The Effect of Dividends on Consumption

Citation

Permanent link

Terms of Use

Share Your Story

Accessibility

MALCOLM BAKER
Harvard University

STEFAN NAGEL
Stanford University

JEFFREY WURGLER
New York University

The Effect of Dividends on Consumption

MICROSOFT'S $32 BILLION CASH dividend of December 2004 was the largest corporate payout ever. Classical models of finance and consumption-saving decisions predict that this dividend will have little effect on the consumption of Microsoft investors. Under the assumptions of Merton Miller and Franco Modigliani, for example, investors can always reinvest unwanted dividends, or sell shares to create homemade dividends, and thereby insulate their preferred consumption stream from corporate dividend policies.[1] Thus, in traditional models, the division of stock returns into dividends and capital gains is a financial decision of the firm that has no "real" consequence for investor consumption patterns.

Yet there are a number of reasons to think that dividend policy, and dividends more generally, may indeed affect consumption. Most obviously, the popular advice to "consume income, not principal" suggests a potentially widespread mental accounting practice in which investors do not view dividends and capital gains as fungible, as in the homemade dividends story and traditional theories of consumption, but rather place them into

1. Miller and Modigliani (1961).

different mental accounts from which they have different propensities to consume.[2] This behavior is also consistent with a belief that dividends, unlike capital gains, represent permanent income. Less exotic but equally realistic frictions, such as transaction costs (of making homemade dividends) and taxes, can also lead an investor to favor consuming dividends before capital appreciation.

Although the dividends-consumption link is a potentially fundamental one between corporate finance and the real economy, little empirical research has pursued the issue. The reason is probably that the most easily available data on consumption and dividends are aggregate time-series data, which have several limitations. Among other challenges, such data require one to identify the effect of a smooth aggregate dividend series using a small number of data points; they combine investors and noninvestors; and they face an essentially prohibitive endogeneity problem: omitted variables such as business conditions will jointly affect consumption, dividends, and capital appreciation, making it difficult to establish the causality behind any observed correlations.

This paper studies the effect of dividends on investor consumption using two micro data sets that reveal and exploit powerful *cross-sectional* variation in dividend receipts and capital gains. The first is the Consumer Expenditure Survey (CEX), which is a repeated cross section with data on expenditure measures and self-reported dividend income and capital gains (or losses). Our CEX sample includes several hundred households per year between 1988 and 2001. The second data set includes the trading records of tens of thousands of households with accounts at a large discount brokerage from 1991 through 1996.[3] Although these portfolio data do not contain an explicit expenditure measure, they complement the CEX by allowing us to accurately measure net withdrawals from the portfolio, a novel dependent variable in its own right and a precursor to expenditure. The data set also allows us to measure the withdrawal rates of different types of dividend income, including ordinary, special, and mutual fund dividends, which allows for finer comparisons.

We start with an analysis of the CEX data. Our most basic approach is to regress consumption on realized dividend income, *controlling* for

---

2. Mental accounting behavior of this sort is discussed in detail in Thaler and Shefrin (1981), Shefrin and Statman (1984), and Shefrin and Thaler (1988).

3. This data set was introduced by Barber and Odean (2000).

total returns including dividends. The coefficient on dividend income thus captures differences between the consumption responses to dividends and to capital gains. We find that the coefficient on realized dividend income for total consumption expenditure is large, positive, and significant. This basic result is robust to a variety of control variables and estimation techniques, including specifications in first differences. It suggests that, contrary to classical models, the form of returns does matter for consumption.

We then use the brokerage account data in an effort to test the mechanism behind this effect; that is, we test whether dividends are indeed withdrawn from the household portfolio at a higher rate than capital gains. The data strongly confirm this. On average, investors do not reinvest ordinary dividends: the propensity to withdraw modest levels of ordinary dividends is unity. A fraction of mutual fund and special dividends is also withdrawn. On the other hand, very large dividends of any type are not fully withdrawn. As in the CEX data, the effect of capital appreciation on net withdrawals is uniformly smaller than the effect of dividends.

We conduct a variety of subsample splits and robustness tests on each data set. The results suggest that the apparent differential effect of dividend income on net withdrawals and consumption is at least partly causal; that is, it does not arise only because investors who plan to consume dividends in the future buy dividend-paying stocks. In particular, we find that investors tend to withdraw from both predictable and unpredictable components of dividends. For instance, investors often withdraw special dividend income, which is unpredictable by definition.

In sum, although the CEX and the portfolio data involve completely different households and somewhat different data concepts, they lead to qualitatively similar results, namely, that investor consumption is affected by the form of returns, not just the level. What drives this effect? We first evaluate explanations based on well-understood frictions such as transaction costs, taxes, and borrowing constraints. Upon inspection, however, none of these explanations is fully satisfactory. Borrowing constraints are irrelevant in this setting, because the substitution of dividends for capital gains has no overall wealth effect, and homemade dividends can be created by selling shares. Tax stories are varied, but none seems consistent with key aspects of the data. Transaction costs cannot account for, for example, the fact that households with low rates of portfolio turnover withdraw dividends at rates similar to those of high-turnover households.

Although our findings are surely driven by a combination of factors, mental accounting seems among the most compelling. The notion that many investors do not view dividends and capital gains as fungible seems especially plausible in light of the popular adage to "consume income, not principal." Mental accounting offers a natural explanation for both our main findings and certain finer results. For example, ordinary dividends are more likely to be mentally accounted for as current income than are large special dividends. Hence, the mental accounting framework predicts a higher propensity to consume from ordinary dividends than from large special dividends. This is what we find in net withdrawals (where we can measure different types of dividends). Tax and transaction cost explanations, on the other hand, do not predict this pattern.

This paper builds on earlier work that uses aggregate data.[4] Some papers have viewed the equality of the propensity to consume from dividends and corporate retained earnings, not capital appreciation, as the null hypothesis of interest and found weak evidence that corporate saving affects consumption. Other papers find little evidence that capital gains and losses have an effect on aggregate consumption.[5]

Our results also relate to evidence, consistent with the existing literature on the consumption response to windfalls, that consumers have a relatively high propensity to consume moderately sized cash windfalls.[6] It appears that ordinary dividends are treated like moderate-size windfalls. However, our analysis differs from the existing literature in that we focus on the *relative* propensity to consume two forms of income, dividends and capital gains,

---

4. See Feldstein (1973), Feldstein and Fane (1973), Peek (1983), Summers and Carroll (1987), Poterba (1987), and Poterba (2000).

5. To our knowledge, the only paper to use micro data in this context is a contemporaneous paper by Rantapuska (2005). He analyzes Finnish investor registry data and finds that there is little reinvestment within two weeks after receipts of dividends or tender offer proceeds. His results are broadly consistent with and complementary to ours, but there are some important differences. In particular, the CEX data allow us to look at actual consumption, not just reinvestment. Moreover, reinvestment may occur over horizons much longer than two weeks, an issue that our brokerage account data allow us to investigate. Finally, automatic reinvestment plans are absent in Finland but common in the United States, so the effect of dividends on consumption and reinvestment could be quite different in any case.

6. For instance, Souleles (1999) finds that consumption responds to federal income tax refunds whether or not the household faces borrowing constraints, and Souleles (2002) documents that consumption responds to preannounced tax cuts. Related studies in this vein include Bodkin (1959), Kreinin (1961), Wilcox (1989), Parker (1999a), Stephens (2003), and Johnson, Parker, and Souleles (2006).

holding their sum, total return, constant. More broadly, this study falls into a growing literature on "household finance."[7]

At the end of the paper, we briefly consider what our estimates imply for the response of aggregate consumption to the May 2003 dividend tax cuts. Alternative scenarios suggest a consumption stimulus in the range of $8.3 billion to $49.9 billion, which is not insubstantial in relation to a standard deviation of total personal consumption expenditure of $66 billion over the preceding five years.

Evidence from the Consumer Expenditure Survey

Our first data set is drawn from the Consumer Expenditure Survey, obtained from the Inter-University Consortium for Political and Social Research at the University of Michigan. The strength of the CEX is its detailed data on household consumption and demographics. Its comparative weakness, for our purpose, is that dividends and portfolio returns are self-reported and thus likely to be noisy. After introducing the data and definitions, we describe our empirical methodology and then present regression estimates of the effects of dividends on consumption.

Data and Definitions

The CEX has been conducted annually by the Bureau of Labor Statistics since 1980.[8] It is a short panel based on a stratified random sample of the U.S. population. Selected households are interviewed quarterly for five quarters and are then replaced by new households. As we discuss more fully below, the information on financial asset holdings and changes in these holdings over the preceding twelve months is collected in the fifth interview; data on dividends, interest received, other income variables, and demographics are collected in the second and fifth interviews and cover the twelve months before the interview date. We extract most of the variables from the CEX family files, but the data on housing and credit are from the detailed expenditure files.

---

7. See Campbell (2006).
8. We use the average estimates in the interview survey of the CEX, not the more detailed records from the diary survey.

Basic variables are as follows. We consider both expenditure on non-durable goods and total expenditure (which includes durables) as measures of consumption. A priori it is not clear which of the two consumption measures is likely to be affected more strongly by dividends. On one hand, nondurables expenditure is less lumpy and could be adjusted more smoothly in response to changing dividend income than durables expenditure. On the other hand, durables consumption is more discretionary than nondurables consumption, and so the household might have more flexibility to adjust durables consumption when dividend income changes. We define nondurables consumption, C, as the sum of food, alcohol, apparel, transportation, entertainment, personal care, and reading expenditure.[9] We use the total expenditure variable as provided in the CEX. In both cases we sum consumption over the four quarters from the second to the fifth interview. Dividends, D, are defined as (in the words of the survey question) "the amount of regular income from dividends, royalties, estates, or trusts" over the past twelve months. We also collect interest, I, received by the household. We use reported income after taxes, Y, as a proxy for total income.

Total wealth, W, is the sum of home equity (property values less outstanding mortgage balances) and financial wealth. Financial wealth is the sum of balances in checking accounts, savings accounts, savings bonds, money owed to the household, and "stocks" (which includes not only holdings of stocks and mutual funds, but also corporate bonds and government bonds that are not savings bonds), minus other debt.[10] Before 1988, information on the level of mortgage balances is lacking from the CEX, so we use the 1988 to 2001 data only. Also, whereas for financial assets we can measure changes over the twelve months preceding the fifth interview, for other wealth components (home equity and "other debt") we can compute only the change over the nine months between the second and the fifth interviews.

In their fifth interview survey participants are asked about the amount of securities purchased and sold over the preceding twelve months. This information allows us to decompose the change in the value of stock holdings into an active investment or disinvestment component and a capital

---

9. This definition follows Parker (2001).

10. The surveys do not ask respondents to include retirement assets, but they also do not ask explicitly to exclude them, so it is unclear whether some respondents include them.

gains or losses component. To compute the latter, *G,* we need to make an assumption regarding the timing of investment. We assume that half the reported investment was made at the beginning of the period and half at the end.

We employ a few filters to screen out unusual observations. We require that there be only one consumer unit (family) in the household and that the marital status of the respondent and the size of the family remain the same from the second to the fifth interview. We delete observations where any wealth component or income is topcoded.[11] We require that lagged financial wealth be positive and that a nonzero fraction of this wealth be invested in stocks or mutual funds. This last screen is the most significant: most (roughly 80 percent) of the households in the sample do not participate in the stock market. We use the consumer price index (CPI) to deflate all variables to December 2001 dollars.

Summary Statistics

Table 1 presents summary statistics for the CEX data. After applying the filters, we have 3,106 household-year observations. In this sample, mean nondurables consumption, reported in the top panel, is $15,042, and the median is slightly lower. Total expenditure, including durables, is three to four times as large. The next two panels report wealth and income measures. Financial wealth is typically around a third of total wealth. Total income, which includes dividends but not capital gains, has a mean of $56,566 and again a slightly lower median. Comparing the first and third panels, one sees that, on average, total income is slightly higher than total expenditure. For the households in our sample that hold some stock, average interest income is $1,264 and average dividends total $935.

As one would expect, the mean capital gain of $363 is relatively small compared with total income, and its average share in total income is roughly the same as the average share of interest income. Capital gains, however, do show significant variation across households. Note that the extreme values

---

11. To preserve the anonymity of respondents, the CEX administrators reset observations above certain thresholds on wealth, income, and some other variables to a cutoff threshold value. Before 1995 the topcoding level was $100,000 for many items in the survey. However, since the topcoding threshold applies to single items, the total value of variables such as income after tax, for example, which is calculated as the sum of many single items, can be much larger than $100,000. After 1995, the topcoding thresholds were raised.

Table 1. Annual Summary Statistics for the Sample Drawn from the Consumer Expenditure Survey, 1988–2001[a]
Dollars except where stated otherwise

Variable	No. of observations	Mean	Percentile			Minimum	Maximum
			50th	5th	95th		
Consumption							
Nondurables[b]	3,106	15,042	13,698	4,463	30,003	1,347	78,548
Total	3,106	48,076	44,582	15,549	91,892	4,955	201,559
Wealth[c]							
Financial	3,106	67,700	38,701	2,928	222,207	14	984,165
Total[d]	3,106	161,822	127,276	10,943	428,919	190	1,199,269
Income							
Total (Y_t)[e]	3,106	56,566	52,316	12,282	115,505	49	303,793
Interest (I_t)	2,869	1,264	145	0	6,383	0	86,391
Dividends (D_t)	3,106	935	0	0	4,751	0	144,658
Other	2,869	54,128	50,526	10,192	112,245	−13,823	302,238
Capital gains (G_t)[f]	3,106	363	0	−16,014	18,988	−301,407	181,503

Income components as percent of total income

Interest	2,869	4.2	0.2	0.0	19.1	−137.1	2,086.4
Dividends	3,106	2.1	0.0	0.0	12.0	−36.4	236.7
Other	2,869	89.3	97.5	45.3	122.2	−13,249.2	3,996.0
Capital gains	3,106	4.4	0.0	−27.3	38.2	−5,216.1	13,397.0
Controls							
Share of financial wealth invested in stock (percent)	3,106	56.19	60.26	3.76	97.94	0.05	100.00
Age of household head (years)	3,106	52	49	30	80	21	93
Family size	3,106	2	2	1	5	1	11

Source: Consumer Expenditure Survey and authors' calculations.

a. Sample is limited to households with the following characteristics: household has nonzero financial wealth invested in stocks; data on income and consumption are not missing; household consists of only one consumer unit (family); marital status of the respondent and family size remain unchanged from the second to the fifth interview; none of the wealth components are topcoded. All variables are converted to December 2001 dollars using the consumer price index as the deflator. All means, percentiles, and minimum and maximum values refer to the distribution of households with respect to the indicated variable.

b. Sum of food, alcohol, apparel, transportation, entertainment, personal care, and reading expenditure over the four quarters from a household's second to fifth interview.

c. Both wealth variables are lagged one period.

d. Sum of home equity and financial wealth, which is the sum of checking and savings accounts balances, holdings of savings bonds, money owed to the household, and stock holdings (stocks plus mutual funds plus small positions in corporate and government bonds other than savings bonds) minus other debts.

e. After-tax income over the preceding four quarters, as reported by households in their fifth interview. It includes income from dividends (defined as dividends, royalties, and income from estates or trusts) and interest income, but not capital gains.

f. Difference between the change in reported stock holdings over four quarters and the reported net investment in stocks during the same period.

are from wealthy households with a large amount of financial wealth. What the table does not show is that capital gains also vary widely across time: virtually all of the largest negative observations, including the minimum of −$301,407, originate from 2001, where the measurement period includes the crash in technology stock prices during 2000 and 2001.

The fourth panel shows that, on average, interest and dividends account for 4 percent and 2 percent of total income, respectively. The distribution is skewed, with a median household dividend income of zero. It is likely that some of the zero-dividend observations in the CEX result from underreporting of dividends by the interviewees. To ensure that our results are not driven by the zero-dividend observations, we include a zero-dividend dummy variable in our regressions.

Empirical Methodology

The null hypothesis of interest is that capital gains and dividends are fungible, which means that households should react similarly to a change in wealth whether it comes in the form of a capital gain or in the form of a dividend. In other words, only the total return should matter, not the split of that return into dividends and capital gains or losses.

To test this hypothesis, we run ordinary least squares regressions with specifications alternatively in levels, first differences, and log differences. We describe and motivate these in turn. Our basic levels specification is as follows:

$$(1) \qquad C_{it} = a_0 + a_1' \mathbf{Z}_{it} + a_2' \mathbf{F}_{it} + g R_{it} + d D_{it} + u_{it},$$

where C_{it} is household i's consumption in period t (in this specification, consumption is summed over the four quarters preceding the fifth interview); $\mathbf{Z}_{it}$ is a vector of household characteristics; $\mathbf{F}_{it}$ is a vector of financial variables that includes income, lagged wealth, and interactions with $\mathbf{Z}_{it}$; R_{it} is the total dollar return on stocks including dividends; and D_{it} is total dollar dividend income. In equation 1 the total stock return is already accounted for with R_{it}, and therefore $d = 0$ under the null. However, if for some reason a household has a higher propensity to consume from dividends than from capital gains, we expect $d > 0$.

The levels specification can be interpreted as an approximation to the consumption rule used by households. Different consumption models map income, wealth, and other household characteristics onto consumption in

different ways.[12] We are agnostic as to which consumption model is most accurate. Our goal is simply to distinguish between models in which capital gains and dividends are fungible and those in which the effect of dividends diverges from that of capital gains. We approximate the consumption rule with a range of variables that may be relevant for consumption decisions, allowing them to enter linearly, quadratically, and through interactions to approximate the nonlinear consumption function.[13] In the end the levels specification boils down to asking whether two consumers in the same financial situation, with similar income, similar household characteristics, and similar total return on financial assets, but different *compositions* of total returns across dividends and capital gains, have different consumption.

Household characteristics in $\mathbf{Z}_{it}$ include the education of the household head (dummies for high school and college graduation), the age of the household head, age of household head squared, family size, family size squared, and a set of year-month fixed effects to absorb seasonal variation in consumption as well as variation in macroeconomic factors.[14] Financial variables in $\mathbf{F}_{it}$ include variables that proxy for future income and for current cash on hand, including income after tax (excluding dividends),[15] lagged total wealth, lagged financial wealth, the percentage of financial wealth invested in stocks, and the squares of all these variables. We also allow for interactions of age and family size with income, lagged wealth, and lagged financial wealth.

In interpreting an estimate that $d > 0$, the key question is whether this set of controls is sufficient or whether some omitted variable could be positively correlated with dividends, thus biasing upward the estimate of d. Although all of these controls should do a reasonable job of approximating households' consumption rule, it is difficult to fully rule out the possibility

12. Under the basic form of the permanent income hypothesis, permanent income determines consumption, and so the right-hand-side variables in equation 1 matter to the extent that they are correlated with permanent income. In models of buffer-stock saving with impatience, such as those of Deaton (1991) and Carroll (1997), consumption depends on cash on hand (liquid wealth plus current income) relative to its target level.

13. This approach follows Hayashi (1985), Carroll (1994), and Parker (1999b).

14. The quarterly interviews are conducted for overlapping ends of quarters, and so we need year-month fixed effects, not simply year-quarter fixed effects.

15. The income variable does not include capital gains (realized or unrealized), so we only need to subtract dividends. In specifications where dividends plus interest is the explanatory variable, we subtract dividends and interest.

of some remaining unobserved difference between households that hold dividend-paying stocks and those that hold nonpaying stocks. Moreover, wealth and capital gains in the CEX survey are inevitably measured with error, and this sort of measurement error problem causes an upward bias in our dividend coefficient, to the extent that dividends proxy for mismeasured wealth changes. To address this omitted variables problem we also run regressions in first differences, which removes any household fixed effects that could be correlated with dividend income.

Differencing is also useful for addressing an important endogeneity concern, namely, that any relationship between dividends and consumption is not causal but rather reflects the fact that households that expect to consume might decide ex ante to hold securities that pay the preferred consumption stream in the form of dividends.[16] While such an "ex ante effect" would also mean that fungibility does not hold, in the sense that some consumers anticipate their unwillingness to consume from principal and adjust their portfolio accordingly, it would not imply that the composition of returns has an effect on consumption. However, to the extent that any such ex ante effect is largely a household fixed effect, with only slow time variation, differencing should help to eliminate it.

Our basic differences specification is as follows:[17]

$$(2) \qquad \Delta C_{it} = b_0 + b_1' \mathbf{Z}_{it} + b_2' \Delta \left(Y_{it} - D_{it} \right) + g R_{it} + d \Delta D_{it} + e_{it}.$$

Since the CEX offers at most four quarterly consumption observations per household, we define ΔC_{it} as the difference in consumption between the

16. See Graham and Kumar (2006) and references therein for clear evidence of dividend clienteles. Graham and Kumar show that the allocation to and trades of dividend-paying stocks depend on investor characteristics.

17. This is not an exact difference of the specification in equation 1. We have only a single observation per household of lagged wealth, lagged financial wealth, and capital gains, and so we are not able to compute first differences. The most notable issue is that we do not first-difference returns. Including R_t instead of ΔR_t in the regression means that we are leaving a $-R_{t-1}$ term in the residual as an omitted variable. Fortunately, this should have little effect on our test, as the change in dividends from $t - 1$ to t is not likely to be highly correlated with R_{t-1}. To the extent that there is some correlation, high R_{t-1} should forecast higher dividend changes from $t - 1$ to t as firms' dividend policy responds with a lag to unexpected increases in profits. As a result, the $-R_{t-1}$ term in the residual is negatively correlated with dividend changes, and hence this should lead to a downward bias on the dividend change coefficient. This effect would bias the test against our hypothesis.

fifth and the second interview. As mentioned above, dividends and income in the CEX are measured over overlapping twelve-month periods leading up to the second and fifth interviews. We define ΔD_{it} and $\Delta(Y_{it} - D_{it})$ as the difference in the reported values. Because of the imperfect matching of measurement periods between ΔC_{it} and ΔD_{it}, the d estimate is likely to be biased toward zero. (The same is true for b_2.) Inferences about the magnitude of d will thus be difficult, but a significant positive coefficient will still be meaningful, as the null is still $d = 0$. As before, $\mathbf{Z}_{it}$ is a vector of household characteristics and time dummies. In some specifications we also include the level of second-quarter consumption as an explanatory variable, because it may pick up some noise that is introduced through the measurement-period mismatch between ΔC_{it} and the income variables.

Finally, to check whether the results are robust to functional form, we also try a third set of specifications with the change in the logarithm of consumption as the dependent variable. There we use an indicator variable for the *sign* of dividend growth as our key explanatory variable, because we lack a clear prediction about how consumption growth would be affected quantitatively by dividend growth. For example, a 10 percent increase in dividends would presumably have a different effect on the percentage growth in consumption when dividends are a small proportion of total income than when they are a large proportion. By using an indicator variable, we simply estimate the average difference in consumption growth between households with dividend increases and those with dividend decreases.[18]

Effects of Dividends on Household Consumption

Table 2 reports estimates of equation 1. Specifications in the first four columns use nondurables consumption as the dependent variable, and the rest use total expenditure. Independent variables in the first specification include total returns, dividends, and a dummy for zero dividends, plus a large number of controls. We find little economic impact of total returns on consumption, and no statistically significant relationship. But dividends are positively related to the level of consumption, and the effect is statistically significant. A one-dollar difference between households in

---

18. See Johnson, Parker, and Souleles (2006) for a similar dummy variable approach to analyze the effect of tax rebates on log consumption.

Table 2. Regressions of Consumption on Dividends, Total Returns, and Other Sources of Income Using Consumer Expenditure Survey Data in Levels[a]

	Dependent variable							
	Nondurables expenditure[b]				Total expenditure			
Independent variable	2-1	2-2	2-3	2-4	2-5	2-6	2-7	2-8
Total return on stocks ($R_t = G_t + D_t$)	−0.01 (0.01)	−0.01 (0.01)			−0.01 (0.02)	−0.01 (0.02)		
Dividends (D_t)	0.16 (0.04)	0.16 (0.05)			0.75 (0.14)	0.72 (0.14)		
Dividends lagged one period (D_{t-1})		0.01 (0.04)				0.14 (0.11)		
Dummy variable equaling 1 if $D_t = D_{t-1} = 0$	−694 (249)	−688 (253)			−915 (639)	−772 (641)		
Total return ($R_t = G_t + D_t + I_t$)			−0.01 (0.01)	−0.01 (0.01)			−0.02 (0.02)	−0.02 (0.02)
Dividends and interest ($D_t + I_t$)			0.13 (0.04)	0.12 (0.04)			0.58 (0.13)	0.56 (0.13)
Dividends and interest lagged one period ($D_{t-1} + I_{t-1}$)				0.03 (0.03)				0.06 (0.09)
Dummy variable equaling 1 if $D_t + I_t = D_{t-1} + I_{t-1} = 0$			−595 (267)	−566 (268)			−980 (684)	−922 (687)
No. of observations	2,796	2,796	2,410	2,410	2,796	2,796	2,410	2,410
R^2	0.52	0.52	0.52	0.52	0.63	0.63	0.64	0.64

Source: Authors' regressions using Consumer Expenditure Survey data.

a. Consumption, total returns, dividends, and interest income are for the four quarters from the household's second to its fifth interview. Lagged variables cover the four quarters ending with the second interview. All regressions include year-month fixed effects, household controls (family size, high school education of respondent, college education of respondent, age of respondent), income and wealth controls (income, lagged income, financial wealth, total wealth, and percent of financial wealth in stocks, with all wealth variables for the period ending four quarters before the fifth interview), and variables interacting household controls with other household controls (high school education × age, college education × age, family size × age, age squared, family size squared) and with income and wealth variables (financial wealth × age, income × family size, total wealth × family size, income squared, total wealth squared, financial wealth squared, and percentage of financial wealth in stocks squared). Numbers in parentheses are heteroskedasticity-robust standard errors. All variables in dollars are deflated by the consumer price index.

b. Defined as in table 1.

dividends received is associated with a 16-cent difference in nondurables consumption.[19]

The second specification reported in table 2 includes the first lagged value of dividends, as a first step toward distinguishing between the "ex ante" (endogenous dividend-consumption clientele) and "ex post" (causal) effects that *d* could capture. (As mentioned previously, our main approach to dealing with this issue is differencing, results of which follow below.) Specifically, if ex ante matching of anticipated dividends and consumption were the full story, then lagged and contemporaneous dividends should have about the same correlation with current consumption. As it turns out, however, the effect of current dividends is far stronger than that of lagged dividends, consistent with a causal effect of dividends on consumption that goes beyond ex ante matching.

The third and fourth specifications look at the sum of dividends and interest income, $D_t + I_t$. It seems possible that mental accounting consumers, for example, would treat interest income and dividend income similarly; likewise, spending from interest income allows households to skirt the transaction costs of selling bonds in the same way that spending from dividends avoids the costs of selling stock. The results provide some support for these analogies, as the effect of $D_t + I_t$ on consumption is similar to that of D_t.

19. Dividends in our data are measured before tax. Our regressions therefore show the relationship between before-tax dividends and consumption. If one were to use after-tax dividends, the fraction that goes into consumption would exceed 16 cents of every dollar. At the same time, however, it is also not clear how households treat taxes on dividends in a mental accounting framework. Since taxes on dividends are not withheld, the before-tax dividend cash flow and the tax payment occur at different points in time. To what extent households "integrate" the before-tax dividend cash flow with the subsequent tax payment, and to what extent it is more appropriate to view them instead as separate income streams with possibly different effects on consumption, are interesting questions. Unfortunately, we cannot answer them with the data at hand. Our focus instead is on documenting that dividends have an independent effect on consumption, and showing that before-tax dividends affect consumption is sufficient for that purpose. The 0.16 unit consumption effect of 1 unit of dividends could in principle be compared with the coefficient on labor income. However, in our specifications we see income and wealth variables merely as controls for all the potential determinants of households' consumption rule that could be *correlated* with dividends. We would prefer not to claim that we have a complete and correct model that would deliver the marginal propensity to consume out of income. Nonetheless, for the interested reader, the total effect of current and lagged income is 0.18 in regressions 2-1 and 2-2, 0.71 in regression 2-5, and 0.70 in regression 2-6. So the effect of after-tax labor income is in the same range as that of before-tax dividends.

The last four specifications in table 2 use total expenditure as the dependent variable. The estimated coefficients on D_t and $D_t + I_t$ are roughly four to five times those in the regressions with nondurables consumption on the left-hand side. As total expenditure is proportionally higher than nondurables consumption, on average these results suggest that dividend income is not used exclusively for nondurables consumption but rather boosts expenditure of all types. In all other respects, the results in these specifications are similar to those for nondurables.

It is interesting that no evidence emerges of a significant effect of capital gains; indeed, all the point estimates on total returns are negative. Of course, a low (but positive) propensity to consume capital gains would not have been surprising. Under the permanent income hypothesis, for instance, forward-looking consumers spread the consumption from an unexpected increase in wealth over their lifetime, so that the coefficient on total returns is predicted to be on the order of the real interest rate. From this perspective, what is striking about the results in table 2 is the far higher consumption from the return component that we label "dividends." The very large effects of dividends on total expenditure, in particular, strongly suggest that individuals consume dividends disproportionately in the period in which they are received.

Table 3 reports estimates of equation 2. The first specification includes total returns, the change in dividends, and other controls, including a dummy for zero dividends over the preceding and current twelve-month periods and, in some specifications, lagged consumption. Since we are regressing the change in *quarterly* consumption (from the second to the fifth interview) on changes in dividends measured over *twelve-month* periods (preceding the second and fifth interviews), one would expect the coefficient estimates on ΔD_t to be about one quarter of those on D_t in the levels specifications.

The results indicate that multiplying the coefficient estimates on ΔD_t by four does yield numbers that are at least of the same order of magnitude as the estimates in table 2, although somewhat lower, in particular for the nondurables specifications. The moderate decrease is consistent with some ex ante effect in the levels estimates, but it could also reflect the noise introduced through the imperfect matching of dividends and consumption measurement periods. Consistent with the latter possibility, controlling for lagged consumption, which should absorb some of the noise, raises the magnitude of the coefficient on dividend changes. But

Table 3. Regressions of Consumption on Dividends, Total Returns, and Other Sources of Income Using Consumer Expenditure Survey Data in First Differences[a]

	Dependent variable							
	Change in nondurables expenditure[b]				Change in total expenditure			
Independent variable	3-1	3-2	3-3	3-4	3-5	3-6	3-7	3-8
Total return on stocks ($R_t = G_t + D_t$)[c]	−0.003	−0.002			0.006	0.004		
	(0.003)	(0.003)			(0.008)	(0.008)		
Change in dividends (ΔD_t)[d]	0.017	0.005			0.093	0.057		
	(0.009)	(0.010)			(0.029)	(0.028)		
Dummy variable = 1 when $D_t = D_{t-1} = 0$	−279	−127			−850	−833		
	(92)	(110)			(256)	(255)		
Change in income less dividends ($\Delta[Y_t − D_t]$)[d]	−0.001	0.000			0.025	0.034		
	(0.003)	(0.004)			(0.007)	(0.008)		
Total return ($R_t = G_t + D_t + I_t$)			−0.004	−0.004			0.003	0.002
			(0.003)	(0.004)			(0.009)	(0.009)
Change in dividends plus change in interest ($\Delta D_t + \Delta I_t$)[d]			0.009	0.007			0.056	0.056
			(0.008)	(0.008)			(0.028)	(0.028)
Dummy variable = 1 when $D_t + I_t = D_{t-1} + I_{t-1} = 0$[d]			−268	−78			0	−732
			(105)	(127)			(0)	(277)
Change in income less dividends and interest ($\Delta[Y_t − D_t − I_t]$)[d]			−0.002	0.000			0.028	0.039
			(0.004)	(0.004)			(0.008)	(0.010)
Consumption lagged one period (C_{t-1})	−0.678		−0.703		−0.621		−0.627	
	(0.047)		(0.049)		(0.041)		(0.045)	
No. of observations	2,796	2,796	2,410	2,410	2,796	2,796	2,410	2,410
R^2	0.38	0.06	0.39	0.06	0.37	0.07	0.39	0.08

Source: Authors' regressions using Consumer Expenditure Survey data.

a. The dependent (consumption) variables are defined as the difference between quarterly consumption in the fifth (and last) interview and that in the second interview three quarters earlier. All regressions include year-month fixed effects and household controls (family size and high school education, college education, and age of respondent) and the following interactions: high school education × age, college education × age, family size × age, age squared, and family size squared. Numbers in parentheses are heteroskedasticity-robust standard errors. All variables in dollars are deflated by the consumer price index.

b. Consumer nondurables expenditure is defined as in table 1.

c. Total returns are measured over the four quarters before a household's fifth interview.

d. Difference between annual income items reported at the fifth interview and the second interview three quarters earlier. This variable is only an approximation of the first difference because income is measured after tax whereas dividends are measured before tax.

for the nondurables specifications overall, standard errors are large, and the coefficient estimates are at best marginally significant. For total expenditure, on the other hand, all coefficient estimates for ΔD_t and $\Delta D_t + \Delta I_t$ are statistically significant.

Table 4 presents results of the regressions specified in log differences. As mentioned above, the analysis here focuses on a dummy variable for an increase in dividends. Its coefficient measures the average difference in consumption growth between households with dividend increases and those without. In all specifications the coefficient estimates on the $\Delta D_t > 0$ dummy is positive, and it is significantly different from zero in all but the first two nondurables specifications. But even there the point estimate is economically large: the average household that experiences an increase in dividend income increases its consumption by 2 percent relative to the average household that does not.

We also experimented with splitting the sample by age. Dividends account for a bigger fraction of income in households headed by older individuals and are larger in absolute terms: the mean dividend income for households with a household head below age 65 is $614, versus $1,818 for households with a household head of age 65 or older. On one hand, the consumption effects of dividends could be stronger for older households, because those households might be more aware of their dividend income, and that income is more likely to be retirement income. On the other hand, older households could be less prone to consume from dividends according to a simple mental accounting rule, because dividends make up a substantial part of their income and the household might therefore think more carefully about spending them.

The results are as ambiguous as the theoretical predictions. For example, rerunning the base case total expenditure regression (regression 2-5) from table 2, with dividends interacted with a dummy variable for age greater than 65, yields a negative coefficient on the interaction term (−0.43) that is on the borderline of statistical significance (standard error of 0.23). Interacting age with dividends produces similarly insignificant results. This seems consistent with the argument that older households' consumption is less sensitive to dividend income. However, even taking the point estimates at face value, dividend income has a quantitatively more important effect on dollar consumption for older households than for younger ones, because the variation in dividends across older households is so much larger.

Table 4. Regressions of Consumption on Dividends, Total Returns, and Other Sources of Income Using Consumer Expenditure Survey Data in Log Differences[a]

	Dependent variable							
	Change in nondurables expenditure[b]				Change in total expenditure			
Independent variable	4-1	4-2	4-3	4-4	4-5	4-6	4-7	4-8
$\text{Log}(1+[G_t+D_t]/FW_{t-1})$[c]	−0.034	−0.013			0.011	−0.002		
	(0.025)	(0.029)			(0.030)	(0.034)		
Dummy variable = 1 when $\Delta D_t > 0$	0.026	0.020			0.074	0.083		
	(0.026)	(0.029)			(0.024)	(0.028)		
Dummy variable = 1 when $D_t = D_{t-1} = 0$	−0.035	0.002			−0.017	0.017		
	(0.022)	(0.025)			(0.021)	(0.025)		
Change in log of income less dividends $(\Delta \log[Y_t - D_t])$[d]	0.010	0.020			0.035	0.047		
	(0.012)	(0.014)			(0.012)	(0.014)		
$\text{Log}(1+[G_t+D_t+I_t]/FW_{t-1})$			−0.031	−0.003			0.010	0.003
			(0.027)	(0.032)			(0.033)	(0.038)
Dummy variable = 1 when $\Delta D_t + \Delta I_t > 0$			0.036	0.042			0.029	0.047
			(0.018)	(0.021)			(0.017)	(0.019)
Dummy variable = 1 when $D_t + I_t = D_{t-1} + I_{t-1} = 0$			−0.036	0.007			−0.040	−0.003
			(0.020)	(0.022)			(0.018)	(0.020)
Change in log of income less dividends and interest $(\Delta \log[Y_t - D_t - I_t])$[d]			0.009	0.022			0.035	0.049
			(0.013)	(0.015)			(0.014)	(0.016)
Log of consumption lagged one period (C_{t-1})	−0.441		−0.451		−0.456		−0.440	
	(0.021)		(0.023)		(0.021)		(0.023)	
No. of observations	2,764	2,764	2,369	2,369	2,764	2,764	2,369	2,369
R^2	0.26	0.06	0.27	0.08	0.29	0.07	0.28	0.08

Source: Authors' regressions using Consumer Expenditure Survey data.

a. The dependent (consumption) variables are defined as the difference between the logarithm of quarterly consumption in the fifth (and last) interview and that in the second interview three quarters earlier. All regressions include year-month fixed effects, household controls (family size and high school education, college education, and age of respondent), and the following interactions: high school education × age, college education × age, family size × age, age squared, and family size squared. Numbers on parentheses are heteroskedasticity-robust standard errors. All variables in dollars are deflated by the consumer price index.

b. Consumer nondurables expenditure is defined as in table 1.

c. Total returns $(G + D)$ are measured over the four quarters prior to a household's fifth interview. FW is financial wealth, defined as in table 1, note d.

d. Difference between annual income items reported at the fifth interview and the second interview three quarters earlier.

As an additional robustness check, we have also removed capital gains outliers from the regression. In a survey like the CEX, which is based on self-reported information, the capital gains data are likely to have substantial measurement error. We want to ensure that the absence of a capital gains effect on consumption is not caused by a few large and potentially erroneous outliers. Winsorizing capital gains at their 5th and 95th percentiles, however, results in quantitatively similar estimates.[20] Perhaps more important, winsorizing the capital gains data leaves the coefficients on dividends virtually unaffected. Overall, it seems that the results are not unduly influenced by outliers.

In summary, the best available U.S. micro data on consumption suggest that *controlling for total returns,* dividends have a significant effect on consumption. The relationship is generally robust across specifications in levels, simple differences, and log differences.

Evidence from Household Portfolios

As already mentioned, a concern with the self-reported CEX data is that dividends and capital gains are likely to be measured with substantial error. It is not clear to what extent measurement error influences the foregoing results. Furthermore, the results would be made even more persuasive if we could verify the intermediate, mechanical step between receipt of dividends and consumption expenditure—that dividends are in fact withdrawn from brokerage accounts, and at a higher rate than capital gains. Our second micro data set, based on household portfolios, achieves these objectives and thus complements the CEX data. Furthermore, it allows us to study net withdrawals from investment portfolios, an interesting and novel dependent variable in its own right.[21] Finally, the larger sample size and detail of the portfolio data allow for certain robustness tests and sample splits that are not possible in the CEX data.

---

20. Winsorizing replaces all observations in the tails of the distribution (in this case the top and bottom 5 percent) with the observed values at the 5th and the 95th percentiles, respectively. In the base case nondurables regression (regression 2-1) in table 2, the coefficient on the total return drops to −0.02 with a standard error of 0.02. In the base case total expenditure regression (regression 2-5) in table 2, the coefficient rises to 0.01 with a standard error of 0.04.

21. In a paper that is similar in spirit, Choi and others (2006) use shifts in savings into 401(k) plans to identify changes in consumption.

Data and Definitions

Our household portfolio data set contains monthly position statements and trading activity for a sample of 78,000 households with accounts at a large discount brokerage firm.[22] To enter the sample, households were required to have an open account during 1991. For the sampled households, position statements and accounts data were gathered for January 1991 through December 1996. The full data set covers all accounts, including margin and retirement accounts, opened by each sampled household at this brokerage. For our sample we exclude margin accounts, Individual Retirement Accounts (IRAs), Keogh accounts, and accounts that are not joint tenancy or individual accounts. Securities followed include common stocks, mutual and closed-end funds, American depository receipts, and warrants and options held in these accounts. We focus on common stocks and mutual funds, which represent all, or nearly all, of most households' portfolios.

We use household-month level observations on net withdrawals, portfolio value, capital gains, and total dividends. Net withdrawals C (we use C in analogy to our earlier definitions, although, to be precise, we are not studying consumption but rather net withdrawals in this data set) are inferred as the starting value of portfolio assets A, plus capital gains G, plus dividends D, minus the ending value of the portfolio. That is, for household i,

$$(3) \qquad C_{it} = A_{it-1} + G_{it} + D_{it} - A_{it},$$

where the components that can be directly estimated include total portfolio value, defined as the product of price P and quantity Q held in investment j and summed across investments,

$$(4) \qquad A_{it} = \sum_{j} Q_{jt} P_{jt};$$

capital gains,

$$(5) \qquad G_{it} = \sum_{j} Q_{jt-1}\left(P_{jt} - P_{jt-1}\right),$$

where prices are adjusted for stock splits; and total dividend income,

$$(6) \qquad D_{it} = \sum_{j} Q_{jt-1} D_{jt},$$

where D_{jt} is dividends paid per share of investment j.

22. See Barber and Odean (2000) for more details about the data set.

For simplicity, we suppress the household i subscript on per-share quantities, prices, and dividends.

To estimate these quantities from the brokerage data, we pool each household's accounts to obtain positions and trades by household-month. The brokerage data do not directly identify dividend income; we match portfolio holdings to the stock file of the Center for Research in Securities Prices (CRSP) database to measure dividends on common stocks, and to the CRSP mutual fund file to measure dividends on mutual funds. For each stock and mutual fund in a household's portfolio at the beginning of the month, we use the monthly CRSP data on dividend distributions to calculate the dollar amount of dividends received during that month. We assume that each household holds until the end of the month the securities in its portfolio at the beginning of the month. For common stock dividends, we use CRSP distribution codes 1232, 1212, 1218, 1222, and 1245 to identify ordinary dividends, and 1262 and 1272 to identify special dividends.[23] We then total the dollar amounts of stock and mutual fund dividends across all stocks and funds in the portfolio to get a monthly measure of dividends.

The data contain outliers due to account openings and closings that do not reflect actual consumption and saving decisions. We exclude household-month observations where we cannot identify a CRSP mutual fund or common stock match for at least 75 percent of the account value at month $t - 1$, and we exclude households where the account value falls below $10,000, or dividends are missing in any of the months t to $t - 11$. This leaves 93,312 household-months of data on lagged account value, dividends, capital gains, and net withdrawals. These data still contain some outliers; for instance, the minimum value for net withdrawals as a percentage of lagged account value is $-2,807.7$, indicating a very large net inflow of funds in that portfolio. To prevent a few such data points from driving results, we exclude household-months in which net withdrawals exceed 50 percent in absolute value. This screen excludes about 0.96 percent of the sample.[24] The final sample includes 92,412 household-months.

---

23. This method follows DeAngelo, DeAngelo, and Skinner (2000).

24. The results below are robust to choosing different cutoffs. For example, they are quantitatively similar when 5 percent or 0.5 percent of the most extreme observations are eliminated. But some deletion of outliers is necessary: the most extreme *single* observation would otherwise account for about *one-third* of the sum of squared net withdrawals (even though there are close to 100,000 observations in total), making any regression analysis practically meaningless.

The household portfolio data have fairly clear advantages over the CEX data, but also some limitations of their own. One is that we usually do not know how large the accounts we observe figure in the household's total wealth, although for a fraction of the sample we do have self-reported data on household net worth.[25] In any case it is not clear that this should lead to bias as opposed to just adding noise. Another limitation is that we observe net withdrawals, not consumption. Although, as mentioned above, this means that the portfolio data are a useful complement to the CEX, a concern is that dividends and realized capital gains may be deposited into a cash account that we cannot observe. If so, and if a portion of these funds is eventually reinvested and ultimately reappears in the portfolio, we should not be counting that portion as potential consumption. Therefore an important part of the analysis below is to examine the extent to which contemporaneous withdrawals are offset by delayed reinvestment; for consumption, we care only about long-run withdrawals.

Summary Statistics

The size and composition of the portfolios in the sample are described in the top panel of table 5. The mean account value is $54,410 and the median is $28,430. On average, common stocks make up 82.7 percent of the total portfolio value, and mutual funds another 13.5 percent.

Changes in portfolio value are reported in the second panel. To make cross-household comparisons, we scale net withdrawals, capital gains, and dividend estimates by portfolio value at the end of month $t - 1$. The mean rate of net withdrawals by household-month in our sample is low, at less than 0.1 percent, and the median rate is zero. The average total monthly return is positive, at 1.1 percent. The average dividend income per month, 0.2 percent of beginning-of-month portfolio value, is a significant fraction of the average month's total return, but much less volatile.

The final two panels of table 5 break dividend income down by type of dividend. Dividend income is positive in just under half of all household-months. For these observations (bottom panel), an average of 77.9 percent of dividend income is due to ordinary dividends, with mutual funds account-

---

25. Data from the Survey of Consumer Finances for 1992 and 1995 show that 87 percent and 89 percent, respectively, of U.S. households with a brokerage account have only one brokerage account. This suggests that our brokerage account data often capture at least the entire wealth these investors have invested in brokerage accounts.

Table 5. Summary Statistics for the Sample Drawn from the Brokerage Portfolio Data, 1991–96[a]
Percent of assets in previous period except where stated otherwise

Variable	No. of observations	Mean	Percentile				Minimum	Maximum
			50th	10th	90th			
Portfolio composition								
Assets in previous period (thousands of dollars)	92,412	54.41	28.43	13.85	99.78	10.00	5,018.89
Common stocks	92,412	82.69	0.00	0.00	100.00	0.00	100.00
Mutual funds	92,412	13.49	0.00	0.00	0.00	0.00	100.00
Other assets	92,412	3.82	0.00	0.00	15.48	0.00	25.00
Withdrawals, dividends, and total returns								
Withdrawals (C)[b]	92,412	0.06	0.00	−0.70	0.99	−50.00	50.00
Dividends (D)[c]	92,412	0.20	0.00	0.00	0.55	0.00	102.39
Returns (R)[d]	92,412	1.11	1.06	−6.13	8.28	−73.96	153.47
Dividends by type, all households[e]								
Ordinary	92,412	0.12	0.00	0.00	0.43	0.00	2.96
Mutual fund	92,412	0.07	0.00	0.00	0.07	0.00	29.91
Special	92,412	0.01	0.00	0.00	0.00	0.00	102.39
Dividends by type as percent of total current-period dividends[f]								
Ordinary	44,509	77.92	100.00	0.00	100.00	0.00	100.00
Mutual fund	44,509	21.79	0.00	0.00	100.00	0.00	100.00
Special	44,509	0.30	0.00	0.00	0.00	0.00	100.00

Source: Barber and Odean (2000) and authors' calculations.

a. Observations are excluded when a CRSP mutual fund or common stock match cannot be identified for more than 75 percent of household account value in the period preceding the returns calculations; when the account value falls below $10,000, or dividends are missing in any of the months t to $t − 11$; for margin accounts; for accounts that are not joint tenancy or individual accounts; and when the absolute value of consumption exceeds 50 percent of assets. All means, percentiles, and minimum and maximum values refer to the distribution of households with respect to the indicated variable.

b. Monthly withdrawals are estimated as the household's account value in the previous period (aggregating across all eligible accounts held by the household) less the account value in the current period plus dividends and capital gains earned on the previous-month account holdings.

c. Dividends are calculated from CRSP and the CRSP mutual fund database on common stock and mutual fund account holdings at the end of the previous month.

d. Dividends plus capital gains, the latter defined as capital appreciation as taken from CRSP and the CRSP mutual fund database on previous-month common stock and mutual fund account holdings.

e. Ordinary and special dividends are identified from CRSP (distribution codes 1232, 1212, 1218, 1222, and 1245 for ordinary, and 1262 and 1272 for special dividends). Mutual fund dividends are identified from the CSRP mutual fund database.

f. Distribution includes only those households receiving dividends.

Figure 1. Net Withdrawals versus Dividends Received by Individual Household Account[a]

Net withdrawals (percent of total assets)[b]
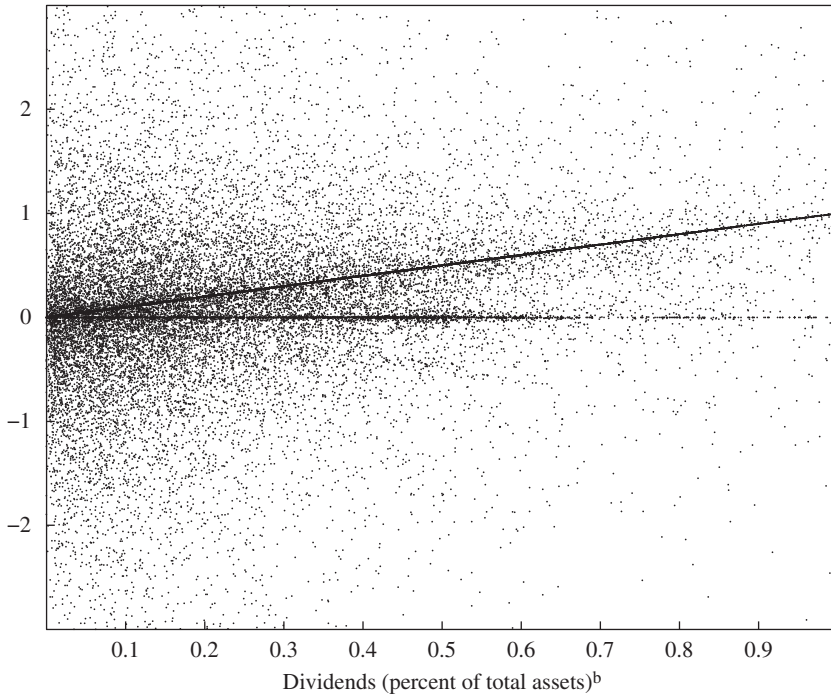
Dividends (percent of total assets)[b]

Source: Authors' calculations using data from Barber and Odean (2000).
a. Each observation represents activity (net withdrawals and contemporaneous dividends) in the brokerage account of a single household in a single month. Only household-month observations with positive dividends are included.
b. In period $t - 1$.

ing for almost all of the remainder. Special dividends are rare but can be very large when they do occur.

Effects of Dividends and Capital Gains on Net Withdrawals

Figure 1 is a scatterplot of household-month observations of net withdrawals against contemporaneous total dividends. The figure clearly shows two modal behaviors with respect to dividend income. The clustering of points along a line indicating a one-for-one increasing relationship between net withdrawals and dividends suggests that many investors follow a "zero (contemporaneous) reinvestment" policy; the clustering of points along a second line indicating a flat relationship suggests that many other

Figure 2. Net Withdrawals of Dividends versus Dividends Received and Total Returns, by Decile[a]

Percent of total assets[b]
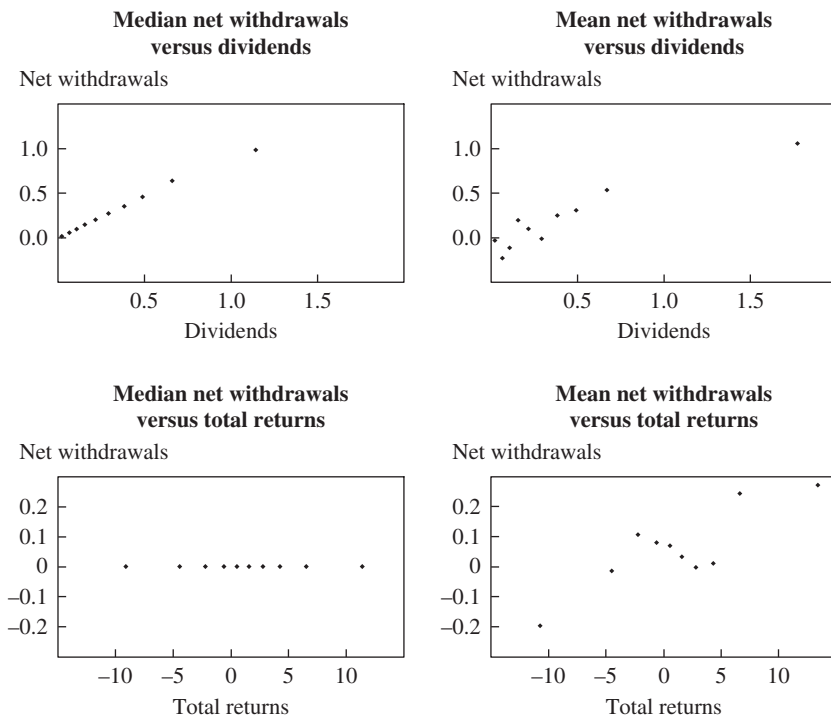
Source: Authors' calculations using data from Barber and Odean (2000).
  a. Data for household-months with positive dividends are sorted into deciles according to the value of monthly dividends (top two panels) or total returns (bottom two panels); for the top two panels, an eleventh group consists of household-months with no dividends; median or mean net withdrawals is then computed for each group.
  b. All data are expressed as a percent of household total assets in period $t - 1$.

investors have an "automatic reinvestment" policy. The many thousands of observations that lie on neither line suggest a weakly positive relationship more generally. An analogous scatterplot of net withdrawals as a function of capital gains (not shown) reveals no visible patterns.

Figure 2 plots median and mean responses to dividend payouts. In the top left panel, dividend income is broken down into eleven groups, one for household-months with no dividend income and ten deciles for those with positive dividends. Within each group we plot median net withdrawals against median total dividends. The results suggest that the median house-

hold does not immediately reinvest moderate-size dividends: net withdrawals increase one for one with dividend income over the bottom several deciles; that is, in this range the first of the two modal behaviors noted in figure 1 is also the median behavior.

The top right panel of figure 2 depicts the mean responses to dividend payouts. We show mean net withdrawals for the zero-dividend group and for the mean level of dividends within each of the ten positive-dividend deciles. The figure again shows a positive relationship between dividends and net withdrawals. Note that the mean behavior is to contemporaneously withdraw most, but not all, of a relatively large dividend. (This could be consistent with a mental accounting practice in which the large dividends that result from cash acquisitions, for example, are treated not like ordinary dividends but rather as principal to be reinvested.)

The bottom two panels provide an initial look at the effect of total returns, again at the median and at the mean. The contrast with the picture for dividends confirms the CEX results: the effect of total returns appears to be much smaller. The bottom left panel shows that regardless of the level of total returns, the median contemporaneous net withdrawal is zero. The bottom right panel shows that, at the mean, very large total returns engender net withdrawals, and very low total returns net inflows. There is no clear effect in the intermediate range.

Table 6 reports regression estimates of the effects of contemporaneous dividends and total returns on the rate of withdrawals. The first three specifications include linear effects only; we then confirm the additional structure suggested in the figures using a piecewise linear specification. Specifically, we allow for a differential effect when dividends are in the top decile and a differential effect when total returns (primarily capital gains) are smaller than 2.5 percent in absolute value. Again suppressing the household i subscripts,

$$(7) \qquad \frac{C_t}{A_{t-1}} = a + d_1 \frac{D_t}{A_{t-1}} + d_2 \frac{D_t}{A_{t-1}} \left\{ \frac{D_t}{A_{t-1}} > 90\%ile \right\}$$
$$+ r_1 \frac{R_t}{A_{t-1}} + r_2 \frac{R_t}{A_{t-1}} \left\{ \left| \frac{R_t}{A_{t-1}} \right| < 0.025 \right\} + v_t.$$

It may be helpful to interpret the coefficients explicitly. Regression 6-1 indicates that, on average, investors have a propensity to contemporaneously withdraw dividends of about 0.35. Regression 6-2 shows an average

Table 6. Simple Regressions of Net Brokerage Withdrawals on Dividends and Total Returns[a]

	Dependent variable is net withdrawals as share of previous-period assets and regressions are					
	Linear			Piecewise linear		
Independent variable	*6-1*	*6-2*	*6-3*	*6-4*	*6-5*	*6-6*
Intercept	−0.01	0.04	−0.03	−0.06	0.04	−0.07
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Dividends as share	0.35		0.35	0.77		0.77
of previous-period	(0.09)		(0.09)	(0.09)		(0.09)
assets (D_t/A_{t-1})						
$D_t/A_{t-1} \times$ dummy = 1 if				−0.44		−0.44
$D_t/A_{t-1} >$ 90th percentile				(0.11)		(0.11)
Total returns as share		0.02	0.02		0.02	0.02
of previous-period		(0.00)	(0.00)		(0.00)	(0.00)
assets (R_t/A_{t-1})						
$R_t/A_{t-1} \times$ dummy = 1 if					−0.03	−0.05
$\left| R_t/A_{t-1} \right| < 0.025$					(0.02)	(0.02)
R^2	0.0025	0.0005	0.0029	0.0027	0.0005	0.0032

Source: Authors' regressions using data from Barber and Odean (2000).
a. All data are in percent. All regressions include an intercept (not reported). Heteroskedasticity-robust standard errors are in parentheses. The sample in each regression consists of 92,412 observations.

propensity to contemporaneously withdraw total returns of 0.02. Regression 6-3 shows that, for a given contemporaneous total return, investors have a 0.35 *higher* propensity to withdraw from the dividends component than from the capital gains component. Because the propensity to withdraw from contemporaneous total returns is almost zero, this also means that the total propensity to withdraw from dividends is around 0.35, as in the first regression. Although direct comparisons are not appropriate, it is interesting that these coefficients are of the same order of magnitude as the effects of dividends and capital gains on total consumption that we estimated in the CEX data (tables 2 and 3). And again, what is most striking is not that the coefficient on capital gains is so small, but that the coefficient on dividends is so large.

As an aside, it may seem that the relatively small coefficient on returns implies that the effect of capital gains on consumption is negligible, but this is not obvious. In fact, because the range between the 10th and the 90th percentile is about thirty times bigger for returns (from −6.13 to 8.28 percent of total assets) than for dividends (from 0.0 to 0.55; see table 5), the point estimates in table 6 suggest that the variation in withdrawals caused by divi-

dends and capital gains may be of roughly similar magnitude. (Of course, we found at best weak effects of total returns in the CEX, and so, unlike in the case of dividends, we are unable to find any strong evidence that capital gains lead to withdrawal-financed consumption.) In any case, given our particular hypotheses, the appropriate focus is on the relative magnitude of the dividend and capital gains effects for a given change in wealth, not on the proportion of withdrawal variance explained by each effect.

Of the last three regressions in table 6, which estimate piecewise linear effects, the first indicates a propensity to withdraw contemporaneous dividends of 0.77 for typical levels of dividend income and of 0.33 (0.77 − 0.44) for unusually high levels. Regression 6-6 shows that, for small total returns, investors have a propensity to withdraw from contemporaneous capital gains of −0.03 (0.02 − 0.05; that is, they do not withdraw at all), whereas the differential propensity to withdraw contemporaneous dividends stays the same. All of these results are consistent with figure 2.

Delayed Reinvestment

Although the analysis so far suggests large differences in the withdrawal behavior of dividends versus capital gains, and hence that dividends may indeed affect consumption, several questions remain. One is whether a portion of dividends (and perhaps capital gains), rather than being withdrawn for consumption, may just have been temporarily moved to a cash account and later reinvested. To the extent that is the case, estimates based on contemporaneous effects will overstate the true potential impact on consumption.

To investigate this effect, we augment our previous model to allow for up to one year of delays in reinvestment. The resulting model is unsightly but easy to interpret:

$$(8) \quad \frac{C_t}{A_{t-1}} = a + d_1 \frac{D_t}{A_{t-1}} + d_2 \frac{D_t}{A_{t-1}} \left\{ \frac{D_t}{A_{t-1}} > 90\%ile \right\}$$

$$+ d_3 \frac{1}{11} \sum_{s=1}^{11} \frac{D_{t-s}}{A_{t-1}} + d_4 \frac{1}{11} \sum_{s=1}^{11} \frac{D_{t-s}}{A_{t-1}} \left\{ \frac{D_{t-s}}{A_{t-1}} > 90\%ile \right\}$$

$$+ r_1 \frac{R_t}{A_{t-1}} + r_2 \frac{R_t}{A_{t-1}} \left\{ \left| \frac{R_t}{A_{t-1}} \right| < 0.025 \right\}$$

$$+ r_3 \frac{1}{11} \sum_{s=1}^{11} \frac{R_{t-s}}{A_{t-1}} + r_4 \frac{1}{11} \sum_{s=1}^{11} \frac{R_{t-s}}{A_{t-1}} \left\{ \left| \frac{R_{t-s}}{A_{t-1}} \right| < 0.025 \right\} + v_t.$$

In this specification, when the monthly total return is greater than 2.5 percent in absolute value, the long-run propensity to withdraw capital gains is $(r_1 + r_3)$. When smaller, the long-run propensity is $(r_1 + r_2 + r_3 + r_4)$. Likewise, the *differential* or "extra" long-run propensity to withdraw a small or medium-size dividend income realization is $(d_1 + d_3)$, and the differential long-run propensity to withdraw a top-decile dividend realization is $(d_1 + d_2 + d_3 + d_4)$. Note that in this setup any effect of delayed reinvestment shows up empirically as a *negative* estimate for d_3 and d_4 for dividends (r_3 and r_4 for capital gains), because dividends or capital gains that are reinvested will be detected as reduced net withdrawals as a function of the lagged variable.[26]

Table 7 shows that allowing for the possibility of a full year of delayed reinvestment does not alter earlier inferences about the effects of dividends. In the simple linear regressions (7-1 through 7-3), the contemporaneous coefficients are as before, and the effects of lagged dividends are nil. The full piecewise linear model (regression 7-6) shows that the long-run propensity to withdraw small or medium-size dividends is 0.73 (0.80 − 0.07) greater than that of total returns, statistically indistinguishable from the 0.77 gap in the short-run propensities to withdraw that we found in table 6, and thus indicating little or no reinvestment. On the other hand, the differential long-run propensity to withdraw very large dividends is still positive, but considerably smaller, at 0.33 (0.80 − 0.47 − 0.07 + 0.07), which is also the same as the estimate we obtained without allowing for delayed reinvestment. Finally, there is little evidence that capital gains engender reinvestment.

Thus accounting for delays in reinvestment does not change the conclusion that there is a large difference in the propensities to withdraw dividends and capital gains. Unless households in this sample are out of steady state, systematically accumulating cash balances (and doing so out of dividends, not capital gains), the results are consistent with the notion that a substantial portion of dividend income is permanently withdrawn to finance consumption.

---

26. In principle, one could also include individual lags of D_t and R_t instead of the summation terms, and then sum the estimated coefficients on the individual lags to calculate the total effect of delayed reinvestment. The approaches are equivalent when D_t and R_t and their lags, respectively, are uncorrelated. In our data these correlations are low, so both approaches lead to similar results. For simplicity, we report results from the summed lags approach.

Table 7. Regressions of Net Brokerage Withdrawals on Dividends and Total Returns Controlling for Effect of Delayed Reinvestment[a]

| | *Dependent variable is net withdrawals as share of previous-period assets and regressions are* | | | | | |
| | *Linear* | | | *Piecewise linear* | | |
Independent variable	*7-1*	*7-2*	*7-3*	*7-4*	*7-5*	*7-6*
Dividends as share of previous-period assets (D_t/A_{t-1})	0.35 (0.09)		0.35 (0.09)	0.81 (0.10)		0.80 (0.10)
$D_t/A_{t-1} \times$ dummy = 1 if $D_t/A_{t-1} >$ 90th percentile				−0.48 (0.12)		−0.47 (0.12)
Average of 11 monthly lags of dividends/assets ($\frac{1}{11} \Sigma_{s=1 \text{ to } 11} D_{t-s}/A_{t-1}$)	0.01 (0.10)		0.01 (0.10)	−0.16 (0.17)		−0.07 (0.18)
$\frac{1}{11} \Sigma_{s=1 \text{ to } 11} D_{t-s}/A_{t-1} \times$ dummy = 1 if $D_{t-s}/A_{t-1} >$ 90th percentile				0.14 (0.18)		0.07 (0.18)
Total returns as share of previous-period assets (R_t/A_{t-1})		0.02 (0.00)	0.02 (0.00)		0.02 (0.00)	0.02 (0.00)
$R_t/A_{t-1} \times$ dummy = 1 if $\left\lvert R_t/A_{t-1}\right\rvert < 0.025$					−0.03 (0.02)	−0.04 (0.02)
$\frac{1}{11} \Sigma_{s=1 \text{ to } 11} R_{t-s}/A_{t-1}$		0.00 (0.01)	0.00 (0.01)		0.00 (0.01)	0.00 (0.01)
$\frac{1}{11} \Sigma_{s=1 \text{ to } 11} R_{t-s}/A_{t-1} \times$ dummy = 1 if $\left\lvert R_{t-s}/A_{t-1}\right\rvert < 0.025$					0.03 (0.06)	−0.06 (0.06)
R^2	0.0025	0.0005	0.0029	0.0027	0.0005	0.0032

Source: Authors' regressions using data from Barber and Odean (2000).

a. All data are in percent. All regressions include an intercept (not reported). Heteroskedasticity-robust standard errors are in parentheses. Data on household net worth and tax rate are self-reported and were supplied to the brokerage firm at the time the account was opened. The sample in each regression consists of 92,412 observations.

Household Characteristics

To check the robustness of our results, we split the sample across several household and portfolio characteristics (table 8). First, we split by portfolio size. These accounts are believed to typically represent a rather small fraction of the household's net worth, but for about a fifth of the sample we have self-reported data on net worth and tax rates supplied to the brokerage firm when the account was opened, so we can test whether the results extend to households for which the portfolio represents at least half of reported net worth. Second, we split by net worth itself. Third, we split by marginal income tax rate, which is obviously also a proxy for income. Fourth, we split the sample by portfolio turnover.

Table 8. Split-Sample Regressions of Net Brokerage Withdrawals on Dividends and Total Returns[a]

Dependent variable is net withdrawals as share of previous-period assets and sample is split according to

Independent variable	Household portfolio value			Household net worth		Household tax rate		Household portfolio turnover	
	<Median	>Median	>Half of net worth	<Median	>Median	<Median	>Median	<Median	>Median
Dividends as share of previous-period assets (D_t/A_{t-1})	0.77	0.80	0.84	0.67	0.81	0.44	1.00	0.75	0.89
	(0.12)	(0.13)	(0.43)	(0.32)	(0.36)	(0.29)	(0.40)	(0.07)	(0.19)
D_t/A_{t-1} × dummy = 1 if D_t/A_{t-1} > 90th percentile	−0.43	−0.48	−0.54	−0.16	−0.72	−0.32	−0.57	−0.45	−0.52
	(0.15)	(0.16)	(0.44)	(0.32)	(0.36)	(0.30)	(0.41)	(0.11)	(0.21)
Total returns as share of previous-period assets (R_t/A_{t-1})	0.02	0.02	0.01	0.02	0.02	0.04	0.00	0.01	0.03
	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)
R_t/A_{t-1} × dummy = 1 if $|R_t/A_{t-1}| < 0.025$	0.00	−0.08	−0.02	−0.07	−0.01	−0.07	−0.01	−0.02	−0.07
	(0.03)	(0.03)	(0.08)	(0.06)	(0.07)	(0.06)	(0.08)	(0.02)	(0.04)
No. of observations	45,092	47,320	6,240	11,947	7,973	11,768	8,152	48,353	44,059
R^2	0.0042	0.0026	0.0012	0.0035	0.0010	0.0021	0.0026	0.0062	0.0029

Source: Authors' regressions using data from Barber and Odean (2000).
a. All data are in percent. All regressions include an intercept (not reported). Heteroskedasticity-robust standard errors are in parentheses.

The results suggest that the higher propensity to withdraw dividend income is broadly robust across the available household characteristics. Wealthier households appear more likely to reinvest very large dividends, but again standard errors are too large to allow any confident conclusions.

Composition of Dividends

Intuition and mental accounting theories suggest that it may be inappropriate to treat all types of dividends as equivalent. The nonlinear effects documented in figure 2 and table 6 may be due to differences in the treatment of special dividends and ordinary dividends, for example, and the reinvestment of dividends could also vary by type.

Figure 3 shows scatterplots of contemporaneous net withdrawals as a function of dividends of each type. An immediate result is that the "automatic reinvestment" mode is apparent only in mutual fund dividends (middle panel), likely reflecting formal elections to automatically reinvest. In addition, both mutual fund dividend recipients and many ordinary dividend recipients (top panel) engage in the "zero reinvestment" mode. Perhaps because large special dividends are so rare, there is little visually apparent pattern in how they are withdrawn or reinvested (bottom panel).

Figure 4 depicts median and mean net withdrawals by dividend type. The median behavior (top left panel) is to withdraw ordinary dividends dollar for dollar. For mutual fund dividends, the median behavior (middle left panel) is to withdraw nothing. For special dividends, on the other hand, the median behavior is to withdraw (bottom left panel). In means (the three right-hand panels), the patterns are rougher, as expected, and affected by the fact that the average household is a net saver into its portfolio over this period. Even in means, however, there are generally monotonic relationships for dividends of each type, although very high values of mutual fund dividends do not increase mean net withdrawals one for one.

These impressions are confirmed formally in table 9. Households' propensity to contemporaneously withdraw ordinary dividends (near unity) is 0.80 higher than their propensity to withdraw capital gains (near zero). Also, reflecting the automatic reinvestment policy that many mutual fund investors pursue, mutual fund dividends are withdrawn at a lower rate. The standard errors are too large to allow finer observations about reinvestment and how behavior changes for unusually large dividends. Small special dividends are withdrawn at roughly the same rate as ordinary dividends,

Figure 3. Net Withdrawals versus Dividends Received by Individual Household Account, by Type of Dividend[a]
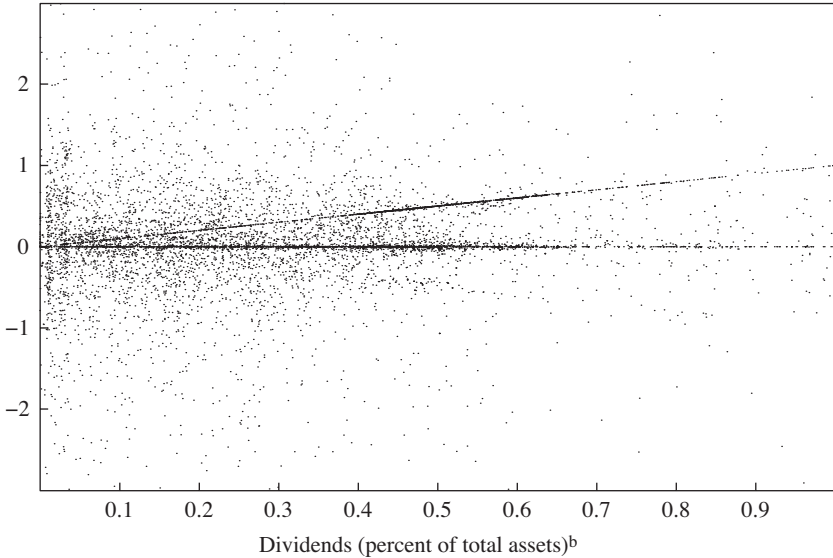
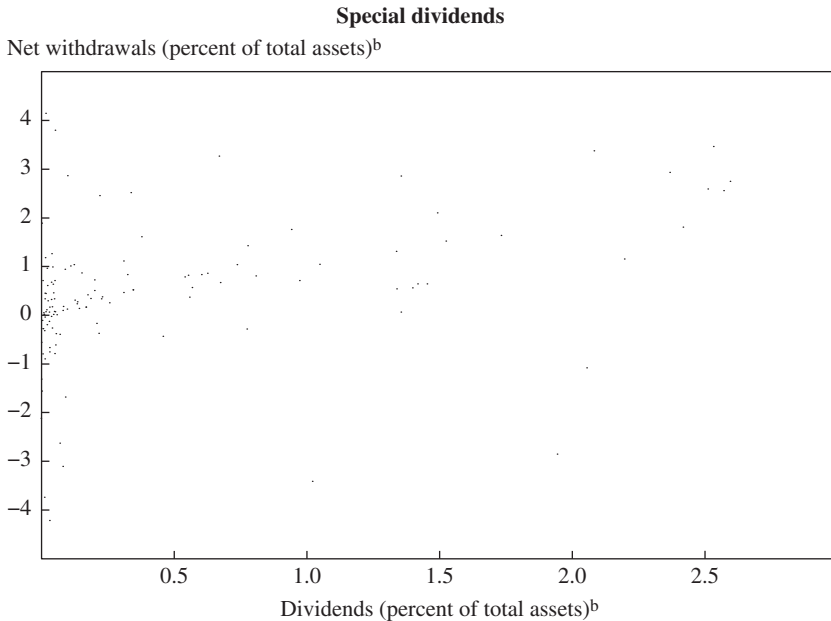**Ordinary dividends**

Net withdrawals (percent of total assets)[b]

Dividends (percent of total assets)[b]

Mutual fund dividends
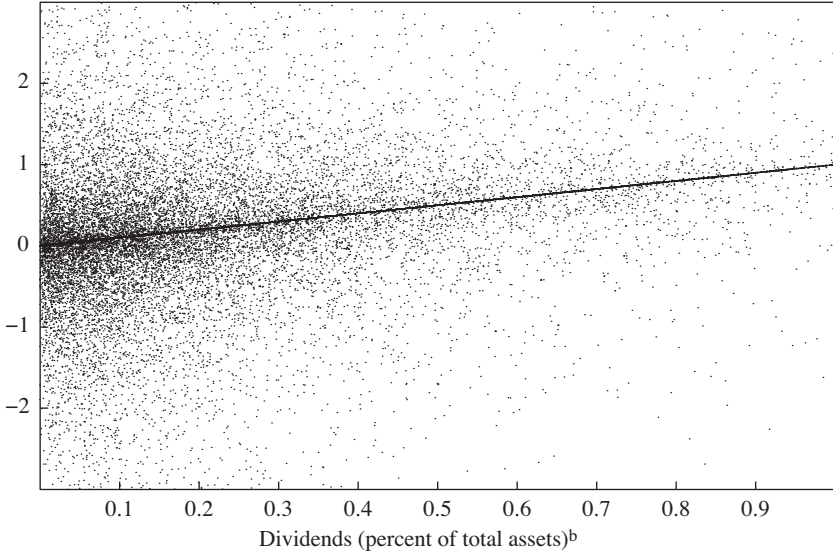
Net withdrawals (percent of total assets)[b]

Dividends (percent of total assets)[b]

Figure 3. Net Withdrawals versus Dividends Received by Individual Household Account, by Type of Dividend[a] (*Continued*)

Special dividends

Net withdrawals (percent of total assets)[b]

Dividends (percent of total assets)[b]

Source: Authors' calculations using data from Barber and Odean (2000).

a. Each observation represents activity (net withdrawals and contemporaneous dividends) in the brokerage account of a single household in a single month. Only household-month observations with positive dividends are included.

b. In period $t - 1$.

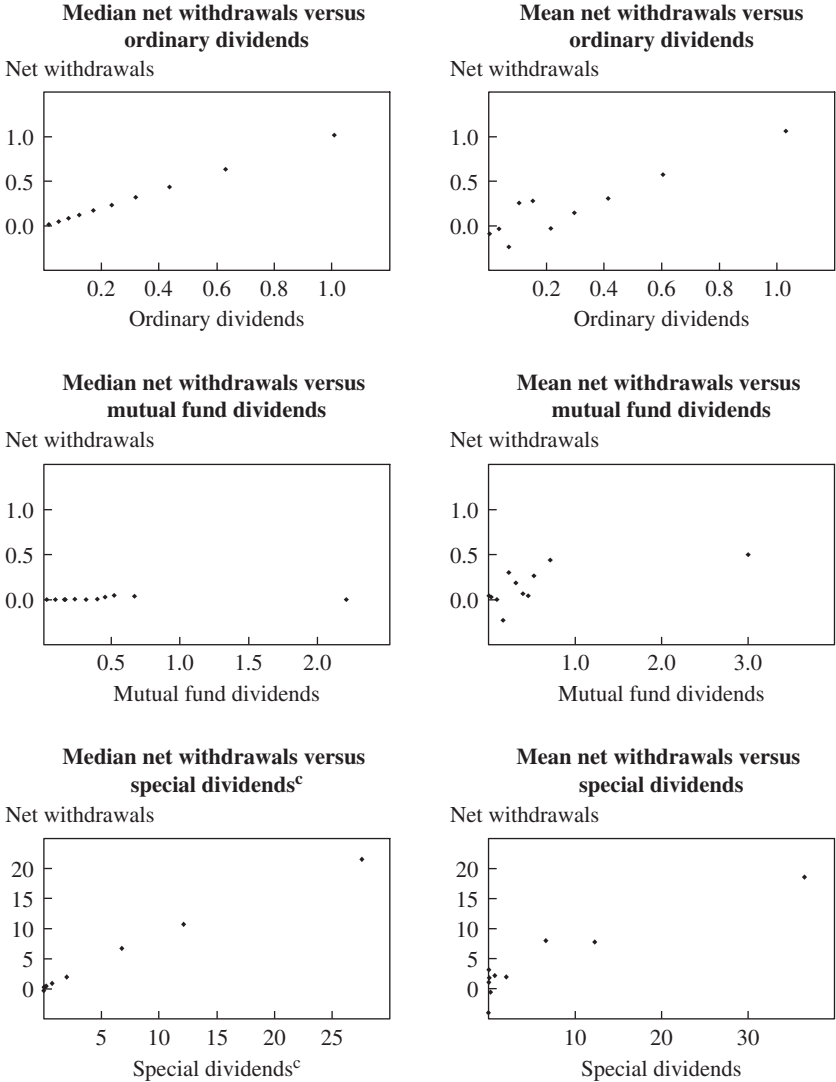whereas the point estimates suggest that large special dividends are mostly reinvested.

Reverse Causality

Like the CEX results, the above results may be affected by an endogeneity problem. Some households may have chosen their ordinary-dividend-paying stocks and, to a lesser extent, their mutual funds ex ante in anticipation of consuming the dividends. If so, the evidence presented so far is insufficient to demonstrate that dividends, particularly ordinary dividends, have a causal effect.

For the ex ante effect to dominate, there would have to be a large predictable component in dividends such that it is feasible for households to match desired future consumption with anticipated dividend streams. Unlike

Figure 4. Net Withdrawals versus Dividends Received, by Type of Dividend and Decile[a]

Percent of total assets[b]

Median net withdrawals versus ordinary dividends

Net withdrawals

Mean net withdrawals versus ordinary dividends

Net withdrawals

Median net withdrawals versus mutual fund dividends

Net withdrawals

Mean net withdrawals versus mutual fund dividends

Net withdrawals

Median net withdrawals versus special dividends[c]

Net withdrawals

Mean net withdrawals versus special dividends

Net withdrawals

Source: Authors' calculations using data from Barber and Odean (2000).

a. Data for household-months with positive dividends are sorted into deciles according to the value of monthly dividends of various types; an eleventh group consists of household-months with no dividends; median or mean net withdrawals is then computed for each group.

b. All data are expressed as a percent of household total assets in period $t-1$.

c. All dividends other than ordinary or mutual fund dividends; includes special dividends, liquidating dividends, and cash acquisitions.

Table 9. Regressions of Net Brokerage Withdrawals on Dividends of Different Types and Total Returns[a]

| | *Dependent variable is net withdrawals as share of previous-period assets and dividends are* | | | | | |
| | *Ordinary* | | *Mutual fund* | | *Special and other* | |
Independent variable	*9-1*	*9-2*	*9-3*	*9-4*	*9-5*	*9-6*
Dividends as share	0.82	0.71	0.40	0.35	0.75	0.75
of previous-period	(0.11)	(0.13)	(0.12)	(0.14)	(0.13)	(0.13)
assets (D_t/A_{t-1})						
$D_t/A_{t-1} \times$ dummy = 1 if	0.16	0.16	−0.26	−0.23	−0.46	−0.46
$D_t/A_{t-1} >$ 90th percentile	(0.12)	(0.12)	(0.13)	(0.13)	(0.19)	(0.19)
Total returns as share	0.02	0.02	0.02	0.02	0.02	0.02
of previous-period	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
assets (R_t/A_{t-1})						
$R_t/A_{t-1} \times$ dummy = 1 if	−0.02	−0.02	−0.04	−0.04	−0.03	−0.03
$\left|R_t/A_{t-1}\right| <$ 0.025	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Ratio of 12-month lag		0.13		0.05		−0.08
of dividends to total		(0.09)		(0.06)		(0.04)
assets (D_{t-12}/A_{t-1})						
R^2	0.0023	0.0023	0.0007	0.0007	0.0021	0.0022

Source: Authors' regressions using data from Barber and Odean (2000).

a. All data are in percent. All regressions include an intercept (not reported). Heteroskedasticity-robust standard errors are in parentheses. The sample in each regression consists of 92,412 observations.

in our CEX analysis, dividends here are scaled by portfolio value, which already reduces a potential source of cross-sectional predictability. As it turns out, scaled dividends *in total* (the sum of ordinary, mutual fund, and special dividends) are unpredictable from lagged dividends (that is, almost all variation is "unexpected"): twelve months of lagged dividends explains only 4 percent of the variation in scaled dividends in the current month. Hence reverse causality is empirically not a major concern in the total-dividends results that we reported above, unless we are to believe that investors are rapidly rebalancing their portfolios in anticipation of changing consumption needs.

Ordinary dividends on their own (scaled by beginning-of-period portfolio value), however, are highly predictable, with the one-year-lagged value explaining 57 percent of the variation in ordinary dividends, and the one-year- and three-month-lagged values together explaining 81 percent. Mutual fund dividends are less predictable, with the one-year-lagged value explaining 43 percent and the three-month-lagged value (as expected)

adding little. Special dividends are, of course, unpredictable by definition. Therefore, like our results for total dividends, our results for special dividends are not subject to reverse causality concerns.

The question in terms of understanding causality is whether this predictable component in ordinary and mutual fund dividends alone explains consumption, or whether the unpredictable component also plays a role. To examine this, our second specification in table 9 includes the twelve-month lag of dividends as an additional control for the potential ex ante effect of expected consumption on holdings of dividend-paying assets. If the ex ante effect is the full story, and it is largely a household fixed effect with slow time variation, then the twelve-month lag of dividends and contemporaneous dividends should have about the same correlation with withdrawals. And if the ex ante effect is not a complete explanation, then the coefficient on the contemporaneous dividend should be larger than that on the twelve-month lag, since it captures effects on withdrawals related to the dividend component that is not predictable by D_{t-12}.

Consistent with a modest ex ante effect, the coefficient estimate on D_{t-12} is greater than zero for both ordinary and mutual fund dividends, although the effects are statistically insignificant. But the coefficients for the contemporaneous dividend terms remain highly significant and far larger than the coefficients on the twelve-month lag. We find similar results for mutual fund dividends.

These results suggest that reverse causality in the form of ex ante matching of withdrawals and dividends most likely plays a fairly modest role in the case of ordinary and mutual fund dividends. It plays even less of a role for our other results, including special dividends and total dividends. Although one cannot establish causality with complete confidence, all of the results are consistent with an important element of causality running from dividends to withdrawals—and, based on our analysis of the CEX data, to consumption.

Explanations

Our results from two quite different micro data sets suggest that investors have a higher propensity to consume from dividends than from capital gains. So far we have focused solely on documenting the basic facts and their robustness. Now we move on to potential explanations.

Borrowing Constraints

A standard explanation for the high sensitivity of consumption to current income is borrowing constraints.[27] However, borrowing constraints by themselves do not predict a different propensity to consume from dividends than from capital appreciation. The substitution of dividends for capital gains has no overall wealth effects, and homemade dividends can always be created by buying and selling shares. Hence, borrowing constraints are not an important factor.

Transaction Costs

The transaction costs of making homemade dividends are a more relevant factor a priori. Perhaps households recognize that reinvesting dividends, especially in the modest amounts that accrue in the smaller accounts in our sample, would require the purchase of an odd lot of shares, which carries relatively high transaction costs. To the extent such costs are substantial, rational households should prefer to consume from recent dividends rather than from selling shares.

The CEX data allow us to examine a transaction cost explanation in which the trading costs (and perhaps taxes) of creating extra homemade dividends constrain consumption. For households where income exceeds total expenditure, this constraint does not bind: these households could create homemade dividends at no cost by simply saving less. In unreported results, we find coefficients of a similar magnitude and generally lower standard errors (a coefficient of 0.90 with a standard error of 0.12 in a variation on regression 2-5 in table 2) among households that save income, casting doubt on this effect as a complete explanation.

The brokerage data results in table 8 also contain results that cast doubt on transaction costs as a complete explanation. First, if households view odd-lot transactions costs as an important consideration, one might expect a higher propensity to withdraw dividends in smaller accounts, which face the odd-lot costs more often. But the propensity to withdraw dividends appears not to depend on the size of the portfolio. Second, the propensity to withdraw dividends is similar, if not even higher, for high-turnover households. These households would be able, if they wished, to reinvest

---

27. A closely related, but behavioral, explanation for the high propensity to consume current income is hyperbolic discounting as in Angeletos and others (2001).

unwanted dividends at little, if any, marginal cost; in other words, again, the transaction costs are not binding.[28]

Taxes

Perhaps investors fail to fully reinvest dividends (that is, have a higher propensity to withdraw them) because they regularly withhold a portion for federal and state taxes. Of course, taxes can be paid from any source, and so this story is already founded on mental accounting. Table 8 shows that high-tax households are more likely than low-tax households to withdraw dividend income. In fact, the difference between the two groups is much too large (although standard errors are also large) to attribute to differential taxation: higher-tax households withdraw 100 percent of their small and medium-size dividends, far more than they would need to cover taxes.

Another tax consideration is the higher tax rate on dividend income than on capital gains that prevailed in our sample period. Perhaps households made mistakes ex ante in buying the highly taxed dividend-paying assets, or purchased them at a discount, and ex post, given their holdings, it makes sense to finance consumption through dividends rather than capital gains. But, to develop this same idea further, many households in our sample have individual stocks with accumulated capital losses at any given time, and so from an ex post tax perspective these households should consume from realized losses even before dividends. Yet empirically the evidence indicates that investors are more likely to sell winners than losers in every month except December.[29]

Different "Permanence" of Dividends and Capital Gains

The results might yet be reconciled with fully optimizing, forward-looking behavior if stock returns have permanent and transitory components. In our regressions we control for total returns, and so dividends do not add any additional information about the size of wealth shocks. But if changes in dividends are more strongly correlated with the permanent component of stock returns than with the transitory component, changes in dividends

---

28. See Odean (1999) and Barber and Odean (2000) for more general arguments that investors trade too much and fail to properly consider transaction costs.

29. See Odean (1998).

could provide some information about the permanence of wealth shocks.[30] In this case one would expect dividends to be correlated with consumption even after controlling for total returns.

At the level of the aggregate market, such an explanation could have relevance, although it would be difficult to distinguish it from other explanations such as mental accounting. A large proportion of the variation in market-level returns appears to be transitory, driven by temporary movements in discount rates.[31] There is also empirical support for the idea that aggregate consumption responds more to permanent than to transitory changes in asset values.[32]

However, our results are driven by *cross-sectional,* not aggregate variation in returns and dividends. This is an important difference, because movements in discount rates are systematic, driven by macroeconomic variables. As a result, the variation in returns induced by changes in discount rates is, to a large extent, a common component across stocks.[33] The time fixed effects in our regressions absorb aggregate movements in asset values, leaving the market-adjusted and largely permanent component of returns. Thus differences in the permanence of dividends and capital gains also cannot explain our results.

Mental Accounting

Finally, a higher propensity to consume from dividends than from capital gains is predicted by typical mental accounting theories. Indeed, Hersh Shefrin and Richard Thaler explicitly describe such a higher propensity as an important (but as yet untested) prediction of their mental accounting framework.[34]

---

30. Note that the issue of permanence of wealth shocks correlated with dividends is unrelated to the issue of whether companies set dividends equal to the permanent component of earnings. It is perfectly possible for a company's earnings to have a strongly transitory component while its stock returns are entirely permanent, and vice versa. The relevant issue here is the permanence of stock returns, not of earnings.

31. See Poterba and Summers (1988), Fama and French (1988), and Campbell and Shiller (1988).

32. See Lettau and Ludvigson (2004).

33. Vuolteenaho (2002) and Cohen, Polk, and Vuolteenaho (2006) find that only a small fraction of individual variation in stock returns around the market return is transitory.

34. See Shefrin and Thaler (1988).

In the Shefrin and Thaler model, households place wealth into one of three mental accounts: current income, current assets, and future wealth.[35] Shefrin and Thaler argue that the propensity to consume wealth categorized as current income, such as dividends, is greater than the propensity to consume wealth categorized as assets, such as capital and its appreciation. Household behavior in their model is thus consistent with the popular advice to "spend from income, not from principal."

Our main results fit well with these predictions. The propensity to withdraw and consume dividends is indeed far higher for dividends than for capital gains. Moreover, in the CEX data, the propensity to consume dividends is similar to the propensity to consume labor income, consistent with the notion that both are placed in the "current income" mental account.

In addition, mental accounting seems to offer more natural explanations for some finer aspects of our results than do the other theories. For example, it is natural that ordinary dividends and small special dividends would be categorized as current income to a greater extent than large special dividends, which, in turn, would be seen as still more income-like than capital appreciation. Under mental accounting, one would thus expect a higher propensity to consume ordinary than large special dividends, and a higher propensity to consume the latter than capital gains. Table 9 shows precisely this pattern.

The underlying psychology behind this sort of mental accounting is an important open question. Self-control and prospect theory are potential psychological roots.[36] Another, anecdotally plausible possibility is that although firm-level stock returns and cross-sectional variation in portfolio performance are largely permanent, individuals do not view them as such. A quasi-rational rule of thumb for a passive investor facing perceived stock market mispricing may then be to consume dividends but not capital gains.

Mental accounting of any type suggests bounded rationality, and so a natural way to close this discussion is to comment on the welfare consequences of deviating from fully optimizing behavior in this setting. We suspect that these consequences are relatively small for two reasons: dividends make up a small fraction of total portfolio returns, and more important, they have a much lower standard deviation. Corporations smooth dividends,

---

35. See also Shefrin and Statman (1984).
36. See Shefrin and Statman (1984).

adjusting only partially and only to the permanent component of earnings, as captured by the Lintner dividend model. This behavior on the corporate side limits the welfare consequences of an investor rule of thumb to consume from dividends.

The May 2003 Dividend Tax Cut

The Jobs and Growth and Taxpayer Relief Reconciliation Act of 2003 reduced the maximum federal tax rate on dividend income from over 38 percent to 15 percent. After taking into account state income taxes and their deductibility from federal income tax, the average household marginal tax rate on dividends fell from 32.1 percent in 2002 to 18.5 percent in 2003.[37]

The tax cuts were designed to stimulate economic growth. Reducing the double taxation of corporate profits was expected to lower the cost of capital and thereby spur capital formation and growth, although there is a debate in the economics literature over whether this view is true. An alternative view is that retained earnings are the marginal source of finance for new investment projects. In that case taxes on dividends would have no effect on real investment.[38]

Our results suggest that the dividend tax cut of 2003 may have had another, more direct impact on growth through its impact on household consumption, just as the Microsoft dividend might have had a measurable impact on consumer spending. An interesting exercise then is to use our estimates from (pre-2003) micro data to assess how much the increase in after-tax dividend income may have increased aggregate consumption.

An important preliminary note is that taxes are not withheld when dividends are paid, and so the May 2003 tax cut did not have a direct effect on the cash flows occurring on the date when the dividends are paid. Our estimates are based on how individuals' consumption reacts at that point. So, for our estimates to be valid measures of the propensity to consume from *after-tax* dividend income, we need to assume that individuals' monthly withdrawal behavior fully reflects the relevant taxes that are to be paid when the tax year ends. For this exercise, we will assume that our estimated

37. These numbers are from Poterba (2004).
38. See Auerbach and Hassett (2006) for a discussion of the two views on the investment effect of dividend taxes and of the evidence in the context of the 2003 tax cuts.

marginal propensities to consume before-tax dividends in tables 2 and 6 come from a *constant* marginal propensity to consume (MPC) after-tax dividends, or

$$(9) \qquad MPC_{pre-tax,t} = MPC_{after-tax} \times (1 - \tau_t),$$

where τ is the tax rate.

A second caveat is that our estimates come from a representative sample of U.S. households. Dividends are paid disproportionately to the highest-income households, which are perhaps more sophisticated in their financial planning and less likely to use mental accounting rules of thumb. In this regard it is a useful feature of our CEX analysis that the variables are defined in dollars, which implies that the regressions put more weight on households with higher income and higher dividends. Moreover, the sample is restricted to stockholders. This ensures that our results are driven by households with substantial income. Nevertheless, it is possible that we still are not capturing the behavior of the richest households. For now we will assume that our estimates apply, but we interpret them as upper-bound impacts.

We first consider a scenario in which the dividend tax cut has no effect on the supply of dividends by corporations. In this case the impact on consumption is simply the change in the before-tax MPC times dividends D. Rearranging equation 9 yields

$$(10) \quad \left(MPC_{pre-tax,2003} - MPC_{pre-tax,2002} \right) \times D = \left(\frac{1 - \tau_{2003}}{1 - \tau_{2002}} - 1 \right) \times MPC_{pre-tax,2002} \times D.$$

According to the IRS *Statistics of Income,* individuals reported dividend income of \$103 billion in 2002. With a fall in the dividend income tax rate from 32.1 percent to 18.5 percent and an initial before-tax MPC of 0.4—a number that appears to be around the middle of our baseline estimates—we obtain \$8.3 billion as the estimated effect on aggregate consumption. Table 3 points to a before-tax MPC somewhat lower than 0.4, whereas table 2 suggests a value above 0.7. At this high end, where the after-tax MPC is essentially 1.0, the estimated effect for 2003 is \$14.0 billion.

A second scenario is that the dividend tax cut, by reducing the relative tax disadvantage on dividend income, may have increased the supply of dividends. Raj Chetty and Emmanuel Saez suggest that the tax cut caused

an increase in dividend payouts.[39] In fact, they find that a sample of firms with limited tax incentives—the largest shareholder is not taxable—did not increase the rate at which they initiated dividends, for example, and thus they attribute the entire change to tax effects. On the other hand, Alon Brav and coauthors surveyed hundreds of financial executives in the wake of the tax cut and found that they only occasionally cite the tax cut as a motivator of payout decisions.[40] Stock market sentiment may also have affected dividend behavior during this period, as some firms initiated or increased dividends in an attempt to distance themselves from the non-dividend-paying "new economy" firms that had crashed in 2000 and 2001.[41] In any case, suppose for the sake of argument that the entirety of the observed change in dividends from 2002 to 2003, from $103 billion to $115 billion, was due to the tax cut. Recall that the before-tax MPC rises as the tax rate falls, from 0.4 to 0.48:

$$(11) \qquad MPC_{pre-tax,2003} = MPC_{pre-tax,2002} \times \frac{1 - \tau_{2003}}{1 - \tau_{2002}}.$$

Applying this estimate to the before-tax increase in dividends, the supply channel adds another $5.8 billion to the effect on consumption, for a total effect of $14.1 billion. At the higher MPC estimate, the total effect is $23.8 billion.

Dividends in the *Statistics of Income* continued to increase in 2004, to $147 billion, including the large Microsoft payout; hence this calculation might still underestimate the effect for subsequent years. Let us suppose the tax cut took two years to have its full effect, and therefore take the rise from the 2002 to the 2004 value as the supply increase. Then the estimates of total consumption effects in the previous paragraph rise to $29.4 billion and $49.9 billion, respectively.

To gain some perspective on these estimated changes in consumption, which range from $8.3 billion to $49.9 billion, consider that total personal consumption expenditure in 2003 was $7.7 trillion, and that the average increase in total personal consumption over the previous five years was

---

39. See Chetty and Saez (2005) and Poterba (2004).
40. See Brav and others (2007).
41. Baker and Wurgler (2004a, 2004b) study how investor sentiment affects dividend payment.

$365 billion, with a standard deviation of $66 billion. Against this standard deviation, effects on the order of those estimated above do not seem trivial.

Conclusion

How investors consume from dividends versus capital gains is important to a range of questions in corporate finance, macroeconomics, behavioral economics, and tax policy. Classical theories suggest that investor consumption patterns are independent of how returns are split into dividends and capital gains, whereas mental accounting and various economic frictions motivate an alternative hypothesis that investors are relatively more likely to consume dividends. The contribution of this study is to exploit the cross-sectional variation in two household-level data sets in order to document the effect of dividends on consumption.

The main finding is that consumption indeed responds much more strongly to returns in the form of dividends than to returns in the form of capital gains. Data from the Consumer Expenditure Survey show a strong relationship between household consumption and dividends, after controlling for total returns (which include dividends). A sample of household portfolio data also shows that dividends are much more likely than capital gains to generate withdrawals from investment accounts, thus illustrating the mechanical process of translating dividend income into consumption. We stress that the interesting result is not that the propensity to consume capital gains is rather low—indeed, it should be low for forward-looking consumers acting according to the permanent income hypothesis—but that the propensity to consume dividends is so high. A review of alternative explanations suggests that the results may in part reflect mental accounting processes of the sort summed up in the adage, "consume income, not principal."