The effect of dividends on consumption[*]

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Abstract

Classical models predict that the division of stock returns into dividends and capital appreciation does not affect investor consumption patterns, while mental accounting and other economic frictions predict that investors have a higher propensity to consume from stock returns in the form of dividends. Using two micro data sets, we show that investors are indeed far more likely to consume from dividends than capital gains. In the Consumer Expenditure Survey, household consumption increases with dividend income, controlling for total wealth, total portfolio returns, and other sources of income. In a sample of household investment accounts data from a brokerage, net withdrawals from the accounts increase one-for-one with ordinary dividends of moderate size, controlling for total portfolio returns, and also increase with mutual fund and special dividends. We comment on several potential explanations for the results.

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I. Introduction

Microsoft's $32 billion cash dividend of December 2004 was the largest corporate payout ever. Classical models of finance and consumption-savings decisions predict that this dividend will have little effect on the consumption of Microsoft investors. Under the assumptions of Miller and Modigliani (1961), 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. 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—discussed in detail in Thaler and Shefrin (1981), Shefrin and Statman (1984), and Shefrin and Thaler (1988)—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 different mental accounts from which they have different propensities to consume. Less exotic but equally realistic frictions, such as transactions 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 link between corporate finance and the real economy, little empirical research has pursued the issue. This is probably because the most easily available data on consumption and dividends is 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;

such data combine investors and non-investors; and such data face an essentially prohibitive endogeneity problem: omitted third variables such as business conditions will jointly affect consumption, dividends, and capital appreciation, making it difficult to establish the causality behind any correlations.

In this paper, we study the effect of dividends on investor consumption using two micro data sets that provide 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 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 was introduced by Barber and Odean (2000) and includes the trading records of tens of thousands of households with accounts at a large discount brokerage between 1991 and 1996. While 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 total returns including dividends. The coefficient on dividend income thus captures differences between the consumption responses to dividends and 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, i.e. 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, i.e. not arising 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, with both data sets indicating 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 like 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 effects, 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 low-turnover and high-turnover households withdraw dividends at similar rates.

While 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 Shefrin and Thaler (1988) 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.

Our paper builds on an earlier literature that uses aggregate data. Early contributions include Feldstein (1973) and Feldstein and Fane (1973), which viewed the equality of the propensity to consume from dividends and corporate retained earnings, not capital appreciation, as the null hypothesis of interest. Subsequently, Peek (1983) and Summers and Carroll (1987) find that capital gains and losses have little effect on aggregate consumption. Poterba (2000) surveys studies on the stock market wealth effect.

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 allows us to investigate. Finally, automatic reinvestment plans are absent in Finland but common in the U.S., so the effect of dividends on consumption and reinvestment could be quite different in any case.

Our results also relate to evidence that consumers have a relatively high propensity to consume moderately-sized cash windfalls. For instance, Souleles (1999) finds that consumption responds to federal income tax refunds whether or not the household faced borrowing constraints, while Souleles (2002) documents that consumption responds to pre-announced tax cuts. Related studies in this vein include Bodkin (1959), Kreinin (1961), Wilcox (1989), Parker (1999a), Stephens (2003), and Johnson, Parker, and Souleles (2005). Intuitively, ordinary dividends are like moderate-size windfalls. However, our analysis differs in that we focus on the *relative* propensity to consume two forms of income, dividends and capital gains, holding constant the level of the total return, dividends plus capital gains. More broadly, this study falls into a growing literature that Campbell (2006) terms "household finance."

The paper proceeds as follows. Section II analyzes a sample from the Consumer Expenditure Survey. Section III studies portfolio data from a discount brokerage house. Section IV reviews explanations, and Section V concludes.

II. Evidence from the Consumer Expenditure Survey

Our first data set is drawn from the Consumer Expenditure Survey (CEX). The strength of the CEX is 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. (For this reason, the analysis below is followed by an analysis of a second, complementary data set.) After introducing the data and definitions, we describe our empirical methodology and then present regression estimates of the effects of dividends on consumption.

A. *Data and definitions*

The CEX has been conducted by the Bureau of Labor Statistics since 1980. 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; dividends, received interest, other income variables, and demographic data are collected in the second and fifth interviews and cover the twelve months prior to 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.

Basic variables are as follows. We follow Parker (2001) and define non-durables consumption, *C*, as the sum of food, alcohol, apparel, transportation, entertainment, personal care, and reading expenditure, and we sum up consumption over the four quarters from the second to fifth interview. We also consider the CEX total expenditure variable as a consumption measure. Dividends, *D*, are based on the question asking for "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 (sum of property values minus sum of 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 (holdings of stocks and mutual funds, but also corporate bonds and government bonds that are not savings bonds), minus other debt.[1] Before 1988, there is no information on the level of

[1] 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. Also, the bond component of the "stocks" position cannot be isolated in the CEX data, but it is likely to be very small for most households (see Brunnermeier and Nagel (2005) for details).

mortgage balances, so we use the 1988 to 2001 data only. Also, while for financial assets we can measure changes in 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 fifth interviews.

Survey participants are asked about the amount of securities purchased and sold over the preceding twelve months in their fifth interview. This information allows us to decompose the change in the value of stock holdings into an active investment/disinvestment component and a capital gains component. In order to compute capital gains, 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 is 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 fifth interview. We require that lagged financial wealth be positive, and that a nonzero fraction of this wealth be invested in shares or mutual funds. We delete observations where any wealth component or income is topcoded.[2] We use the Consumer Price Index (CPI) to deflate all variables to December 2001 dollars.

B. Summary statistics

Table 1 presents summary statistics for the CEX data. After filters, we have 3,106 household-year observations. In this sample, the mean non-durables consumption, reported in Panel A, is \$15,042, and the median is slightly lower. Total expenditure, including durables, is three to four times higher. Panels B and C show wealth and income measures. Financial wealth is typically around a third of total wealth. Total income, which includes dividends, but not capital

[2] 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.

gains, has a mean of $56,566 and again a slightly lower median. Comparing Panels A and C, one sees that on average, total income is slightly higher than total expenditure. For the mean household, interest income is $1,264 and dividends total $935. Panel D shows that on average, interest and dividends account for 4% and 2% of total income, respectively. The distribution is skewed, with the median household reporting zero dividend income.

C. Empirical Methodology

The null hypothesis of interest is that capital gains and dividends are fungible, which means that households should react similarly to wealth changes that come in the form of a capital gain and 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/losses.

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

$$C_{it} = a_0 + a_1' Z_{it} + a_2' F_{it} + gR_{it} + dD_{it} + u_{it} \tag{1}$$

where C_{it} is household i's consumption in t (specifically, in the levels specification, consumption is summed over the four quarters prior to the fifth interview); Z_{it} is a vector of household characteristics; F_{it} is a vector of financial variables that includes income, lagged wealth, and interactions with Z_{it}; R_{it} is the total dollar return on stocks including dividends; and D_{it} is the total dollar dividend income. In Eq. (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 into consumption in different ways.[3] 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 there is a wedge between the effect of dividends and capital gains. Like Hayashi (1985), Carroll (1994), and Parker (1999b), 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 non-linear consumption function. 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 Z_{it} include the education of the household head (dummies for high-school and college graduation), the age of the household head, age 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 macro factors. Financial variables in F_{it} include variables that proxy for future income and for current cash-on-hand, including income after tax (excluding dividends), income squared, lagged total wealth, lagged total wealth squared, lagged financial wealth, lagged financial wealth squared, the percentage of financial wealth invested in stocks and its square. We also allow for interactions of age and family size with income, lagged wealth, and lagged financial wealth.

In terms of interpreting an estimate that $d > 0$, the key question is whether this set of controls is sufficient or whether there is some omitted variable that could be positively correlated

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

with dividends and thus bias upwards the estimate of d. While all of these controls should do a reasonable job of approximating households' consumption rule, it is difficult to fully rule out the possibility of some remaining unobserved difference between households that hold dividend paying stocks and those that hold nonpaying stocks. 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.[4] 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 a causal effect from the composition of returns to 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:

$$\Delta C_{it} = b_0 + b_1' Z_{it} + b_2' \Delta Y_{it} + gR_{it} + d\Delta D_{it} + e_{it} \, . \tag{2}$$

We define ΔC_{it} as the difference between fifth and second interview quarter's consumption, since the CEX offers at most four quarterly consumption observations per household. As mentioned above, dividends and income in the CEX are measured over overlapping 12-month periods leading up to the second and fifth interviews. We define ΔD_{it} and ΔY_{it} as the difference in the reported values. Because of the imperfect matching of measurement periods between ΔC_{it} and

[4] See Graham and Kumar (2005) and references therein for clear evidence of dividend clienteles. Graham and Kumar show that the allocation to and trades of dividend-paying stocks depends on investor characteristics.

ΔD_{it}, the d estimate is likely to be biased towards 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, 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 log consumption growth as the dependent variable. In that case, we use an indicator variable for the *sign* of dividend growth as our key explanatory variable, because we don't have a clear prediction about how consumption growth would be affected quantitatively by dividend growth. For example, a 10% 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.[5]

D. Effects of dividends on household consumption

Table 2 reports estimates of Eq. (1). Specifications in the left columns use non-durables consumption as the dependent variable, and those in the right columns use total expenditure. The first specification includes total returns, dividends, and a dummy for zero dividends, plus a large number of controls described above. The estimates indicate that there is little relationship between total returns and consumption, both in economic and statistical terms. But dividends are positively related to the level of consumption, and the effect is statistically significant. A $1

[5] See Johnson, Parker, and Souleles (2004) for a similar dummy variable approach to analyze the effect of tax rebates on log consumption.

difference between households in dividends is associated with a 16-cent difference in non-durables consumption.

The second specification includes the lag 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 deal with this issue is differencing, which follows 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 the lagged coefficient, consistent with a causal effect from 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 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.

The last 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 as high as in the regressions with non-durables consumption. As total expenditure is proportionally higher than non-durables consumption, on average, these results suggest that dividend income is not used exclusively for non-durables consumption but rather boosts expenditures of all types. In all other respects, the results in these specifications are similar to those for non-durables.

It is interesting that there is no evidence of a significant effect of capital gains; indeed 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 the coefficient on capital gains is expected 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 is labeled "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 Eq. (2). The first specification includes total returns, the change in dividends, and other controls including a dummy for zero dividends over the prior and current 12-month period 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 *12-month* periods (preceding the second and fifth interview), we 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 yields numbers of the same order of magnitude as the estimates in Table 2, though somewhat lower. The moderate decrease is consistent with some ex-ante effect in the levels estimates, but it could also reflect the noise that is introduced through the imperfect matching of dividends and consumption measurement periods. Consistent with the latter possibility, we find that controlling for lagged consumption, which should pick up some noise, raises the magnitude of the coefficient on dividend changes. But for the non-durables 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 specifications in log differences. As mentioned above, the analysis here focuses on a dividend-increase dummy variable. Its coefficient measures the average difference in consumption growth between households with dividend increases and those with dividend decreases. In all specifications, the coefficient estimates on the $\Delta D_t > 0$ dummy is positive, and it is also significantly different from zero in all but the first two non-durables 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% relative to the average household with non-increasing dividend income.

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

III. Evidence from household portfolios

A concern with the CEX data is that dividends and capital gains are likely to be measured with substantial error, as they are both self-reported. It is not clear to what extent measurement error influences the foregoing results. Furthermore, the results would be made even more convincing if we could verify the intermediate, mechanical step between receipts of dividends and consumption expenditure—that dividends are in fact withdrawn from brokerage accounts, and done so at a higher rate than capital gains. Our second micro data set, based on household portfolios, achieves these objectives and thus nicely 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.[6] And 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.

A. *Data and definitions*

Our household portfolio data set was introduced by Barber and Odean (2000). It contains monthly position statements and trading activity for a sample of 78,000 households that had accounts at a large discount brokerage firm. To enter the sample, households were required to have an open account during 1991. For sampled households, position statements and accounts data were gathered for January 1991 through December 1996. The data include all accounts, including margin and retirement accounts, opened by each sampled household at this brokerage. For our sample, we exclude margin accounts, IRAs, Keogh accounts, and accounts that are not joint tenancy or individual accounts. Securities followed include common stocks, mutual and closed-end funds, ADRs, and warrants and options held in these accounts. We focus on common stock and mutual funds, which represent all, or nearly all, of most households' portfolios. See Barber and Odean (2000) for additional data details.

We use household-month level observations on net withdrawals, portfolio value, capital gains, and total dividends. Net withdrawals C (we use C in analogy with our earlier definitions, although, to be precise, we are studying net withdrawals in this data set) are inferred as the starting value of assets in the portfolio A, plus capital gains G, plus dividends D, minus the ending value of the portfolio. That is, for household i,

$$C_{it} = A_{it-1} + G_{it} + D_{it} - A_{it}, \tag{3}$$

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

[6] Similar in spirit, Choi et al. (2004) use shifts in savings into 401-K plans to identify changes in consumption.

$$A_{it} = \sum_j Q_{jt} P_{jt} \ , \tag{4}$$

capital gains,

$$G_{it} = \sum_j Q_{jt-1}\left(P_{jt} - P_{jt-1}\right), \tag{5}$$

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

$$D_{it} = \sum_j Q_{jt-1} D_{jt} \ . \tag{6}$$

For simplicity, we suppress the household i subscript on the quantity of each security Q.

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 CRSP stock file to measure dividends on common stocks and the CRSP mutual fund file to measure dividends on mutual funds. Dividends are estimated as the security's dividend yield from CRSP in month t applied to holdings as of the end of month t-1. For common stock dividends, we follow DeAngelo, DeAngelo, and Skinner (2000) in using CRSP distribution codes 1232, 1212, 1218, 1222, and 1245 to identify ordinary dividends and 1262 and 1272 to identify special dividends.

The data contain outliers due to account openings and closings that do not reflect actual consumption and savings 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 account value falls below $10,000. 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 proportionately large net inflow of funds. To prevent a few such data points from driving results, we exclude household-months in which net withdrawals exceed 50% in absolute value. This screen excludes about 0.96% of the sample.[7] The final sample includes 92,412 household-months.

The advantages of household portfolio data vis-à-vis the CEX data are fairly clear, but these data nonetheless do have limitations of their own. One is that we usually do not know how important the accounts we observe are in terms of the household's total wealth, although in a fraction of the sample we do have self-reported data on household net worth. 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. While as mentioned above this means that the portfolio data is 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 are eventually reinvested and ultimately reappear 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.

B. Summary statistics

The size and composition of portfolios are described in Panel A of Table 5. The mean account value is $54,400 and the median is $28,400. For the mean household, 82.7% of this value is due to common stock holdings and 13.5% reflects mutual funds.

Changes in portfolio value are in Panel B. In order 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 household-month in our sample has slight net withdrawals at the rate of

[7] The results below are robust to choosing different cutoffs. For example, they are quantitatively similar when 5% or 0.5% of the most extreme observations is eliminated. But some process is necessary: as the most extreme *single* observation would account for about *one third* of the total sum of squared net withdrawals (even though there are close to 100,000 observations in total), and so any analysis would be practically meaningless.

0.06% per month, while net savings in the median household-month is zero. The average total monthly return is positive, at 1.11%. The average dividend income per month, 0.20% of beginning-of-month portfolio value, is a significant fraction of the average month's total return, but much less volatile.

Dividend income is broken down in Panels C and D. Dividend income is positive in just under half of the household-months. For these observations, an average of 77.92% of the dividend income is due to ordinary dividends, with mutual funds accounting for almost all of the remainder. Special dividends are rare, but can be very large when they do occur.

C. Effects of dividends and capital gains on net withdrawals

Figure 1 shows scatterplots of household-month observations of net withdrawals against contemporaneous total dividends. The figure clearly shows two modal behaviors with respect to dividend income. The line of points indicating a one-for-one increasing relationship between net withdrawals and dividends evidences a "zero (contemporaneous) reinvestment" policy; the line of points indicating a flat relationship indicates an "automatic reinvestment" policy. The many thousands of observations that lie on neither line suggest a positive relationship more generally. We omit an analogous scatterplot of net withdrawals as a function of capital gains because it shows no visible patterns.

Mean and median behaviors are plotted in Figure 2. In Panel A, we break dividend income into eleven groups, one for household-months with no dividend income and ten deciles for positive-dividend observations. Within each group, we plot median total dividends and net withdrawals. The results suggest that median behavior is not to immediately reinvest moderate-size dividends. Net withdrawals increase one-for-one with dividend income over the bottom several deciles, i.e. in this range a modal behavior from Figure 1 is also the median behavior.

Mean dividend-withdrawing behavior is presented in Panel B. 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 larger dividends. (This could be consistent with a mental accounting practice in which the large dividends that result from cash acquisitions, for example, are not treated like ordinary dividends but rather as principal to be reinvested.)

The bottom two panels provide an initial look at the effect of capital gains. The contrast with the dividends pictures confirms the CEX results: the effect of capital gains appears to be much smaller than that of dividends. Panel C shows that regardless of the level of capital gains, median contemporaneous net withdrawals are zero. Panel D shows mean behavior, which suggests that very high capital gains engender net withdrawals, on average, and very low capital gains engender net inflows, on average. There is no clear effect in the intermediate range.

In Table 6, we estimate the effects of contemporaneous dividends and total returns on the rate of withdrawals. Our first specifications include linear effects only, and then we 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 2.50% in absolute value:

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

We suppress the household *i* subscripts.

It may be helpful to explicitly interpret the coefficients. The first regression in the left panel indicates that, on average, investors have a propensity to withdraw contemporaneous dividends of about 0.35. The second regression shows that, on average, investors have a propensity to withdraw contemporaneous returns of 0.02. The third regression 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 capital gains 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 (Table 2 and Table 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 10^{th} and 90^{th} percentile is about 30 times bigger for returns than for dividends (see Table 5), the point estimates in Table 6 suggest that the variation in withdrawals caused by dividends and capital gains may be of roughly similar magnitude. (Of course, we found at best weak effects of capital gains in the CEX, so unlike in the case of dividends we are unable to find 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.

Moving to the second panel of Table 6, with piecewise linear effects, the first regression indicates a propensity to withdraw contemporaneous dividends of 0.77 for typical levels of dividend income and 0.33 (0.77 – 0.44) for unusually high levels of dividend income. The last regression shows that for small levels of total returns, investors have a propensity to withdraw from contemporaneous capital gains of -0.03 (0.02 – 0.05), i.e. they do not withdraw at all, while the differential propensity to withdraw contemporaneous dividends stays the same. All of these results are consistent with Figure 2.

D. Delayed reinvestment

While 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 the possibility that 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 reinvested in subsequent months. To the extent that this 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:

$$\frac{C_t}{A_{t-1}} = a + d_1 \frac{D_t}{A_{t-1}} + d_2 \frac{D_t}{A_{t-1}} \left\{ \frac{D_t}{A_{t-1}} > 90^{th} Pctle \right\} + d_3 \frac{1}{11} \sum_{s=1}^{11} \frac{D_{t-s}}{A_{t-1}} + d_4 \frac{1}{11} \sum_{s=1}^{11} \frac{D_{t-s}}{A_{t-1}} \left\{ \frac{D_{t-s}}{A_{t-1}} > 90^{th} Pctle \right\}$$

$$+ r_1 \frac{R_t}{A_{t-1}} + r_2 \frac{R_t}{A_{t-1}} \left\{ \left| \frac{R_t}{A_{t-1}} \right| < 0.025 \right\} + r_3 \frac{1}{11} \sum_{s=1}^{11} \frac{R_{t-s}}{A_{t-1}} + r_4 \frac{1}{11} \sum_{s=1}^{11} \frac{R_{t-s}}{A_{t-1}} \left\{ \left| \frac{R_{t-s}}{A_{t-1}} \right| < 0.025 \right\} + v_t . \qquad (8)$$

Under this specification, when the monthly total return is greater than 2.5% in absolute value, the long-run propensity to withdraw capital gains is (r_1 + r_3). When the monthly total return is smaller than 2.5% in absolute value, the long-run propensity to withdraw capital gains is (r_1 + r_2 + r_3 + r_4). Likewise, the *differential* or "extra" long-run propensity to withdraw a small or medium dividend income realization is (d_1 + d_3), while 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 (r_3 and

r_4), as dividends (capital gains) that are reinvested will be detected as reduced net withdrawals as a function of lagged dividends (capital gains).[8]

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, the contemporaneous coefficients are as before, and the effects of lagged dividends are nil. The full piecewise linear model in the rightmost column shows that the long-run propensity to withdraw small or medium dividends is 0.73 (0.80 – 0.07) greater than that of capital gains, 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 of such dividends. On the other hand, the differential long-run propensity to withdraw very large dividends is still positive, but is 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.

E. Household characteristics

For robustness tests, Table 8 splits the sample across several household and portfolio characteristics. First, we split by portfolio size. These accounts typically represent a rather small

[8] In principle, one could also include individual lags of D_t and R_t instead of the summation terms and then sum up 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.

fraction of 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 at the opening of the account, 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 tax rate, which is obviously also a proxy for income. Fourth, we split the sample by portfolio turnover.

The results suggest that the higher propensity to withdraw dividend income is broadly robust across the available household characteristics. An apparent exception is that the difference is insignificant for the below-median tax rate subsample, but this is inconclusive due to the large standard errors in this small sample. Wealthier households appear more likely to reinvest very large dividends, but again standard errors are too large for any confident conclusions.

F. 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, likely reflecting formal elections to automatically reinvest. In addition, both mutual fund dividend recipients and many ordinary dividend recipients 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.

Median and mean net withdrawals by dividend type are in Figure 4. The median behavior is to withdraw ordinary dividends one-for-one. For mutual fund dividends, the median behavior is to withdraw nothing. For special dividends, on the other hand, the median behavior is to withdraw. In means, 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. Ordinary dividends have a propensity to be contemporaneously withdrawn that is 0.90 higher than capital gains, i.e. a propensity to be contemporaneously withdrawn of near unity versus one near zero. Also, reflecting the automatic reinvestment policy pursued by many mutual fund investors, mutual fund dividends are withdrawn at a lower rate. Standard errors are too large to make 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, while the point estimates suggest that large special dividends are mostly reinvested.

G. Reverse causality

As with our CEX results, the above results are potentially 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 consumption. If so, the evidence presented so far does not clearly 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 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) are unpredictable based on lagged dividends, i.e. almost all variation is "unexpected", with twelve months of lagged dividends explaining only 4% 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% of the variation in ordinary dividends, and the one-year and three-month-lagged values together explaining 81%. Mutual fund dividends are less so, with the one-year lagged value explaining 43% 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, the 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's largely a household fixed effect with slow time-variation, then the twelve-month lag of dividends and contemporaneous dividends should have about the same correlations with withdrawals. And if the ex-ante effect does not explain everything, then the coefficient on the contemporaneous dividend should be larger than the coefficient on the twelve-month lag, because 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 $D_{t\text{-}12}$ 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 much 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. While it is impossible to 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.

IV. Explanations

Two quite different micro data sets both suggest that investors have a differentially higher propensity to consume from dividend income than capital gains. So far we have focused solely on documenting the basic facts and investigating their robustness. Now we move forward to consider potential explanations.

A. Borrowing constraints

A standard explanation for the high the sensitivity of consumption to current income is borrowing constraints.[9] However, borrowing constraints by themselves do not predict a different

[9] A closely related, but behavioral, explanation for the high propensity to consume current income is hyperbolic discounting as in Angeletos et al. (2001).

propensity to consume from dividends and 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 cannot be an important factor.

B. Transaction costs

The transaction costs of making homemade dividends are an a priori more relevant factor. Perhaps households recognize that reinvesting dividends, especially the modest levels that accrue in the smaller accounts in our sample, would require the purchase of an odd lot, 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 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 transaction 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 to reinvest unwanted dividends at little, if any, marginal cost; in other words, again, the transaction costs are not binding.[10]

C. Taxes

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

Another tax consideration is the higher tax rate of dividend income than capital gains that prevails in our sample period. Perhaps households have 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, developing this same idea further, many households in our sample have individual stocks with accumulated capital losses at any given time, so from an ex post tax perspective these households should consume from realized losses even before dividends. Yet Odean (1998) documents that investors are more likely to sell winners than losers in every month except December.

D. Different "permanence" of dividends and capital gains

The results might 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,

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

but if changes in dividends are more strongly correlated with the permanent component of stock returns than with the transitory component, changes in dividends could provide some information about the permanence of wealth shocks.[11] 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. Poterba and Summers (1988), Fama and French (1988), and Campbell and Shiller (1988) find that a large proportion of market-level return variation is transitory, driven by temporary movements in discount rates, and Lettau and Ludvigson (2004) find empirical support for the idea that aggregate consumption responds more to permanent than to transitory changes in asset values.

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 macro variables. As a result, the return variation induced by changes in discount rates is, to a large extent, a common component across stocks: Vuolteenaho (2002) and Cohen, Polk, and Vuolteenaho (2005) find that only a small fraction of individual stock return variation around the market return is transitory. The time fixed effects in our regressions absorb aggregate movements in asset values, leaving the market-adjusted and largely permanent component of returns. Thus different permanence of dividends and capital gains also cannot explain our results.

E. Mental accounting

Finally, a higher propensity to consume from dividends than capital gains is predicted by typical mental accounting theories. Indeed, Shefrin and Thaler (1988) explicitly describe the

[11] 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 that earnings of a company have a strongly transitory component, while the stock returns are entirely permanent and vice versa. The relevant issue here is the permanence of stock returns, not earnings.

higher propensity to consume from dividends than capital appreciation as an important untested prediction of their mental accounting framework.

In the Shefrin and Thaler model, households place wealth into one of three mental accounts: "current income," "current assets," and "future wealth." Like Shefrin and Statman (1984), 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. Their model thus is 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 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 they are both placed in the "current income" mental account.

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

The underlying psychology behind this sort of mental accounting is an important open question. Shefrin and Statman (1984) discuss self control and prospect theory as potential psychological roots. Another anecdotally plausible possibility is that, although firm-level stock returns 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 consequence of deviating from fully optimizing behavior in this setting. We suspect that these consequences are relatively small for two reasons. First, dividends make up a small fraction of total portfolio returns. Second, and more importantly, dividends have a much lower standard deviation. Corporations smooth dividends, 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."

V. 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, while 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 returns in the form of capital gains. Data from the Consumer Expenditure Survey (CEX) show a strong relationship between household consumption and dividends, controlling for total returns (which includes dividends). A sample of household portfolio data also show that dividends are much more likely than capital gains to generate withdrawals from the investment account, thus illustrating the mechanical process of translating dividend income into consumption. 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.”

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Figure 1. Net withdrawals versus dividends: Scatter plot. We plot monthly net withdrawals against contemporaneous dividends. Net withdrawals are equal to household monthly net withdrawals. All data are scaled by household account value in period *t*-1 and expressed in percentage terms.

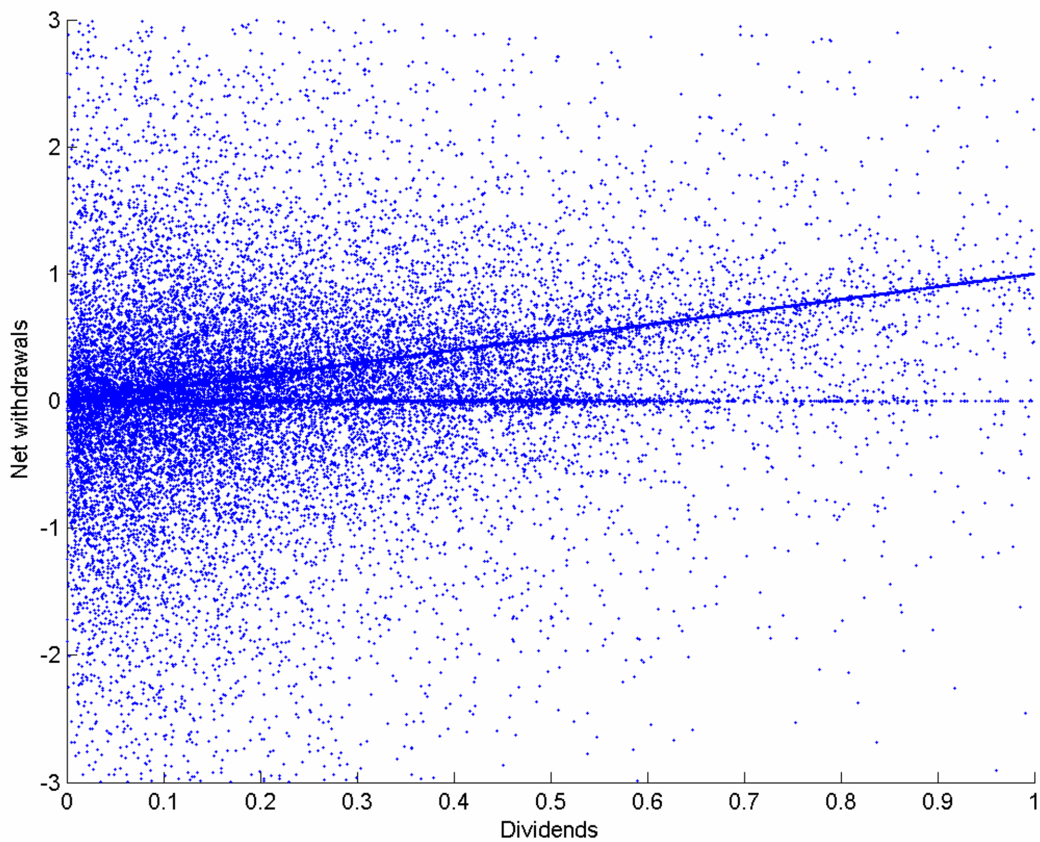
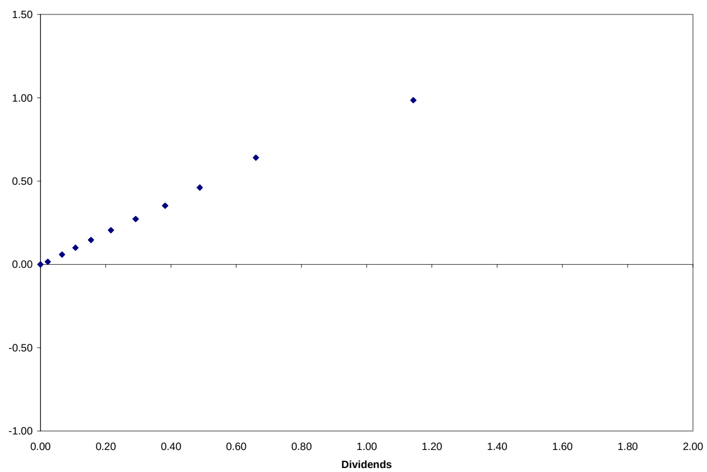
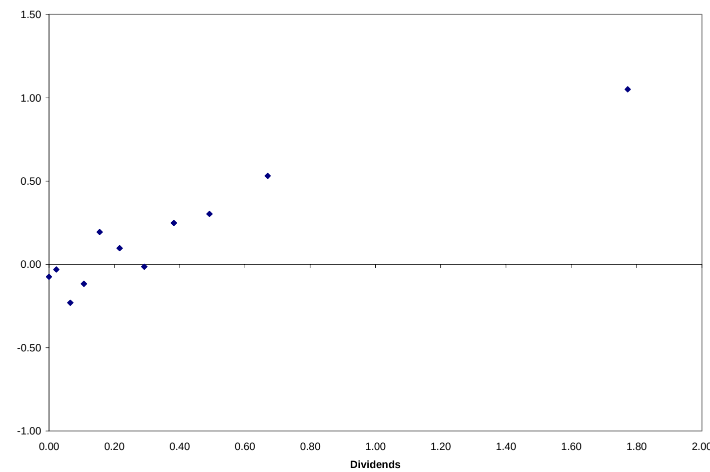


Figure 2. Net withdrawals of dividends and total returns: Decile plots. We sort the data into groups according to monthly dividends and total returns and compute the corresponding level of net withdrawals. The first two panels show dividend sorts. The eleven groups include ten deciles for months with positive dividends and a single group for months with zero dividends. The second two panels show total returns sorts. The ten groups break the sample into deciles according to monthly total returns. We plot within group median (average) net withdrawals versus median (average) dividends in Panels A and C (Panels B and D). Net withdrawals are equal to the monthly net withdrawals by household. All data are scaled by household account value in period t-1 and expressed in percentage terms.

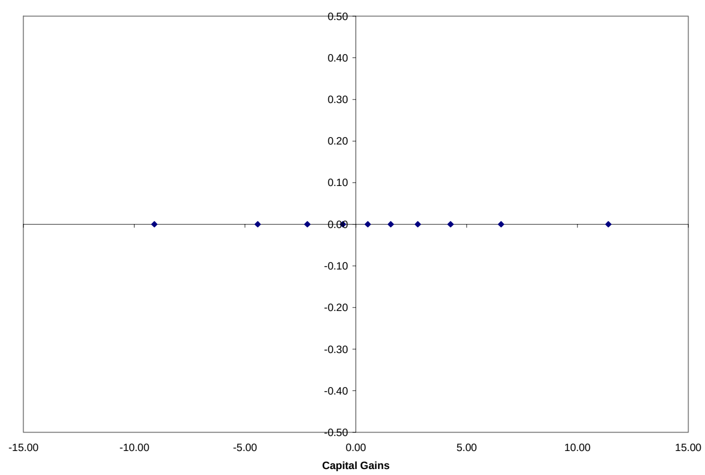
Panel A. Median net withdrawals versus dividends



Panel B. Average net withdrawals versus dividends



Panel C. Median net withdrawals versus total returns



Panel D. Average net withdrawals versus total returns

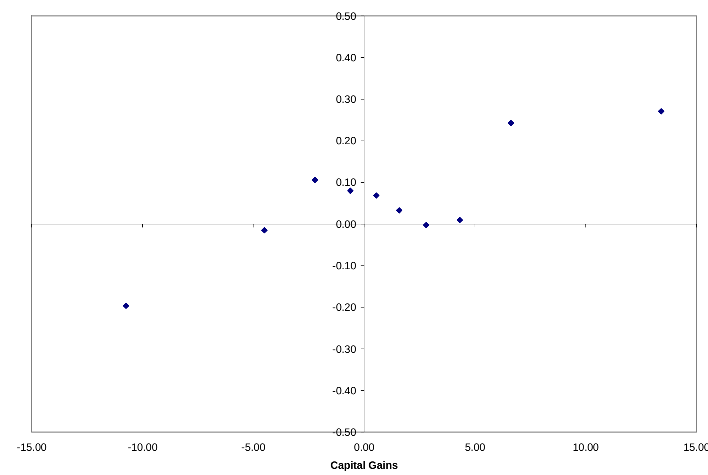
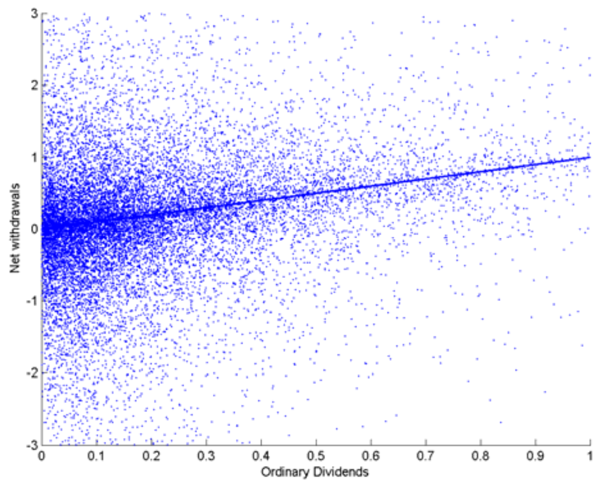
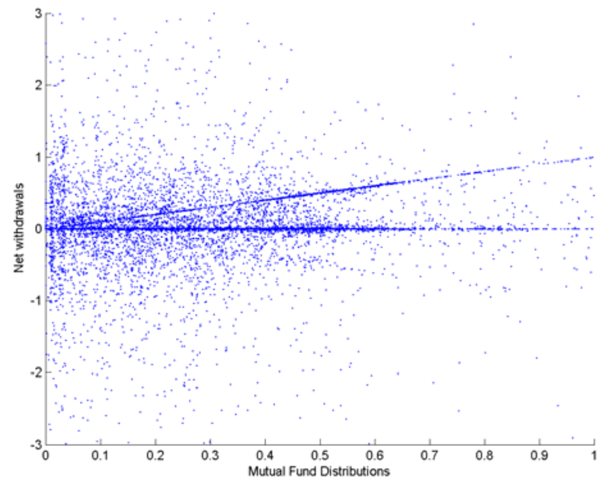


Figure 3. Net withdrawals of dividends by type: Scatter plots. We plot monthly net withdrawals against contemporaneous ordinary, mutual fund, and special dividends. Net withdrawals are equal to household monthly net withdrawals. All data are scaled by household account value in period *t*-1 and expressed in percentage terms.

Panel A. Net withdrawals versus ordinary dividends



Panel B. Net withdrawals versus mutual fund dividends



Panel C. Net withdrawals versus special dividends

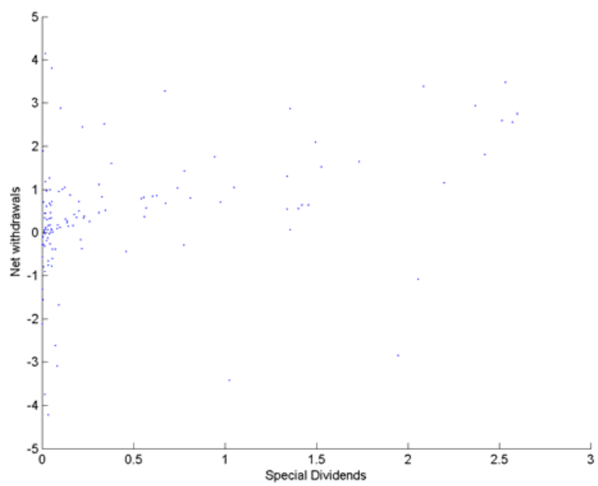
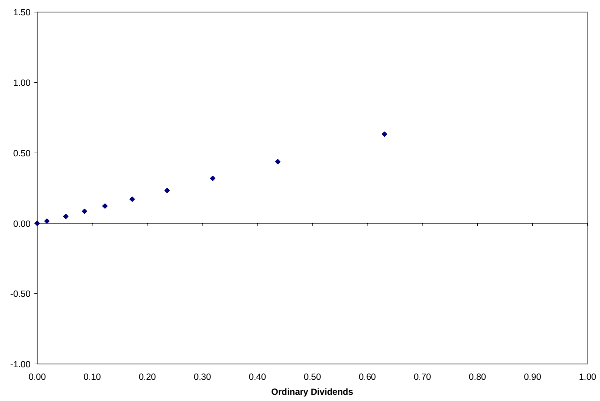
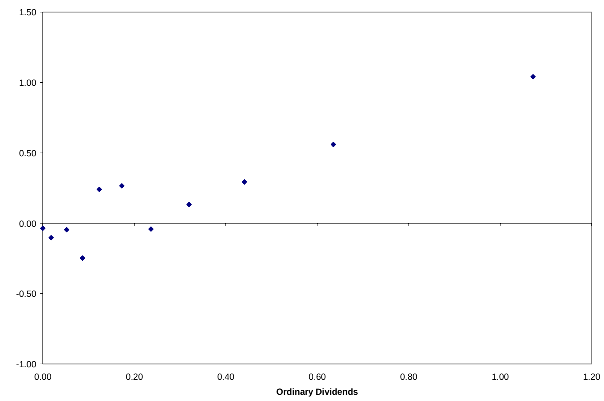


Figure 4. Net withdrawals of dividends: Ordinary, mutual fund, and special dividends. We sort the data into groups according to monthly ordinary, mutual fund, and special dividends and compute the corresponding level of net withdrawals. The first two panels show ordinary, common stock dividend sorts; the second two panels show mutual fund dividend sorts; and the last two panels show sorts on the remaining dividends, including special dividends, liquidating dividends, and cash acquisitions. In each case, the eleven groups include ten deciles for months with positive dividends and a single group for months with zero dividends. We plot within group median (average) net withdrawals versus median (average) dividends in Panels A, C, and E (Panels B, D, and F). Net withdrawals are equal to the monthly net withdrawals by household. All data are scaled by household account value in period *t*-1 and expressed in percentage terms.

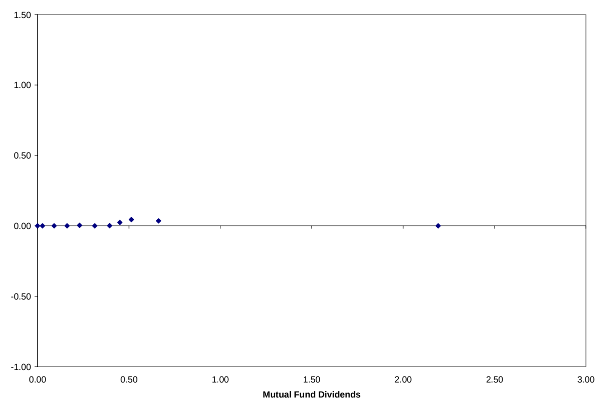
Panel A. Median net withdrawals vs. ordinary dividends



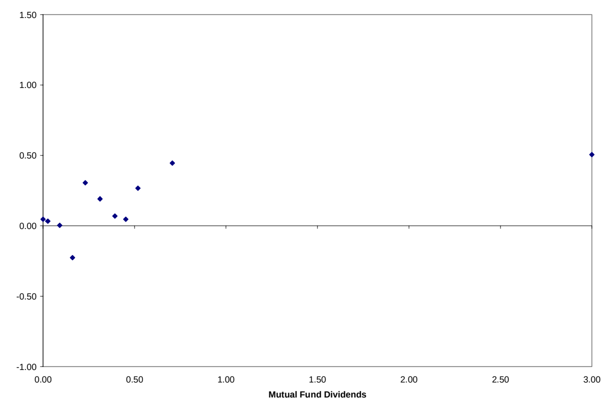
Panel B. Average net withdrawals vs. ordinary dividends



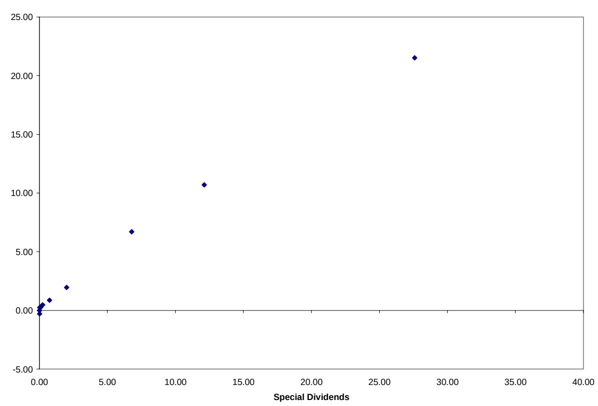
Panel C. Median net withdrawals vs. MF dividends



Panel D. Average net withdrawals vs. MF dividends



Panel E. Median net withdrawals vs. special dividends



Panel F. Average net withdrawals vs. special dividends

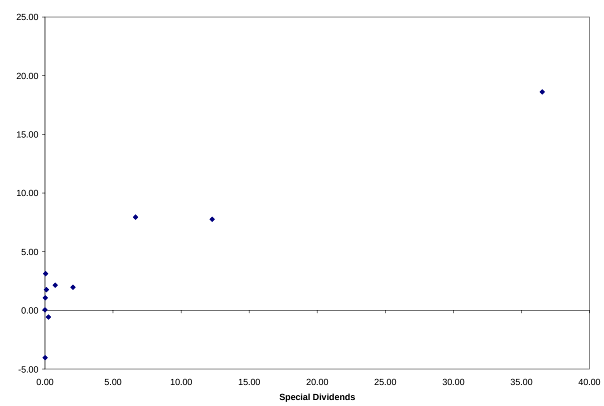


Table 1. Summary statistics: Consumer expenditure survey data, 1988-2001. We report means, medians, and standard deviations for annual consumption, wealth, and income in the short-panel CEX. Non-durable consumption is equal to the sum of food, alcohol, apparel, transportation, entertainment, personal care, and reading expenditure over the four quarters from a household's second to fifth interview. Total expenditure, which includes durables, over the same period is taken directly from the CEX files. Income is the after-tax income over the prior four quarters, as reported by households in their fifth interview. It includes income from dividends (income from dividends, royalties, estates, or trusts) and interest income, but not capital gains. Total wealth is measured as the sum of home equity and financial wealth. We define financial wealth as 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. We compute dollar capital gains as the difference between the change in reported stock holdings over four quarters and the reported net investment in stocks during the same period. We limit the sample to households with nonzero financial wealth invested in stocks and nonmissing data on income and consumption. We also require that there is only one consumer unit (family) in the household and that the marital status of the respondent and the family size remain unchanged from the second to fifth interview, and that none of the wealth component is topcoded. We use the CPI to deflate all variables into December 2001 dollars.

	N	**Mean**	**50%**	**5%**	**95%**	**Min**	**Max**
Panel A. Consumption							
Non-Durable Consumption	3,106	15,042	13,698	4,463	30,003	1,347	78,548
Total Consumption	3,106	48,076	44,582	15,549	91,892	4,955	201,559
Panel B. Wealth							
Financial Wealth (t-1)	3,106	67,700	38,701	2,928	222,207	14	984,165
Total Wealth (t-1)	3,106	161,822	127,276	10,943	428,919	190	1,199,269
Panel C: Income							
Income (Y_t)	3,106	56,566	52,316	12,282	115,505	49	303,793
Interest income (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 income	2,869	54,128	50,526	10,192	112,245	-13,823	302,238
Capital gains (G_t)	3,106	363	0	-16,014	18,988	-301,407	181,503
Panel D. Composition of Income and Capital Gains (%)							
Interest income	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 income	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
Panel E. Control Variables							
Financial Wealth Invested in Stock (%, t-1)	3,106	56.2	60.3	3.8	97.9	0.0	100.0
Age	3,106	52	49	30	80	21	93
Family Size	3,106	2	2	1	5	1	11

Table 2. Consumption of dividends and other sources of income: Consumer expenditure survey data in levels. OLS regressions of consumption on total returns, dividends, and interest income. Non-durable consumption is equal to the sum of food, alcohol, apparel, transportation, entertainment, personal care, and reading expenditure over the four quarters from a household's second to fifth interview. Total expenditure, which includes durables, over the same period is taken directly from the CEX files. Total returns, dividends, and interest income cover the same four quarters. Lagged dividends cover the four quarters ending with the second interview. Household Controls: Family Size, HS Education, College Education, Age. Income and Wealth: Income (covering the same four quarters), Lagged income (covering the four quarters ending with the second interview), Financial Wealth (period ending four quarters prior to the fifth interview), Total Wealth (period ending four quarters prior to the fifth interview), Percent of Wealth in Stocks (period ending four quarters prior to the fifth interview). Interactions (HC x HC): HS Education*Age, College Education*Age, Family Size*Age, Age^2, Family $Size^2$. Interactions (HC x IW): Financial Wealth*Age, Income*Family Size, Total Wealth*Family Size, $Income^2$, Total $Wealth^2$, Financial $Wealth^2$, Percentage of Wealth in $Stocks^2$. Heteroskedasticity robust standard errors are in parentheses. All variables deflated by the CPI.

	Non-durable consumer expenditure				Total consumer expenditure			
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
$R_t = G_t + D_t$	-0.01	-0.01			-0.01	-0.01		
	(0.01)	(0.01)			(0.02)	(0.02)		
D_t	0.16	0.16			0.75	0.72		
	(0.04)	(0.05)			(0.14)	(0.14)		
D_{t-1}		0.01				0.14		
		(0.04)				(0.11)		
$\{D_t = D_{t-1} = 0\}$	-694	-688			-915	-772		
	(249)	(253)			(639)	(641)		
$R_t = G_t + D_t + I_t$			-0.01	-0.01			-0.02	-0.02
			(0.01)	(0.01)			(0.02)	(0.02)
$D_t + I_t$			0.13	0.12			0.58	0.56
			(0.04)	(0.04)			(0.13)	(0.13)
$D_{t-1} + I_{t-1}$				0.03				0.06
				(0.03)				(0.09)
$\{D_t + I_t = D_{t-1} + I_{t-1} = 0\}$			-595	-566			-980	-922
			(267)	(268)			(684)	(687)
Year-Month Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls: Household Characteristics (HC)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls: Income and Wealth (IW)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interactions: HC x HC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interactions: HC x IW	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	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

Table 3. Consumption of dividends and other sources of income: Consumer expenditure survey data in differences. OLS regressions of changes in consumption on total returns, changes in income, changes in dividends, and changes in interest income. Non-durable consumption is equal to the sum of food, alcohol, apparel, transportation, entertainment, personal care, and reading expenditure. Total expenditure, which includes durables, is taken directly from the CEX files. We use the difference between quarterly consumption in the fifth (and last) interview and the second interview three quarters earlier. Total returns are measured over the four quarters from a household's second to fifth interview. We take the difference between annual dividends, interest, and other income ending in the fifth interview and the second interview three quarters earlier. Household Controls: Family Size, HS Education, College Education, Age. Interactions (HC x HC): HS Education*Age, College Education*Age, Family Size*Age, Age^2, Family $Size^2$. Heteroskedasticity robust standard errors are in parentheses. All variables deflated by the CPI.

	Changes in non-durable consumer expenditure				Changes in total consumer expenditure			
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
$R_t = G_t + D_t$	-0.003	-0.002			0.006	0.004		
	(0.003)	(0.003)			(0.008)	(0.008)		
ΔD_t	0.017	0.005			0.093	0.057		
	(0.009)	(0.010)			(0.029)	(0.028)		
$\{D_t = D_{t-1} = 0\}$	-279	-127			-850	-833		
	(92)	(110)			(256)	(255)		
$\Delta(Y_t - D_t)$	-0.001	0.000			0.025	0.034		
	(0.003)	(0.004)			(0.007)	(0.008)		
$R_t = G_t + D_t + I_t$			-0.004	-0.004			0.003	0.002
			(0.003)	(0.004)			(0.009)	(0.009)
$\Delta D_t + \Delta I_t$			0.009	0.007			0.056	0.056
			(0.008)	(0.008)			(0.028)	(0.028)
$\{D_t + I_t = D_{t-1} + I_{t-1} = 0\}$			-268	-78			0	-732
			(105)	(127)			(0)	(277)
$\Delta(Y_t - D_t - I_t)$			-0.002	0.000			0.028	0.039
			(0.004)	(0.004)			(0.008)	(0.010)
C_{t-1}	-0.678		-0.703		-0.621		-0.627	
	(0.047)		(0.049)		(0.041)		(0.045)	
Year-Month Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls: Household Characteristics (HC)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interactions: HC x HC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	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

Table 4. Consumption of dividends and other sources of income: Consumer expenditure survey data in log differences. OLS regressions of changes in log consumption on log total returns, changes in log income, changes in dividends, and changes in interest income. Non-durable consumption is equal to the sum of food, alcohol, apparel, transportation, entertainment, personal care, and reading expenditure. Total expenditure, which includes durables, is taken directly from the CEX files. We use the difference between log quarterly consumption in the fifth (and last) interview and the second interview three quarters earlier. Total returns are measured over the four quarters from a household's second to fifth interview. We use an indicator variable equal to one if annual dividends and interest ending in the fifth interview exceed the second interview three quarters earlier. We use the difference between log annual income in the fifth interview and the second interview three quarters earlier. Household Controls: Family Size, HS Education, College Education, Age. Change in Income Controls: Change in Income (differenc in annual income from the second to the fifth interview). Interactions (HC x HC): HS Education*Age, College Education*Age, Family Size*Age, Age^2, Family $Size^2$. Heteroskedasticity robust standard errors are in parentheses. All variables deflated by the CPI.

	Changes in log non-durable consumer expenditure				Changes in log total consumer expenditure			
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
$\log(1+(G_t+D_t)/FW_{t-1})$	-0.034	-0.013			0.011	-0.002		
	(0.025)	(0.029)			(0.030)	(0.034)		
$\{\Delta D_t > 0\}$	0.026	0.020			0.074	0.083		
	(0.026)	(0.029)			(0.024)	(0.028)		
$\{D_t = D_{t-1} = 0\}$	-0.035	0.002			-0.017	0.017		
	(0.022)	(0.025)			(0.021)	(0.025)		
$\Delta\log(Y_t - D_t)$	0.010	0.020			0.035	0.047		
	(0.012)	(0.014)			(0.012)	(0.014)		
$\log(1+(G_t+D_t+I_t)/FW_{t-1})$			-0.031	-0.003			0.010	0.003
			(0.027)	(0.032)			(0.033)	(0.038)
$\{\Delta D_t + \Delta I_t > 0\}$			0.036	0.042			0.029	0.047
			(0.018)	(0.021)			(0.017)	(0.019)
$\{D_t + I_t = D_{t-1} + I_{t-1} = 0\}$			-0.036	0.007			-0.040	-0.003
			(0.020)	(0.022)			(0.018)	(0.020)
$\Delta\log(Y_t - D_t - I_t)$			0.009	0.022			0.035	0.049
			(0.013)	(0.015)			(0.014)	(0.016)
$\log C_{t-1}$	-0.441		-0.451		-0.456		-0.440	
	(0.021)		(0.023)		(0.021)		(0.023)	
Year-Month Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls: Household Characteristics (HC)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interactions: HC x HC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	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

Table 5. Summary statistics: Household portfolio data. Monthly net withdrawals are estimated as a household's account value at *t*-1 (aggregating across all eligible accounts held by the household) less the account value at *t* plus dividends and capital gains earned on the account holdings at *t*-1. Dividends are equal to the dividend yield from CRSP and the CRSP mutual fund database in month *t* on common stock and mutual fund account holdings at *t*-1. Capital gains are the capital appreciation from CRSP and the CRSP mutual fund database in month *t* on common stock and mutual fund account holdings at *t*-1. Ordinary dividends are equal to the dividend yield from CRSP (distribution codes 1000 through 1999 excluding codes 1262 and 1272) on common stock account holdings at *t*-1. Mutual fund dividends are equal to the dividend yield from the CRSP mutual fund database on mutual fund account holdings at *t*-1. Special dividends are all other dividends. All data are scaled by household account value in period *t*-1 and expressed in percentage terms. We exclude observations where we cannot identify a CRSP mutual fund or common stock match for more than 75 percent of the household account value at *t*-1; households where account value falls below $10,000; margin accounts; and accounts that are not joint tenancy or individual accounts. We further exclude observations where the absolute value of consumption exceeds 50%. This screen eliminates 900 observations, or 0.96% of the sample.

	N	**Mean**	**50%**	**10%**	**90%**	**Min**	**Max**
Panel A. Portfolio Composition							
A_{t-1} ($000)	92,412	54.4	28.4	13.8	99.8	10.0	5,018.9
Common Stocks (%)	92,412	82.69	0.0	0.0	100.0	0.0	100.0
Mutual Funds (%)	92,412	13.49	0.0	0.0	0.0	0.0	100.0
Other Assets (%)	92,412	3.82	100.0	0.0	100.0	0.0	25.0
Panel B. Dividends, Capital Gains, and Withdrawals (%)							
Withdrawals C_t/A_{t-1}	92,412	0.06	0.0	-0.7	1.0	-50.0	50.0
Dividends D_t/A_{t-1}	92,412	0.20	0.0	0.0	0.5	0.0	102.4
Returns R_t/A_{t-1}	92,412	1.11	1.1	-6.1	8.3	-74.0	153.5
Panel C: Dividends by Type (%)							
Ordinary D_t/A_{t-1}	92,412	0.12	0.0	0.0	0.4	0.0	3.0
Mutual Fund D_t/A_{t-1}	92,412	0.07	0.0	0.0	0.1	0.0	29.9
Special D_t/A_{t-1}	92,412	0.01	0.0	0.0	0.0	0.0	102.4
Panel D. Composition of Dividends by Type where D_t>0 (%)							
Ordinary D_t/A_{t-1}	44,509	77.92	100.0	0.0	100.0	0.0	100.0
Mutual Fund D_t/A_{t-1}	44,509	21.79	0.0	0.0	100.0	0.0	100.0
Special D_t/A_{t-1}	44,509	0.30	0.0	0.0	0.0	0.0	100.0

Table 6. Net withdrawals of dividends and total returns: Univariate regressions. OLS regressions of net withdrawals on dividends and total returns. Net withdrawals is equal to household monthly net withdrawals. All data are scaled by household account value in period *t*-1 and expressed in percentage terms. Heteroskedasticity-robust standard errors are in parentheses.

	Linear Regressions			Piecewise Linear Regressions		
	1	**2**	**3**	**1**	**2**	**3**
D_t/A_{t-1}	0.35		0.35	0.77		0.77
	(0.09)		(0.09)	(0.09)		(0.09)
D_t/A_{t-1}* $\{D_t/A_{t-1} > 90^{th}$ Pctle$\}$				-0.44		-0.44
				(0.11)		(0.11)
R_t/A_{t-1}		0.02	0.02		0.02	0.02
		(0.00)	(0.00)		(0.00)	(0.00)
R_t/A_{t-1}* $\{\lvert R_t/A_{t-1}\rvert < 0.025\}$					-0.03	-0.05
					(0.02)	(0.02)
N	92,412	92,412	92,412	92,412	92,412	92,412
R^2	0.0025	0.0005	0.0029	0.0027	0.0005	0.0032

Table 7. Net withdrawals of dividends and total returns: The effect of delayed reinvestment. OLS regressions of net withdrawals on dividends and total returns and 11-month lags of dividends and total returns. Net withdrawals are equal to household monthly net withdrawals. All data are scaled by household account value in period *t*-1 and expressed in percentage terms. Heteroskedasticity-robust standard errors are in parentheses.

	Linear Regressions			Piecewise Linear Regressions		
	1	**2**	**3**	**1**	**2**	**3**
D_t/A_{t-1}	0.35		0.35	0.81		0.80
	(0.09)		(0.09)	(0.10)		(0.10)
D_t/A_{t-1}* $\{D_t/A_{t-1} > 90^{th}$ Pctle$\}$				-0.48		-0.47
				(0.12)		(0.12)
$\frac{1}{11} \Sigma_{s=1 \text{ to } 11} D_{t-s}/A_{t-1}$	0.01		0.01	-0.16		-0.07
	(0.10)		(0.10)	(0.17)		(0.18)
$\frac{1}{11} \Sigma_{s=1 \text{ to } 11} D_{t-s}/A_{t-1}$* $\{D_{t-s}/A_{t-1} > 90^{th}$ Pctle$\}$				0.14		0.07
				(0.18)		(0.18)
R_t/A_{t-1}		0.02	0.02		0.02	0.02
		(0.00)	(0.00)		(0.00)	(0.00)
R_t/A_{t-1}* $\{\lvert R_t/A_{t-1}\rvert < 0.025\}$					-0.03	-0.04
					(0.02)	(0.02)
$\frac{1}{11} \Sigma_{s=1 \text{ to } 11} R_{t-s}/A_{t-1}$		0.00	0.00		0.00	0.00
		(0.01)	(0.01)		(0.01)	(0.01)
$\frac{1}{11} \Sigma_{s=1 \text{ to } 11} R_{t-s}/A_{t-1}$* $\{\lvert R_{t-s}/A_{t-1}\rvert < 0.025\}$					0.03	-0.06
					(0.06)	(0.06)
N	92,412	92,412	92,412	92,412	92,412	92,412
R^2	0.0025	0.0005	0.0029	0.0027	0.0005	0.0032

Table 8. Net withdrawals of dividends and total returns: By household type. OLS regressions of net withdrawals on dividends and total returns and 11-month lags of dividends and total returns. Net withdrawals are equal to household monthly net withdrawals. All data are scaled by household account value in period *t*-1 and expressed in percentage terms. Heteroskedasticity-robust standard errors are in parentheses. Household portfolio value is the average monthly portfolio value. Household net worth and tax rate are self-reported data supplied to the brokerage firm at the time of the opening of the account.

	Household Portfolio Value			Household Net Worth		Household Tax Rate		Household Portfolio Turnover	
	<Median	**>Median**	**>0.5*NW**	**<Median**	**>Median**	**<Median**	**>Median**	**<Median**	**>Median**
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}* $\{D_t/A_{t-1} > 90^{th}$ Pctle$\}$	-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)
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}* $\{\lvert R_t/A_{t-1}\rvert < 0.025\}$	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)
N	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

Table 9. Net withdrawals and the composition of dividends. OLS regressions of net withdrawals on dividends and total returns and 11-month lags of dividends and total returns. Net withdrawals are equal to household monthly net withdrawals. Ordinary dividends are equal to the dividend yield from CRSP (distribution codes distribution codes 1000 through 1999 excluding codes 1262 and 1272) on common stock account holdings at *t*-1. Mutual fund dividends are equal to the dividend yield from the CRSP mutual fund database on mutual fund account holdings at *t*-1. Special dividends are all other dividends. All data are scaled by household account value in period *t*-1 and expressed in percentage terms. Heteroskedasticity-robust standard errors are in parentheses.

	Ordinary Dividends		Mutual Fund Dividends		Special and Other Dividends	
	1	**2**	**1**	**2**	**1**	**2**
D_t/A_{t-1}	0.82	0.71	0.40	0.35	0.75	0.75
	(0.11)	(0.13)	(0.12)	(0.14)	(0.13)	(0.13)
D_t/A_{t-1}* $\{D_t/A_{t-1} > 90^{th}$ Pctle$\}$	0.16	0.16	-0.26	-0.23	-0.46	-0.46
	(0.12)	(0.12)	(0.13)	(0.13)	(0.19)	(0.19)
R_t/A_{t-1}	0.02	0.02	0.02	0.02	0.02	0.02
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
R_t/A_{t-1}* $\{\lvert R_t/A_{t-1}\rvert < 0.025\}$	-0.02	-0.02	-0.04	-0.04	-0.03	-0.03
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
D_{t-12}/A_t		0.13		0.05		-0.08
		(0.09)		(0.06)		(0.04)
N (000)	92.4	92.4	92.4	92.4	92.4	92.4
R^2	0.0023	0.0023	0.0007	0.0007	0.0021	0.0022