Consuming Dividends*

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Abstract:

This paper studies why investors buy dividend-paying assets and how they time their consumption accordingly to anticipated income. We combine administrative bank data linking customers' categorized consumption transactions and income to detailed portfolio and trading data and survey responses on financial behavior. We find that private consumption is excessively sensitive to dividend income. Investors across wealth, income and age distributions increase spending precisely around dividend receipt. Importantly, we find that consumption responses are driven by financially sophisticated investors who select dividend portfolios, anticipate dividend income, and plan consumption accordingly. Our results contribute to the literature on a dividend clientele and provide evidence of 'planned' excess sensitivity.

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1. Introduction

Understanding the determinants behind private consumption and how income and wealth is channeled into the economy is of utmost importance in designing economic stimulus programs and measuring the business cycle and aggregate economy. To that end, a well-established literature has shown that households are prone to consume from both permanent and transitory changes in income (e.g., Shapiro 1995; Souleles, 1999; Parker 1999; Stephens, 2003; Stephens, 2008), and that individual investors consume from stock market wealth, most notably from income generated through dividend-paying assets (Baker, Nagel, and Wurgler, 2007; Di Maggio, Kermani, and Majlesi, 2018).

The life-cycle/permanent income hypothesis (Friedman, 1957) suggests that under traditional assumptions, household consumption should only respond to unpredictable changes in permanent income. In particular, households should not exhibit contemporaneous consumption responses to the receipt of anticipated income but instead smooth any predictable changes in income over the life-cycle. There is, however, abundant evidence of excess sensitivity of consumption: households strongly respond to the arrival of permanent and transitory income.[1] These consumption patterns may be particularly relevant in the stock market, where research has shown that investors consume from dividend income, but much less from unrealized capital gains and losses.[2] Under traditional assumptions that a firm's dividend policy is irrelevant to investors (Miller and Modigliani, 1961), it is difficult to explain these findings and why individuals would tie their consumption to dividend income.

Thus, an important question arising from this evidence is which households react to dividend income and why? Investors may treat dividends and capital gains differently (Hartzmark and Solomon, 2019) and follow mental accounting practices such as a 'consume income, not principal' or 'living off income' rule of thumb (Baker, Nagel, and Wurgler, 2007; Daniel, Garlappi, and Xiao, 2019; Jiang and Sun, 2019). Private consumption may be excessively sensitive to dividend income if households are liquidity-constrained (Zeldes, 1989; Campbell and Mankiw, 1989), or are inert or inattentive (Reis, 2006, Gabaix, 2016). Impulsive investors may select income-generating portfolios as a commitment device to avoid overspending (Shefrin and Statman, 1984; Daniel, Garlappi, and Xiao, 2019; Jiang and Sun, 2019), and forward-looking households may plan specific purchases from various sources of income (Ameriks, Caplin, and Leahy, 2003). While these underlying mechanisms are difficult to pin down empirically, they are also core to policy.

[1] See Olafsson and Pagel (2018) or Parker et al. (2013) for recent surveys of the empirical literature.
[2] Estimates of the marginal propensity to consume (MPC) out of dividends range between 35% and 75%, while between 0% - 13% from capital gains. See Poterba (2000); Baker, Nagel, and Wurgler (2007); Paiella and Pistaferri, (2017); and Di Maggio, Kermani, and Majlesi (2018) for empirical evidence.

Consumption-driven portfolio choice is important for asset pricing (Hartzmark and Solomon, 2013; Daniel, Garlappi, and Xiao, 2019), corporate dividend strategy (Graham and Kumar, 2006; Becker, Ivkovic, and Weisbenner, 2011), and monetary policy (Daniel, Garlappi, and Xiao, 2019; Hartzmark and Solomon, 2019).

In this paper, we examine how individuals consume from dividend income and test the underlying mechanisms behind their consumption patterns using unique data from a large retail bank. Our data consists of individuals living in Germany and features information on customer demographics, monthly account statistics including portfolio holdings, security trading records and, most importantly, categorized current account transactions. We supplement this administrative data with a short survey allowing us to characterize investors' saving and spending behavior in terms of awareness and impulsiveness. The transaction-level data comes from a personal financial management (PFM) tool that classifies customer transactions into various categories of income and spending. One advantage of our setting is that the PFM tool is offered directly from our cooperating bank to all customers, rather than from a third-party provider reducing concerns about representativeness and selection. We use these data to measure investors' contemporaneous consumption responses around days of receiving dividend income from individual portfolio holdings. Our study is among the first to observe both accurate data about investors' portfolio holdings and trades, and data on investors' spending and consumption transactions.

We first find that investors exhibit a clear and marked response to dividend income both in terms of increased consumption (categorized spending transactions excluding regular spending) and increased uncategorized account outflows, which are largely comprised of financial transfers, peer-to-peer transactions, and invoice settlement. Interestingly, we show that for many households the consumption response to dividend income occurs precisely on the day the dividend is received (a 'day-zero' response on the dividend payment day), or in the days immediately *leading up* to income receipt. The day-zero coefficients amount to 6.9% for consumption responses and 10.4% for uncategorized outflows. This implies that investors on average consume approximately 7% more on days when they receive a dividend relative to average daily spending on other days. The magnitude of uncategorized outflow transactions initiated by investors precisely around days of dividend payments further suggests that previously documented consumption responses to dividend payments are likely to be overstated. For example, our results indicate that it is unlikely that withdrawals from brokerage accounts in response to dividend payments largely reflect consumption (Baker, Nagel, and Wurgler, 2007; Daniel, Garlappi, and Xiao, 2019).[3] Aside from

[3] Similarly, our findings might indicate that estimates derived from imputed consumption may be overstated due to measurement errors as highlighted by Baker et al. (2018).

consumption we find perhaps unsurprisingly, that many investors actively reinvest their dividends shortly after they receive them.

What drives this excess sensitivity to dividend payments? Examining the underlying heterogeneity in our sample provides evidence that it is driven by unconstrained, attentive, and sophisticated investors who seem to plan contemporaneous consumption out of dividends. As the day-zero coefficients across specifications are statistically significant across the entire wealth, income, and age distributions, the observed excess sensitivity cannot be entirely attributed to liquidity constraints that underlie traditional explanations of excess sensitivity in buffer stock models (Zeldes, 1989; Deaton, 1991; Carroll, 1997). Nonetheless, we do find that the effects are most pronounced for the young and least wealthy individuals, supporting recent work by Di Maggio, Kermani, and Majlesi (2018) and Olafsson and Pagel (2018). Across regular income quintiles we find that the response is more pronounced in higher income quintiles. This is consistent with Kueng (2018) who reports that the observed excess sensitivity is driven by high-income households. Additionally, investors who receive fewer dividend payments (i.e., one per year) respond most strongly to payments.[4] We also find that middle-wealth groups reinvest large parts of their dividends, and that higher wealth groups react with above average consumption and uncategorized outflows, but do not reinvest a significant fraction of their dividends in the short-run.

One potential explanation of our findings is that the observed spending is driven by naïve investors who, rather than plan spending decisions, are inattentive and let consumption follow income, as suggested in models of rational inattention (e.g., Reis, 2006; Gabaix, 2016). Our setting allows us to shed light on this. If investors perfectly anticipate dividends (i.e., they know the dividend amount and payment date) and intend to consume out of them, then we would expect consumption responses immediately before, on, and after dividend payments. At the other extreme, completely inattentive investors who live hand-to-mouth and are unaware of the timing and size of dividend payments would only consume in the days *after* dividends have reached their account.[5] We find strong evidence of consumption responses in the days leading up to and on the day dividend income is received, pointing towards anticipation rather than inattention as a determinant of the consumption response. We find additional support that the observed effect is driven by attentive investors who plan to consume out of dividends by documenting a pronounced increase in online-banking logins shortly before and on the day of dividend income arrival. Shortly

[4] Unlike the United States, in Germany it is typical that the average firm pays one dividend per year shortly after the annual general meeting for shareholders.

[5] As noted in Reis (2006), inattentive investors infrequently update their information, for example in our setting on the size and timing of dividend payments.

after dividends are paid out, login activity decreases to its normal level. Importantly, this anticipation effect is in stark contrast to the consumption response we find from other sources of permanent and transitory income such as income from normal salary (permanent) and tax returns (transitory).

Finally, we ask subjects in our sample two simple survey questions on their consumption behavior to further aid our understanding of which investors are excessively sensitive to dividend income, and why. This allows us to test if investors who exhibit less financially prudent behavior such as a lack of financial planning and impulsive consumption are more prone to select into dividend-paying stocks and respond to their income, as suggested in the seminal work of Shefrin and Statman (1984). In contrast, our results indicate that impulsive investors are less likely to tilt their portfolios to dividend-paying assets. Investors who react to dividend income by increasing consumption precisely around its arrival, select into a 'financially sophisticated' group. These individuals state that they are less likely than other dividend-investors to engage in impulsive spending behavior and are aware of their spending and savings choices over time and across categories. That the consumption response is driven by these individuals suggests that excess sensitivity to dividend payments does not reflect inattention or 'absent-mindedness' (Ameriks, Caplin, and Leahy, 2004), but rather planned behavior.

One important concern about our finding that investors increase consumption around dividend receipt, is that the effect may be confounded by coincidental timing of income from other sources which investors react to. We address this and related concerns in a number of ways. First, we include a variety of time-related fixed effects throughout specifications to control for consumption and income patterns which could yield a spurious relationship. Second, our setting allows us to investigate how investors respond to dividend income from different types of assets. We find that while the observed effect is the largest for German individual equities, it is statistically and economically significant for foreign stocks and mutual funds which issue dividends at different points throughout the time period. This allows us to partially rule out the concern that our findings may be driven by a spurious relationship in consumption and the non-random timing of dividend payments. Third, we implement a placebo test where we randomly assign placebo dividend payment dates within the same month of actual dividend payments to dividend-investors. We find no significant consumption response on or around these placebo dates. Finally, we match non-investors to dividend-investors and investigate their consumption response on dividend payment dates. Again, we find no significant effect in consumption which may be timed spuriously to potential dividend payment dates.

Our findings have implications for corporate policy and financial markets. First, if retail investors seek dividends for consumption, heterogeneity in dividend policy over time and the cross-section of firms may have a significant first order effect on the composition of shareholders (Graham and Kumar, 2006; Becker, Ivković, and Weisbenner, 2011). Secondly, *changes* in the size and timing of dividend payouts, and more generally in dividend policy, should affect aggregate (and local) consumption if shareholders tie their consumption decisions to their portfolios. In addition, as firms continue to make share repurchases rather than issue dividends,[6] shareholders are affected via capital gains instead of income, and would be less responsive in their consumption decisions. Furthermore, it seems likely that a significant fraction of investors who seek extra-income for consumption will adjust their portfolios accordingly and sort into alternative income-bearing vehicles. The policy relevance of our findings echo recent research documenting investors' demand for dividend-paying assets specifically for consumption (Daniel, Garlappi, and Xiao, 2019; Jiang and Sun, 2019). What is novel, however, is that in our setting, this finding is driven by a different underlying mechanism. While the behavioral patterns that we identify reflect the a similar outcome, i.e., investors seek income-yielding investments, particularly in a low interest rate environment, we do not find support for the hypothesis that this behavior is mainly driven by investors who may lack self-control and attempt to avoid overconsuming (Shefrin and Statman, 1984)). Instead, we think that the most plausible interpretation of the observed pattern is that expenses are planned around income receipt by sophisticated households, and investors use dividend income as a source of extra-income to fund potentially earmarked or extraordinary consumption.

Our results add to the understanding of how private consumption responds to income from investments and contributes to several related streams of literature. First, our paper contributes to studies on the consumption response to permanent and transitory income arrival. In this context, our paper adds to the growing body of literature that uses granular income and spending data from PFM tools. Closely related to our paper are Gelman et al. (2014) and Olafsson and Pagel (2018) who both document significant contemporaneous consumption responses around income receipt. In contrast, we focus specifically on dividend income and individuals with relatively high wealth (stock market participants). Also related to our paper is Parker (2017) who analyzes spending responses to stimulus payments and finds a strong positive relationship between spending and a lack of sophistication and financial planning. In general, our findings suggest that while unsophisticated households also are sensitive, financially sophisticated investors drive a day-

[6] A large literature examines the nature of share repurchases and their effect on firms and shareholders, (e.g., Brav et al. 2005; Almeida, Vyacheslav, and Kronlund, 2016; Manconi, Peyer, and Vermaelen, 2018). The news media, particularly in the US, has been vocal about the increased shift towards share repurchases or stock buybacks (e.g., Lazonick and Jacobson, 2018; Evans and Ponczek, 2019; Cox, 2019).

zero effect of consumption from dividend income. The observed consumption response is driven by investors anticipating dividend payments and planning to consume out of them.

Our paper is also closely related to Kueng (2018), who similarly uses transaction-level data from a PFM tool and analyzes the welfare implications of excess sensitivity of consumption to dividend payments. His analyses focus on payments from a single security, i.e., the Alaska Permanent Fund, which pays out highly predictable dividends every year in October to most Alaskan households. He finds that households strongly respond to the fund's dividend, especially in the month of the payment. Our results generally support Kueng's (2018) findings, however, our setting is different. Specifically, we expand upon this work by focusing on dividend payments from various securities, including both stocks and funds from domestic and foreign assets, which provide income at different times throughout the year allowing investors to generate various income-streams from dividends. Also, these dividends entail substantially more uncertainty with respect to dividend size and payment date as compared to Permanent Fund Dividend payments.[7] In addition, we use a survey module to understand the underlying mechanism behind our results. Finally, we focus on a sample of investors who are potentially more representative of the higher income households in Europe and the United States.

We also contribute to the literature on how stock market wealth is connected to household consumption. Early work has used aggregate data (e.g., Poterba, 2000; Carroll, Otsuka, and Slacalek, 2011), survey data (e.g., Dynan and Maki, 2001; Paiella and Pistaferri, 2017), and brokerage data (Baker, Nagel, and Wurgler, 2007) to document a robust correlation between consumption and stock market wealth. Recent work by Di Maggio, Kermani, and Majlesi (2018) exploits comprehensive administrative data on the universe of Swedish residents and observes detailed household income and wealth data, including year-end portfolio holdings, overcoming limitations in previous studies including representativeness and unobserved portfolio holdings. However, a challenge with annual data is the absence of consumption (and investment) transactions. Indirect measures of consumption, i.e., imputed consumption, may induce measurement error (e.g., Baker et al., 2018), and it is impossible to study the consumption response around specific dividend payment days with annual holdings information. Our work is most closely related to and motivated by these papers which document that investors strongly respond to dividend income but much less to unrealized capital gains. For instance, Baker, Nagel, and Wurgler (2007) report a marginal propensity to consume (MPC) out of dividends of 75% while they do not find a significant MPC out of unrealized capital gains. Similarly, Di Maggio, Kermani, and Majlesi (2018) find an MPC out

[7] See, for example, Chen, Da, and Priestley (2012) and Rangvid, Schmeling, and Schrimpf (2014) for evidence on dividend predictability.

of dividends of 35% and an MPC of 5-13% out of unrealized capital gains. In a similar vein, Meyer, Pagel, and Previtero (2019) investigate how consumption responds to realized capital gains from mutual fund liquidations and estimate an MPC similar to documented MPCs out of dividend income. Relatedly, Loos, Meyer, and Pagel (2019) find similar MPCs in their investigation of the effect of a capital gains tax reform in Germany on individuals' consumption and investment behavior. While these recent works suggest that MPCs out of realized gains and dividends can be large and of similar magnitude, we highlight the channel through which income from stock market wealth translates into consumption is different. Specifically, investors may *plan* to consume out of sources of stock market income such as dividends. This is unlikely to be the case for unexpected events such as mutual fund liquidations or changes in tax requirements.

Finally, we also add to literature describing a dividend clientele (Black and Scholes, 1974; Allen, Bernardo, and Welch, 2000; Graham and Kumar, 2006). Our results provide evidence that certain types of investors may be drawn to certain types of assets, and support previous work finding that concentrated holdings among retail investors have significant implications on financial products and financial innovation (Campbell, 2006), corporate policy decisions (Becker, Ivković, and Weisbenner, 2011), and financial markets (Daniel, Garlappi, and Xiao, 2019). Our analysis provides micro-evidence that investors who construct portfolios tilted towards higher dividend yields are those who exhibit the strongest (contemporaneous) response to dividend payments in their daily consumption behavior. Investors in our setting 'reach for income' (Daniel, Garlappi, and Xiao, 2019; Jiang and Sun, 2019), and follow the adage to 'consume income, not principal' (Baker, Nagel, and Wurgler, 2007; Hartzmark and Solomon, 2019). However, our results do not necessarily suggest that this planned-consumption channel is driven by individuals with self-control problems who prefer dividend-paying stocks as a commitment device to avoid overconsuming (Shefrin and Statman, 1984).

The remainder of the paper is organized as follows: Section 2 describes the dataset and presents summary statistics of the sample. Section 3 explains our empirical design used to identify consumption responses. Section 4 presents results on investors' consumption responses around days of dividend payments, focusing on the drivers of the observed excess sensitivity and analyzing heterogeneity in consumption responses among investors. Section 5 concludes.

2. Data and summary statistics

2.1. Data

We cooperate with a large German bank that offers the full range of retail banking services. The bank provides us with comprehensive data that includes customer demographics, account

statistics, security transactions and, most importantly, categorized current account transactions. Transaction-level data comes from a PFM tool offered at the bank. We draw on a random sample of 88,098 bank customers who activated the PFM tool in years prior to our analysis. The tool categorizes customers' transactions into different categories of outflows and inflows. In Germany, it was launched within the bank's online-banking environment at the end of 2014 and is provided free to customers. While the tool's functionalities are comparable to financial applications such as Mint.com the major difference is that the PFM tool in our setting is part of the online-banking environment and not offered by a third party, which potentially improves sample representativeness. In fact, customers at the bank can activate the PFM tool with one click in the online-banking environment, without creating an account, disclosing additional (private) information, or linking external bank accounts. Another advantage of this setting is that even if the investors in our sample do not actively use the PFM, but simply accepted the terms of the bank at the onset of the program, they remain in our dataset with full information. Unlike existing studies using bank or brokerage data, we need not rely on proxies for consumption. Instead, the categorization feature of the PFM tool provides us with direct measures of consumption (discussed in detail in the following section).

Customer demographic information include age, gender, marital status, employment status, ZIP code region and a proxy for overall household wealth. Data also include information on banking relationships such as length of relationship, number of branch visits during the last 12 months, information on types of banking products used, and the bank's internal credit score.

Finally, we observe monthly financial balances of customers' deposit accounts (debits), securities accounts, and debt holdings. We define household wealth as all assets deposited at the bank including checking accounts, term accounts, savings product balances and securities accounts. Net wealth is defined as total assets deposited at the bank less credit balances. Also, we observe logins to the bank's online-banking platform and the PFM. Log-in data is available from end of 2016 until end of October 2017. Further, we observe end-of-month portfolio holdings as well as individual trading records enabling us to accurately identify dividend income and other income from investments. Holdings and trading data are available from January 1st 2017 until December 31st 2017, thus restricting our sample period to the year 2017 during which we observe full details on both consumption as well as dividend income.

Our complete sample spans over the year 2017 and includes 88,098 customers who activated the PFM tool before 2017. 12,579 of those customers are investors who own risky assets and have a positive portfolio value in at least one month during the sample period. Our main sample is composed of investors who receive at least one cash dividend from dividend-paying

stocks and/or funds during the sample period ("dividend-investors"). To measure the timing and size of income from dividends we combine data from the PFM tool with dividend payment dates from Datastream. That is, for each investor we only flag those days as dividend-income-days on which investors receive dividends according to Datastream payment dates (matched to ISIN-level portfolio holdings), and which have a positive inflow in the corresponding sub-category of the PFM tool labeled "Dividends/Interest/Distributions." This conservative criterion allows us to precisely estimate dividend income and minimize potential measurement error due to misclassification in the PFM tool or in Datastream's dividend payment date information. To measure the size of dividends received, we use inflows within the corresponding sub-category of the PFM tool. Thus, we measure what investors actually receive rather than relying on measures provided in external data (i.e., dividends per share, dividend yield, etc.), which are likely to be overestimated given taxes to capital gains, automatic reinvestment plans, or any other additional brokerage fees and commissions. Our methodology may still be subject to measurement error in the event of coincidental timing between dividend income and other income attributed to the same sub-category on the very same day, such as interest payments. However, this appears to occur infrequently and is unlikely to systematically bias our estimates of received dividend income in any relevant way.

We further restrict our analysis to investors with at least 12 consumption days during the sample period (on average one consumption transaction per month) yielding a final sample of 10,339 dividend-investors who receive at least one dividend payment within the sample period. The remaining group of 2,240 investors constitutes individuals who do not receive any income from dividend-paying stocks or funds according to our definition. It is important to note, however, that these investors may indeed own dividend-paying stocks or funds, but do not receive cash payments from these securities (potentially due to the company paying the dividend in the form of stock rather than cash, or due to automatic reinvestment plans setup with the bank).[8]

2.2. Personal financial management and consumption

The transaction-level data from the PFM tool includes the transaction date, the amount, and the assigned category of each inflow and outflow. The PFM's algorithm automatically allocates transactions into 13 main and 88 sub-categories for each transaction. Categories are defined based on classifications typically used by governmental statistic organizations, in our case the German National Bureau of Statistics.

[8] These individuals indeed constitute a group of interesting and relevant investors; however, they do not create a valid counterfactual group for comparison. As such, the bulk of our empirical analyses will present within-dividend-investor-results over the days on, after, and leading up to the receipt of dividend income.

Spending categories include living (e.g., groceries and clothing), housing (e.g., furniture), leisure (e.g., restaurants, bars, sports activities, and holidays), mobility (e.g., fuel and public transportation), health (e.g., pharmacy and hospitalization), children (e.g., children's clothing and toys), occupation and education (e.g., training programs and tuitions), expenses related to various types of insurance or credit contracts, and cash withdrawals. Income categories include regular income such as salary, pension, rental income and other types of income such as tax refunds, bonus payments, cash deposits, children's allowances and other government subsidies, as well as dividend income and other investment income.

Our main dependent variable of interest, consumption, includes non-recurring outflow transactions. Recurring outflows such as rent, subscriptions, mortgage payments, insurance premiums or debt payments constitute regular spending. Thus, we focus on active, self-initiated purchases and ensure that consumption responses are not driven by coincidental timing of recurring payments and dividend income.[9]

If a transaction cannot clearly be allocated to one category, it is labeled as uncategorized and is left for manual allocation by the user. A large share of these uncategorized transactions are peer-to-peer transactions, but they need not be. In many cases they constitute payments or transfers to a retailer or party unknown to the algorithm. As such, settling invoices such as medical expenses and other bills make up a large part of uncategorized outflows. Since each customer exhibits different spending patterns, uncategorized outflows are also very heterogeneous among customers. It is thus difficult to approximate what fraction of uncategorized outflows represents consumption. In our analyses we therefore exclude uncategorized outflows from our consumption variable and investigate them separately in additional analyses. During the sample period, about 35% of the observed outflow transactions are uncategorized.

Since we are interested in the contemporaneous, or immediate consumption response of investors to income, we have to tackle an issue related to the difference between a transaction's booking date and a transaction's value date. In particular, date stamps of the transactions we are provided with represent value dates. Thus, dates stamps of transactions that we define as consumption in some cases do not coincide with the dates when the consumption actually occurred. Instead, actual consumption dates are represented by booking dates which we unfortunately do not observe. Since the length of the delay between actual consumption and date stamps that we observe depends on the specific type of transaction, we cannot identify the exact delay for transactions within consumption categories. However, based on discussions with the

[9] Relatedly, Vellekoop (2018) shows that households significantly increase consumption after commitments are paid, i.e., in response to large recurring outflows such as rent expenses.

cooperating bank, there does not appear to be any systematic bias in transaction delays. The majority of transactions have the same booking and value dates, while some have a value date up to two days after actual consumption occurred. In addition, the PFM tool does not record transactions on Saturdays or Sundays which further delays some transactions by two days.[10]

The aforementioned issue is not a problem for our variable of interest, dividend income, since in this case value dates represent the actual days that the income arrived at an investor's account (and are cross-verified with Datastream dividend payment dates). Additionally, dividends in Germany are only paid out during weekdays. All of our following analyses are based on daily income and spending records covering 260 weekdays during the sample period (year 2017) for each investor in the sample.

2.3. Summary statistics

We compare descriptive characteristics of our main sample of dividend-investors to other investors who do not receive any type of income from investments during the sample period according to our definition outlined earlier. As noted before, the latter group consists of investors without dividend-paying assets, those who receive a non-cash dividend, or those who have automatic reinvestment plans. Additionally, some of these investors might hold these assets at month-end but not on the relevant date to be eligible for dividends, leading to an upward bias in the portfolio value of dividend assets that are measured at the end of a month.

A. Demographic characteristics and financial assets

Table 1 provides summary statistics of our entire sample across the distribution and compares mean values of dividend-investors with non-dividend investors as described previously. We find that dividend-investors are on average substantially wealthier in terms of risky assets and non-risky assets deposited at the bank. They are on average older, more likely to be married and retired, and have longer relationship with the bank. Panel C of Table 1 additionally highlights differences in portfolio characteristics among dividend-investors and other investors. Dividend-investors invest a larger fraction of their portfolios into equities, particularly stocks and funds, and less into exchange-traded funds (ETFs). They are more diversified in terms of the number of stocks and funds they hold yielding a lower Herfindahl-Hirschman Index (HHI),[11] but less diversified in terms of global diversification. Specifically, the average share of stocks and assets with a German

[10] This implies that transactions which occur on a Friday and have an average difference of one day between booking and value date are shown to us with a Monday date stamp. As a result, depending on the timing of the transaction during the week, some transactions are further delayed by up to two days.

[11] The HHI describes the degree to which a portfolio is diversified across a larger number of assets and is defined as the sum of squared portfolio weights. A smaller value indicates higher diversification. For more information see, e.g., Blume and Friend (1975), and Dorn and Huberman (2005).

investment focus in the portfolios of dividend-investors (other investors) amounts to 40% (21%). Dividend-investors also trade more often (on average 9.9 trades per year) than other investors (on average 6.2 trades per year).

B. Consumption

In Table 2, Panels A, B, and C describe the distribution of various spending categories including our consumption variable for our main sample of dividend-investors. We average all monthly outflow categories over the year 2017 for each investor. The distributions of resulting monthly averages are presented in the table. The average (median) consumption per month amounts to €1,694 (€1,320). These numbers are higher as compared to monthly spending of Icelandic households that use a PFM tool, as reported in Olafsson and Pagel (2018), which is consistent with our sample focusing on investors who participate in risky asset markets and are likely to be in the top half of the wealth distribution. The 5th (95th) percentile of the distribution amount to €268 (€4,122) per month indicating that there are investors who consume low (high) amounts during a typical month. Given this large heterogeneity among investors and potential outliers on the right tail of the distribution that might bias results. We address this in two dimensions in our main analyzes, by winsorizing at the top of the distribution, and by reporting our results as the deviation from an individual's average daily spending rather than in levels (discussed further in Section 3). Panel A of Figure 1 plots the distribution of regular spending and consumption over a month. In line with expectations, regular spending typically occurs beginning-of-month with a second peak in the middle of a month. Consumption is rather evenly distributed over a month with more consumption days occurring during the middle of a month.

C. Dividend income

Panel D of Table 2 shows the distribution of several sources of income in our main sample. Again, the table presents distributions of monthly investor-averages. The average (median) regular income per month amounts to €4,343 (€3,297).[12] Again, these numbers are higher as compared to the average monthly salary of $2,701 reported in Olafsson and Pagel (2018). This again reflects differences in household characteristics among stock market participants as compared to non-participants. 89% of our sample receive any kind of regular income on the observed bank accounts. Conditional on receiving a regular income, the 5th (95th) percentile of the distribution amount to €777 (€12,587) per month showing that there are investors who earn low (very high) monthly income. Our main variable of interest is dividend income. We find that investors receive on average

[12] Besides salary, regular income includes government aid (e.g., child allowance and social security benefits) and rental income.

€121.8 *per month* from dividends. 75% of investors receive 6 or less dividend payments per year with an average of 5.1 dividends per year, which is skewed to the right by some investors who receive more than 18 dividends per year. When looking at conditional dividend income, we find that the average (median) investor receives €266.9 (€113.8) *per dividend*. The median investor receives around €230 per year from two dividends. On the right tail of the distribution of dividend income, we find that more than five percent of investors receive more than approximately €485 (€5,800) per month (year) from dividend income. Again, we ensure that these potential outliers are not driving our results (discussed further in the following section). These statistics further suggest that our analyses provide economically relevant information as they are not based on small-sized dividends from a sample of low-wealth households.

Panel B of Figure 1 plots the distribution of regular and irregular income over a month. As expected, regular income such as salary by and large occurs at the end of the month. Irregular income such as tax refunds are more evenly distributed with a spike towards the end of the month. This distribution differs somewhat from Olafsson and Pagel (2018) who observe a large spike at the beginning of the month for regular income. Looking at dividend income, Panel C shows that there is no clear pattern in the distribution of dividend payments over a month. That is, there are no specific days when dividends are typically paid out during a month such as at the end of a month when regular income arrives. Instead, dividend payments seem to be distributed evenly over a typical month. This ensures that our findings are not largely influenced by coincidental timing of dividend income and regular or other income as well as by coincidental timing of dividend income and consumption. There is, however, a clear spike in the distribution of dividend income when looking at the months that sample investors receive dividends (shown in Panel C of Figure 1). Given that the portfolios of our German sample investors are tilted towards their home country (see Table 1), most investors receive dividends in May. In this month most of the big German companies, that are part of the leading market index in Germany (DAX-30), organize their annual general meetings after which dividends are paid out. Due to investors' tendency to overweight familiar assets and the resulting similarity of investor portfolios, many of the dividend payments we observe affect a large number of investors.[13] Nevertheless, we observe dividend payments on 251 days out of the 260 weekdays that are included in our time-series over the year 2017. That is, only on 9 days during the sample period we do not observe any dividend payments.[14]

[13] For instance, the five most commonly held assets in our sample pay out dividends to approximately 40% of all investors in 2017.

[14] Of the 30 companies that constituted the DAX-30 index in 2017, 18 companies paid out dividends in May. Three (four) companies paid out dividends in March (April), while the remaining four companies paid out dividends in June.

In sum, when analyzing the consumption response to dividend payments in our sample of dividend-investors it is important to note that this will lead to a sample of wealthy, high-income and high-consumption individuals, who are perhaps more representative of the upper half of the wealth distribution when being compared to investors in other bank/brokerage data sets (e.g., Barber and Odean, 2000; Dorn and Sengmueller, 2009; Bhattacharya et al., 2012). It also suggests that the effects we find are unlikely to be negligible in terms of their economic significance since sample investors' wealth is comparatively high.

D. Dividend clientele

In Table 3, Columns 1-3, we further investigate the cross-sectional determinants of investing in dividends by estimating logistic regressions where the outcome variable takes the value of one if the investor is defined as a dividend-investor. Results are consistent with observed differences in means between dividend-investors and other investors and generally supportive of Graham and Kumar (2006), who find that older and lower-income households prefer dividend-paying stocks. In Column 1 we start with a basic set of demographic controls and add additional variables to the specifications in Column 2 and 3. In general, we note that relative to the full sample of investors, men are slightly less likely to fall into our definition of dividend-investors. Older investors who have higher levels of wealth and invest locally (as noted with the home share) are more likely to be dividend-investors.

When we focus on the sample of dividend-investors and consider the intensive margin of portfolio allocation to dividend-paying assets we find interesting results. In Columns 4-6 of Table 3 we specify logistic regressions where the dependent variable equals one if an investor has an above median ratio of total (yearly) dividend income to portfolio value. Columns 4-6 show that investors who receive a higher amount of dividend income for each euro invested into risky assets are older, more likely to be female, retired, less wealthy, and tend to earn a higher income, which differs somewhat from Graham and Kumar (2006). These investors also trade less and invest a larger fraction of their portfolios into German assets as compared to investors who receive less dividend income as a fraction of their portfolio size.

3. Empirical strategy

We study an investor's contemporaneous consumption response on the days surrounding dividend payments. To do so, we follow Gelman et al. (2014) and Olafsson and Pagel (2018) and use the following regression framework as our baseline equation

$$Y_{it} = \sum_{k=-7}^{7} \beta_k I_i(Dividend_{t+k}) + \delta_{dow} + \phi_{wom} + \psi_{my} + \eta_{holiday} + \theta_i + \epsilon_{it}. \quad (1)$$

Our dependent variable Y_{it} is calculated as follows. We first create a balanced panel for each investor in our sample and sum up daily consumption per individual. On days without an outflow transaction, we set household consumption to zero. We then calculate the average daily consumption of each individual *i* by dividing total consumption by the number of weekdays during the sample period. Y_{it} is then computed as the consumption of individual *i* on day *t* divided by average daily consumption of individual *i*.[15] δ_{dow}, ϕ_{wom}, ψ_{my} and $\eta_{holiday}$ are day-of-week fixed effects, week-of-month fixed effects, month-of-year fixed effects, and holiday fixed effects, respectively. θ_i are individual fixed effects which absorb time-invariant heterogeneity across the sample. Our variable of interest $I_i(Dividend_{t+k})$ is an indicator that equals one if investor *i* receives a dividend payment at time $t+k$, and is equal to 0 otherwise. The coefficient, β_k, therefore measures the fraction by which an individual's consumption deviates from average daily consumption in the -7 to +7 days surrounding the receipt of dividend income. The day-of-week dummies capture within-week patterns for both income and consumption, while the week-of-the-month fixed effects and month-by-year dummies control for cyclical patterns within each month and over the year. Holiday fixed effects comprise two indicators that equal one on bank holidays and, respectively, on the days after bank holidays. It is important to account for bank holidays as the PFM tool does not record any transactions on these days. The majority of such transactions are recorded the day after bank holidays.[16] We cluster robust standard errors at the individual level.

4. The consumption response to dividend payments

The starting point of our main analysis is to investigate an individual's active response to dividend income across various measures of consumption. We present coefficients from linear regressions as described in equation (1) graphically in Figure 2. Figure 2 shows the percentage deviation from average daily consumption in Panel A, and average daily uncategorized outflows in Panel B. The *y*-axis is the size of the coefficient and the *x*-axis shows the 14 days around dividend payments that occur on date t = 0 ("day-zero"). Coefficient estimates for the day of dividend payments are referred to as day-zero effects or day-zero (coefficient) estimates. It is important to note, however, that day-zero coefficients may also reflect consumption that has occurred 1 or 2 days before day-zero, since the dates of transactions we observe do not always reflect the actual

15 Note that this computation methodology also includes days where no consumption occurs.

16 This mechanically leads to an exceptionally large amount of spending transactions on days after bank holidays, which might bias our estimates. Our results are virtually unchanged when including non-bank holidays as well. That is, we do not find that non-bank holidays affect consumption in any systematic way that would bias our estimates.

consumption date (as noted in Section 2). The figure illustrates that investors exhibit a clear response to dividend payments both in terms of increased consumption and increased uncategorized outflows. The day-zero coefficients amount to 6.9% for consumption responses and 10.4% for uncategorized outflows. This implies that investors on average consume almost 7% more on a day which they receive a dividend and initiate 10.4% higher uncategorized outflows as compared to a usual day, most likely reflecting peer-to-peer transactions and various expense payments. At the mean, our estimates imply that individuals consume slightly more than their average daily spending (about 6 euros) and are likely to reflect a change at the intensive margin rather than inducing ad-hoc shopping trips. However, we note that there is large heterogeneity across the sample. Lower wealth groups spend substantially more on payment days as compared to what they normally spend. For instance, with an average daily spending of 62 euros the lowest wealth group spends around 11 euros more than usual on dividend payment days. In relative terms this is significant given that these individuals receive on average 47 euros per dividend and around 2 dividends per year, suggesting that per dividend, investors actively consume more than 20% of it, on the day which it was received. The economic magnitude is also in line with previous literature studying other sources of income such as Parker (2017) and Olafsson and Pagel (2018) who find that the contemporaneous consumption response to *regular income* arrival is about $30.

For a more comprehensive picture of how investors react to dividend income, we also test for abnormal reinvestment activity on the days around the arrival of dividend income. To do so, we adjust the dependent variable Y_{it} in our baseline equation (1) and define it as the ratio of individual *i*'s risky asset purchase volume on date *t* to his or her average daily purchase volume. Perhaps unsurprisingly, we find that many investors actively reinvest their dividends shortly after they receive them. Figure 3 displays coefficient estimates of model (1) where the dependent variable is the ratio of investor *i*'s purchase volume on day *t* divided by his or her average daily purchase volume on the *y*-axis, thus measuring the percentage deviation from average investment. We find that investors purchase between 50-80% more than they do on an average day shortly after receiving a dividend. Of course, this effect might not necessarily reflect dividend reinvestment since it takes into account all kinds of investments including those not funded by received dividend income. Since the effect, however, is concentrated within the days after dividend receipt, it is likely that effects are driven by at least partial dividend reinvestment.

Existing theoretical and empirical evidence has shown that investors from different wealth groups exhibit heterogeneous consumption responses to various sources of income (Stephens, 2003; Stephens, 2008; Di Maggio, Kermani, and Majlesi, 2018). We therefore investigate spending and reinvestment responses across the wealth distribution of our sample. In Figure 4 we plot

consumption responses, uncategorized outflow responses, and (re)investment around days of dividend payments for wealth quintiles. Table 4 provides the corresponding coefficient estimates and statistical significance levels for consumption responses. Consistent with Olafsson and Pagel (2018), we find that the lowest wealth quintile exhibits the strongest response both in terms of an increased consumption and increased uncategorized outflows at the day that dividends are paid out. The corresponding coefficient estimates amount to 18.1% and 34.3%, respectively, implying 18.1% (34.3%) increase in normal consumption (uncategorized outflows) on dividend payment days. In terms of consumption, wealth quintiles 2-5 also react with greater than average consumption on payment days but substantially less than the lowest wealth group, with coefficient estimates ranging from 7.1% (quintile 2) to 5.1% (quintile 4). On the contrary, we find a clear pattern for dividend reinvestment: middle wealth groups 2-4 display substantially higher coefficient estimates in the reinvestment specification with wealth group 3 investing more than three times as much on days after dividend payments as compared to other days (see Panel C of Figure 4). We conclude that the lowest wealth quintile responds most strongly to dividend payments with increased consumption, both in terms of statistical and economic significance, while middle wealth groups reinvest large parts of their dividends. Higher wealth groups also react with above average consumption and uncategorized outflows but do not appear to reinvest a large fraction of their dividends in the short-run consistent with dissaving of elderly households.

A concern about the large day-zero effect we find could be that our results are confounded by coincidental timing of dividend income and other sources of income. The various time fixed effects should fully absorb this, however to further test and address this concern we conduct a variety of placebo tests. First, we estimate model (1) using randomly assigned placebo dividend payments and investigate the consumption response around these days. For each investor and dividend receipt date in our main sample of dividend-investors, we replace the actual dividend payment date with a randomly generated payment date within the same month of the actual payment.[17] Panel A of Figure 5 plots the results of this exercise. It becomes apparent that investors do not react with more than usual consumption on placebo dividend payment dates. Second, we investigate the consumption response of *non*-investors on precisely the dividend payment dates that we observe for our main sample of dividend-investors. Since the two groups of individuals differ substantially along several characteristics such as age, wealth, income and consumption we first construct a group of non-investors that are comparable to dividend-investors along observable dimensions. We conduct a one-to-one nearest-neighbor propensity score match using Coarsened Exact Matching (CEM, Iacus, King, and Porro, 2012). CEM restricts the matching procedure in a

[17] For instance, if an investor receives a dividend on May 15th 2017, we first generate a random number between 0 and 31 and replace the actual payment day with the randomly generated day in May 2017.

way that only individuals are matched that fall within the same parameters of the specified characteristics.[18] After matching, both groups are highly comparable across characteristics such as age, wealth, income and consumption.[19] Panel B of Figure 5 shows the consumption response of non-investors on days that their matched counterpart of the dividend-investor group receives dividend payments. We do not observe any significant spending responses. The results from these placebo tests suggest that our results are unlikely to be spuriously driven by confounds in dividend income and other sources of income.

4.1. How do investors consume dividend income?

One novel element of our setting is that the PFM tool provides detailed information on consumption categories. Therefore, we investigate what types of consumption underlie the observed increase in consumption from dividend income. Table 5 states the consumption response from dividends, i.e., coefficient estimates from specification (1), for different consumption categories: living, leisure, housing, mobility, internet purchases, and cash withdrawals. For comparison, the table again includes the baseline uncategorized outflows. We find that most pronounced responses occur before and, more strongly, on the day of dividend receipt in the categories living, leisure, mobility, and cash withdrawals. We do not find any significant responses in the categories housing, which primarily includes durable spending (e.g., furniture), and internet purchases. The strong day-zero coefficient in the category mobility of 11.7%, that is similar to the respective estimate for uncategorized outflows, is surprising. This category includes expenses for refueling, taxis, local public transport, and any expenses related to cars including purchases of cars. In unreported results, we find that the effect is mainly driven by expenses in the sub-category "car". Unfortunately, we are currently not able to further investigate the patterns behind this effect since we do not see the exact type of expense, for example whether it is driven by some people actually buying a new car or making major adjustments to their cars shortly after receiving dividends. Insignificant estimates within the category internet, which includes online-shopping at e-commerce marketplaces (e.g., Amazon), as well as transactions via PayPal, are not surprising within our sample

[18] We match individuals that are of the same gender, and within the same group of the following bins: wealth in euros (0-25; 25-50; 50-100; 100-150; 150+), age in years (18-35; 35-50; 50+), regular income in euros (0-0.5; 0.5-1; 1-2.5; 2.5-5; 5+), regular income in April 2017 in euros (0-2; 2-6; 6-10; 10+), banking relationship length in years (0-5; 5-10; 10-15; 15+), and monthly logins (0-1; 1-4; 4-8; 8+). All euro values are denoted in 1,000s ('000).

[19] Figure A.1 in the Online Appendix shows the wealth, income, consumption, and age distribution of dividend-investors and the matched group of non-investors, highlighting that both groups are highly comparable across these characteristics. Importantly, Panel B of Figure A.1 illustrates that both groups have very similar income patterns with respect to the timing and size of income (regular and irregular income excluding dividend income) over the year 2017. If our effects were driven, for instance, by coincidental timing of dividend income and other income, we would expect that the matched group of non-investors also reacts on the observed dividend payment dates.

as we observe relatively few expenses within this category.[20] In unreported results, however, we find that the lowest wealth group, represented on average by comparatively younger individuals who may be more inclined to purchase items online, exhibit relatively strong spending responses in the days around dividend payments within this category (coefficient estimates of around 30%).

Overall, our analysis of how investors consume out of dividends suggests that the observed response largely reflects greater consumption on nondurables around days of dividend payments. Investors appear to use dividend income for daily consumption. This is inconsistent with standard theory and consumption smoothing.[21]

4.2. Why do investors exhibit excess sensitivity to dividend payments?

We have thus far provided evidence that investors' consumption is sensitive to the arrival of dividend income. A natural question to ask is what drives this observed excess sensitivity to dividend payments? To answer this question, we investigate a number of potential mechanisms. First, we analyze the heterogeneity of consumption response across several observable investor characteristics and evaluate the relative importance of financial constraints as an underlying mechanism. Liquidity constraints are one of the leading explanations in traditional models of consumption behavior such as the permanent income hypothesis and buffer stock models (e.g., Zeldes, 1989; Caroll, 1997). Second, we ask whether consumption responses are in line with rational inattention models and thus can be explained by the behavior of 'inattentive consumers' (Reis, 2006). Particularly, the model of Reis (2006) predicts that individuals respond to dividend payments at the day of the payment or thereafter if they could not foresee upcoming payments at their last planning date. For those individuals, dividend payments represent rather unpredictable events that would lead to consumption responses at individuals' next planning dates or instantaneous reactions if the payments are extraordinary and thus attention-grabbing. Third and relatedly, by matching survey responses to our main sample of investors, we test whether a lack of awareness about one's own spending and savings behavior, i.e., 'absent-mindedness' (Ameriks, Caplin, and Leahy, 2004), and the tendency to spend impulsively, as proxies for self-control, add to the explanation of excess sensitivity. Particularly, we use these survey questions to investigate if an individual's propensity to exhibit financially prudent spending behavior is associated with less pronounced spending responses.

[20] We note that in Germany online-shopping or the use of services such as PayPal as well as online-banking or mobile-banking usage are still substantially less common as compared to the United States. Cash payments still make up the largest part of payments in Germany.

[21] As Kueng (2018) notes, significant spending responses on durables might not necessarily reflect deviations from standard theory (i.e., deviations from consumption smoothing).

A. Liquidity constraints and investor characteristics

To test whether excess sensitivity is more prevalent among liquidity-constrained households we estimate our main model (1) separately for each quintile across several investor characteristics and analyze the day-zero coefficients. First, in Table 6 we analyze investor characteristics, while Table 7 focuses on measures of liquidity constraints. Each coefficient represents a separate regression analyzing the response to dividend income conditional on an investor's inclusion into a quintile of the specified investor characteristic. For brevity we only report the day-zero coefficients as they are most pronounced across the majority of specifications. In the table we highlight estimates within each group with the largest effect for a specific observable characteristic. For example, looking at the age distribution, we find that younger investors exhibit the strongest day-zero response (coefficient estimate of 15.9%). Coefficient estimates of other age groups range from an insignificant estimate of 4.0% (quintile 2) to a significant estimate of 6.2% (quintile 5).

The first result we wish to highlight in Table 6 is across quintiles of regular income. Surprisingly, we find that the day-zero response is most pronounced in the middle and 4th income quintile. These groups of investors are unlikely to be largely represented by liquidity-constrained investors. While unreported, we note that investors in the lowest (highest) quintile of regular income also react to dividend payments, but less strongly and typically after (before) dividend payments. This may suggest that higher-income individuals are more aware of their dividend payments than low-income investors and spend dividend income already before its arrival, while low-income individuals only react after income arrival.

Turning to characteristics on investors' portfolios, we note that investors in the highest quintile of dividend income respond most strongly (day-zero effect of 9.8%), although this response is not markedly higher as compared to investors who receive lower dividend income (the day-zero effect in the second quintile amounts to 7.7%). However, looking across the distribution of dividend income scaled by regular income or portfolio size reveals a more pronounced pattern. Investors for whom dividend income represents a larger fraction of regular income respond more strongly than other investors with coefficient estimates of 10.8% in the 4th quintile and 9.5% in the 5th quintile. Furthermore, heterogeneity in the consumption response between investors in the highest quintile of dividend income scaled by portfolio value and other quintiles are even more pronounced. Specifically, investors who maximize dividend income for each euro invested into risky assets consume 16.0% more on the day of dividend payments as compared to usual spending. Coefficient estimates in other groups range between an insignificant estimate of 1.9% (i.e., a day-zero non-response in the 3rd quintile) and a significant estimate 7.4% (4th quintile). On one hand,

these findings differ from Kueng (2018), who finds that excess sensitivity "declines monotonically in the relative payment size [dividend income scaled by current income]". On the other hand, they are consistent with Daniel, Garlappi, and Xiao (2019) and Jiang and Sun (2019) who suggest that individuals buy dividend-paying assets, especially during low-interest-rate environments, because they 'reach for income' specifically for consumption. Our results support this idea and provide micro-evidence that investors who construct portfolios tilted towards higher dividend yield, also exhibit the strongest (contemporaneous) consumption response. However, we do not find support for the authors' suggestions that individuals, especially older and low-income households, treat labor income and dividend income as close substitutes and live off their investment income, as we do not find that these groups of investors react more strongly in our sample.[22] In addition, Tables 2 and 3 suggest that the tendency to hold high-dividend-yielding portfolios is associated with higher income, contrary to the interpretation of a substitution-effect.

From January 2017 to the end of October 2017 we observe online-banking login data for our main sample. We do not find a clear pattern in the size of the consumption response across the distribution of login activity except for the fact that investors who log in rather infrequently do not exhibit day-zero responses. In unreported results we examine the timing of the response and find that those who log in frequently exhibit very pronounced day-zero responses and, strikingly, do not respond on any other days around dividend payments. In contrast, those who log in less often react strongly before dividend payments, potentially indicating that these investors keep track of annual general meetings where dividends are officially announced[23] and increase spending on these dates without inspecting dividend inflows on their accounts (we discuss investors' login behavior and the timing of spending responses in detail in the following section).[24] Additionally, investors who hold only few assets (on average one stock), receive relatively few dividend payments (i.e., one per year), and tilt their portfolios towards German stocks respond most strongly to payments. Overall, investors who are more inclined to exhibit excess sensitivity are typically younger and less wealthy investors, who receive one or two dividends per year from one German stock, specifically trying to maximize their dividend yield.

In Table 7 we focus specifically on measures of liquidity constraints. The first three rows investigate quintiles of checking account balances, liquid assets (checking and savings account balances), and net liquid assets (checking and savings account balances less long-term and short-

[22] Note the variables *Regular income* and *Age* and corresponding day-zero coefficient estimates in Table 6.
[23] In the case of German stocks, the announcement of the size of the dividend and its payable date takes place at the annual general meeting. Further details about dividend payout policies are discussed in the next section.
[24] Of course, there are various other channels through which investors are able to track their in- and outflows, however, account logins are observable to us in our dataset.

term debt, and credit card balances plus overdraft limits).[25] Across rows we observe that the size of the coefficient peaks within the first quintiles but remains rather large and statistically significant across columns. For instance, we find that investors in the 4th (5th) quintile of liquid assets, who hold on average €35,403 (€166,548) in their checking and savings accounts, spend more than 7.5% (4.5%) on the day they receive dividends as compared to what they usually spend. We observe a very similar pattern when looking at contemporaneous consumption responses across the distribution of investors' net liquid assets.

In rows 4-6, we normalize level measures of liquid wealth by individuals' income and spending. We first follow Zeldes (1989) and investigate liquid assets relative to two-months of average recurring income (from salary or pension). Our results remain qualitatively unchanged when looking at these measures of liquidity. Investors with relatively little cash holdings as a fraction of their regular income respond most strongly to dividend payments. However, those in the higher quintiles who hold on average more than eight times of their regular income in their checking and savings accounts also exhibit statistically significant day-zero responses that range between 5% and 8%. We also find very similar effects when liquid wealth is scaled by average daily spending (cash-on-hand ratio), thus measuring liquidity in terms of the average number of consumption days held in checking and savings accounts as in Carroll (2001), Kueng (2018), and Olafsson and Pagel (2018). For instance, investors in the 3rd and 4th quintile of liquid assets relative to spending, who hold on average liquidity of around 262 and, respectively, 610 days of spending, increase spending on dividend payment days by 8.2% and 7.8%, respectively.[26] Finally, in the last row of Table 7 we consider the average checking account balance available over the five days *before* dividend payments and investigate consumption responses within quintiles of this liquidity measure.[27] Again, we find that the effects are not entirely driven by significantly constrained investors. Surprisingly, we find that investors in the 2nd quintile with an average checking account balance of around €2,085 right before dividends are paid out react more strongly on day-zero as those in the lowest quintile who have substantial overdraft balances before they receive their dividends.

In general, it is important to note that while consumption responses are more pronounced among individuals in the lowest quintiles of our measures of liquidity, these individuals still hold

[25] We follow Kueng (2018) and exclude assets in securities accounts (including brokerage accounts) from our measures of liquidity constraints although these assets can be liquidated within a short time. The bulk of assets held in these accounts are thus typically liquid wealth.

[26] Note that we only include weekdays in all our analyses and when calculating different measures of average daily income or spending. That is, liquidity of around 21 days of spending translates into liquidity of around one month of spending.

[27] We compute daily checking account balances by continuing end-of-month checking account balances with an individual's daily in- and outflows.

significant liquidity on average, e.g., €2,302 in checking and savings accounts, which translates into around 40 days of spending left at the end of an average month. In fact, only 8.6% (4.8%) of sample investors have negative checking account balances at the end of three (six) months during the entire sample period. At the same time, these investors hold on average €8,004 (€7,443) in savings accounts and, strikingly, on average €34,852 (€32,499) in securities accounts (i.e., financial assets that can be largely liquidated in short time). Overall, our evidence suggests that consumption responses cannot be attributed solely to liquidity-constrained investors. In particular, although investors with less cash on hand exhibit the strongest day-zero response, coefficient estimates are significant and around the 4-10% range across the distribution of several measures of liquidity constraints.

B. Inattention

Do investors anticipate their dividend payments and plan to consume out of them; exhibiting excess sensitivity in response to anticipated income? Or are investors inattentive and unaware of the exact timing and size of dividend payments because they never update their information about the dividends or only infrequently as in the spirit of models of rational inattention (Reis, 2006)? If the former, investors anticipate dividends (they know precisely when dividends are distributed), then we would expect consumption responses before, on, and after dividend receipt. The latter would predict that the consumption response occurs *only* after dividend income receipt.[28]

As noted earlier, a non-negligible fraction of transaction date-stamps that we observe and that we use in all our analyses are delayed by 1-2 days relative to actual consumption days, depending on the transaction. More precisely, all observed coefficient estimates presented thus far represent actual day-zero consumption but may also include consumption that has occurred earlier. Hence, investors appear to react in the time interval of [-2, 0] days relative to the dividend arrival. This strongly supports the idea that investors do indeed anticipate dividends and potentially plan consumption out of this income.[29] This is inconsistent with investors being unaware of dividend payments and reacting on unexpected payments, in which case we would not see a spike at day-zero, but only after the dividend payment days. Additionally, this provides evidence of anticipation effects in terms of investors spending their dividend income before it arrives in their accounts, and

[28] To be precise, models of inattention such as Reis (2006) would predict consumption responses at an individual's next planning date if individuals could not foresee the dividends (i.e., size and payment date) at their past planning date, or instantaneous reactions if the payments are attention-grabbing.
[29] We further examine planning behavior in the following section.

thus also substantiates previous results that liquidity constraints only play a minor role in explaining the effects we observe.

These findings differ from previous literature in two ways. First, observed consumption behavior is very different to the related findings of Gelman et al. (2014) and Olafsson and Pagel (2018), who report that individuals with sufficient liquidity cushions strongly react to regular and irregular income at the day of the arrival of income, but not before. Second, observed anticipation effects (i.e., spending responses prior to the arrival of the dividend income) differ somewhat from Kueng (2018), who finds no evidence of anticipation effects, although in this setting it is difficult to rule them out as the analysis is based on monthly consumption. Instead, our results are consistent with the notion that some investors react on the announcement of dividend payments (i.e., the declaration date). For a large part of assets observed in our sample, i.e., German stocks, the announcement of the size of the dividend and its payable date takes place at the annual general meeting. By law, German companies may pay dividends at earliest three business days after the general meeting. We find that among the top 80 most commonly held German stocks in our sample 58 companies (80%) actually do so. Only 7 companies pay out dividends later than 7 days after the general meeting. This suggests that our findings reflect to some extent consumption decisions which occur shortly before the payment day in response to the dividend's official announcement. This notion is supported by Figure 2, which shows that investors also exhibit a statistically significant albeit economically weaker consumption response three days before dividend payment days.

While we can mostly rule out inattention in our setting, Table 4 may also provide some weak evidence of inattentive investors. We observe consumption responses 5 days after dividend payments for lower wealth groups (i.e., quintiles one and two), albeit them being significantly smaller than day-zero responses in the lowest wealth group. We do not see such delayed responses for the higher wealth groups, who are instead more likely to react on both dividend announcements (i.e., three days before payments) and actual payment days. This might indicate that a smaller group of investors are not entirely aware of the exact timing and size of upcoming dividend payments as they update only based on visible, salient in- and outflows, and live hand-to-mouth by letting consumption follow income. These investors may react in response to unexpected dividend income rather than in anticipation. The PFM tool could be serving as a driver of this effect by making dividend payments more salient to these investors. This delayed reaction is consistent with both liquidity constraints, reaction to unanticipated income, and a literature which examines salience and investment decisions.[30]

[30] See Frydman and Wang (2019) for a recent review.

How does the size and timing of consumption responses differ between various sources of income?. In Figure 6 we compare the magnitude and timing of contemporaneous consumption responses to dividend income (Panel A) to a different, perfectly anticipated source of income – regular income (Panel B), and to a potentially unanticipated source of income - tax refunds (Panel C). Panel B of Figure 6 highlights that the most pronounced consumption response occurs *after* income arrival, generally in the one or two days following regular income receipt. We also find economically and statistically significant responses in the time interval [0, +4] relative to regular income arrival. This response is very different to the response observed in the case of dividend payments and indicates that investors do not react with abnormal consumption *before* their salary arrives. This important difference is most pronounced for investors in the middle and higher wealth quintiles who react most strongly to regular income one day after income arrival but exhibit significant spending responses already before dividend payments. Similarly, Figure 6 shows that significant spending responses to tax refunds typically occur after taxes are refunded (Panel C). Turning to the size of the effects, we find that day-zero spending responses to dividend payments are of very similar magnitude as day-zero responses to regular income arrival, but substantially smaller when being compared to spending responses one day after regular income arrival when the largest responses occur. In fact, day-zero coefficient estimates with respect to dividend payments are around 50% larger than day-zero estimates with respect to regular income arrival in the lowest wealth quintile (18.1% and 12.0%, respectively). Interestingly, we find that among the highest wealth group cumulative spending responses around days of dividend payments and regular income arrival are quite comparable.[31]

As addressed in our discussion of Table 6 in the previous section, there seems to be a relationship between login activity and the timing of spending responses: higher login activity is associated with pronounced day-zero responses and non-responses on days before or after dividend payments. The question remains, however, whether investors actively track the payments of their dividends. To identify such behavior, we use the online-banking login data which allows us to further investigate the documented planned-consumption-channel. Therefore, we adjust the dependent variable of equation (1) and replace it with the fraction of individual *i*'s number of logins on date *t* over his or her average daily logins. In this framework, the coefficient of interest now measures the percentage deviation from usual login-behavior on a specific day, enabling us to

[31] Note that our coefficient estimates for spending responses to income arrival are significantly lower as compared to Olafsson and Pagel (2018), who report coefficient estimates around 40% for the highest salary groups, which are similar to our estimates for the lower wealth groups. We believe that these differences arise from our conservative measurement of both income and consumption. A detailed comparison of our results and those of Olafsson and Pagel (2018) is, however, out of the scope of this paper as we are interested in how income from stock market wealth is channeled into household consumption.

identify potentially unusual login-behavior around days of dividend payments. Figure 7 presents results of this regression model. The findings strongly support the planned-consumption-channel in that investors log in to the online-banking system significantly more around days of dividend payments than they do on other days. This is especially pronounced for the time horizon of 2 days before until 1 day after payment. Coefficient estimates are insignificant and even turn negative from 2 days after the payment onwards. More precisely, individuals appear to track the payment of their dividends. In unreported results, we find that investors from all age, income, and wealth bands log in significantly more often around dividend payment days. This result is rather inconsistent with models of inattention and in line with the findings of Kueng (2018), who documents increased Google search intensity for terms related to the Alaska Permanent Fund prior to its income distribution to Alaskan households.[32]

Our setting further allows us to distinguish between different sources of dividend income stemming from different types of assets. We are thus able to test whether investors are more responsive to income from certain types of assets as opposed to others. Table 8 presents the consumption response from model (1) to income from stock dividends, stock dividends paid out by German companies, stock dividends paid out by foreign (non-German) companies, and dividends paid out by mutual funds or ETFs, respectively. In each column, we exclude investors who do not receive any dividend income from the respective type of asset during our sample period. We find that investors (1) respond to all types of dividends, (2) are more responsive to stock dividends than to fund dividends, and (3) exhibit the strongest consumption response to German stock dividends. Interestingly, the pattern of the consumption response is very similar across dividend-paying assets. Again, we find that investors who increase consumption in response to dividend payments, do so precisely around the day of its arrival independent of which asset pays the dividend. As dividend payments of non-German firms receive substantially less attention in the media, the day-zero response to foreign stock dividends further supports the idea that investors are actively tracking their dividend payments.

In sum, our results suggest that the observed consumption response is driven by investors anticipating dividend payments and planning to consume out of them. This is consistent with investors exhibiting excess sensitivity in response to anticipated regular income arrival. Especially for higher wealth groups, our findings are rather inconsistent with the notion that excess sensitivity is driven by inattentive investors who live hand-to-mouth and let consumption follow income. For

[32] Particularly, Kueng (2018) finds that Google search intensity for the term "Permanent Fund" increases markedly in the months before Alaskan households receive payments from the Alaska Permanent Fund.

lower wealth groups, however, we find some evidence for this interpretation, but the planned-consumption-channel still appears much more pronounced also for those individuals.

C. Self-control and awareness

During 2016, prior to our analysis, an online survey was conducted with a subsample of the investors in our main sample. The survey was part of an unrelated project focusing on individuals' savings behavior. We combine the answers from this survey with our data on consumption patterns and investment behavior. The survey was conducted within the bank's online portal. The responses from this subsample correspond to approximately 25% of our main dividend-investor sample. The questions attempt to capture an individual's awareness of his or her own spending and savings behavior and an individual's propensity to make impulsive purchases.

The first question (translated from German) asks "How familiar are you with your expenses within categories such as housing, living, leisure, or savings, and investing?" We define this question as 'awareness.' The second survey question was a statement translated as follows: "It happens often that I spontaneously buy what I like", which we term 'impulsiveness.'[33] Survey participants were asked to state to what extent they agree with the question or statement on a 5-point Likert scale. The scale ranges from 1 'Completely unaware' to 5 'Completely aware' (awareness) and, respectively, 1 'Completely agree' to 5 'Completely disagree' (impulsiveness). These questions enrich our data and provide additional insights into what type of individuals drive the observed excess sensitivity.

The awareness question allows us to distinguish between attentive consumers as opposed to 'absent-minded' consumers who have little knowledge or only a rough idea of what and where they consume and may be less likely to make financial plans (Ameriks, Caplin, and Leahy, 2004). Similarly, we hypothesize that less impulsive spenders are more likely to exhibit forward-looking behavior and accordingly plan their expenses and savings as compared to impulsive spenders. The questions further allow us to test models of inattention and add to a literature that finds a strong correlation between excess sensitivity and an individual's tendency to exhibit financially prudent savings and spending behavior such as a propensity to plan (Ameriks, Caplin, Leahy, 2003; Parker, 2017).

As impulsive consumption is one of the central tenets of self-control and self-regulation (i.e., Ainslie, 1975; Baumeister, 2002; Hoch and Loewenstein, 1991), our survey enables us to test the work of Shefrin and Statman (1984), Thaler and Shefrin (1981), and Shefrin and Thaler (1992)

[33] The exact wording of the awareness question in German was „Wie gut kennen Sie die Aufteilung Ihrer monatlichen Ausgaben auf verschiedene Bereiche wie Wohnen, Lebenshaltung, Freizeit oder Sparen und Anlegen?". The impulsiveness question was „Wie sehr stimmen Sie folgender Aussage zu – ‚Ich kaufe oft spontan was mir gefällt'".

who model self-control in individuals. Shefrin and Statman (1984) apply this model to the demand for dividends and posit that investors with self-control problems can 'safeguard their wealth against compulsion and immediate gratification by employing a rule' where they are to only consume from dividends rather than the portfolio capital. It follows that those with self-control problems would use dividends as a commitment device and tie their consumption to this source of income.

More precisely, both theory and empirical evidence would predict that excess sensitivity is driven by consumers who are less attentive (i.e., absent-minded) and/or more impulsive spenders (i.e., those with less self-control). We test this prediction in Table 9. In Table 9 we present coefficient estimates of specification (1) separately for different groups of survey respondents. Columns 1, 2, and 3 focus on the groups of investors who state to be unaware, aware and very aware about their expenses and savings, respectively. Columns 4, 5, and 6 focus on the groups of investors who state to be very prudent, prudent and impulsive consumers, respectively. In contrast to what theory and previous empirical evidence would predict (that our responses are driven by unsophisticated and impulsive consumers), we find that the observed day-zero effect is entirely driven by the group of investors who state that they are aware about their spending and savings behavior and less likely to engage in impulsive shopping (Columns 2-5 of Table 9). We do not find significant day-zero estimates for the group of 'absent-minded' or impulsive individuals. That is, the day-zero effect seems to be driven by a rather financially sophisticated group composed of individuals that engage in more financially prudent behavior.

In Figure 8 we connect investors' login data around dividend receipt to their survey responses on awareness and impulsive behavior. Across the top row we plot the login behavior for individuals who responded as being 'very aware', 'aware', and 'unaware,' while across the bottom row is the login behavior for those who are 'very prudent', 'prudent', and 'impulsive.' We note that the login behavior around dividends seems to closely reflect these behavioral traits. Those most aware of their spending log in prior to the arrival of dividend income while those who are unaware do so in a more uniform manner. Similarly, investors who say they are impulsive show login patterns which appear to be orthogonal to their dividend payments, while those who are prudent seem to track the arrival of their dividends.

Are these findings driven by other investor characteristics or traits? In Table 10 we investigate the cross-sectional determinants of unawareness and impulsive consumption. Importantly, we find that differences in consumption responses across survey respondents are not mainly driven by observable demographic characteristics or investment traits. We find some evidence that unaware investors tend to be male and less likely to be married, while impulsive investors seem to be slightly younger, have more wealth, and are less likely to hold ETFs. In general,

the R^2 across specifications show that these covariates explain only a small fraction of the overall variation suggesting that our survey measures indeed characterize behaviors or traits which are uniquely captured aside from administrative data.

Our results from this analysis differ from existing studies in two ways. Firstly, they are in contrast to Parker (2017) who finds a strong positive relationship between spending in response to stimulus payments and a lack of sophistication and financial planning. Secondly, survey responses by investors in our setting do not perfectly line up with theoretical models of dividend-investors who tie consumption to income from these assets as a commitment device to overcome self-control problems (Shefrin and Statman, 1984; Daniel, Garlappi, and Xiao, 2019; Jiang and Sun, 2019). Our results rather suggest that *less* impulsive investors are more prone to consume from dividend income precisely around days of its arrival. These survey results support our previous findings that observed excessive consumption responses are driven by investors who plan to consume out of their dividends.

5. Conclusion

During recent years, a growing body of literature has analyzed household consumption behavior and how consumption patterns are linked to changes in household income and wealth. This increased interest has been partially driven by increased data availability including high-frequency, granular data on household consumption, income and (stock market) wealth. By exploiting data from personal financial management tools recent studies are able to measure consumption with precision and document excess sensitivity in response to various sources of income. A related strand of literature finds that households consume out of income from investments (i.e., dividends) but not out of unrealized changes in risky asset holdings. However, existing work in this strand of research still leaves much to be answered due to insufficient data on both household consumption *and* household portfolio holdings and trading behavior.

We contribute to these branches of literature by using a unique dataset of bank customers allowing us to precisely measure the contemporaneous consumption response to dividend income. We find that there is an abundance of 'dividend-investors' who not only consume from dividends, but exhibit excess sensitivity in response to dividend income. Furthermore, our data allows us to look precisely at who drives this effect by exploiting details about household demographic characteristics, types of spending, and survey responses that provide us with unique self-assessed traits on household financial behavior. Our findings suggest that excess sensitivity is driven by a financially sophisticated group of individuals who anticipate dividend income and plan to consume out of dividends.

We do not find evidence that liquidity constraints explain the sensitivity to dividend income. While lower wealth groups and individuals with less liquid assets do react more strongly, excess sensitivity is prevalent across the entire wealth distribution. Additionally, we find that across the income distribution, excess sensitivity is more pronounced for higher income groups. Moreover, we only find weak evidence that inattention drives our findings as investors react around the announcement of dividends and, most strongly, on the day of arrival. Since we find little evidence of delayed consumption response, our results do not support the notion that excess sensitivity reflects the response of inattentive investors who let consumption follow income. This is substantiated by increased login-activity around, and particularly *before* dividend arrival. One novel aspect of our setting is that we are able to measure an investor's tendency to exhibit financially prudent behavior like financial planning, awareness about one's spending behavior, and impulsive spending through survey responses. In contrast to theory, we find that the observed day-zero response is driven by more financially sophisticated investors, who are well aware of their own spending and savings behavior and unlikely to shop impulsively.

Overall, our results on how investors consume from dividend income support existing studies on spending responses to other sources of income in that investors from all wealth and income bands exhibit excess sensitivity. One of our contributions is to show that previous explanations of excess sensitivity vary dramatically when comparing the consumption reaction to dividend income with the reaction to other sources of income. In particular, while theory and evidence suggest that less financially sophisticated households exhibit excess sensitivity (to tax refunds or salary arrival), our results rather point in the opposite direction. Finding that excess sensitivity is driven by financially sophisticated investors might suggest that programs to foster responsible financial behavior will not change the way individuals treat dividend income. Our findings are important for estimating the MPC out of stock market wealth, for understanding heterogeneity in consumption patterns amongst higher-wealth households, and for corporate dividend policy and asset pricing.

References

Ainslie, George (1975). Specious reward: a behavioral theory of impulsiveness and impulse control. *Psychological bulletin* 82(4), 463.

Allen, Franklin, Antonio E. Bernardo, and Ivo Welch (2000). A theory of dividends based on tax clienteles. *Journal of Finance* 55(6), 2499-2536.

Almeida, Heitor, Vyacheslav Fos, and Mathias Kronlund (2016). The real effects of share repurchases. *Journal of Financial Economics* 119(1), 168-185.

Ameriks, John, Andrew Caplin, and John Leahy (2003). Wealth accumulation and the propensity to plan. *Quarterly Journal of Economics* 118(3), 1007-1047.

Ameriks, John, Andrew Caplin, and John Leahy (2004). The absent-minded consumer. *No. w10216. National Bureau of Economic Research.*

Andres, C., André Betzer, Inga van den Bongard, Christian Haesner, and Erik Theissen (2013). The information content of dividend surprises: Evidence from Germany. *Journal of Business Finance & Accounting,* 40(5-6), 620-645.

Bailey, Warren, Alok Kumar, and David Ng (2011). Behavioral biases of mutual fund investors. *Journal of Financial Economics* 102(1), 1-27.

Baker, Malcolm, Stefan Nagel, and Jeffrey Wurgler (2007). The effect of dividends on consumption. *Brookings Papers on Economic Activity* 38(1), 277–291.

Baker, Scott R., Lorenz Kueng, Steffen Meyer, and Michaela Pagel (2018). Measurement error in imputed consumption. *No. w25078. National Bureau of Economic Research.*

Barber, Brad M., and Terrance Odean (2000). Trading is hazardous to your wealth: The common stock investment performance of individual investors. *Journal of Finance* 55(2), 773-806.

Baumeister, Roy F (2002). Yielding to temptation: Self-control failure, impulsive purchasing, and consumer behavior. *Journal of Consumer Research* 28(4), 670-676.

Becker, Bo, Zoran Ivković, and Scott Weisbenner (2011). Local dividend clienteles. *Journal of Finance* 66(2), 655-683.

Bhattacharya, Utpal, Andreas Hackethal, Simon Kaesler, Benjamin Loos, and Steffen Meyer (2012). Is unbiased financial advice to retail investors sufficient? Answers from a large field study. *Review of Financial Studies* 25(4), 975-1032.

Bilinski, Pawel, and Mark T. Bradshaw (2015). Analyst Dividend Forecasts and Their Usefulness to Investors: International Evidence. *Working Paper.*

Black, Fischer, and Myron Scholes (1974). The effects of dividend yield and dividend policy on common stock prices and returns. *Journal of Financial Economics* 1(1), 1-22.

Blume, Marshall E., and Irwin Friend (1975). The asset structure of individual portfolios and some implications for utility functions. *Journal of Finance* 30(2), 585-603.

Brav, A., Graham, J. R., Harvey, C. R., & Michaely, R. (2005). Payout policy in the 21st century. *Journal of Financial Economics*, 77(3), 483-527.

Campbell, John Y (2006). Household finance. *Journal of Finance* 61(4), 1553-1604.

Campbell, John Y., and N. Gregory Mankiw (1989). Consumption, income, and interest rates: Reinterpreting the time series evidence. *NBER Macroeconomics Annual* 4, 185-216.

Carroll, Christopher D. (1997). Buffer-stock saving and the life cycle/ permanent income hypothesis. *Quarterly Journal of Economics* 112(1), 1-55.

Carroll, Christopher D. (2001). A Theory of the Consumption Function, with and without Liquidity Constraints. *Journal of Economic Perspectives* 15(3), 23-45.

Carroll, Christopher D., Misuzu Otsuka, and Jiri Slacalek (2011). How large are housing and financial wealth effects? A new approach. *Journal of Money, Credit and Banking* 43(1), 55-79.

Chen, Long, Zhi Da, and Richard Priestley (2012). Dividend smoothing and predictability. *Management science* 58(10), 1834-1853.

Cox, J. (2019, July 29). Companies are ramping up share buybacks, and they're increasingly using debt to do so. Retrieved from https://www.cnbc.com/2019/07/29/buybacks-companies-increasingly-using-debt-to-repurchase-stocks.html

Daniel, Kent, Lorenzo Garlappi, and Kairong Xiao (2019). Monetary policy and reaching for income. *No. w25344*. *National Bureau of Economic Research*.

Deaton, Angus (1991). Saving and Liquidity Constraints. *Econometrica* 59(5), 1221–1248.

Di Maggio, Marco, Amir Kermani, and Kaveh Majlesi (2018). Stock market returns and consumption. *No. w24262*. *National Bureau of Economic Research.*

Dorn, Daniel, and Gur Huberman (2005). Talk and action: What individual investors say and what they do. *Review of Finance* 9(4), 437-481.

Dorn, Daniel, and Paul Sengmueller (2009). Trading as entertainment? *Management Science* 55(4), 591-603.

Dynan, Karen, and Dean Maki (2001). Does stock market wealth matter for consumption? *Finance and Economics Discussion Series* (23). Washington: Board of Governors of the Federal Reserve System.

Evans, R., & Ponczek, S. (2019, March 29). The $1 Trillion Buyback Hysteria May Be Overstated. Here's Why. Retrieved from https://www.bloomberg.com/news/articles/2019-05-29/the-1-trillion-buyback-hysteria-may-be-overstated-here-s-why

Friedman, Milton (1957). A theory of the consumption function. Reprint, Princeton, NJ: Princeton Univ. Press (National Bureau of economic research general series, 63).

Frydman, Cary, and Baolian Wang (2019). The Impact of Salience on Investor Behavior: Evidence from a Natural Experiment. *Journal of Finance*, forthcoming.

Gabaix, Xavier (2016). Behavioral macroeconomics via sparse dynamic programming. *No. w21848*. *National Bureau of Economic Research*.

Gelman, M., Shachar Kariv, Matthew D. Shapiro, Dan Silverman, and Steven Tadelis (2014). Harnessing naturally occurring data to measure the response of spending to income. *Science* 345(6193), 212-215.

Graham, John R., and Alok Kumar (2006). Do dividend clienteles exist? Evidence on dividend preferences of retail investors. *Journal of Finance* 61(3), 1305-1336.

Hartzmark, Samuel M., and David H. Solomon (2013). The dividend month premium. *Journal of Financial Economics* 109(3), 640-660.

Hartzmark, Samuel M., and David H. Solomon (2019). The dividend disconnect. *Journal of Finance*, forthcoming.

Hoch, Stephen J., and George F. Loewenstein (1991). Time-inconsistent preferences and consumer self-control. *Journal of Consumer research* 17(4), 492-507.

Iacus, Stefano M., Gary King, and Giuseppe Porro (2012). Causal inference without balance checking: Coarsened exact matching. *Political analysis* 20(1), 1-24.

Jiang, Hao, and Zheng Sun (2019). Reaching for Dividends. *Journal of Monetary Economics*, forthcoming.

Kueng, Lorenz (2018). Excess sensitivity of high-income consumers. *Quarterly Journal of Economics* 133(4), 1693–1751.

Lazonick, W., and Jacobson, K. (2018, August 23). End Stock Buybacks, Save the Economy. Retrieved from https://www.nytimes.com/2018/08/23/opinion/ban-stock-buybacks.html

Loos, Benjamin, Steffen Meyer, and Michaela Pagel (2019). The Consumption Effects of the Disposition to Sell Winners and Hold on to Losers. *Working Paper*.

Lusardi, Annamaria (1999). *Behavioral Dimensions of Retirement Economics*. New York: Brookings Institution Press.

Lusardi, Annamaria, and Olivia S. Mitchell (2007). Baby Boomer retirement security: The roles of planning, financial literacy, and housing wealth. *Journal of Monetary Economics* 54(1), 205-224.

Manconi, Alberto, Urs Peyer, and Theo Vermaelen (2018). Are buybacks good for long-term shareholder value? Evidence from buybacks around the world. Jou*rnal of Financial and Quantitative Analysis*, 1-37.

Meyer, Steffen, Michaela Pagel, and Alessandro Previtero (2019). The Consumption Response to Realized Capital Gains: Evidence from Mutual Fund Liquidations. *Working Paper*.

Miller, Merton H., and Franco Modigliani (1961). Dividend Policy, Growth, and the Valuation of Shares. *Journal of Business* 34(4), 411–33.

Olafsson, Arna, and Michaela Pagel (2018). The liquid hand-to-mouth: Evidence from personal finance management software. *Review of Financial Studies* 31(11), 4398-4446.

Paiella, Monica, and Luigi Pistaferri (2017). Decomposing the wealth effect on consumption. *Review of Economics and Statistics* 99(4), 710-721.

Parker, Jonathan A. (1999). The reaction of household consumption to predictable changes in social security taxes. *American Economic Review* 89(4), 959-973.

Parker, Jonathan A. (2017). Why Don't Households Smooth Consumption? Evidence from a $25 Million Experiment. *American Economic Journal: Macroeconomics* 9(4), 153-83.

Parker, Jonathan A., Nicholas S. Souleles, David S. Johnson, and Robert McClelland (2013). Consumer spending and the economic stimulus payments of 2008. *American Economic Review* 103(6), 2530-53.

Poterba, James M. (2000). Stock market wealth and consumption. *Journal of Economic Perspectives* 14(2), 99-118.

Rangvid, Jesper, Maik Schmeling, and Andreas Schrimpf (2014). Dividend predictability around the world. *Journal of Financial and Quantitative Analysis* 49(5-6), 1255-1277.

Reis, Ricardo (2006). Inattentive consumers. *Journal of Monetary Economics* 53(8), 1761-1800.

Shapiro, Matthew D., and Joel Slemrod (1995). Consumer response to the timing of income: Evidence from a change in tax withholding. *American Economic Review* 85(1), 274–283.

Shefrin, Hersh M., and Meir Statman (1984). Explaining investor preference for cash dividends. *Journal of Financial Economics* 13(2), 253-282.

Shefrin, Hersh M., and Richard H. Thaler (1992). Mental accounting, saving, and self-control. *Advances in Behavioral Economics* 395.

Souleles, Nicholas S. (1999). The response of household consumption to income tax refunds. *American Economic Review* 89(4), 947-958.

Stephens Jr, Melvin (2003). "3rd of tha Month": Do social security recipients smooth consumption between checks?. *American Economic Review 93*(1), 406-422.

Stephens Jr, Melvin (2008). The consumption response to predictable changes in discretionary income: Evidence from the repayment of vehicle loans. *Review of Economics and Statistics* 90(2), 241-252.

Thaler, Richard H., and Hersh M. Shefrin (1981). An economic theory of self-control. *Journal of Political Economy* 89(2), 392-406.

Vellekoop, Nathanael (2018). Explaining Intra-Monthly Consumption Patterns: The Timing of Income or the Timing of Consumption Commitments? *Working Paper*.

Zeldes, Stephen P. (1989). Consumption and liquidity constraints: An empirical investigation. *Journal of Political Economy* 97(2), 305-346.

Table 1: Summary statistics

In the following table we present means and percentiles for demographic, financial, and portfolio characteristics of individuals in our sample. Panel A focuses on demographic information while Panel B looks at financial assets. Panel C states portfolio measures of investors in the sample. On the right side of the table we compare dividend-investors to all other investors in our sample and present a *t*-test of mean values. All amounts are in euros and are calculated as the average throughout year 2017 unless otherwise noted. *, **, and *** denote significance at the 10%, 5% and 1% level, respectively.

	Dividend-investors						Other investors	Difference in means
	Mean	5th perc.	25th perc.	Median	75th perc.	95th perc.	Mean	*t*-test
Panel A: Demographics								
Male	68.7	0.0	0.0	100.0	100.0	100.0	69.6	0.9
Age	50.2	29.0	39.0	48.0	60.0	78.0	46.4	-3.7***
Married	43.0	0.0	0.0	0.0	100.0	100.0	39.1	-3.9***
Years with bank	19.5	4.7	11.0	18.1	25.3	42.6	17.7	-1.8***
Employed	53.2	0.0	0.0	100.0	100.0	100.0	52.7	-0.5
Civil servant	2.5	0.0	0.0	0.0	0.0	0.0	2.4	-0.2
Manager	2.6	0.0	0.0	0.0	0.0	0.0	3.3	0.6*
Retired	8.5	0.0	0.0	0.0	0.0	100.0	5.6	-2.9***
Monthly logins	8.3	0.6	2.2	4.7	10.1	26.6	7.8	-0.4*
Panel B: Financial assets								
Total assets	152,065	3,548	16,416	49,219	136,096	611,268	65,603	-86,461***
Risky assets	101,148	443	4,767	20,928	78,460	418,617	24,894	-76,253***
Non-risky assets	45,363	1,170	5,747	15,269	42,717	170,565	38,293	-7,069**
Dividend assets	72,358	339	3,934	16,262	58,450	292,541	10,397	-61,960***
Panel C: Portfolio statistics								
Equity share	70.3	0.0	41.7	93.0	100.0	100.0	53.2	-17.0***
Bond share	8.1	0.0	0.0	0.0	2.2	52.7	8.9	0.7
Stock share	47.4	0.0	0.0	39.6	100.0	100.0	34.4	-13.0***
Fund share	46.4	0.0	0.0	42.7	95.8	100.0	36.0	-10.4***
ETF share	3.8	0.0	0.0	0.0	0.0	26.9	6.6	2.8***
Home share	40.0	0.0	0.0	25.1	83.9	100.0	21.4	-18.5***
Dividend asset share	81.3	28.5	67.2	94.6	100.0	100.0	28.1	-53.1***
Dividend stock share	42.3	0.0	0.0	30.3	90.4	100.0	9.8	-32.5***
Dividend fund share	39.0	0.0	0.0	26.3	79.6	100.0	18.3	-20.7***
Assets (#)	6.5	1.0	1.3	3.1	7.7	23.5	1.9	-4.7***
Stocks (#)	3.5	0.0	0.0	1.0	4.0	14.7	0.8	-2.7***
Funds (#)	2.4	0.0	0.0	1.0	3.0	10.0	0.7	-1.7***
Dividend assets (#)	4.5	1.0	1.0	2.2	5.0	15.0	0.7	-3.8***
Total trades (#)	9.9	0.0	0.0	1.0	8.0	42.0	6.2	-3.7***
N	10,339						2,241	12,579

Table 2: Consumption and other outflows

In the following table we present means and percentiles for monthly consumption and outflow measures for individuals in our sample. Panel A focuses on total outflows while Panel B on consumption categories as defined by the PFM. Panel C looks at regular spending categories and Panel D focuses on all inflows. All values are calculated as the average per month unless otherwise noted. All inflow and outflow numbers are in euros.

	Mean	5th perc.	25th perc.	Median	75th perc.	95th perc.
Panel A: Outflows						
Total outflows	14,239.6	1,851.5	4,140.8	7,191.2	13,467.4	44,694.2
Regular spending	1,791.4	72.4	587.0	1,186.8	2,150.1	5,003.7
Consumption	1,693.8	268.3	807.0	1,320.1	2,095.8	4,122.4
Uncategorized outflows	5,891.6	269.0	1,000.1	2,267.3	5,122.2	20,580.9
Net spending	148.4	-3,535.7	-365.9	39.9	579.2	4,239.5
Savings & investing	3,511.8	0.0	0.9	308.3	1,724.4	13,973.5
Panel B: Consumption						
Living	348.8	28.8	116.5	230.2	421.1	991.5
Housing	65.2	0.0	0.4	16.4	62.4	259.6
Leisure	165.0	0.0	21.9	69.9	176.3	590.8
Mobility	163.7	0.0	15.2	57.9	134.9	523.0
Health	77.6	0.0	2.2	17.8	66.8	320.2
Children	1.2	0.0	0.0	0.0	0.0	6.5
Occupation	25.0	0.0	0.0	1.1	17.6	110.4
Cash withdrawals	689.0	8.3	216.7	476.6	884.9	1,990.0
Credit card	678.2	0.0	1.3	239.6	786.9	2,790.6
Internet	158.3	0.0	2.7	46.3	184.4	585.7
Other	64.2	0.2	6.7	14.7	35.3	225.5
Consumption days	9.3	2.4	6.1	9.2	12.3	16.4
Panel C: Regular spending						
Insurance	628.7	0.8	128.0	348.6	839.5	2,056.5
Credits	99.8	0.0	0.0	0.0	0.0	58.3
Rent	381.5	0.0	0.0	40.0	590.0	1,500.0
Energy	133.5	0.0	2.2	66.0	187.1	420.7
Regular spending days	3.0	0.7	2.0	2.9	4.0	5.7
Panel D: Inflows						
Total inflows	14,388.0	1,893.3	4,271.9	7,298.0	13,689.5	44,142.4
Regular income	4,343.1	0.0	1,758.1	3,297.2	5,428.9	11,810.4
Regular income (cond.)	4,935.6	777.4	2,354.8	3,753.7	5,861.1	12,586.7
Irregular income	309.8	0.0	2.8	70.2	272.6	1,131.2
Dividend income	121.8	0.4	5.8	26.0	94.4	489.2
Dividend income (p.a.)	1,457.5	5.0	68.4	310.4	1,130.8	5,857.1
Dividend income (per dividend)	266.9	3.4	34.2	113.8	283.7	972.0
Dividend income (% income)	21.0	0.1	0.9	2.9	8.6	41.5
Dividend income (% port. value)	2.8	0.2	0.9	1.6	2.6	4.9
Dividend days (p.a.)	5.1	1.0	1.0	2.0	6.0	18.0
Sales proceeds	2,852.5	0.0	0.0	0.0	867.1	10,977.8
Bank transactions	39.2	7.8	12.3	14.9	17.1	19.5
N	10,339					

Table 3: Cross-sectional determinants of dividend clientele

The following table presents cross-sectional determinants of different measures of dividend-investors. Columns 1-3 focus on the full sample of investors and the dependent variable takes the value of one if an individual is defined as a dividend-investor (see text). In Columns 4-6, we focus on the sample of dividend-investors and the dependent variable takes the value of one if the investor has an above median ratio of total (yearly) dividend income to portfolio value. Coefficients state the marginal effects after a logistic regression. *, **, and *** denote significance at the 10%, 5% and 1% level, respectively.

	All investors			**Dividend-investors**		
	Dividend-receipt dummy			Above median dividend yield		
	(1)	(2)	(3)	(4)	(5)	(6)
Male	0.000	0.003	-0.015**	-0.069***	-0.064***	-0.060***
	(0.008)	(0.008)	(0.007)	(0.012)	(0.011)	(0.011)
Age	0.003***	0.001**	0.001**	-0.001*	0.002***	0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Married	0.006	0.010	0.007	0.014	0.010	0.002
	(0.007)	(0.007)	(0.007)	(0.011)	(0.011)	(0.010)
Employed	0.016**	0.015**	0.019***	0.017	0.005	0.005
	(0.008)	(0.008)	(0.007)	(0.012)	(0.012)	(0.011)
Civil servant	0.015	0.026	0.039*	0.010	-0.015	0.016
	(0.023)	(0.022)	(0.021)	(0.032)	(0.031)	(0.031)
Manager	-0.029	-0.070***	-0.053***	-0.116***	-0.066**	-0.056*
	(0.020)	(0.020)	(0.019)	(0.033)	(0.033)	(0.032)
Retired	-0.005	0.007	0.036**	0.090***	0.062***	0.076***
	(0.017)	(0.017)	(0.015)	(0.022)	(0.021)	(0.021)
Monthly logins		0.000	-0.001*		-0.000	0.001***
		(0.000)	(0.000)		(0.000)	(0.000)
Log. wealth		0.050***	0.039***		-0.066***	-0.035***
		(0.002)	(0.002)		(0.003)	(0.004)
Log. income		0.001	-0.001		0.008***	0.005**
		(0.001)	(0.001)		(0.002)	(0.002)
Stock share			0.303***			0.017
			(0.018)			(0.021)
ETF holder			-0.045***			-0.163***
			(0.012)			(0.017)
Total trades			0.001***			-0.003***
			(0.000)			(0.000)
Home share			0.242***			0.143***
			(0.012)			(0.020)
HHI			-0.455***			0.028
			(0.018)			(0.024)
Pseudo R^2	0.01	0.06	0.18	0.00	0.03	0.07
N	12,579	12,578	12,578	10,339	10,339	10,339

Table 4: Consumption response around dividend payment days across wealth quintiles

The following table presents the consumption response around days of dividend payments. Column 1 includes the full sample, while Columns 2-6 separate the results by quintile of average wealth in the year 2017. Each specification includes month, day of week, week of month, holiday, and individual fixed effects. Robust standard errors are clustered at the individual level. *, **, and *** denote significance at the 10%, 5% and 1% level, respectively.

	All	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**
	(1)	(2)	(3)	(4)	(5)	(6)
day -7	0.018	0.018	0.024	0.056*	0.062**	-0.018
	(0.012)	(0.036)	(0.032)	(0.029)	(0.025)	(0.018)
day -6	-0.036***	-0.036	-0.016	-0.046*	-0.042*	-0.031*
	(0.011)	(0.034)	(0.032)	(0.026)	(0.022)	(0.017)
day -5	-0.016	-0.069**	0.006	-0.026	-0.032	0.001
	(0.011)	(0.034)	(0.031)	(0.027)	(0.022)	(0.018)
day -4	-0.004	0.075*	0.008	-0.019	-0.035	0.005
	(0.011)	(0.039)	(0.033)	(0.028)	(0.022)	(0.017)
day -3	0.040***	0.050	0.024	0.024	0.050**	0.040**
	(0.011)	(0.035)	(0.031)	(0.026)	(0.022)	(0.016)
day -2	0.008	0.046	-0.027	0.031	-0.040*	0.028
	(0.011)	(0.039)	(0.031)	(0.028)	(0.021)	(0.018)
day -1	0.027**	0.050	0.019	0.075**	-0.009	0.026
	(0.011)	(0.036)	(0.032)	(0.029)	(0.023)	(0.018)
day 0	0.069***	0.181***	0.071**	0.063**	0.051**	0.063***
	(0.012)	(0.042)	(0.033)	(0.028)	(0.024)	(0.019)
day 1	-0.012	-0.008	-0.002	-0.009	0.006	-0.025
	(0.011)	(0.037)	(0.034)	(0.029)	(0.024)	(0.017)
day 2	0.014	-0.034	0.013	-0.013	0.010	0.032*
	(0.011)	(0.034)	(0.033)	(0.026)	(0.023)	(0.018)
day 3	-0.002	0.016	-0.058*	0.024	0.001	-0.001
	(0.011)	(0.033)	(0.030)	(0.027)	(0.024)	(0.017)
day 4	-0.008	-0.011	-0.037	-0.046*	-0.009	0.014
	(0.011)	(0.036)	(0.032)	(0.027)	(0.022)	(0.018)
day 5	0.022*	0.104***	0.081**	-0.032	0.030	0.010
	(0.012)	(0.040)	(0.035)	(0.027)	(0.026)	(0.019)
day 6	-0.009	-0.022	0.010	-0.005	-0.008	-0.010
	(0.011)	(0.037)	(0.034)	(0.028)	(0.025)	(0.017)
day 7	0.012	0.038	0.009	0.024	-0.003	0.011
	(0.011)	(0.037)	(0.030)	(0.027)	(0.023)	(0.018)
Fixed effects						
Month	Yes	Yes	Yes	Yes	Yes	Yes
Day of week	Yes	Yes	Yes	Yes	Yes	Yes
Week of month	Yes	Yes	Yes	Yes	Yes	Yes
Holiday	Yes	Yes	Yes	Yes	Yes	Yes
Individual	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.02	0.03	0.03	0.03	0.02	0.02
N	2,540,715	508,335	508,107	508,123	508,108	508,042

Table 5: Consumption response around dividend payment days and type of consumption

The following table presents the consumption response around days of dividend payments by various consumption types. Column 1 includes the full sample and presents the baseline result, while Columns 2-8 each feature an dependent variable which is the average daily spending in that specified consumption category. For each category we winsorize at the top 99th percentile. Each specification includes month, day of week, week of month, holiday, and individual fixed effects. Robust standard errors are clustered at the individual level. *, **, and *** denote significance at the 10%, 5% and 1% level, respectively.

	Total	**Living**	**Housing**	**Leisure**	**Mobility**	**Internet**	**Cash**	**Uncat.**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
day -7	0.018	0.015	0.039	-0.010	0.041	-0.031	0.024	0.027
	(0.012)	(0.014)	(0.063)	(0.040)	(0.043)	(0.037)	(0.021)	(0.021)
day -6	-0.036***	-0.004	0.063	-0.095***	-0.038	-0.044	-0.034*	0.021
	(0.011)	(0.013)	(0.067)	(0.036)	(0.038)	(0.037)	(0.021)	(0.020)
day -5	-0.016	-0.016	-0.022	-0.086**	-0.144***	-0.027	0.001	-0.039*
	(0.011)	(0.014)	(0.062)	(0.038)	(0.035)	(0.037)	(0.021)	(0.020)
day -4	-0.004	0.033**	-0.096	0.029	0.046	0.051	-0.021	0.010
	(0.011)	(0.015)	(0.060)	(0.043)	(0.040)	(0.041)	(0.021)	(0.020)
day -3	0.040***	0.024*	-0.059	0.014	0.069*	0.010	0.036*	0.060***
	(0.011)	(0.013)	(0.059)	(0.036)	(0.040)	(0.037)	(0.020)	(0.020)
day -2	0.008	0.006	0.059	-0.060	-0.055	-0.010	-0.027	0.031
	(0.011)	(0.014)	(0.063)	(0.038)	(0.038)	(0.036)	(0.021)	(0.020)
day -1	0.027**	0.082***	-0.079	0.091**	0.121***	-0.035	0.023	0.021
	(0.011)	(0.015)	(0.059)	(0.042)	(0.043)	(0.037)	(0.021)	(0.020)
day 0	0.069***	0.063***	0.015	0.060	0.117***	-0.008	0.079***	0.104***
	(0.012)	(0.015)	(0.063)	(0.041)	(0.043)	(0.037)	(0.023)	(0.021)
day 1	-0.012	-0.028**	-0.001	-0.022	0.001	-0.014	-0.020	0.001
	(0.011)	(0.014)	(0.065)	(0.040)	(0.042)	(0.038)	(0.020)	(0.021)
day 2	0.014	-0.005	-0.052	-0.040	0.004	0.022	0.017	0.005
	(0.011)	(0.013)	(0.062)	(0.038)	(0.039)	(0.037)	(0.020)	(0.019)
day 3	-0.002	0.033**	-0.055	-0.033	0.021	-0.013	-0.014	0.003
	(0.011)	(0.014)	(0.061)	(0.038)	(0.041)	(0.037)	(0.021)	(0.021)
day 4	-0.008	-0.020	0.030	-0.066*	0.021	0.044	-0.027	-0.003
	(0.011)	(0.014)	(0.067)	(0.037)	(0.041)	(0.038)	(0.022)	(0.021)
day 5	0.022*	-0.046***	0.064	0.155***	0.164***	0.004	0.014	0.058***
	(0.012)	(0.014)	(0.066)	(0.043)	(0.044)	(0.041)	(0.023)	(0.021)
day 6	-0.009	-0.022	-0.032	-0.031	-0.100**	0.052	0.014	-0.024
	(0.011)	(0.014)	(0.066)	(0.042)	(0.040)	(0.043)	(0.022)	(0.021)
day 7	0.012	0.056***	-0.011	0.015	0.086*	0.008	0.000	0.009
	(0.011)	(0.014)	(0.064)	(0.038)	(0.044)	(0.038)	(0.021)	(0.020)
Fixed effects								
Month	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Day of week	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Week of month	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Holiday	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.02	0.02	0.00	0.00	0.00	0.00	0.01	0.01
N	2,540,715	2,513,409	1,910,675	2,373,376	2,334,118	1,987,001	2,429,588	2,537,025

Table 6: Investor characteristics and the consumption response to dividend payments

The following table presents the consumption response on day-zero of dividend payments across quintiles of various investor characteristics. Columns 1-5 include a sample of that quintile for each of the characteristics in rows. Each cell represents day-zero coefficient estimates (β_0) of regression equation (1) run separately for each characteristic and within each quintile. Each specification includes month, day of week, week of month, holiday, and individual fixed effects. Highest coefficient estimates across quintiles of specific characteristics are indicated in bold font. Robust standard errors are clustered at the individual level. *, **, and *** denote significance at the 10%, 5% and 1% level, respectively.

	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
	(1)	(2)	(3)	(4)	(5)
Age	**0.159*** **	0.040	0.053**	0.058**	0.062**
Mean	31.80	41.61	48.79	57.26	72.90
Investors	2,121	2,151	2,104	1,936	2,027
Wealth	**0.181*** **	0.071**	0.062**	0.051**	0.063***
Mean	6,483	21,556	50,279	114,605	567,867
Investors	2,070	2,069	2,068	2,066	2,066
Regular income	0.025	0.063**	**0.130*** **	0.098***	0.031
Mean	1,260	2,619	3,762	5,349	11,688
Investors	1,795	1,795	1,795	1,795	1,795
Dividend size	0.063**	0.077***	0.048*	0.058**	**0.098*** **
Mean	9.49	47.30	116.72	245.15	915.93
Investors	2,068	2,068	2,068	2,068	2,067
Dividend size (% of income)	0.050*	0.064**	0.020	**0.108*** **	0.095***
Mean	0.25	1.19	3.01	7.08	93.79
Investors	1,795	1,795	1,795	1,795	1,795
Dividend size (% of portfolio value)	0.072**	0.072***	0.019	0.074***	**0.160*** **
Mean	0.39	1.03	1.62	2.40	8.57
Investors	2,068	2,068	2,068	2,068	2,067
Dividend days	**0.183*** **	0.118***	0.109**	0.060**	0.054***
Mean	1.00	2.00	3.00	5.20	16.67
Investors	3,629	1,698	1,030	2,087	1,895
Number of assets	**0.176*** **	0.117***	0.045	0.095***	0.054***
Mean	0.95	1.84	3.33	6.50	20.18
Investors	2,395	1,749	2,060	2,075	2,060
Home share (%)	0.043	0.038	0.071***	0.065***	**0.183*** **
Mean	0.00	5.76	26.19	70.07	99.99
# investors	2,862	1,274	2,068	2,068	2,067
Monthly trades	0.077***	**0.122*** **	0.052*	0.051*	0.069***
Mean	0.00	0.08	0.20	0.61	3.74
Investors	3,937	1,374	1,296	1,855	1,877
Monthly logins	0.049	**0.085*** **	0.062**	0.076***	0.071***
Mean	3.23	5.72	9.39	16.13	42.83
Investors	2,208	2,000	2,016	2,070	2,045

Table 7: Liquidity constraints and the consumption response to dividend payments

The following table presents the consumption response on day-zero of dividend payments across quintiles of various measures of liquidity constraints. Columns 1-5 include a sample of that quintile for each of the liquidity measures in rows. Each cell represents day-zero coefficient estimates (β_0) of regression equation (1) run separately for each measure and within each quintile. Each specification includes month, day of week, week of month, holiday, and individual fixed effects. Highest coefficient estimates across quintiles of specific liquidity measures are indicated in bold font. Robust standard errors are clustered at the individual level. *, **, and *** denote significance at the 10%, 5% and 1% level, respectively.

	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
	(1)	(2)	(3)	(4)	(5)
Checking deposits	**0.123*****	0.067**	0.102***	0.040*	0.041*
Mean	482	3,882	7,691	16,731	91,446
Investors	2,070	2,067	2,069	2,067	2,066
Liquid assets	**0.145*****	0.055**	0.061**	0.075***	0.045**
Mean	2,302	7,172	15,610	35,403	166,548
Investors	2,070	2,070	2,067	2,067	2,065
Net liquid assets	**0.113*****	0.101***	0.042	0.082***	0.040*
Mean	-35,972	9,068	17,961	37,220	164,713
Investors	2,068	2,068	2,068	2,068	2,067
Liquid assets to income	**0.133*****	0.059**	0.062**	0.082***	0.051**
Mean	0.42	1.06	2.21	4.74	33.55
Investors	1,850	1,851	1,851	1,849	1,846
Net liquid assets to income	**0.133*****	0.068**	0.040	0.091***	0.052**
Mean	-5.66	1.35	2.55	5.11	34.07
Investors	1,851	1,850	1,850	1,849	1,847
Cash-on-hand ratio	**0.128*****	0.042	0.082***	0.078***	0.036
Mean	39.81	119.31	262.39	610.93	5,110.45
Investors	2,067	2,069	2,068	2,067	2,068
Deposits around dividends	0.063**	**0.113*****	0.072***	0.088***	0.032
Mean	-9,798	2,085	6,446	16,822	100,070
Investors	2,069	2,068	2,068	2,068	2,066

Table 8: Consumption response around dividend payment days and type of dividend-paying asset

The following table presents the consumption response around days of dividend payments by various dividend-paying asset types. Column 1 presents the baseline result and displays coefficients estimates from specification (1) including dividend payments from all assets. Columns 2-5 display consumption responses to all individual-stocks, German stocks, foreign stocks, and fund dividend payments, respectively. Each specification includes month, day of week, week of month, holiday, and individual fixed effects. Robust standard errors are clustered at the individual level. *, **, and *** denote significance at the 10%, 5% and 1% level, respectively.

	All dividends	**Stock dividends**	**German stock dividends**	**Foreign stock dividends**	**Fund dividends**
	(1)	(2)	(3)	(4)	(5)
day -7	0.018	-0.007	0.006	-0.015	0.044**
	(0.012)	(0.012)	(0.019)	(0.016)	(0.018)
day -6	-0.036***	-0.032***	-0.034*	-0.026*	-0.041***
	(0.011)	(0.012)	(0.019)	(0.015)	(0.016)
day -5	-0.016	-0.035***	-0.009	-0.054***	-0.027
	(0.011)	(0.012)	(0.019)	(0.015)	(0.017)
day -4	-0.004	0.011	0.027	-0.007	-0.047***
	(0.011)	(0.012)	(0.019)	(0.016)	(0.017)
day -3	0.040***	0.022*	0.038**	0.010	0.041***
	(0.011)	(0.012)	(0.017)	(0.017)	(0.016)
day -2	0.008	-0.010	-0.036*	0.005	0.031*
	(0.011)	(0.013)	(0.019)	(0.016)	(0.016)
day -1	0.027**	0.038***	0.060***	0.018	0.004
	(0.011)	(0.013)	(0.020)	(0.016)	(0.015)
day 0	0.069***	0.076***	0.105***	0.048***	0.057***
	(0.012)	(0.013)	(0.021)	(0.016)	(0.017)
day 1	-0.012	-0.019	-0.032*	-0.014	0.031*
	(0.011)	(0.012)	(0.018)	(0.017)	(0.018)
day 2	0.014	-0.028**	-0.027	-0.027*	0.023
	(0.011)	(0.012)	(0.017)	(0.016)	(0.016)
day 3	-0.002	0.003	-0.007	0.009	0.038**
	(0.011)	(0.012)	(0.018)	(0.016)	(0.017)
day 4	-0.008	-0.032**	-0.060***	-0.008	-0.018
	(0.011)	(0.012)	(0.019)	(0.016)	(0.016)
day 5	0.022*	0.013	0.017	0.008	0.044**
	(0.012)	(0.013)	(0.021)	(0.016)	(0.018)
day 6	-0.009	-0.009	-0.023	-0.002	-0.017
	(0.011)	(0.012)	(0.017)	(0.017)	(0.019)
day 7	0.012	0.025*	0.067***	-0.007	-0.008
	(0.011)	(0.013)	(0.018)	(0.017)	(0.017)
Fixed effects					
Month	Yes	Yes	Yes	Yes	Yes
Day of week	Yes	Yes	Yes	Yes	Yes
Week of month	Yes	Yes	Yes	Yes	Yes
Holiday	Yes	Yes	Yes	Yes	Yes
Individual	Yes	Yes	Yes	Yes	Yes
R^2	0.02	0.02	0.02	0.02	0.02
N	2,540,715	1,734,657	1,562,000	731,094	1,569,177

Table 9: Spending awareness, impulsive buying, and the consumption response to dividend payments

The following table presents the consumption response around days of dividend payments by response to survey questions on financial behavior. The dependent variables across columns take the value of one if an individual stated that they fall into that category of behavior. Columns 1-3 focus on a question regarding self-assessed awareness of an individual's own spending and savings behavior, while Columns 4-6 focus on a question about impulsive spending behavior. Each specification includes month, day of week, week of month, holiday, and individual fixed effects. Robust standard errors are clustered at the individual level. *, **, and *** denote significance at the 10%, 5% and 1% level, respectively.

	Awareness			Impulsiveness		
	Unaware	Aware	Very aware	Very prudent	Prudent	Impulsive
	(1)	(2)	(3)	(4)	(5)	(6)
day -7	0.195***	0.010	0.060	0.051	0.068*	0.003
	(0.066)	(0.037)	(0.037)	(0.036)	(0.039)	(0.045)
day -6	0.103	0.004	-0.023	0.020	-0.079**	-0.022
	(0.073)	(0.036)	(0.032)	(0.032)	(0.037)	(0.042)
day -5	-0.042	-0.012	-0.024	0.014	-0.014	-0.106***
	(0.054)	(0.036)	(0.034)	(0.034)	(0.040)	(0.039)
day -4	0.103	-0.035	0.028	0.016	-0.015	-0.006
	(0.070)	(0.033)	(0.033)	(0.032)	(0.038)	(0.043)
day -3	-0.025	-0.010	-0.002	-0.010	0.030	0.019
	(0.056)	(0.032)	(0.030)	(0.031)	(0.037)	(0.040)
day -2	0.012	0.015	0.046	-0.046	0.090**	0.105**
	(0.062)	(0.034)	(0.036)	(0.032)	(0.039)	(0.050)
day -1	0.018	-0.015	0.064*	0.049	0.015	-0.015
	(0.067)	(0.033)	(0.036)	(0.036)	(0.037)	(0.044)
day 0	-0.024	0.074**	0.074**	0.061*	0.092**	0.045
	(0.061)	(0.037)	(0.037)	(0.036)	(0.041)	(0.045)
day 1	0.002	-0.022	-0.011	-0.013	-0.032	-0.012
	(0.066)	(0.036)	(0.033)	(0.035)	(0.038)	(0.044)
day 2	0.068	0.016	0.048	0.010	0.068	-0.004
	(0.059)	(0.037)	(0.036)	(0.032)	(0.045)	(0.044)
day 3	0.008	-0.036	-0.001	-0.019	0.016	0.040
	(0.055)	(0.033)	(0.033)	(0.031)	(0.041)	(0.047)
day 4	-0.019	0.005	-0.020	-0.022	-0.019	-0.023
	(0.067)	(0.038)	(0.033)	(0.036)	(0.037)	(0.043)
day 5	0.104	0.038	-0.018	0.044	0.068	-0.075*
	(0.073)	(0.039)	(0.035)	(0.037)	(0.044)	(0.041)
day 6	-0.056	-0.060*	0.001	0.020	-0.032	-0.080*
	(0.074)	(0.032)	(0.037)	(0.037)	(0.038)	(0.047)
day 7	-0.049	0.026	-0.009	0.008	-0.038	0.008
	(0.062)	(0.034)	(0.035)	(0.033)	(0.037)	(0.047)
Fixed effects						
Month	Yes	Yes	Yes	Yes	Yes	Yes
Day of week	Yes	Yes	Yes	Yes	Yes	Yes
Week of month	Yes	Yes	Yes	Yes	Yes	Yes
Holiday	Yes	Yes	Yes	Yes	Yes	Yes
Individual	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.02	0.03	0.02	0.02	0.02	0.02
N	70,516	211,003	241,957	246,349	192,351	129,129

Table 10: Cross-sectional determinants of unawareness and impulsiveness

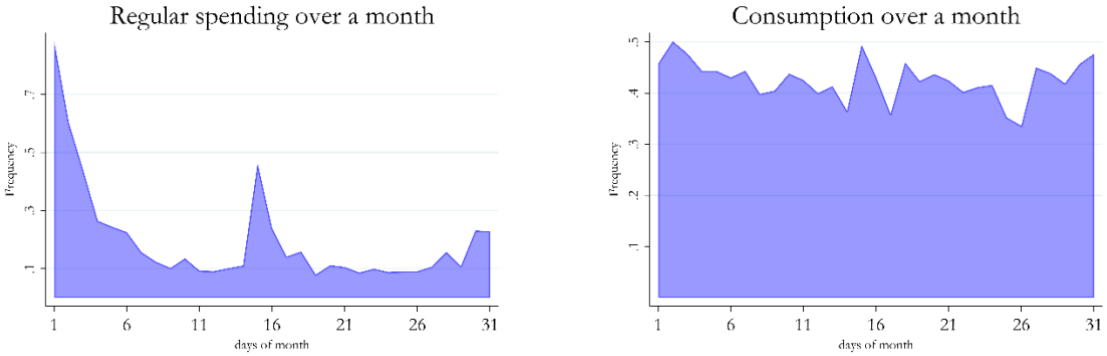
The following table presents cross-sectional determinates of unawareness and impulsiveness. The dependent variable in Column 1 takes the value of one if an individual is measured as unaware based on the survey questions from Table 8. In Column 2 the outcome variable is impulsive as measured by the survey data. Refer to the text for the exact criteria of the variables. Coefficients state the marginal effects after a logistic regression. *, **, and *** denote significance at the 10%, 5% and 1% level, respectively.

	Unaware	Impulsive
	(1)	(2)
Male	0.027*	-0.014
	(0.016)	(0.019)
Age	-0.001	-0.002**
	(0.001)	(0.001)
Married	-0.036***	0.009
	(0.014)	(0.017)
Employed	-0.023	0.000
	(0.015)	(0.019)
Civil servant	-0.055	0.030
	(0.046)	(0.047)
Manager	-0.029	0.023
	(0.044)	(0.049)
Retired	0.035	-0.002
	(0.023)	(0.032)
Monthly logins	-0.000	-0.000
	(0.001)	(0.001)
Log. wealth	0.006	0.013**
	(0.005)	(0.006)
Log. income	0.000	0.004
	(0.003)	(0.004)
Above median dividend share	0.003	-0.014
	(0.013)	(0.016)
Stock share	0.020	0.057
	(0.028)	(0.035)
ETF holder	0.001	-0.094***
	(0.020)	(0.029)
Total trades	-0.000	0.000
	(0.000)	(0.000)
Home share	-0.018	-0.019
	(0.029)	(0.036)
HHI	0.015	0.008
	(0.031)	(0.040)
Pseudo R^2	0.02	0.01
N	2,613	2,613

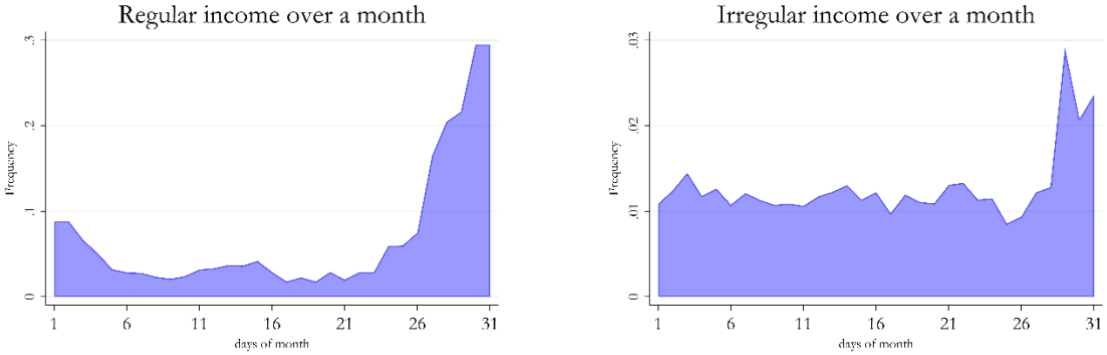
Figure 1: Consumption and income over time

In Panel A, the figures plot the distribution of regular spending and consumption over a month. Panel B shows the distribution of regular and irregular income over a month, and Panel C shows the distribution of dividend income over a month and a year. Sample size is 10,339 dividend-investors.

Panel A: Regular spending and consumption



Panel B: Regular and irregular income



Panel C: Dividend income

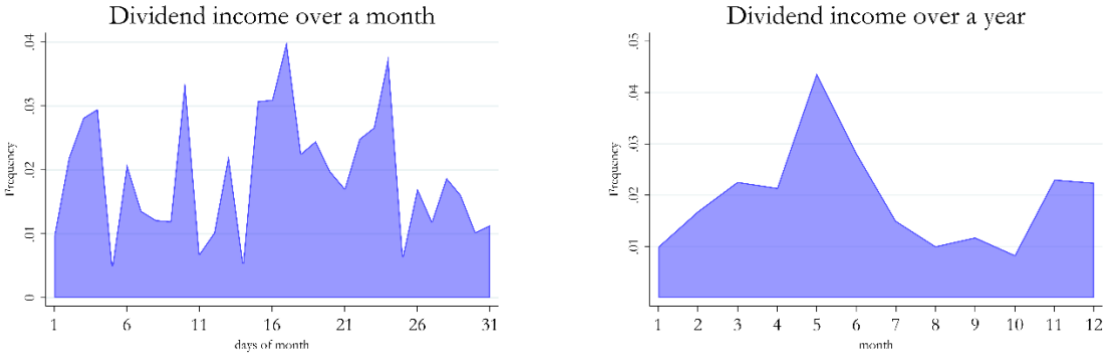
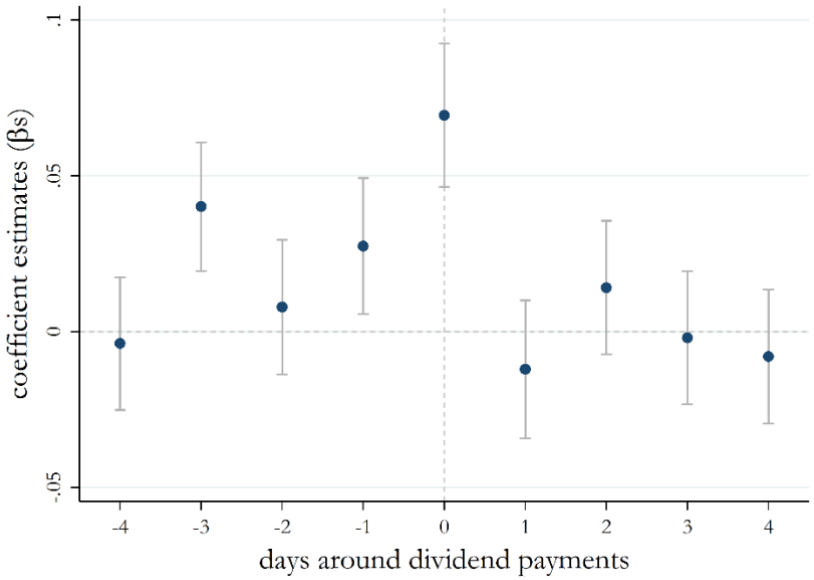


Figure 2: The consumption response to dividend payments

This figure plots coefficient estimates from equation (1) on the *y*-axis. The *x*-axis shows the days around dividend payments. Bars show 95% confidence intervals and dashed lines highlight the day of dividend payments (t = 0). Panels A and B show the percentage deviation from average daily consumption and uncategorized outflows, respectively. Sample size is 10,339 dividend-investors.

Panel A: Categorized consumption



Panel B: Uncategorized outflows

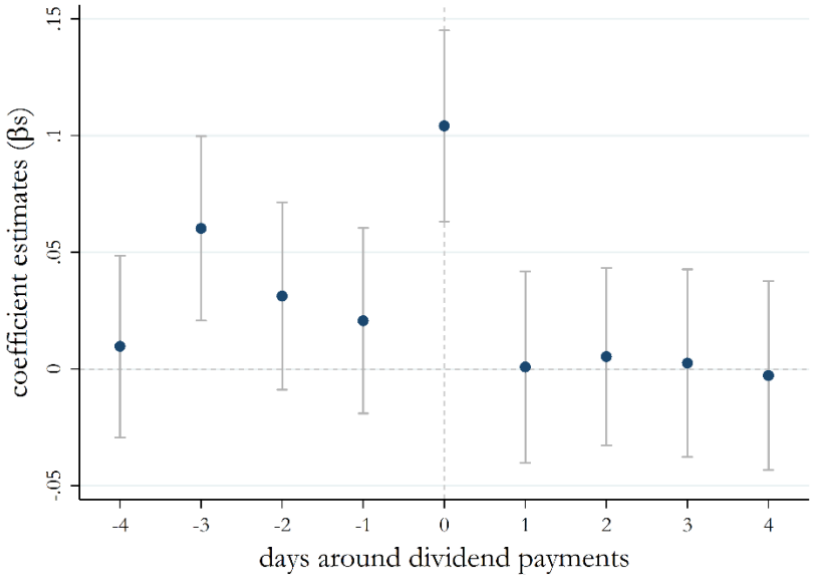


Figure 3: Reinvestment around dividend payments

This figure plots coefficient estimates from equation (1) on the *y*-axis where the dependent variable is ratio of individual i's purchase volume on date t to his or her average daily purchase volume. The *x*-axis shows the days around dividend payments. Bars show 95% confidence intervals and dashed lines highlight the day of dividend payments (t = 0). Sample size is 10,339 dividend-investors.

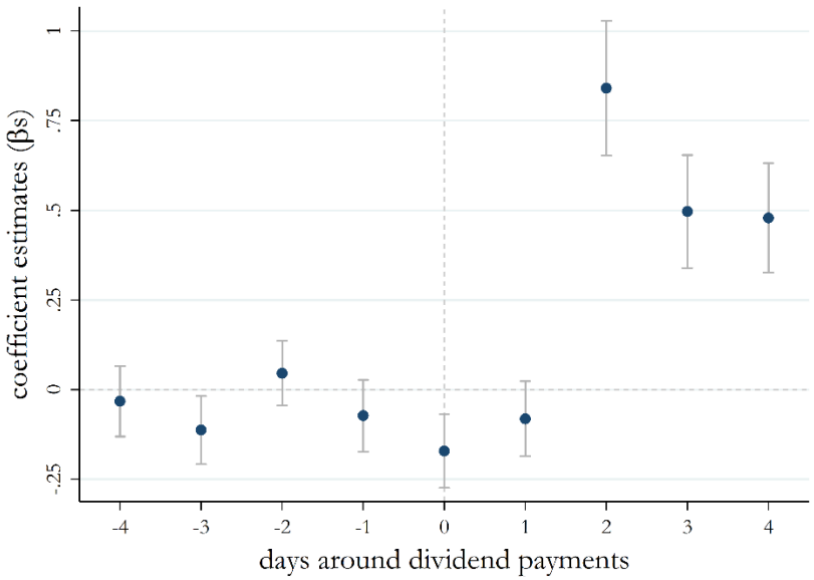


Figure 4: Responses to dividend payments across wealth quintiles

This figure plots coefficient estimates from equation (1) on the *y*-axis, where we run regressions separately within quintiles of investor wealth. The *x*-axis shows the 14 days around dividend payments. Dashed lines show the day of dividend payments (t = 0). Panels A, B and C show the percentage deviation from average daily consumption, uncategorized outflows, and purchase volume, respectively. Sample size is 10,339 dividend-investors, split into quintiles of wealth. *, **, and *** denote significance at the 10%, 5% and 1% level, respectively.

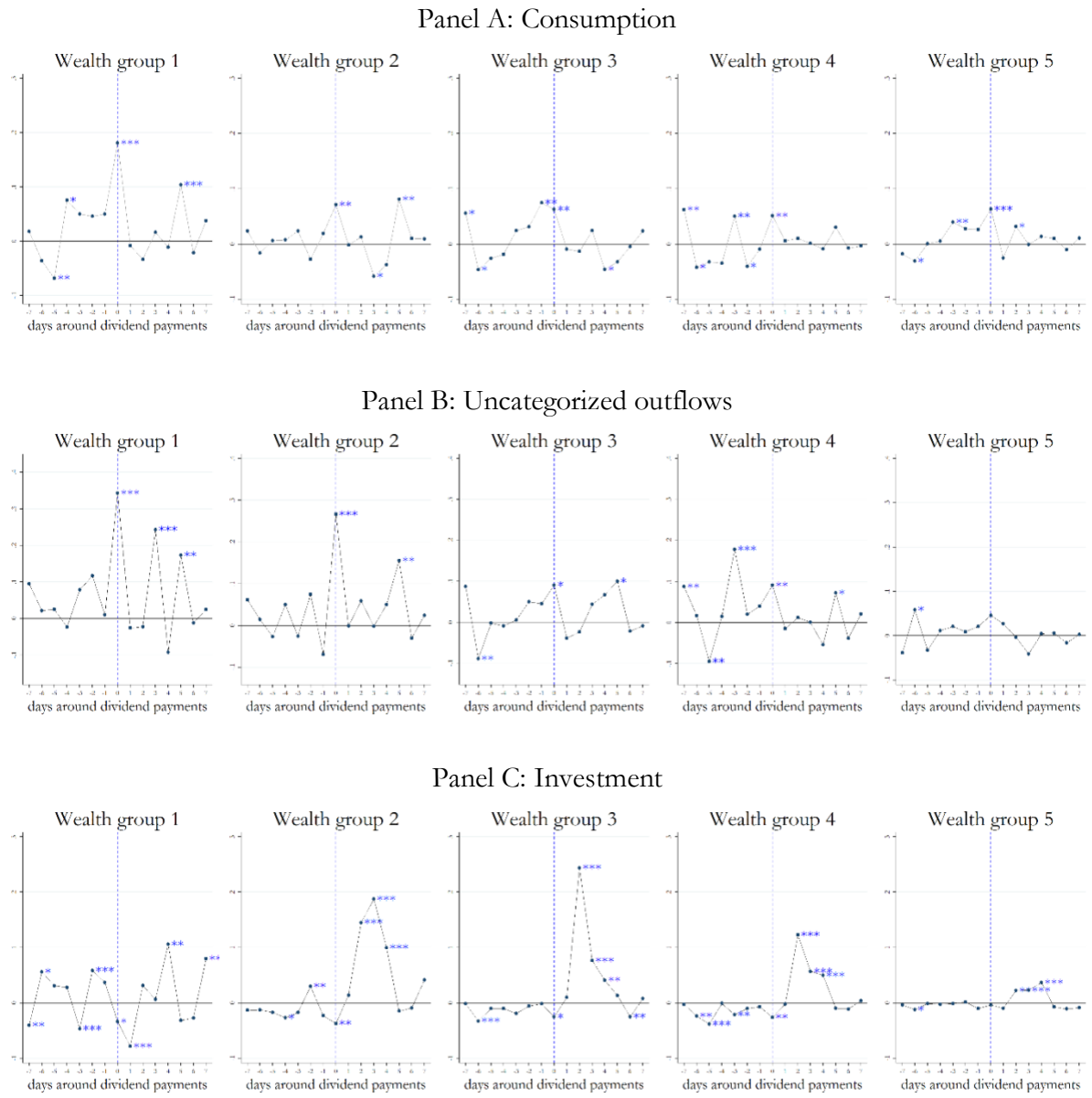
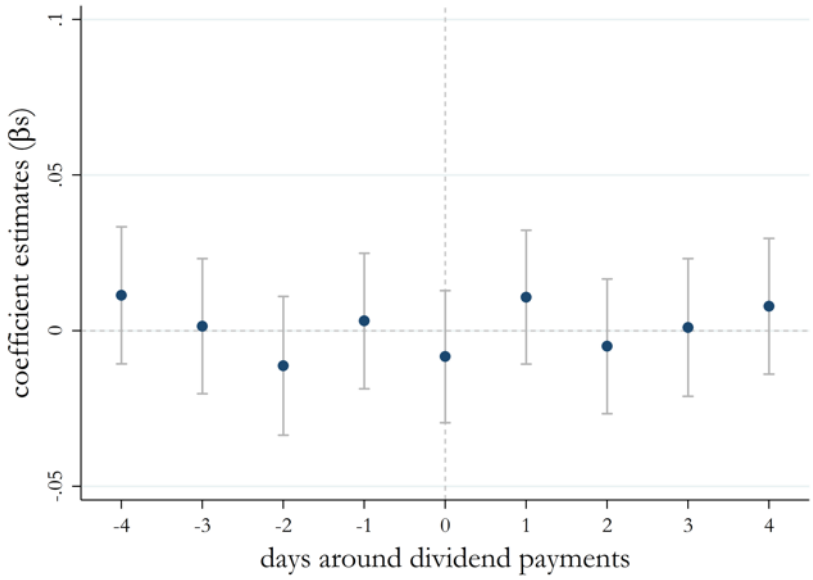


Figure 5: The consumption response to dividend payments – Placebo test

This figure plots coefficient estimates from equation (1) on the *y*-axis. The *x*-axis shows the days around dividend payments. Bars show 95% confidence intervals and dashed lines highlight the day of dividend payments (t = 0). In Panel A the figure plots investors' consumption responses to placebo dividend payment dates. Placebo dividend payments dates are randomly generated payment dates within the same month of the actual date that an investor receives a dividend. Sample size is 10,339 dividend-investors. Panel B plots the consumption response of non-investors that are matched to the main sample of dividend-investors along several individual characteristics such as age, wealth, income, and consumption. Refer to the text for the exact matching procedure. Sample size is 4,818 matched non-investors.

Panel A: Consumption reaction of dividend-investors on randomly generated payment dates



Panel B: Consumption reaction of non-investors on actual dividend payment dates of matched dividend-investors

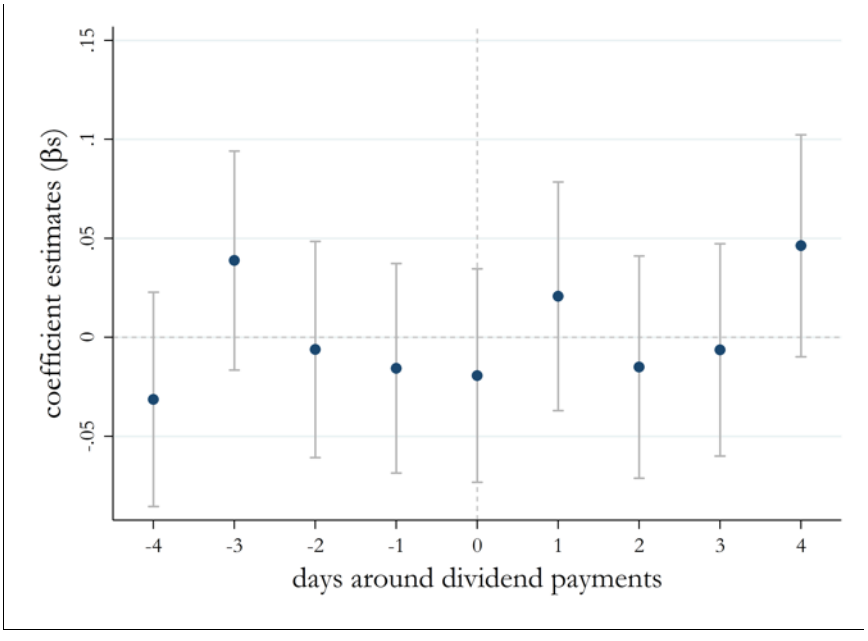


Figure 6: Consumption response to dividend payments, regular income arrival, and tax refunds across wealth quintiles

This figure plots coefficient estimates from equation (1) on the *y*-axis, where we run regressions separately within quintiles of investor wealth. In panels A, B, and C, the *x*-axis shows the 14 days around dividend payments, the arrival of regular income and the arrival of tax refunds, respectively. Dashed lines show the day of income arrival (t = 0). Sample size is 10,339 dividend-investors, split into quintiles of wealth. *, **, and *** denote significance at the 10%, 5% and 1% level, respectively.

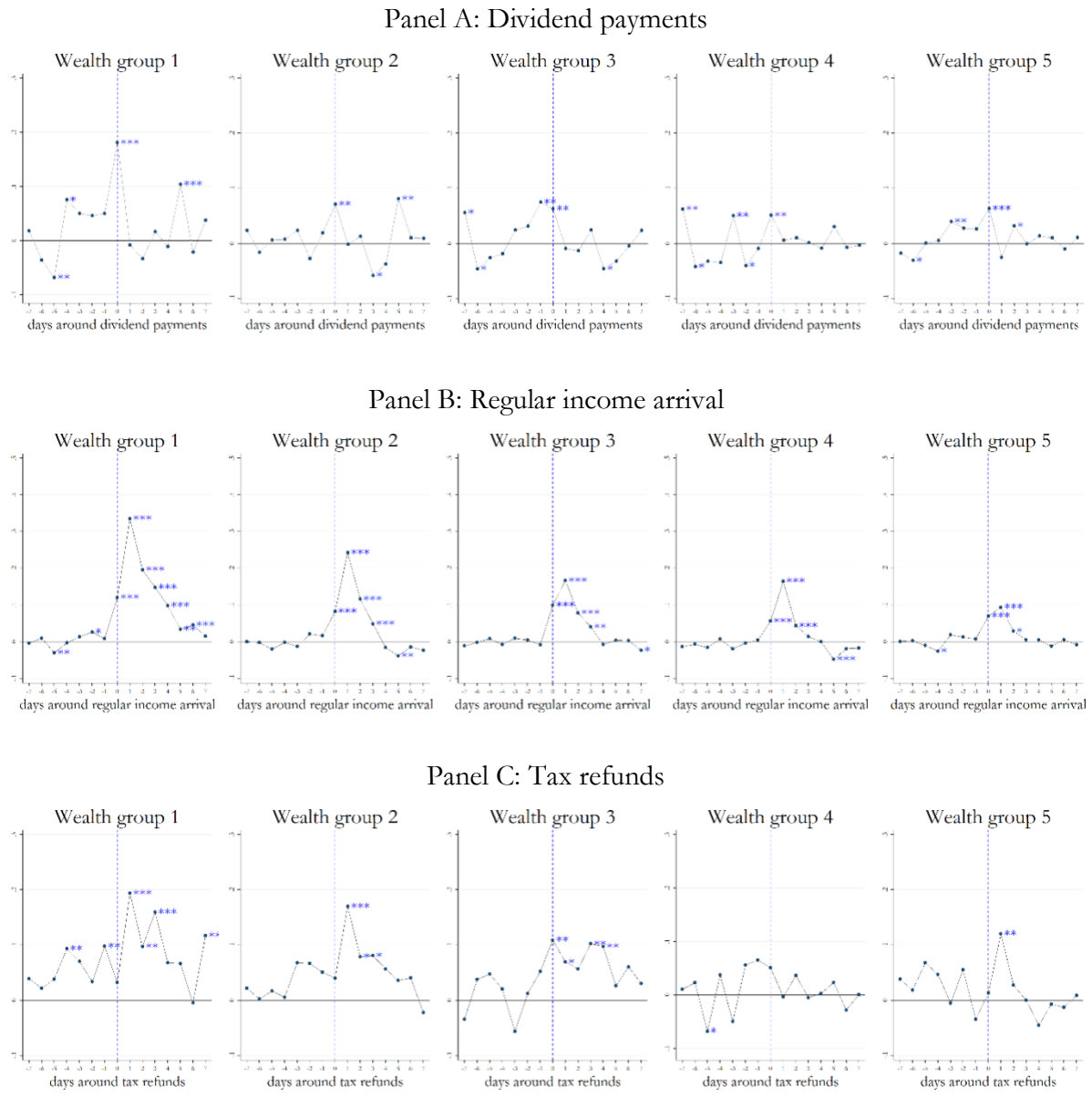


Figure 7: Login behavior around dividend payments

This figure plots coefficient estimates from equation (1) on the *y*-axis where the dependent variable is the ratio of individual i's number of online-banking logins on date t to his or her average daily logins. The *x*-axis shows the days around dividend payments. Bars show 95% confidence intervals and the dashed line highlights the day of dividend payments (t = 0). Sample size is 10,339 dividend-investors.

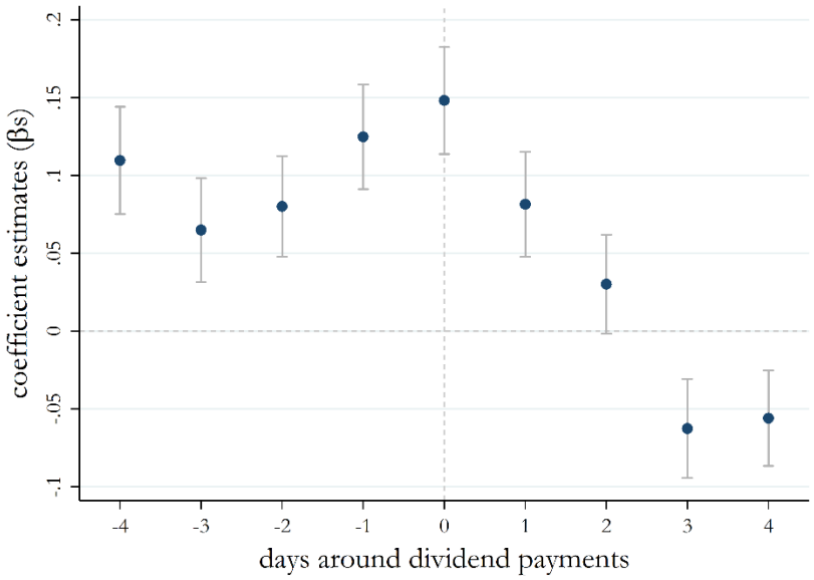


Figure 8: Login behavior around dividend payments and survey responses

This figure plots coefficient estimates from equation (1) on the *y*-axis where the dependent variable is the ratio of individual i's number of online-banking logins on date t to his or her average daily logins. Each plot corresponds to the survey responses from Table 8. The *x*-axis shows the days around dividend payments. Bars show 95% confidence intervals and the dashed line highlights the day of dividend payments (t = 0). Sample size is 10,339 dividend-investors.