCF has been conducted every three years. In recognition of the

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

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

highly skewed distributions of many types of financial and real assets, each 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, but missing value imputations in the public release versions are typically done separately. In 1983, 438 of the 4103 SCF households in the SCF were from the high-income sample, compared with 1450 of 3906 in 1992.³³

Our 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 The 1986 SCF was entirely a re-interview of the 1983 sample and was not as complete in its gathering of stock and pension data as the previous survey.³⁵ One of the 1989 priorities was establishing 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 percent of households owning stock in 1962, 1983, and 1992. The successive rows of the table contain progressively more comprehensive

³³Kennickell and Starr-McCluer (1994).

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

³⁵Heeringa, Connor, and Woodburn (1994).

³⁶Curtin, Juster, and Morgan (1989) compare different wealth surveys, and conclude that the SCF is the only one with enough high-income households to permit tabulations of detailed asset categories. Avery, Elliehausen, Canner, and Gustafson (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 (1994) describes the link between SCF data and aggregate data from the Flow of Funds accounts.

measures of stock ownership. The first row focuses on direct holding of shares in publicly traded companies. The next row also includes stock held indirectly through mutual funds. The next row adds shares held in IRAs or Keogh accounts, then shares held through tax-deferred saving plans such as 401(k)s, and finally, 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 us to calculate two definitions of ownership in 1962: directly held stock, and stock held either directly or through mutual funds. Neither IRAs nor 401(k) plans existed in 1962, and the 1962 SCF did not collect information on detailed pension plan attributes, so 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% of all households owned stock either directly or through one of the intermediaries we consider, only 17.8% 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 who 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 our most expansive definition increased by 4.2

³⁷Some equity holdings may still be omitted in our 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. We have imputed the share of mutual fund holdings in 1983 that are accounted for by equity mutual funds. The 1983 SCF questionnaire did not collect information on the type of mutual fund investors held. We therefore divided reported 1983 mutual fund assets between stock and bond mutual funds on the basis of the mix of these funds in the 1989 SCF.

percentage points from 33.2 to 37.4 percent.³⁸ Between 1983 and 1992, an additional 12.7% of households became stock owners.

The information in 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, defined by an absolute level of equity holding. When we limit our definition of stockholders to only those individuals with at least \$2000 invested in common stocks in 1992³⁹, the fraction of households categorized as stockowners declines to 12.9% in 1992, and the extended measure of ownership falls to 29.3%. Thus roughly eight percent of households own some corporate stock, but less than \$2000 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

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 stock holders. One important dimension for such analysis is stockholder age.⁴¹ Table 8 presents

³⁸SCF 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.

³⁹All monetary amounts in our analysis of the Survey of Consumer Finances refer to 1992 dollars.

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

⁴¹Bosworth, Burtless, and Sabelhaus (1991) and Attanasio (1994) present information on age-specific saving rates.

information on stockownership by the age of household head.⁴² Households over the age of 65 hold more than 40% (50% in 1983) of the household sector's publicly traded stock. The highest probability of owning stock occurs in the years preceding retirement.

Table 8 illustrates the dramatic growth of indirect stock holdings. In 1983, for example, 17% of households in the 45-54 group held stock only indirectly. By 1992, the analogous percentage had grown to 28%. The comparable statistic for those aged 35-44 rose from 20% to 24%. Comparing the entries in the middle and right panels of Table 8 suggests that the critical growth has taken place in mutual fund holdings and IRA/Keogh holdings. Including indirect holdings has a larger effect on the estimated rate of stock ownership for younger households than for older ones. In 1992, the share of 35-44 year old households that own shares directly is only 20.2%, compared with 44.1% owning stock directly or indirectly. The increase in ownership probability is smaller (18.4% to 26.5%) for households over the age of 65.

To link the disaggregate information on stock ownership to our discussion of consumption and stock price fluctuations, we can use the information in Table 8 to compute the age distribution of capital gains on corporate stock. The market value of corporate stock was \$6048.8 billion at the end of 1994, and it increased by \$1119 billion between December 1994 and June 1995. Since 63.7% 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 shown below:

Age < 35	\$ 37 billion
Age 35-45	\$ 121 billion
Age 45-54	\$ 175 billion

⁴²Our convention for selecting a head of household is that when the survey respondent is part of a married couple, the head is the spouse with higher wage, salary, and self-employment income. If neither spouse reports labor income, the head is the older spouse.

Age 54-64	\$ 161 billion
Age 65 +	\$ 219 billion.

The key conclusion from this calculation is that the majority of wealth changes from stock market fluctuations accrue to older households.⁴³

Some have argued that younger households benefit indirectly when share prices rise because they will receive substantial bequests from the current elderly. This could stimulate higher consumption even among households that do not hold stock. Ultimately, the young will receive in bequests any assets that are not consumed by older households. 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.⁴⁴ The results suggest that bequests are not a critical factor in the near term. Over the next five years, we estimate that 5.7% of corporate stock will be bequeathed. Over a fifteen year horizon the share is 24.4%, and over 25 years, 45.3%. These calculations do not suggest that younger generations will receive a large fraction of outstanding equity through the bequest 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 under the age of 45.

The concentration of stock ownership, as well as its age distribution, can affect the

⁴³We 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 end of life. We set $T = 80$, assume that all over-65 households are age 72 and that all under 35 are 30, and that the households in the other age brackets are all at the bracket midpoint (i.e., 50 for the 45-54 bracket). This implies a "predicted" consumption response of \$45 billion (6.3%) to the \$713 billion share price increase.

⁴⁴For married couple households that own stock, we define a bequest as occurring when both members of the couple have died. The average mortality table may understate life expectancy for stockholders, since age-specific mortality rates are negatively correlated with wealth holdings.

linkage between stock price fluctuations and consumption 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. We describe the concentration of share ownership in Table 9, which presents information from the 1962, 1983, and 1992 SCFs. The results confirm well-known cross-sectional patterns, but suggest new conclusions about trends. In 1983, the 0.5% of stockowners with the largest equity portfolios, including both direct and indirect holdings, owned 55.1% of the stock. In 1992, the analogous group held only 36.8%. To be included in this top 1/2 of 1%, a household needed at least \$800,000 in equities in 1992. The next one half of one percent of stockholders, which held 10.3% of all equity in 1992, had equity portfolios worth between \$500,000 and \$800,000.

The degree of concentration is even greater if we limit our attention to directly-held publicly traded stock. Over 66% of directly held stock was held by the 0.5% of stockholders with the largest holdings in 1983. This percentage declined to 58.6% by 1992. Comparison between the "All Equity" and "Non Pension Equity" entries 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.⁴⁵

Table 9 permits comparisons of inequality in equity holdings, non-equity 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

⁴⁵Some assets that are accumulated in defined contribution pension plans may show up 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).

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% of households with the largest stock portfolios in 1962 was 63.3%, compared with 66.2% in 1983. Total non-pension equity also became slightly more unequal between 1962 and 1983. The substantial decline in the inequality of non-pension equity between 1983 and 1992 (62.3% to 43.2% held by the top 0.5%) thus 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% of the stockholding population declined, while that of households with stock portfolios in the 90th to 99th percentiles increased substantially. The share of directly held stock accounted for by households in the 80th through 90th percentiles declined slightly.

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, with another forty percent of the gains accruing 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 sixty 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 non-equity financial assets, real assets such as owner-occupied real estate, and total net worth.⁴⁶ These tabulations use the data and

⁴⁶The tabulations for 1992 should be viewed as preliminary and subject to revision because the final public release of the Survey of Consumer Finances has not been made. The data underlying these tabulations contain no missing values but use a preliminary sample

sample weights that underlie the first published tabulations from the 1992 data set.⁴⁷ The sample weights are subject to revision in the final public-use version of the data set. With the exception of owner-occupied real estate, each of these asset categories became more equally distributed between 1983 and 1992.⁴⁸ 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 rising share (9.7% versus 7.6%) of family income accruing to households in the top 1/2 of 1% of the income distribution, and a substantial decline, from 49.6% to 43.4%, in the share of income reported by the bottom 80% of the distribution.⁴⁹ This finding, and the rising concentration of housing equity, is important in showing that the falling 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 more unequally distributed than income, non-equity financial assets are distributed more unequally than net worth, and equity holdings are distributed less equally than non-equity financial assets.

The finding that the fraction of corporate stock and of net worth held by the top 0.5% and top 1% of the distribution declined between 1983 and 1992 contrasts with recent studies of wealth inequality suggesting growing inequality of financial asset holdings increased during

weight to construct the asset distributions.

⁴⁷Kennickell and Starr-McLuer (1994).

⁴⁸Our 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 highest-wealth households.

⁴⁹Levy and Murnane (1992) describe and discuss recent changes in the U.S. income distribution.

the 1983-1989 period.⁵⁰ 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; it is in principle 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.⁵¹

To assess the importance of rising share prices in contributing to inequality, we estimated the change in the inequality of net worth between 1983 and 1992 that would have resulted only from changes in asset prices.⁵² We adjusted the reported 1983 values of corporate stock holdings and closely-held businesses by the real appreciation of the S&P 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

⁵⁰Wolff (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 the Flow of Funds values, these corrections inflate the amount of each asset held by each household that reports the asset. These corrections do not change the set of households who have a given asset, or the inequality within asset categories, although they can affect the measured inequality of broader composite measures of financial assets or net worth.

⁵¹Consider an economy with two assets, A and B. Households in the top 1% 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% of households is $s_A * w_A + s_B * w_B$. Assume that A is distributed less equally than B ($s_A > s_B$). On a different date, the top 1% 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 than the first. If the simple case of $s_B' = s_B$, net worth inequality rises if $s_A'/s_A > s_B/s_A + (1-s_B/s_A) * (w_A/w_A')$. If $s_B/s_A = .25$, and asset A appreciates 50%, so $w_A/w_A' = .67$, then net worth inequality will rise for any s_A'/s_A above .75.

⁵²Weicher (1995) explores the effect of rising share prices on net worth inequality during the 1983-1989 period, and concludes that favorable stock returns did not substantially exacerbate inequality then, because they were paralleled by rising real estate values.

net worth are shown below:

<u>Wealth Percentile</u>	<u>Actual 1983</u>	<u>Predicted 1992</u>	<u>Actual 1992</u>
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

The results show that the actual share of wealth holdings by the highest-wealth 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, principally the diffusion of substantial stock holdings to households near the top, but not at the top, of the wealth distribution, were important than asset price changes in generating changes in the distribution of equity holdings and net worth.

The source of the difference between our findings, which show a decline in the equity holdings and net worth of the top 1% of asset holders, and other findings of 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% of households with the highest net worth increased from 23.7% to 26.1% between 1983 and 1989. This makes the decline from 26.1% in 1989 to 21.7% 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.⁵³

⁵³Even though the SCF is the best available data source on the distribution of wealth, the small number of high-wealth households on whom the SCF results are based still makes these tabulations potentially sensitive to outliers. Analysis of the 1983-1989 SCF panel might provide further information on the changing patterns of asset holdings between these years.

The asset distribution among the highest net worth households in 1983, 1989, and 1992 raises some questions about the 1989 SCF data. Among the top 0.5% of households, for example, the share of net worth held in corporate stocks was 21.2% in 1983, 8.0% in 1989, and 14.4% in 1992. The share of net worth in closely held businesses was 34.6%, 42.1%, and 38.4%, respectively. At a minimum, the negatively-correlated fluctuations in the share 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% of households with the lowest net worth. This group's share of net worth fell from 21.1% in 1983 to 19.2% in 1992. Roughly half of the decline for this group accrued to households between the 80th and 90th percentiles in the wealth distribution, and the remainder accrued to those in the top decile. A key conclusion to emerge from Table 9 is that there have been non-trivial recent changes in the distribution of wealth among those high in the net worth distribution.

To complete the disaggregate analysis of stockownership, we consider the income and non-equity wealth holdings of households who own stock.⁵⁴ Tables 10 and 11 provide summary information on these dimensions of stock ownership, drawn from the 1983 and 1992 SCFs. The tables show a strong positive relationship between income, financial assets other than equity, and the probability of stock ownership.

Table 10 shows that 60.5% of households with a family income of more than

⁵⁴Poterba (1995b) presents more detailed information on the characteristics of stockholders.

\$250,000 in 1992 owned stock directly. The probability of direct or indirect stock ownership was 79.3% for this group. Both of these probabilities were much higher a decade earlier, when the probability of direct or indirect equity ownership for a household with an income of \$250,000 (1992 dollars) was 92%. Approximately 23% of corporate stock was owned by households with 1992 family incomes of more than \$250,000; another 23% 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. Table 10 also shows, however, the rising equality of share ownership. In 1983, those with family incomes of \$100,000 (1992 dollars) and above held 75% of all directly-held equity; that share had declined to 50% by 1992.

Table 11 presents similar information on the non-equity financial assets of the households who own corporate stock. Publicly traded stock is the most unequal of the various equity measures we consider, with 44% of directly-held stock owned by households with non-equity 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 stockholders. On the most expansive definition of equity holdings, the one that 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 non-equity financial assets between \$50,000 and \$250,000.

The conclusion that emerges from this analysis of cross-sectional data on stock ownership is that 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% of households owned some corporate

stock in 1992. The concentration of stock holdings nevertheless implies that a small subset of the population, on the order of five percent of all households, receives roughly three quarters of the capital gains and losses associated with stock price movements.

4. Stock Market Fluctuations and Consumption

We now consider the relationship between stock market returns and consumption. We organize our analysis as a test of whether the stock market has a causal wealth effect on consumption, or is simply a leading indicator that forecasts future changes in consumer spending.⁵⁵ 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. We illustrate the difficulty of interpreting these time series relationships by reference to discussions of the consumption effects of the stock market crashes of 1987 and 1929. We then study four issues that are motivated by our previous discussion of share ownership patterns. First, we examine whether stock price fluctuations affect the mix of consumption spending between "luxury goods" consumed disproportionately by high-income households, and all other goods. Next, we use household survey data to investigate whether the consumption of households that own stock is more closely correlated with changes in share prices than is the consumption of non-stockholding 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. This amounts to testing whether stock price changes in the early

⁵⁵This 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).

post-war years had greater predictive power for consumption growth than analogous fluctuations in more recent years, when individual direct stock ownership represents a smaller share of total market capitalization. Finally, we explore whether changes in share prices that are associated with changes in dividends, i.e. price fluctuations with a constant dividend price ratio, have different effects on consumption spending than fluctuations that are not supported by dividend movements.

4.1 Aggregate Statistics

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

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

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 for the period 1947:2 to 1995:2.⁵⁶

Table 12 present the results of estimating (1) for several broad consumption aggregates. The results in the first row, for total consumption and including only a single lagged stock return, suggest that stock market fluctuations forecast increases in real consumption outlays. A ten percent rise in real stock prices predicts an increase in real per capita consumption of approximately 0.3 percentage points.⁵⁷ Further lagged changes in

⁵⁶Fischer and Merton (1984) report some results for consumption growth as a function of lagged stock returns. Hall (1978) found that lagged stock market returns were the only variable known at the beginning of each quarter with predictive value for future consumption changes.

⁵⁷We tested for the possibility that stock price increases are associated with proportionally different changes in subsequent consumption than stock price decreases, but found no evidence of such an effect.

share prices also have predictive power for consumption growth. The entry in the second row of Table 12, also for total consumption, is the sum of the coefficients on the four lagged values of stock price changes. The cumulative change in aggregate consumption four quarters after a stock price increase is .064, more than twice the first-quarter effect.⁵⁸

We next consider the predictions that stock price fluctuations make for various categories of consumption. We present results with both one lagged value and four lagged values of $\Delta \ln P_{t-1}$ for the three major subcategories of consumption: nondurables, services, and durables. 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 ten percent increase in share prices predicts an increase in durable outlays of 1.4% in the first quarter, and 2.9% after four quarters. Rising stock prices predict a proportionate increase in durable outlays between four and six times larger than that on nondurables, which in turn is several times larger than the effect on consumption of services.

The results in Table 12 focus on the change in consumption beginning in the quarter after a change in stock prices, to avoid the simultaneity in contemporaneous stock returns and consumption growth. This may lead us to underestimate the total change in consumption that is predicted by a stock price change, although our use of quarterly data should mitigate this problem. We have explored the sensitivity of our findings to including the contemporaneous stock market return. 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 .064 (.014), the current stock market return has a coefficient of .011 (.007). The coefficients on the lagged stock market

⁵⁸In equations not reported here, we also included four lagged values of the real consumption growth rate in the specification. Only one of the four lagged values of consumption enters with a statistically significant coefficient, and the long-run predicted effect of stock price growth on consumption is very similar to that from the equation in the second column.

returns are virtually unchanged when we add 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 increase in share prices between December 1994 and June 1995 (17.0%) predicts, after four quarters, an increase in total consumption of 1.09%, and an increase in durable consumption of 4.92%. Since total durable spending in 1994 was \$591.5 billion, this corresponds to a \$29 billion increment to 1995 outlays, and to a \$50.4 billion increase in total consumption. Since a 17% rise in share prices translates into just over one trillion dollars of wealth creation, the predicted change in consumption spending is approximately .05 times the change in net worth.⁵⁹ Thus, the conclusion that emerges from these consumption growth equations, which exclude many other potential "control" variables, is very similar to that from 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.⁶⁰

4.2 Consumption and the Stock Market in 1987 and 1929

In spite of the long tradition of modelling aggregate consumption as a function of labor

⁵⁹One 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 leads to a reduction in the flow of contributions to these plans; these contributions are classified as personal saving in the national income accounts. Bernheim and Shoven (1988) discuss this linkage between asset prices and saving in more detail.

⁶⁰The 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.

income and household net worth⁶¹, there appears to be some reluctance to apply this model to analyzing the consumption effects of large stock market movements. This is particularly evident in discussions about the economic effects of the 1987 and 1929 stock market crashes.

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 their effects. Real share prices declined nearly thirty percent from their peak in August 1987 to their value after the crash. 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."⁶² This conclusion was based on the fact that most households do not own stock, the highly-concentrated distribution of ownership among those who do own shares, and the view that those who do own substantial stock have enough wealth to insulate their consumer spending from short-run shocks.⁶³ Popular accounts noted that a feared consumption collapse failed to materialize in the months after the crash, and that surveys showed that most consumers reported that they had not

⁶¹Blinder and Deaton (1985) provide a recent discussion of aggregate consumption functions. Ando and Modigliani (1963) is the seminal paper on the empirical modelling of aggregate consumption as a function of labor income and net worth.

⁶²U.S. Presidential Task Force on Market Mechanisms (1988, p. VII-2).

⁶³Mankiw and Zeldes (1991) note that households that report owning stock in the Panel Survey of Income Dynamics account for 32% of total food consumption in this data base. 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. The fraction of consumption done by households with substantial equity holdings is likely to be substantially smaller.

adjusted their spending patterns in response to the crash.⁶⁴

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 are shown below:

<u>Quarter</u>	<u>$\Delta \ln$ (Stock Price)</u>	<u>Growth Rate of Per Capita:</u>	
		<u>Consumption</u>	<u>Durables Expenditure</u>
1987:1	.148	-.002	-.067
1987:2	.019	.010	.032
1987:3	.046	.007	.033
1987:4 (Crash)	-.290	-.003	-.034
1988:1	.091	.015	.047
1988:2	.006	.004	.002
1988:3	-.023	.005	-.010

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

The columns for consumption growth show that per capita consumption growth was slightly negative, and the growth in spending on durables was substantially negative, in the quarter of the crash.⁶⁵ If we include indicator variables for 1987:4 and 1988:1 in the regression equations for total consumption outlays reported in Table 12, the resulting

⁶⁴Pennar (1988) reports evidence of a Business Week/Harris Poll in which 85% of the respondents indicated that the crash did not affect their finances, and noting that some macroeconomic forecasters had revised downward their view of the "wealth effect" of stock prices on consumption.

⁶⁵Dornbusch and Fischer (1994) note that consumption grew slowly after the crash, and use this as evidence in support of a wealth effect on consumption.

coefficients are $-.0096$ ($.0073$) and $.018$ ($.008$), 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 1987:4.⁶⁶ For durables, the patterns are slightly different. The effect of 1987:4 is negative, but the 1988:1 coefficient is $.071$ ($.042$). Expenditure on durables did decline in the quarter of the stock market crash, but it was unusually strong, given the decline in share prices, during the first quarter of 1988. The data thus suggest that the 1987 stock market crash had a smaller negative effect on consumption growth than the regression equations in Table 12 would otherwise have predicted.⁶⁷

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 be small

⁶⁶The models in Table 12 related consumption growth to lagged returns. Since the stock market crash occurred only three weeks into the fourth quarter of 1987, it is therefore plausible to expect unusually low consumption growth in this quarter. While the coefficient estimate on the dummy variable for 1987:Q4 confirms this, we are unable to reject the hypothesis that this quarter's consumption growth is explained by the model that excludes current returns.

⁶⁷Birinyi and Miller (1987) conclude that the evidence suggesting that stock market fluctuations cause consumption changes is weak at best. They present evidence of 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 below for whether stock market fluctuations affect the share of luxury consumption.

during the inter-war period.⁶⁸ Household spending on durables declined more than that on non-durables, which remained robust until 1932.⁶⁹ Thus it appears that the negative effect of a stock price decline on consumers, through the wealth effect, was muted.

4.3 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 Survey⁷⁰ (CEX) to identify several groups of goods that are disproportionately consumed by high-income households that are likely to own stock, and test whether the share of these goods in aggregate consumption rises after stock prices increase. Anecdotal evidence suggesting a very strong market for some luxury products in 1995, possibly related to the rise in share prices.⁷¹

The results of our analysis of consumption patterns are shown in Table 13. We report both the share of spending on particular items that is accounted for by households with before-tax annual incomes of \$70,000, the value at which income in the CEX is top-coded, and the ratio of spending by this group to spending by households with before tax income of

⁶⁸A 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 $\log(C)$. More generally, the marginal propensity to consume out of wealth depends upon the available rate of return.

⁶⁹Temin (1976) discusses the effect of the 1929 stock market crash on consumption. Romer (1990) draws particular attention to the role of consumer uncertainty engendered by the crash in depressing household durables purchases. 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 auto companies, experienced sharp downturns in profits and share prices much earlier.

⁷⁰U.S. Bureau of Labor Statistics (1994).

⁷¹Bird (1995).

\$20-30,000. For example, households with incomes of \$70,000 and above account for 31.4% of spending on new cars, while they account for 23.6% of spending on all goods.

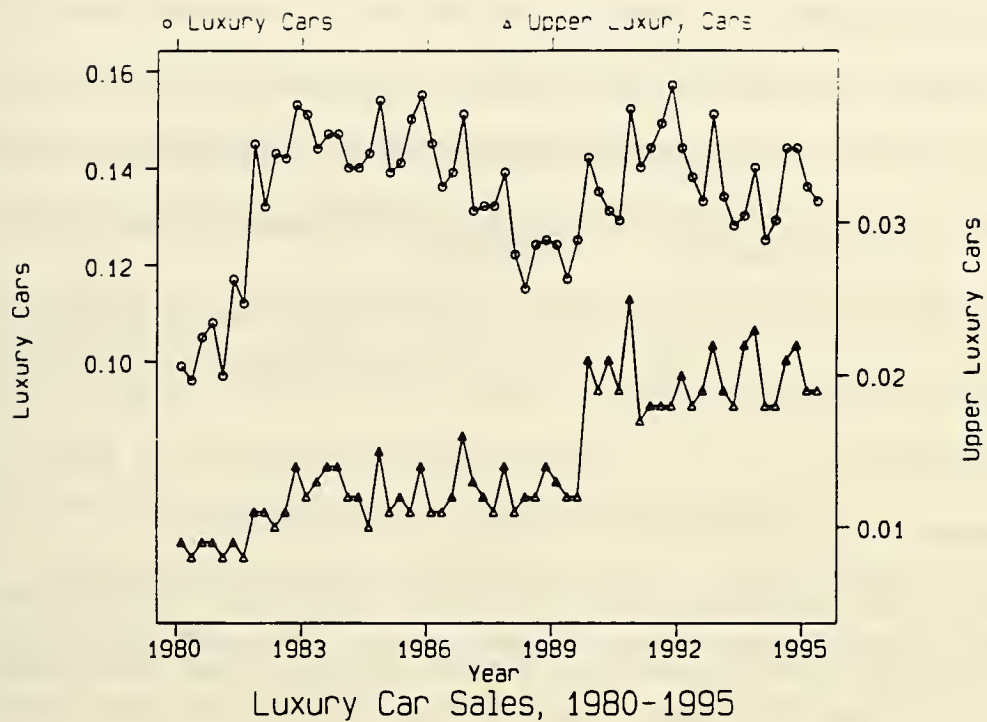
Table 14 reports the results of estimating consumption share equations that are designed to evaluate whether increases in share prices tilt the mix of consumption toward goods that are consumed by higher-income, stock-holding households. The first row considers the case spending on new cars. A 10% rise in share prices in the current quarter is predicted to raise spending on new cars as a share of total consumption by 2.5% in the next quarter, and by 6.3% after four quarters.⁷² The four-quarter effect of a 20% rise in share prices, similar to that in the first half of 1995, would be a rise from 2.3% to 2.7% in new car spending as a percentage 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 cars to several different categories, one of which is "luxury." This includes most cars with prices above \$25,000 in 1994. Of 8.99 million cars sold in 1994, 1.22 million were classified as luxury cars. An additional "upper luxury" category, which accounted for .17 million cars in 1994, consist 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 1980-1995 period.

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

⁷²One difficulty with interpreting these results is that automobile manufacturers and their components suppliers are 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



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 positively affect the fraction of new car sales that are classified as luxury vehicles. We estimate this relationship for the period 1980:1-1995:2, the sample over which the Ward's data were available. The regression equation, which includes unreported seasonal indicator variables, is shown below:

$$\log(\text{luxury}_t/\text{allcar}_t) = -0.283 - 0.084 * \Delta \ln P_{t-1} + 0.821 * \log(\text{luxury}_{t-1}/\text{allcar}_{t-1}) \quad R^2 = .763$$

(0.130) (0.098) (0.064)

These results do not support the operation 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, and on average account for a 14.5% greater share of total vehicle sales in Q4 than in Q1, and 5.4% more in Q4 than in Q3.

We also estimated a similar equation for the share of "upper luxury" cars in the mix of autos sold. The results are shown below, and provide very little support for an operative wealth effect:

$$\log(\text{upp lux}_t/\text{allcar}_t) = -0.223 + 0.017 * \Delta \ln P_{t-1} + 0.900 * \log(\text{upp lux}_{t-1}/\text{allcar}_{t-1}) \quad R^2 = .824$$

(0.244) (0.046) (0.056)

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

The results for the other luxury items 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, domestic services, hotel and motel spending, 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 "anti-luxuries" considered at the bottom of Table 14 provide more support for the proposition that stock returns affect the consumption mix. Rising share prices are associated with a decline in the share of total consumption that is devoted to rental housing, and with a weak negative effect on the share of tobacco spending. These results provide more support for operative wealth effects associated with stock price fluctuations, and leave us with mixed results from our analysis of luxury goods.

4.4 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 such analysis is the absence of data sets that collect information on both household portfolio holdings and consumption. The Panel Survey of Income Dynamics, an annual survey that collects information during the first few months of each year, is one survey that does contain such data, although direct information on consumption is limited to outlays on food. An important study designed to help resolve the "equity premium puzzle" stratified PSID households into those that own stock and those that do not, and then computed the correlation between per capita food consumption growth and excess returns on the stock market for these two groups of households.⁷³ 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 non-stockholders that are not related to their share ownership per se, but they at least

⁷³Mankiw and Zeldes (1991).

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 food consumption growth, we also analyze a broader measure of total consumption from the PSID. It is possible to use information on rent payments, house value, as well as spending for food at home and food away from home to obtain a proxy for total household consumption for PSID households.⁷⁴ While food consumption alone explains only 26% of the variation in total consumption the Consumer Expenditure Survey, a consumption proxy including house value and rental payments explains 72%. 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 the Mankiw and Zeldes study, notably the additional years of consumption data. Third, we use PSID information on participation in pension plans and employer thrift plans to identify households who are likely to have indirect holdings of corporate stock, but no direct holdings. 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 vs. indirect stock holdings.⁷⁵

Our analysis follows previous work in defining the sample for analysis.⁷⁶ In particular,

⁷⁴Skinner (1987) develops this broader consumption measure, and explores its statistical properties.

⁷⁵The PSID survey asks households whether they own "any shares of stock in publicly held corporations, mutual funds, or investment trusts, including stocks in IRAs."

⁷⁶We 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 between households that hold stock, and households that do not, for the sample period considered by Mankiw and Zeldes (1991), we obtain results that are broadly similar to theirs.

we exclude from the 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 topcoded. Because the PSID did not collect information on food consumption in 1973, 1988, or 1989, our sample spans the period 1970-1992 but excludes 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 equity ownership, considering "stockholders" to be those with any, more than \$1000, or more than \$10000 in corporate stock.⁷⁷ The second dimension we consider 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.⁷⁸ 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 our previous analysis focused on quarterly time series data, and related changes in consumption to lagged stock market returns, the PSID data are annual and we therefore focus on contemporaneous changes in share prices and consumption.⁷⁹

⁷⁷These thresholds for the definition of equity ownership are measured in 1984 dollars.

⁷⁸The PSID only collects detailed information on pension plan characteristics for workers over the age of 45. For younger workers, we cannot distinguish between defined benefit and defined contribution plans. We therefore use only an indicator variable for "pension plan participant" in our analysis, recognizing that this combines some DB plan participants with no equity stake with equity holders through defined contribution plans.

⁷⁹We have estimated the correlation between current consumption growth and lagged stock returns for the PSID households, and 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 stock

Table 15 presents the results of our analysis of these consumption correlations. The upper panel reports results for food consumption growth, while the lower panel is concerned with growth in the Skinner consumption index.⁸⁰ When we use the Skinner index, we find small differences between the consumption growth-stock return correlation for stockholders and non-stockholders. For each definition of stock ownership, however, the correlation between consumption growth and stock returns is greater for those who are classified as stock holders than for those who are not. With the Skinner index, only one of these differences, that for "stockholders" defined as having more than \$10000 in equity, approaches significance using conventional statistical tests. 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 non-food components of the Skinner index, since 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 and the Skinner index of consumption growth, when we consider non-stockholders, those who have thrift plans exhibit greater correlation between consumption 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 correlation than those without such plans.⁸¹ These results are consistent with the notion that even indirect stock holding matters in household consumption planning, but they do not

price changes and consumption growth.

⁸⁰The differences in the stock returns-food consumption growth correlations between stockholders and non-stockholders parallel those in Mankiw and Zeldes (1991). Our results from the longer PSID sample period yield less statistically significant differences in these correlations than in the Mankiw and Zeldes (1991) study.

⁸¹For consumption growth, these findings emerge for two of the three definitions of "stockholding," any equity held and stock worth more than \$10,000.

reject the null hypothesis of no effect. For those households who own stock directly, some of the patterns are difficult to explain. Those in thrift plans exhibit weaker consumption correlations than those who are not in such plans for two of the three definitions of stockownership.

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 who own stock than of those who do not. The PSID data do not have enough power, however, to distinguish between the view that only direct stock ownership matters, and the possibility that either direct or indirect stock ownership has a similar effect on consumption growth. The results are consistent with the presence of a wealth effect, but they are not definitive support for it. There is only weak evidence that the consumption of those with larger stock portfolios is more closely correlated with the stock market than is the consumption of those with small portfolios.

4.5 The Ownership of Shares 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.⁸² The first such measure, which corresponds to direct individual ownership, is the ratio of the Flow of Funds household sector stock ownership (excluding nonprofit holdings) to the total market value of shares

⁸²We also tested the sub-sample coefficient stability of the equations reported in Table 12, dividing the sample before and after 1970:1, and before and after 1985:1. We could not reject the null hypothesis of constant coefficients for any of the consumption categories; this foreshadows our weak results for the trending shareownership variables.

outstanding. This time series declines substantially during the postwar period, from 72.3% in 1960, to 51.3% in 1980, to 40.2% in 1994. We amend equation (1) 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.⁸³

In addition to our measure of direct shareownership, $SHARE1_t$, we also 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 households 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%, and by 1994, it had declined to 63.7%.

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. Unfortunately, the collinearity of these two variables makes it impossible to reject the hypothesis that either α_1 or α_2 in (2) is zero, although we reject the hypothesis that these coefficients are jointly zero. The third row presents an equation that

⁸³Including a trending variable such as $SHARE_{t-1}$ as a separate regressor in these equations does not affect the results, because there is little trend in the rate of consumption growth.

includes only the $\text{SHARE1}_t * \Delta \ln P_{t-1}$ variable, and shows that the explanatory power of this variable alone is greater than that of the lagged stock price variable alone.⁸⁴

The fourth and fifth rows in Table 16 show results similar to those in the second and third rows, with SHARE2_t replacing 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 while the lagged share price term alone has a negative coefficient. Yet the collinearity problems remain in these specifications. On balance, the results do not support the view that changing patterns of stock ownership have altered the link between share price fluctuations and consumption.⁸⁵

4.6 The Forecast Power of Stock Returns, Dividend Movements, and Earnings Movements

A final aspect of the linkage between stock returns and consumption that we now consider is whether the source of stock price fluctuations affects the predictive power of stock returns for future consumption growth. Given the evidence that fluctuations in the dividend-price ratio and earnings-price ratio predict future stock returns, which implies 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, one might expect differences in the predictive effects of different stock market shocks.

To explore whether fluctuations in share prices, dividends, earnings, or some

⁸⁴A non-nested hypothesis test of the model with $\text{SHARE1}_t * \Delta \ln P_{t-1}$, against the model with $\Delta \ln P_{t-1}$ as the dependent variable, does not permit us to reject either hypothesis in favor of the other.

⁸⁵One way to develop additional tests of whether stock ownership patterns affect the wealth effect of stock prices on consumption would involve analyzing data from different countries. In Japan, for example, the fraction of shares held directly by individuals is substantially lower than in the United States.

combination of these variables has 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 S&P Industrials ($\Delta \ln D_{t-1}$):

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

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 with D/P constant, then γ_1 should be positive, and α_1 should be indistinguishable from zero.

Table 17 shows the results of estimating equation (3). We report results 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 marginally significant. 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, we estimated models (not shown) with four lagged values of real stock price changes, and 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 also followed a separate strategy to identify the effects of shocks to discount rates, and shocks to expected cash flows, on consumption growth. We estimated a first-order autoregression for the dividend-price ratio, and defined the residuals from this equation as estimates of the shock to discount rate expectations.⁸⁸ This autoregression, for the period 1947:2 to 1995:2, generates an estimated coefficient of .961 (.021) on the lagged value of D/P. We then include the value of $[(D/P)_{t-1} - .961 * (D/P)_{t-2}]$ 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 estimation equation for total consumption is:

$$\Delta \ln c_t = .004 + .013 * \Delta \ln P_{t-1} - .004 * [(D/P)_{t-1} - .961 * (D/P)_{t-2}] \quad R^2 = .0719$$

(.001) (.016) (.003)

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.

5. Conclusions and Future Directions

This paper documents substantial changes during the postwar period in the aggregate

⁸⁸This procedure follows the suggestion of Fama and French (1988), who argue that "the unexpected component of D/P can be interpreted as a (noisy) measure of the shock to expected returns (p.20)."

and cross-sectional patterns of corporate stock ownership. While most shares were held directly by households in the 1950s and early 1960s, there has been a gradual but significant trend toward greater ownership of equity through mutual funds and through thrift plans (e.g. 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 incidence of stock ownership remained stable during the 1960s and 1970s, but the rise of IRAs, thrift plans, and other related institutions has led to a substantial increase in stock ownership during the most recent decade.

We explore the implications of growing intermediary ownership for the effect of stock price fluctuations on consumer spending. We find clear evidence that changes in share prices portend growth in consumer spending, with a particularly large effect for outlays on consumer durables. We then try to distinguish between two alternative explanations 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 spending change actually occurs. The second view 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 study household level data from the Panel Survey of Income Dynamics on the correlation between consumption growth and stock returns for households that own, and do not own, corporate stock. We do not find any pronounced effects of stock price fluctuations on the mix of luxury and non-luxury consumption within the following year. This evidence casts doubt on the short-run consumption consequences of wealth effects

associated with stock price movements.⁸⁷ 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 determination.

These findings represent a challenge to the traditional model of the aggregate consumption function that is found in many macroeconomic textbooks.⁸⁸ 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 stock holders, or in greater bequests. It is possible that consumption responds gradually to increases in stock market wealth, and that our focus on consumption fluctuations 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 stock price changes, and changes in 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 no evidence that consumption evolves differently after increases in share prices associated with dividend

⁸⁷It is still possible that cash realizations of past gains affect current consumption outlays, as suggested in Poterba (1991).

⁸⁸The findings in many ways parallel Morck, Shleifer, and Vishny's (1990) findings that the stock market's role in predicting investment movements was largely due to its role as a passive informant of future developments.

increases and 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, for example decisions to leave paid employment and to strike out as an entrepreneur, and may also encourage retirement.⁸⁹ Changing share prices may also affect "consumer confidence," and influence spending decisions through this poorly-understood channel.

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 dispersed individual ownership to concentrated stock holdings alters the way 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.⁹⁰ Many discussions of "noise trader" models in financial economics implicitly portray individual investors as the poorly informed traders who may be affected by fads or other investment trends, with professional money managers as the 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 on this issue remains to be done.

⁸⁹Holtz-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.

⁹⁰Friedman (1995).

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Table 1: Real Value of the Stock Market, 1955-1995

Year	Real Value of S&P 500	% Change in Real S&P 500	Real Value of Corporate Stock, FOF
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*	539.4	18.5	7,167.8

Notes: Real S&P 500 is computed using average S&P index for each December and the CPIU. Entries for 1995 relate to June; column 3 for 1995 is the authors' estimate.

Table 2: Relative Measures of Corporate Share Values, 1947-1995

Year	MV Shares/GDP	P/E Ratio	P/D Ratio	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	1.008	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*	1.039	16.3	39.2	1.467

Notes: Column 1 is the market value of corporate stock as estimated in the Flow of Funds accounts (year end value) divided by the fourth-quarter GDP for each year. Column 2 (Column 3) is the P/E ratio (reciprocal of the dividend price ratio) for the Standard and Poor's Composite Stock Price Index averaged for the last month of each calendar year. Column 3 is the market value of equity in nonfinancial corporations divided by the replacement cost of their net assets, net of debt outstanding, from the Balance Sheets for the U.S. Economy. June 1995 q is estimated by the authors.

Table 3: Rate of Return to Nonfinancial Corporate Capital, 1947-1995

Year	Unadjusted	Cycle-Adjusted
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 (est.)	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	7.8

Source: Tabulations based on data from the National Income and Product Accounts and Balance Sheets of the U.S. Economy. 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 NFCs, divided by an estimate of the mid-year 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 NFC tangible assets as of March 31, 1995.

Table 4: Dividends & Other Cash Payouts, Nonfinancial Corporations, 1980-1995

Year	Ratio of Total Cash Payouts to Cash Dividends	Price/Dividend Ratio	Price/Total Cash Payouts
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	1.206	39.2	32.5

Source: Column 1 is the ratio of dividends plus gross share purchases by nonfinancial corporations, including both share repurchases and shares bought in corporate control transactions, to dividend payments by NFCs. Column 2 is the price-dividend ratio for the S&P500; column three equals column 2 divided by column 1. Data on dividend payments for NFCs are from NIPA Table 1.16; data on gross share purchases are from the Federal Reserve Board. The value for 1995 is an estimate based on data for the first two quarters; the P/D and P/Cash ratios are as of June 30, 1995.

Table 5: Unadjusted Percentage of Flow of Funds Corporate Stock Holdings
Held by Major Investor Categories, 1952-1994

Year	Households	Pension Funds	Mutual Funds	Foreign	Insurance Companies
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: Calculations based on Flow of Funds Accounts, July 1995. Pensions include private and government plans. Mutual funds include closed end as well as open end investment companies. Households includes ownership by nonprofit institutions. Insurance companies includes both property/casualty and life insurance companies.

Table 6: Adjusted Flow of Funds Data on Stock Ownership:
Individual Direct and Beneficial Ownership, 1952-1994

Year	FOF Households	Bank					"Indiv- iduals"
		Non- profits	Personal Trusts	Mutual Funds	DC Pensions	Variable Annuities	
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

Notes: Authors' calculations as described in the text.

Table 7: Number of Stockowners, 1962, 1983, and 1992

Stock Category	Millions of Households			Percentage of Households		
	1962	1983	1992	1962	1983	1992
Households With 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		19.7	26.8		23.5	28.0
Plus 401(k) Plan		23.2	31.8		27.7	33.2
Plus All DC Plan		27.9	35.7		33.2	37.4
Households With Stock Holdings > \$2,000						
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		14.4	21.5		17.1	22.5
Plus 401(k) Plan		16.8	24.8		20.0	25.9
Plus All DC Plan		20.7	28.0		24.6	29.3
Total	57.9	83.9	95.6			

Source: Authors' tabulations from 1962, 1983, and 1992 Surveys of Consumer Finances. Further description may be found in the text.

Table 8: Distribution of Stockowners by Age, 1983 and 1992

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

Source: Authors' tabulations from the 1983 and 1992 Surveys of Consumer Finances. Further description may be found in the text.

Table 9: Ownership Concentration Ratios for Various Assets, 1962, 1983 and 1992

Percentiles	1992 Definitions					1962 Definitions				
	All Equity	Non-Pension Equity	Publicly Traded Stock	Non-Equity Financial Assets	Total Net Worth	Housing Equity	Total Family Income	Non-Equity Financial Assets	Total Net Worth	
	1992									
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			
Bottom 80	1.80	0.49	0.00	13.70	19.20	28.07	43.35			
	1983									
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	
Bottom 80	1.02	0.08	0.00	14.62	21.08	34.48	49.60	10.33	23.65	
	1962									
Top 0.5		59.49	65.29			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	
Bottom 80		0.00	0.00			33.41	53.25	10.94	22.10	

Source: Authors' tabulations from the 1983 and 1992 Surveys of Consumer Finances. Further description may be found in the text.

Table 10: Distribution of Stockowners by Family Income, 1983 and 1992

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

Source: Authors' tabulations from the 1983 and 1992 Surveys of Consumer Finances. Further description may be found in the text.

Table 11: Distribution of Stockowners by Non-Stock Financial Asset Category, 1983 and 1992

Asset Category	Publicly Traded Stock			Publicly Traded, Mutual Fund, and IRA/Keogh			Publicly Traded, Mutual Fund, IRA/Keogh, and DC Plan			Percent of HH Owned
	Percent Who Own Stock	Percent of Stock Owned	Percent Who Own Stock	Percent of Stock Owned	Percent Who Own Stock	Percent of Stock Owned	Percent Who Own Stock	Percent of Stock Owned		
	1992									
Zero	0.75	0.44	0.11	1.07	0.40	0.08	4.49	1.26	0.08	10.52
0 - 5	7.92	15.83	4.32	12.51	15.91	4.23	21.58	20.58	4.20	35.65
5 - 10	14.80	8.32	4.65	27.29	9.75	4.56	38.95	10.44	4.76	10.02
10 - 25	17.56	13.63	4.08	37.45	18.49	5.75	49.64	18.39	6.94	13.84
25 - 50	24.84	14.63	8.33	39.69	14.87	9.02	52.97	14.89	11.03	10.50
50 - 100	32.40	14.89	9.48	50.57	14.78	10.88	62.01	13.60	12.02	8.19
100 - 250	48.45	19.04	25.56	61.09	15.27	23.36	65.88	12.35	22.43	7.01
Over 250	55.18	13.21	43.47	69.14	10.53	42.12	74.31	8.49	38.55	4.27
	1983									
Zero	0.69	0.38	0.00	0.69	0.31	0.00	1.41	0.44	0.01	10.36
0 - 5	7.22	13.92	1.08	9.82	15.36	1.21	19.46	21.54	2.50	36.77
5 - 10	17.04	10.09	1.16	22.66	10.88	1.30	35.37	12.03	2.01	11.29
10 - 25	24.40	20.33	4.62	30.19	20.39	5.92	44.57	21.31	7.16	15.88
25 - 50	31.53	16.78	6.26	40.11	17.31	6.86	49.63	15.16	7.39	10.15
50 - 100	38.52	16.05	9.13	43.62	14.74	9.41	57.00	13.63	10.98	7.94
100 - 250	50.95	14.27	16.36	59.38	13.50	16.85	64.63	10.40	16.88	5.34
Over 250	69.06	8.19	61.38	78.10	7.51	58.45	80.65	5.49	53.07	2.26

Source: Authors' tabulations from the 1983 and 1992 Surveys of Consumer Finances. Further description may be found in the text.

Table 12: Aggregate Consumption Spending and Stock Market Fluctuations

Consumption Concept	Constant	Lagged Change in Real In(Stock Price)	R ²
Total	.0037 (.0011)	.031 (.008)	.068
Total (Four Quarters)	.0036 (.0011)	.064 (.014)	.101
Nondurables	.0021 (.0011)	.032 (.008)	.065
Nondurables (Four Quarters)	.0023 (.0011)	.054 (.015)	.070
Services	.0055 (.0008)	.007 (.006)	.009
Services (Four Quarters)	.0056 (.0008)	.025 (.010)	.015
Durables	.0017 (.0057)	.139 (.041)	.058
Durables (Four Quarters)	-.0011 (.0057)	.290 (.076)	.091

Notes: Each row reports estimates of the coefficient α_1 , or the sum of the coefficients α_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. Standard errors are shown in parentheses. All equations include quarterly indicator variables.

Table 13: Luxury and "Anti-Luxury" Consumption

Consumption Subcategory	CEX Share of \$70K + Households	Spending Ratio for 70K + Households/ 20-30K Households	NIPA Consumption Share
All Consumption Expenditure	.236	1.85	1.000
<u>"Luxuries":</u>			
New Automobiles	.314	3.10	0.023
Education	.308	3.24	0.023
"Other Lodging" (Hotels and Motels)	.369	3.69	0.003
Entertainment - Fees and Admissions	.337	3.44	0.004
Household Operations - Personal Services	.296	2.76	0.003
<u>"Anti-Luxuries":</u>			
Rented Dwellings	.045	0.25	0.037
Tobacco Products	.099	0.54	0.008

Notes: Tabulations in the first two columns are based on data from the 1991-1993 Consumer Expenditure Surveys, as reported in U.S. Bureau of Labor Statistics (1994). Households are allocated to income groups based on income before taxes. Entries in the last column are from the National Income and Product Accounts data for 1994. "Education" is the NIPA entry for "private education and research," and "Entertainment-Fees and Admissions" corresponds to the sum of NIPA categories "motion picture admissions," "legitimate theatre," and "spectator sports."

Table 14: Luxury Consumption and Stock Price Fluctuations

Consumption Concept	One Quarter Lagged Change in ln(Stock Price)	Four Quarter Sum of Lagged Changes in ln(Stock Price)
"Luxuries":		
New Automobiles	0.250 (0.103)	0.627 (0.193)
Education	-0.022 (0.012)	-0.041 (0.024)
"Other Lodging" (Hotels and Motels)	-0.007 (0.041)	0.011 (0.082)
Entertainment - Fees and Admissions	-0.086 (0.056)	-0.128 (0.109)
Household Operations - Personal Services	-0.000 (0.033)	0.019 (0.065)
"Anti-Luxuries":		
Rented Dwellings	-0.026 (0.007)	-0.051 (0.015)
Tobacco Products	-0.018 (0.024)	-0.071 (0.046)

Notes: 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. The estimating equation is

$$\log(L_t/C_t) = \alpha_0 + \alpha_1 \cdot \log(L_{t-1}/C_{t-1}) + \alpha_2 \cdot \Delta \ln P_{t-1} + \epsilon_t$$

where L_t denotes luxury (or anti-luxury) consumption and C_t denotes aggregate consumption spending. Standard errors are shown in parentheses. All equations include seasonal dummy variables.

Table 15: Correlation of Consumption Growth & Stock Returns, Stockholders vs. Non-Stockholders

	Any Stock	Stock > \$1,000	Stock > \$10,000
<u>Growth Rate of Per Capita Food Consumption</u>			
Non-Stockholders	.120	.076	.078
Without Thrift Plan	.058	.077	.063
With Thrift Plan	.350	.049	.226
Without Pension Plan	.059	.071	.044
With Pension Plan	.143	.047	.080
Stockholders	.125	.214	.286
Without Thrift Plan	.190	.133	.226
With Thrift Plan	.043	.261	.314
Without Pension Plan	.148	.134	.339
With Pension Plan	.089	.205	.232
<u>Growth Rate of Per Capita Skinner Consumption Index</u>			
Non-Stockholders	-.125	-.146	-.126
Without Thrift Plan	-.208	-.178	-.182
With Thrift Plan	.218	-.010	.048
Without Pension Plan	-.217	-.191	-.202
With Pension Plan	-.004	-.090	-.052
Stockholders	.011	.068	.219
Without Thrift Plan	.081	.042	.269
With Thrift Plan	-.095	.094	.097
Without Pension Plan	.055	.026	.226
With Pension Plan	-.012	.092	.187

Notes: Each entry reports the correlation of a measure of consumption growth with excess return on the stock market for PSID households in each category, as described in the text. The sample period is 1970-1992 excluding 1973, 1974, 1988, 1989, and 1990. Stockholders versus non-stockholders are defined based on the criteria at the column head. The correlation of excess stock market returns with food (Skinner index) consumption growth for all households is .129 (-.070). The standard error of each correlation may be computed as $[(1-\rho^2)/16]^{.5}$, where 16 denotes the degrees of freedom; these standard errors are approximately .25 for each entry above.



Table 16: Stock Ownership & the Stock Price Fluctuations-Consumption Linkage

Consumption Category	Constant	Lagged Change in Real In(Stock Price)	Ownership Share* Lagged Change in Real In(Stock Price)	R ²
Panel A: No Ownership Measure				
Total	.0047 (.0005)		.030 (.007)	.098
Panel B: Direct Individual Stock Ownership Measure				
Total	.0047 (.0005)	-.003 (.031)	.060 (.055)	.098
Total	.0047 (.0005)		.056 (.012)	.104
Panel C: Expanded Individual Stock Ownership Measure				
Total	.0047 (.0005)	-.064 (.069)	.136 (.099)	.102
Total	.0047 (.0005)		.045 (.010)	.103

Notes: Each row corresponds to an estimate of an equation of the form:

$$\Delta \ln c_t = \alpha_0 + \alpha_1 \Delta \ln P_{t-1} + \gamma_2 \text{SHARE1}_{t-1} \Delta \ln P_{t-1} + \epsilon_t$$

All estimates correspond to the period 1947:2-1995:2, 193 quarterly observations. The values of SHARE1 and SHARE2, which replaces SHARE1 in the foregoing equation, are defined based on Flow of Funds data for the period 1952:4-1994:4. They are extrapolated at the beginning and end of the sample. Standard errors are shown in parentheses.

Table 17: Consumption Spending, Stock Market Fluctuations, Dividends, and Earnings

Consumption Concept	Constant	Lagged $\Delta \ln(\text{Stock Price})$	Lagged $\Delta \ln(\text{Dividends})$	Lagged $\Delta \ln(\text{Earnings})$	R ²
Total	.0045 (.0005)	.030 (.007)	.002 (.021)		.071
Total	.0044 (.0005)	.032 (.007)		.015 (.010)	.081
Nondurables	.0022 (.0006)	.032 (.008)	.013 (.021)		.074
Nondurables	.0021 (.0006)	.033 (.008)		.010 (.011)	.076
Services	.0059 (.0004)	.008 (.006)	.001 (.016)		-.001
Services	.0058 (.0004)	.008 (.006)		.005 (.008)	.001
Durables	.0070 (.0030)	.137 (.041)	-.008 (.113)		.046
Durables	.0063 (.0029)	.146 (.041)		.100 (.056)	.062

Notes: 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 the same equation with E_{t-1} replacing D_{t-1} . All estimates correspond to the period 1947:3-1995:2, 192 quarterly observations. Dividends denotes the real value of dividend payments to shares in the S&P 500 Index, Earnings the analogous measure of earnings for these firms. Standard errors are shown in parentheses.

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