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Consuming Dividends*

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Abstract:

This paper studies why investors buy dividend-paying assets and how they time their consumption accordingly. We combine administrative bank data linking customers' consumption transactions and income to detailed portfolio 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 days of dividend receipt. Importantly, the consumption response is driven by financially prudent 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.

JEL Classification: G50, G40, G11, D12, D14

Keywords: Consumption, Stock market wealth, Dividends, Excess sensitivity, Self-control, Household finance, Retail investors

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1. Introduction

When it comes to dividends, investor behavior is puzzling. Although investors should be indifferent between dividends and capital gains (Miller and Modigliani, 1961), both retail and institutional investors often show a strong preference for dividends, which is difficult to explain with standard frictions such as taxes or transaction costs (Hartzmark and Solomon, 2019) and points towards the existence of dividend clienteles.^{1,2} In line with this evidence, recent research suggests that a consumption motive may drive investors' preferences for dividend-paying assets by documenting that households consume from dividend income, but much less from unrealized capital gains (Baker, Nagel, and Wurgler, 2007; Di Maggio, Kermani, and Majlesi, 2020).³ Under traditional assumptions that a firm's dividend policy is irrelevant to investors it is difficult to explain these findings and why individuals would tie consumption to dividend income.

Thus, an important question is which households consume from dividend income and why? Investors may treat dividends and capital gains differently and follow a mental accounting practice such as 'consume income, not principal' or a 'live-off-income' rule of thumb (Baker, Nagel, and Wurgler, 2007; Daniel, Garlappi, and Xiao, 2019; Hartzmark and Solomon, 2019; Jiang and Sun, 2019). Private consumption may respond to dividend income if households are liquidity constrained (Zeldes, 1989; Deaton, 1991; Carroll, 1997; Kaplan et al., 2014; Kaplan and Violante, 2014), 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 understanding household consumption from the stock market is core to policy,⁴ it has proven challenging to pin down the underlying mechanism, and to date there appears to be no consensus on why individuals consume out of dividends.

In this paper, we examine how individuals consume from dividend income and test existing theories which attempt to explain investors' preferences for dividends. We access unique data from

¹ Hartzmark and Solomon (2019) document that retail investors, mutual funds, and institutions behave as if dividends were free income streams unrelated to capital gains. Their evidence is consistent with psychological reasons, particularly mental accounting, rather than institutional reasons (taxes or transaction costs) driving preferences for dividends.

² Black and Scholes (1974), Shefrin and Statman (1984), Allen, Bernardo, and Welch (2000), Graham and Kumar (2006), and Becker, Ivkovic, and Weisbenner (2011) examine the existence and characteristics of dividend clienteles.

³ Estimates of the marginal propensity to consume (MPC) out of dividends range between 35% and 75%, while between 0% - 23% out of capital gains (Baker, Nagel, and Wurgler, 2007; Di Maggio, Kermani, and Majlesi, 2020). See, e.g., Poterba (2000), Kaustia and Rantapuska (2012), and Paiella and Pistaferri (2017) for further empirical evidence.

⁴ Consumption-driven portfolio choice is important for asset pricing (Hartzmark and Solomon, 2013; Harris, Hartzmark, and Solomon 2015; 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; Jiang and Sun, 2019).

a large German bank which features information on customer demographics, categorized current account transactions, portfolio holdings, and individual trading records. We supplement this administrative data with a survey allowing us to characterize investors' saving and spending behavior. 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' marginal propensity to consume (MPC) and their 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 detailed data on investors' spending and consumption transactions. Our analysis of daily consumption responses coupled with survey data enable us to test existing theories of household consumption behavior and provide an explanation for the previously documented large MPCs out of dividends.

We find that consumption is excessively sensitive to dividend income.⁵ Investors spend 20% of dividends on non-recurring purchases within *one week* of dividend income receipt. The MPC with a more narrow definition of consumption including dining out, cash withdrawals, and durables is 2.3% at the mean, and masks substantial heterogeneity. Although our sample consists of wealthy investors relative to the average household, investors in lower wealth groups spend 60% of dividends on non-recurring purchases and 27% on consumption within one week. Conditional on dividend size, we find that even investors with above median wealth consume 10%-25% out of dividends in the week after income arrival. Generally, our results suggest that most investors increase consumption by €10-20 relative to normal spending shortly after dividend receipt and that the consumption response in levels does not vary substantially across the distribution of investor characteristics, wealth and liquid assets, or dividend size.⁶ Rather, investors uniformly increase consumption in response to dividend receipt. As a result, the MPC decreases monotonically and markedly with absolute dividend size.

⁵ The life-cycle/permanent income hypothesis (Friedman, 1957) suggests household consumption should only respond to unpredictable changes in permanent income. In particular, households should smooth 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 anticipated permanent and transitory income (e.g., Parker, 1999; Souleles, 1999; Parker et al., 2013; Olafsson and Pagel, 2018). See Jappelli and Pistaferri (2010) for a recent survey of the empirical literature.

⁶ Olafsson and Pagel (2018) estimate that households increase spending around regular income arrival by around \$30. Parker (2017) finds that the MPC out of stimulus payments is approximately 2% in the week of receipt. When we examine MPCs from other sources of income (i.e., regular income, tax-refunds) we find results similar to those in the extant literature.

Strikingly, we find that most of this consumption occurs precisely on the day dividends are received. To highlight this, we estimate the ratio of spending on the days leading up to, on, and after investors receive a dividend. This empirical strategy is often employed in the literature on excess sensitivity to income using high-frequency data (e.g., Gelman et al., 2014; Olafsson and Pagel, 2018) and underscores the timing component of our findings. We find that investors exhibit a clear and marked response to dividend income across various measures of consumption, precisely on the day the dividend is received (a ‘day-zero’ response on the dividend payment day).

What drives this excess sensitivity to dividend payments? We provide evidence that it is driven by attentive investors who exhibit financially prudent behavior (sophisticated investors), and seem to *plan* contemporaneous consumption out of dividends. The MPC estimates and day-zero coefficients are statistically significant across the wealth, income, and age distributions as well as among households who are far from constrained. Thus, 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 those with less wealth or liquid assets relative to income, supporting recent work by Di Maggio, Kermani, and Majlesi (2020) and Olafsson and Pagel (2018).

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. We document a pronounced increase in online-banking logins on the day of dividend income arrival, suggesting that many investors keep track of their dividend payments and that the observed consumption effect is driven by attentive investors who plan to consume out of dividends.

To further aid our understanding of which investors are excessively sensitive to dividend income, and why, we ask subjects in our sample simple survey questions on their savings and spending behavior. This allows us to test if investors who exhibit less financially prudent behavior are more prone to respond to the receipt of dividend income. In addition, we examine the predictions of Shefrin and Statman (1984) where individuals with self-control issues might tie their consumption to dividend income. We construct an index of ‘prudent’ behavior based on investors’ survey responses and find that those who react to dividend income by increasing consumption precisely around its arrival load positively on this measure. These individuals consume out of dividends immediately after income arrival and state that they are very patient and more likely than other dividend-investors to save rather than spend money, make financial plans, and avoid regretful

purchases. That the consumption response is driven by these sophisticated individuals suggests that excess sensitivity to dividend payments does not reflect inattention or ‘absent-mindedness’ (Ameriks, Caplin, and Leahy, 2004), but rather planned behavior. Importantly, this behavior contrasts with recent findings documenting a positive relationship between spending in response to other sources of income and impatience, and a lack of sophistication and financial planning (Parker, 2017). Our findings also contrast with theoretical models of dividend-investors who tie consumption to dividends as a commitment device (Shefrin and Statman, 1984; Daniel, Garlappi, and Xiao, 2019; Jiang and Sun, 2019). Rather, we suggest that *less* impulsive investors consume a *larger* fraction of their dividend income precisely around days of its arrival.

Finally, we ask subjects in our sample how they use and perceive dividends. Unsurprisingly, we find that those investors who state that they consume the largest fraction of their dividends also consume more from dividends than other investors. Investors state that they view dividends as an expected bonus (49%), salary or pension (12%), windfall gains (14%), or a negligible payment (24%). Importantly, investors who view dividends as predictable recurring income consume much more out of them than investors for whom dividends are unexpected or ‘negligible’. In addition, those who treat dividends as salary or pension are older, more likely to be retired, substantially wealthier, and receive almost nine large dividends per year, providing support for ‘living-off-income’ behavior as documented by Daniel, Garlappi, and Xiao (2019). That more than 60% of investors view dividends as an expected source of income while only 24% view them as theory would predict (i.e., an irrelevant payout) is consistent with Hartzmark and Solomon (2019) who provide evidence that investors view dividends as extra or ‘free’ money and neglect the associated price decrease. In sum, analyzing consumption responses along investors’ perception of dividends further substantiates the ‘planned-consumption’ channel that we identify.

One important concern about our finding that investors increase consumption around dividend receipt is that the effect may be confounded by the coincidental timing of income from other sources which investors may react to. We address this and related concerns in several dimensions. 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, while the observed effect is largest for German stocks, it is statistically and economically significant also for equity mutual funds and foreign stocks which issue dividends at different points throughout a calendar year. Third, we implement a 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 and find no significant effect in consumption. We further stress our results in a simple

difference-in-differences test and document that dividend-investors increase consumption significantly on dividend payment days *relative* to their matched pairs of non-investors. These tests allow us to rule out the concern that our findings may be driven by a spurious relationship in consumption and the non-random timing of dividend payments.

Although our findings are puzzling in the light of standard theory, associated welfare losses from the excess sensitivity that we document are perhaps minor. Nonetheless, we believe our findings have important 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, Ivkovic, and Weisbenner, 2011). Secondly, changes in the size and timing of dividend payouts, and more generally in dividend policy, could affect aggregate (and local) consumption if shareholders tie their consumption decisions to their portfolios. In addition, if firms make share repurchases rather than issue dividends,⁷ shareholders are affected via capital gains instead of income which may affect consumption decisions. Our results suggest that 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 echoes recent research documenting investors' demand for dividend-paying assets specifically for consumption, particularly in low interest rate environments (Daniel, Garlappi, and Xiao, 2019; Jiang and Sun, 2019).

Our study adds to the understanding of how private consumption responds to changes in wealth and income and contributes to several related streams of literature. First, we 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 examine the association between consumption and stock market wealth. Recent work by Di Maggio, Kermani, and Majlesi (2020) exploits comprehensive administrative data, overcoming limitations in previous studies including representativeness and unobserved portfolio holdings. Our work is closely related to and motivated by these studies which document that investors strongly respond to dividend income but much less to unrealized capital gains (Baker, Nagel, and Wurgler, 2007; Di Maggio, Kermani, and Majlesi, 2020). By using high-frequency data on consumption transactions and dividend income receipt, our study provides additional evidence that a significant

⁷ 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).

fraction of the consumption response to dividend income is concentrated precisely around its arrival.⁸ Relatedly, Meyer and Pagel (2020), Meyer, Pagel, and Previtero (2019), and Loos, Meyer, and Pagel (2020) find that MPCs out of exogenous changes in *realized* capital gains stemming from fund liquidations and tax reforms can be large and similar to MPCs out of dividends. Our study documents that the investors who consume from dividends, are those who view dividends as a stable source of income, and anticipate and keep track of their payouts. Specifically, many investors appear to *plan* consumption out of sources of stock market income such as dividends, which is unlikely to be the case for unexpected events such as fund liquidations or tax reforms and therefore highlights a different channel for observed consumption.

Second, we contribute to studies on the consumption response to permanent and transitory income arrival. This literature has generally focused on the consumption response from tax rebates using survey data (e.g., Shapiro and Slemrod, 1995; Parker, 1999; Souleles, 1999; Shapiro and Slemrod, 2003; Johnson et al., 2006; Shapiro and Slemrod, 2009; Parker et al., 2013), and some also examine behavioral mechanisms for why individuals may exhibit excess sensitivity. For example, Parker (2017) finds a strong positive relationship between spending and a *lack* of financial planning and impatience. More recently, this literature exploits granular income and spending data from PFM tools. Related to our study are Gelman et al. (2014) and Olafsson and Pagel (2018) who both document significant contemporaneous consumption responses around income receipt.⁹ In contrast, we focus specifically on dividend income and individuals with relatively high wealth (stock market participants). Relatedly, Kueng (2018) uses transaction-level data from a PFM tool and analyzes excess sensitivity of consumption to a highly predictable annual payment from a single security, i.e., the Alaska Permanent Fund. Our setting allows us to investigate dividend payments from various securities including both stocks and funds from domestic and foreign assets, which provide income at different times throughout the year enabling investors to generate various income-streams from dividends. The shareholder-dividends in our setting entail substantially more uncertainty in both dividend size and payment date. These attributes also reduce potential confounds from coordinated consumption or peer-effects. 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

⁸ Our administrative dataset allows us to address empirical challenges of previous studies. For instance, studies using brokerage data (Baker, Nagel, and Wurgler, 2007) obtain detailed data about holdings and trades but typically do not observe consumption. A challenge with annual data from administrative data sets (Di Maggio, Kermani, and Majlesi, 2020) is the absence of consumption (and investment) transactions. Indirect measures of consumption, i.e., imputed consumption, may induce measurement error (Baker et al., 2018) and it is impossible to study consumption around specific dividend payment days with annual holdings information.

⁹ Ganong and Noel (2019) similarly use high-frequency bank account data to investigate households' spending behavior during unemployment.

States. We contribute to this established literature in two respects. First, by providing evidence that the consumption response from dividends can be quantitatively similar in magnitude to other sources of income. Second, our findings suggest that the underlying mechanism behind the observed response is likely to differ substantially. We find in contrast to other studies, that while unsophisticated households also are sensitive, financially ‘prudent’ investors show excess sensitivity in consumption from dividend income.

Finally, we also contribute to the literature describing a dividend clientele (e.g., Black and Scholes, 1974; Allen, Bernardo, and Welch, 2000; Baker and Wurgler, 2004; 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, Ivkovic, and Weisbenner, 2011; Kumar, Lei, and Zhang, 2019; Golubov, Lasfer, and Vitkova, 2020), and financial markets (Hartzmark and Solomon, 2013; Daniel, Garlappi, and Xiao, 2019; Hartzmark and Solomon, 2019). Our analysis provides micro-evidence that investors who construct portfolios tilted towards higher dividend yields and view dividends as regular income are those who exhibit the strongest (contemporaneous) response to dividend payments in their daily consumption behavior. Alongside the ‘planned-consumption’ channel we identify, these findings are consistent with investors ‘reaching for income’ specifically for consumption (Daniel, Garlappi, and Xiao, 2019; Jiang and Sun, 2019), and following the adage to ‘consume income, not principal’ (Baker, Nagel, and Wurgler, 2007; Hartzmark and Solomon, 2019).

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. Section 5 focuses on the drivers of the observed excess sensitivity and analyzes heterogeneity in consumption responses among investors. Section 6 concludes.

2. Data and summary statistics

2.1. Data and variable definitions

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, importantly, categorized current account transactions. Transaction-level data comes from a PFM tool offered by the bank. 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, bank customers 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, the categorization feature of the PFM tool allows us to construct 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, and information on types of banking products used. 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. 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.

Our dataset consists of a sample drawn in two waves. We first draw a random sample of 88,098 bank customers who activated the PFM tool before 2017. For this sample, all data including demographic information, PFM tool transaction data, login data, account balances, and investment holdings and transaction data are available from January 1st 2017 until December 31st 2017. 12,579 of these customers are investors who have a securities account at the observed bank. In July 2019 we accessed an additional sample of 55,173 investors who activated the tool prior to 2017, including 10,794 investors which match to our first sampling wave. This wave of data provides all variables of interest from June 1st 2017 until June 30th 2019. Our complete sample thus consists of an unbalanced panel of 56,958 customers and spans the period January 2017 to June 2019. For each investor, we observe full information on consumption and dividend income.

Our 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 on which we observe 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, automatic reinvestment plans, or any other additional brokerage fees and commissions. We also cross-verify that PFM tool inflows are no larger than what investors should receive according to their holdings and Datastream’s dividend per share information. 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 who have on average at least two non-durable consumption-outflows per month during the sample period and are above 18 years of age.¹⁰ We also drop investors for whom the maximum received dividend is in the top 1% of the distribution. This yields a final sample of 27,192 dividend-investors who receive at least one dividend payment within the sample period. The remaining group of 3,522 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 or, respectively, the cash receipt is not observable to us (potentially due to automatic transfers to unobservable accounts or automatic reinvestment plans setup with the bank).¹¹

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.

¹⁰ We impose restrictions on the number of observed consumption days to make sure that sample investors actively use the observed bank account for consumption transactions.

¹¹ 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 and are excluded. 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.¹² Table 1 details each type of transaction and how we classify it into consumption variables.

If a transaction cannot clearly be allocated to one category, it is labeled as uncategorized and is left for manual allocation by the user, which often remain uncategorized throughout our sample. In many cases these uncategorized transactions constitute payments or transfers to a retailer or party unknown to the algorithm. As such, peer-to-peer transactions, transfers between accounts, settling invoices such as medical expenses, purchases with smaller, local or foreign retailers, and other bill settlement 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 therefore difficult to approximate what fraction of uncategorized outflows represents consumption versus financial transfers between and within accounts. During the sample period, about 35% of the observed outflow transactions are uncategorized. To address this challenge, we cooperated with the bank to manually classify a small random sample of uncategorized outflows. Among 200 uncategorized outflows, we determined that 50 outflows (25%) were in fact financial transfers, while 142 (71%) were actual consumption transactions. Of these, almost 40% could be attributed to living expenses (e.g., grocery shopping).¹³ We therefore create several consumption measures based on assumptions we make on the nature of the transaction. Our most generalized measure of consumption (non-recurring spending) includes all

¹² 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.

¹³ We also determined that 70% of all identified financial transfers had round integer values, 63% were above €100, and 55% were multiples of €5. In contrast, 92% of all identified living expenses were below €100, 35% are non-integer expenses, and 14% are a multiple of €5. This strongly suggests that only a minor fraction of non-recurring, non-integer uncategorized outflows that are below €100 are non-consumption transactions like financial transfers.

non-recurring uncategorized transactions. We flag an uncategorized transaction as recurring if we observe the same value in spending during several points in the customers' time series.¹⁴ In our main measure of consumption (durable plus non-durable) we exclude potential financial transfers by additionally removing all uncategorized outflows that are above €500 or which are a multiple of €25. In our more restrictive measure of non-durable consumption, we only include non-recurring, non-integer uncategorized outflows that are below €100.¹⁵

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, date 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 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.¹⁶

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 650 weekdays during the sample period (Jan 1st 2017 through June 30th 2019).

¹⁴ We exclude all uncategorized transactions of the same value that reoccur annually (i.e., once a year and in the same month each year) or semi-annually (i.e., twice a year in different months of the year and the same months each year). We do not find evidence of any other schedules (e.g., quarterly or monthly) and in general identify only very few uncategorized outflows as recurring, indicating that the PFM's algorithm is able to accurately categorize recurring outflows.

¹⁵ It is important to note, that these assumptions and definitions on our outcome variable reduces the upward bias on our estimates such that all of our results are far more conservative.

¹⁶ 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.

2.3. Survey data

In July 2019, we conducted a short and simple online survey with a subsample of the investors in our main sample. The survey was conducted within the bank's online portal. We combine the answers from this survey with our data on consumption patterns and investment behavior. 55,173 investors were invited to participate in the survey and 4,560 completed the survey yielding a response rate of 8.26%. We can match 2,059 investors who completed the survey to our main dividend-investor sample. The survey consists of questions related to individual's spending and savings behavior and investors' use and perception of dividends. The survey questions are motivated by previous literature suggesting that consumption sensitivity is related to behavioral traits such as the propensity to save rather than spend, the propensity to make financial plans, patience, and self-control (e.g., Lusardi, 1999; Angeletos et al., 2001; Ameriks, Caplin and Leahy, 2003; Gul and Pesendorfer, 2004a; Gul and Pesendorfer, 2004b; Ameriks, Caplin, and Leahy, 2004; Parker, 2017; Kuchler and Pagel, 2020). We discuss the survey in further detail in Section 5 and the detailed questions can be found in Appendix C.

2.4. Summary statistics

A. Demographic characteristics and financial assets

In Table 2, 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. We find that dividend-investors are on average substantially wealthier in terms of the assets they hold at the bank, largely as a result of a significantly higher portfolio value (risky assets deposited at the bank). They are on average older, more likely to be married and retired, and have a slightly longer relationship with the bank. Panel C of Table 2 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 mutual funds, and less into exchange-traded funds (ETFs). They are more diversified in terms of the number of stocks and funds they hold but less diversified in terms of global diversification. Specifically, the average share of stocks and assets with a German investment focus in the portfolios of dividend-investors (other investors) amounts to 39.4% (19.6%).

In Table A.1 in the Appendix we investigate the cross-sectional determinants of investing in dividends in multivariate logistic regressions. Results confirm observed differences in means between dividend-investors and other investors in that dividend-investors tend to be older, more likely to be retired, spend less on average, invest a larger fraction of their portfolios in single stocks,

and have a strong preference for local investments. These results are generally supportive of Graham and Kumar (2006), who find that older, particularly retired, investors who earn a lower income select into high dividend-paying stocks and constitute a dividend clientele.

B. Consumption

In Table 3, Panels A, B, and C describe the distribution of various spending categories including our three consumption variables for our main sample of dividend-investors. We average all monthly outflow categories over the sample period for each investor. The distributions of resulting monthly averages are presented in the table. The average (median) consumption per month amounts to €1,955 (€1,597). 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 €558 (€4,277) per month indicating that there are investors who consume low (high) amounts during a typical month. We address this large heterogeneity among investors and potential outliers on the right tail of the distribution that might bias results in two dimensions in our main analyses. First, by winsorizing at the top of the distribution and, second, by reporting results as the deviation from an individual's average daily spending in addition to our MPC estimates (discussed further in Section 3). 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.

C. Dividend income

Panel D of Table 3 shows the distribution of several sources of income in our main sample. Again, the table presents distributions of monthly investor-averages. 86% of our sample receive regular income of any type on the observed bank accounts. Conditional on receiving regular income, the average (median) per month amounts to €4,655 (€3,734),¹⁷ relatively large compared to the average monthly salary of \$2,701 reported in Olafsson and Pagel (2018). Again, this reflects differences in household characteristics among stock market participants as compared to non-participants. The 5th (95th) percentile of the distribution amount to €985 (€11,413) 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 €68.3 *per month* from dividends. 75% of investors receive 4 or less dividend payments per year with an average of 3.5

¹⁷ In addition to salary and pension, regular income includes government aid (e.g., child allowance and social security benefits) and rental income.

dividends per year across the sample, which is skewed to the right by some investors who receive more than 10 dividends per year. When looking at conditional dividend income, we find that the average (median) investor receives €213.8 (€126.4) *per dividend*. The median investor receives around €250 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 €288 (€3,453) 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.

Figure 2 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 a month. Irregular income such as tax refunds are more evenly distributed with a spike towards the end of the month. Looking at dividend income, Figure 2 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. Given that the portfolios of our German sample investors are tilted towards their home country (see Table 2), most investors receive dividends in May. In this month most of the large 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.¹⁸ Nevertheless, we observe dividend payments on 616 days out of the 650 weekdays that are included in our time-series over the sample period.¹⁹ 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 compared to investors in brokerage data sets (e.g., Barber and Odean, 2000; Dorn and Sengmueller, 2009; Bhattacharya et al., 2012). It also suggests that the effects we

¹⁸ For instance, the five most commonly held stocks in our sample pay out dividends to approximately 40% of all investors in 2019.

¹⁹ Of the 30 companies that constituted the DAX-30 index in 2017, 18 (19, 22) companies paid out dividends in May 2017, (2018, 2019). The remaining firms typically pay out dividends in February, April, or June. This payout policy has remained stable over the past years, which is why the time period during spring is commonly referred to as the 'dividend-season' in Germany.

find are unlikely to be negligible in terms of their economic significance since sample investors' wealth is comparatively high.

Finally, it is important to note that for a large part of assets observed in our sample, i.e., German stocks, information on the size of upcoming dividend payments, proposed by the company's management, is released four weeks before the actual payment and accessible on the company's website. Following the release of this information, major sources of financial media prominently report the details. The official announcement of the size of the dividend and its payable date then takes place at the annual general meeting. By law, German companies may pay dividends at earliest three business days after the general meeting.²⁰ We find that among the top 80 most commonly held German stocks in our sample between 56-58 companies (70-72.5%) actually did so during the years 2017 and 2019. Only 4-5 companies paid out dividends later than 7 days after the general meeting. It is extremely rare that the final decision on the size differs significantly from the initial proposal. Thus, most of the dividend payments that affect our sample investors are both salient and highly predictable approximately one month before payment. Figure B.1 in the Appendix shows that Google search volume for the (German) term "Dividende" as well as the number of news articles reporting about dividend payments in the German press peak in spring when most German companies pay out dividends.

3. Empirical strategy

We study an investor's contemporaneous consumption response on the days surrounding dividend payments. To do so, we measure both the consumption deviation from an investors' average daily spending as well as the MPC in a narrow window around the receipt of dividends. The first measure is motivated by recent literature documenting individuals' spending responses on and around the days of the arrival of regular income (Gelman et al., 2014; Olafsson and Pagel, 2018). We test if investors increase spending around dividend receipt and, particularly, when they do so by estimating the following regression model:

$$R_{it} = \sum_{k=-5}^5 \beta_k I_i(\text{Dividend}_{t+k}) + \delta_{dow} + \phi_{wom} + \psi_{my} + \eta_{holiday} + \theta_i + \epsilon_{it}. \quad (1)$$

Our dependent variable, R_{it} , measures the ratio of daily spending across the three aforementioned measures of consumption and 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

²⁰ The law became binding on January 1st 2017.

weekdays during the sample period. R_{it} is then computed as the consumption of individual i on day t divided by average daily consumption of individual i . Our variable of interest $I_i(\text{Dividend}_{t+k})$ is an indicator that equals one if investor i receives a dividend payment at time $t+k$, and is equal to 0 otherwise. β_k therefore measures the fraction by which an individual's consumption deviates from average daily consumption in the -5 to +5 weekdays surrounding the receipt of dividend income. Our event horizon thus spans two weeks. Day-of-week fixed effects capture within-week patterns for both income and consumption, while the week-of-month and month-year fixed effects control for cyclical patterns within each month over the sample period. 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.²¹ We cluster robust standard errors at the individual level.

To measure the MPC out of dividends we estimate the following linear regression model:

$$C_{it} = \sum_{k=-5}^5 \beta_k(\text{Dividends}_{t+k}) + \delta_{dow} + \phi_{wom} + \psi_{my} + \eta_{holiday} + \theta_i + \epsilon_{it}. \quad (2)$$

The dependent variable C_{it} is the euro amount of spending of individual i on day t using one of our three measures of consumption. As above, δ_{dow} , ϕ_{wom} , ψ_{my} and $\eta_{holiday}$ are day-of-week fixed effects, week-of-month fixed effects, month-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 (Dividends_{t+k}) is the euro amount of dividends received by investor i at time $t+k$. The coefficient, β_k , therefore measures the amount of consumption on day t relative to 1 euro received in dividends.²² We cumulate these daily MPC estimates over the 5 weekdays before (and after) $t=0$, and compute appropriate standard errors to investigate the one-week (5-weekday) cumulative 'Pre-' and 'Post-MPC' out of dividends. Post-MPC estimates include spending responses on the day of arrival as well.

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 our three measures of consumption. We present coefficients from linear

²¹ This mechanically leads to an exceptionally large amount of spending transactions on days after bank holidays, which would bias our estimates without additional fixed effects. Our results are virtually unchanged when including non-bank holidays as well. We do not find that non-bank holidays affect consumption in any systematic way that would bias our estimates.

²² Note that there are several ways to calculate the MPC out of income receipt, e.g., regressing changes in consumption on changes in income or using a log-on-log specification. We follow Parker (2017) and use a levels-on-levels specification by regressing the euro amount of consumption on the euro amount of received dividends.

regressions as described in equation (1) graphically in Figure 3. More precisely, in Panels A, B, and C Figure 3 shows the percentage deviation from average daily non-recurring spending, average daily consumption, and average daily non-durable consumption around the days of dividend payments, respectively. The y -axis is the size of the coefficient and the x -axis shows the 10 weekdays around dividend payments that occur on day $t = 0$ ('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 coincide with the actual consumption date (as noted in Section 2). The figure illustrates that investors exhibit a clear response to dividend payments both in terms of increased overall spending and increased (non-durable) consumption. The day-zero coefficients amount to 6.1% for non-recurring spending, 7.0% for total consumption, and 6.8% for non-durable consumption. Most importantly, Figure 3 highlights that investors exhibit the most pronounced consumption reaction on the day that dividends are paid out.

How large are the observed spending responses relative to the size of dividend payments? In Table 4 we examine the cumulative MPC out of dividends and compare it with the cumulative MPC out of regular income arrival over the five weekdays before ('Pre-MPC') as well as the day of arrival and the following five weekdays ('Post-MPC') after income receipt across our three measures of consumption.²³ Additionally, the table reports the spending ratios from Figure 3 as well as day-zero spending responses in euro terms. In Columns 1 and 2 we use our broadest measure of consumption (i.e., non-recurring spending) which removes all recurring expenses, however, includes non-recurring uncategorized transactions which may include at least some financial transfers depending on investors' spending patterns. As a result, this measure clearly presents a near upper-bound of true consumption. We find that spending on dividend payment days (regular income arrival) increases by approximately €20.32 (€37.49) relative to any other day. When we estimate regressions that only include spending days (intensive margin), we find that investors consume €4.54 (€48.31) more on spending days when they receive a dividend (their salary) as compared to other spending days when they do not receive a dividend (regular income). This spending behavior constitutes a cumulative MPC of approximately 19.8% (13.7%) on dividend (regular income) payout days and the week thereafter, while the Pre-MPC in the week before dividend (or regular income) arrival is small or insignificant. Thus, investors consume a higher

²³ In all specifications that estimate the MPC out of regular income, we only include investors for whom we observe regular salary or pension inflows during the sample period and drop investors whose average monthly regular income is in the bottom or top 1% of the distribution (23,405 investors). We additionally winsorize regular income in all regressions at the top 1% level.

fraction of their dividends than of their salary. In levels, however, they increase spending relatively more when they receive salary. Consistently, this emerges from the difference in income size with an average dividend size of €213.8 and an average salary of €4,654.5 (see Table 3).²⁴

Depending on investors' spending patterns, a fraction of our first consumption measure may reflect non-consumption related outflows such as financial transfers while for other investors uncategorized outflows included in the measure might largely reflect consumption. In either case, observing such a pronounced response concentrated around the days of dividend income arrival is interesting in itself. Investors appear to anticipate dividends and use a large fraction of them *immediately* following income arrival.

We next estimate the spending response using our consumption measure net of financial transfers (Columns 3 and 4) and our measure of non-durable consumption (Columns 5 and 6). When we use our more restrictive measures of consumption, we naturally find lower day-zero spending in levels and therefore lower average MPCs out of both dividend and regular income.²⁵ Investors consume approximately 2.3% of their received dividends on the payout date and over the following week, while they spend slightly less than one percent of the dividend on non-durable consumption. Again, we find that MPCs out of dividends are significantly higher than MPCs out of regular income. Specifically, investors spend 1.1% (0.4%) of their salary on (non-durable) consumption in the days following income arrival. While the size of the coefficient is smaller, it is important to note that the economic magnitudes of our findings are in line with previous literature studying immediate consumption responses to other sources of income such as Parker (2017) and Olafsson and Pagel (2018) who find that households spend approximately 2% out of predictable stimulus payments and, respectively, increase consumption in response to *regular income* arrival by about \$30.

We present graphical representations of these results in Figure 4. In Panels A, B, and C the figures display daily and cumulative MPC estimates out of dividends and regular income for our three measures of consumption. Daily MPC estimates out of dividends are consistent with our previous findings in that investors respond most strongly on day-zero, spending 5.4%, 1.1%, and 0.7% of received dividends on the day of the payout on non-recurring expenditure, overall consumption, and non-durable consumption, respectively. In contrast, the most pronounced consumption response to regular income occurs *after* income arrival. Precisely, we find economically and statistically significant responses on all days following income receipt. However,

²⁴ In Appendix Table A.2 we show that our results are quantitatively similar when we exclude very small and/or very large dividends.

²⁵ Our results are quantitatively similar when we exclude investors with few or many consumption days (see Table A.3 in the Appendix).

day-zero effects are much less pronounced compared to the pattern we observe for dividend payments.

In Appendix Table A.4 we investigate what types of consumption underlie the observed increase in consumption from dividend income. We find that most of the effect can be attributed to non-durable consumption including spending on groceries, clothing, drugstore articles ('living'), restaurants, events ('leisure'), and cash withdrawals. We do not find that investors spend a significant fraction of their dividends within the categories of housing (which primarily includes durable spending such as furniture), health, or internet. The internet category includes online-shopping at e-commerce marketplaces, as well as transactions via PayPal. Insignificant responses in this category are not surprising within our sample as we observe relatively few expenses within this category.²⁶ Somewhat related to Kueng's (2018) note that some households might regularly spend their state fund payments "by throwing a PFD party", our results suggest that investors might routinely spend their much awaited dividend income on an 'additional bottle of wine.'

When we investigate dividend reinvestment, we observe increased security purchase activity around dividend payments. Yet, we do not find that investors reinvest a significant fraction of their dividends in the short-run over the week following income arrival, i.e., estimates of the marginal propensity to reinvest are close to zero. In fact, only 30% of investors make any security purchases and 8% buy securities in the amount of 80%-120% of received dividends at least once after income arrival. These results are consistent with Baker, Nagel, and Wurgler, (2007), Kaustia and Rantapuska (2012), and Hartzmark and Solomon (2019) who find that many retail investors do not reinvest their dividends and that this behavior is also prevalent among institutional investors and prevails in the long-run.

There are two important things to note with the results presented thus far. First, regardless of consumption measure and source of income, investors appear to consume following its arrival. This is consistent with recent evidence documenting that individuals exhibit excess sensitivity in response to regular and irregular income (e.g., Parker et al., 2013; Gelman et al., 2014; Parker, 2017; Kueng, 2018; Olafsson and Pagel, 2018). We document that this hand-to-mouth behavior is also prevalent among a group of experienced, high-wealth, high-income investors and with respect to dividend payments – *a payout that should be irrelevant to investors*. Additionally, we find that the timing of the consumption response appears to differ between dividend income and regular income. In particular, we find a much more timed response to dividend receipt that is concentrated on the day

²⁶ 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.

of the payout, suggesting that investors specifically plan to consume out of dividend income. We investigate this planning behavior in detail in Section 5. Secondly, the average MPCs presented in Table 4 mask substantial heterogeneity in response. We explore MPC heterogeneity further in the subsequent section.

One concern about the pronounced day-zero effect we find could be that our results are confounded by the coincidental timing of dividend income and other sources of income or consumption, resulting in a spurious relationship. A related concern could be that the patterns in daily consumption we document are imprecise as we observe some transactions only with a lag relative to actual consumption days. The various time fixed effects should absorb this, however to further test and address these concerns we conduct a variety of placebo and robustness tests.²⁷ First, we estimate equation (1) using date fixed effects and focus on dividends that are paid out on different days within a week. Results are presented in Figure B.2 in the Appendix. We find that our results hold when using date fixed effects and that investors strongly increase consumption on day-zero independent of whether they dividends on a Monday, when transactions of the weekend are accumulated, or, e.g., on a Friday. Second, we estimate equation (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.²⁸ Panel A of Figure 5 plots the results of this exercise for one set of randomly generated payment dates. It becomes apparent that investors do not react with more than usual consumption on placebo dividend payment dates. We then re-run this exercise 500 times and store day-zero coefficient estimates as well as corresponding significance levels of each simulation. Results are presented in Figure B.3 in the Appendix. From the simulation exercise we only observe an expected small number of statistically significant positive coefficient estimates on day-zero, while the mass is centered around an economically small and statistically insignificant effect. We conclude that the observed effects are not an artefact of our empirical specification.

Third, 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 dividend-investors and non-investors differ substantially along several characteristics we first construct a matched group of non-investors that are comparable to dividend-investors along observable dimensions. Full details about our matching procedure can be found in Appendix D. After matching, both

²⁷ In Appendix Tables A.5 and A.6, we show that our results are quantitatively similar to using date fixed effects which absorb all variation across time as well as when including time-varying changes in income as an additional control.

²⁸ 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.

groups are highly comparable across observable characteristics as displayed in Figure B.4 in the Appendix. If our effects were driven, for instance, by coincidental timing of dividend income and other income or consumption, we would expect that the matched group of non-investors also reacts on the observed dividend payment dates. 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. We additionally stress the robustness of documented consumption responses of dividend-investors in a difference-in-differences analysis. The consumption response around dividend payment days of our matched sample of *non*-investors serves as a counterfactual in this setting. As shown in Table A.7 in the Appendix, we find that *relative* to the response of non-investors, dividend-investors increase consumption by around €7 on the days that dividends are paid out, whereas non-investors do not react with increased consumption. The results from these placebo tests suggest that our findings are unlikely to be confounded by the timing of dividend payments and other sources of income or consumption.²⁹

4.1. Consumption across the wealth distribution

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, 2020). In Table 5, we examine how the consumption response to dividends varies with wealth (i.e., total assets deposited at the bank). In this, and all following analyses, we use overall (durable and non-durable) consumption as our main measure of consumption and note that these are more conservative than estimations using non-recurring spending.

We first note that investors across all wealth bands spend significantly more on dividend payment days as compared to what they normally spend. Importantly, these spending responses in terms of increased *relative* spending are comparable across the wealth distribution. For instance, investors of the lowest (highest) wealth group increase spending by 4.9% (5.5%) relative to what they usually spend on the day of dividend payments. Day-zero spending ratios in the middle wealth quintiles are statically significant as well and range from 7.6% to 8.9%. When relating these numbers to average daily consumption within wealth groups, these coefficient estimates imply that higher wealth groups spend slightly more than lower groups on dividend payment days in euro terms given their higher average daily consumption (€119.94 among the highest wealth group vs. €69.98 among

²⁹ For example, some dividend payments may occur around holidays when consumption is potentially higher. In this case, we would expect the group of non-investors to also react on the days that the matched group of dividend-investors receive their dividends. Our placebo analysis precisely tests such cases and the findings appear to rule out this effect.

the lowest group). However, relative to the substantially smaller dividends that lower wealth groups receive this spending increase is associated with much larger MPCs. More precisely, while spending on dividend payment days in euro terms only increases modestly with wealth, the mean size of received dividends increases substantially with wealth. Therefore, MPCs out of dividends decrease markedly and monotonically along the wealth distribution, i.e., from 26.9% (lowest wealth quintile) to 1.2% (highest wealth quintile). Figure 6 additionally plots post-cumulative MPCs by wealth quintiles for our three consumption measures in response to dividend income and regular income. We note the monotonic decrease in MPCs by wealth for dividend income and for regular income when looking at consumption. When comparing the estimates in the lower wealth quintiles by type of income, we note that the consumption response to dividends is significantly larger than that to regular income.

Di Maggio, Kermani, and Majlesi (2020) calculate annualized MPCs out of changes in dividend payments that are due to a firm's changing payout policy, making it difficult to compare estimates across studies. In general, we believe our results are qualitatively similar. First, changes in dividend payments are substantially smaller than absolute payment sizes and, second, we report contemporaneous *one-week* MPCs and therefore expect a smaller response. We next investigate how investors' consumption varies with annual changes in received dividends.

4.2. Consumption responses to changes in dividend payments

In Table 6, we examine the consumption response to dividends conditional on year-to-year changes in dividend payout policy. The table shows the spending ratios from equation (1) as well as cumulative MPC estimates from equation (2) across specifications where we condition dividend arrival to assets that did not change (Column 2), decreased (Column 3), or that increased (Column 4) the size of their dividend payment (per share) amount relative to their last payout. In the last column we investigate consumption responses to dividend payments from assets that initiated new dividend payments, i.e., companies or funds that did not pay dividends during the same quarter in the previous year. Column 1 provides our baseline estimates.

The consumption response to dividend income as measured by the spending ratio variable is large and statistically significant on day-zero across columns. We note a large effect when dividend incomes are held constant from year-to-year (Column 2), most likely due to investors' ability to time consumption alongside stable dividends. We note that investors react more strongly when dividends are increased – also on the day after income arrival – as compared to when they are decreased (Columns 3 and 4). Relatedly, we find an economically large effect when dividends are newly issued on the day immediately following income arrival (Column 5) but no effect on day-zero. This pattern is consistent with the notion that for some investors these dividend payments

were unexpected. If investors perceive these payments as an unexpected wealth or income shock, this could explain the strong consumption response. We find a 17% MPC out of newly issued dividends in the week following receipt. When analyzing MPCs out of newly issued dividends our setting is related to the analysis of Di Maggio, Kermani, and Majlesi (2020). We find that a significant fraction of the large MPCs out of changes in dividend income that they document (40-60% across the wealth distribution) is concentrated around income arrival. Importantly, however, Table 6 indicates that investors not only increase consumption in response to an increase in their dividend payments, but also increase consumption around dividend arrival when the size of the dividend is equal to or even smaller than previous year's dividend size. This suggests that investors may plan to consume out of dividends independent of the change in dividend size. Thus, changes in received dividends cannot fully explain the heterogeneity in contemporaneous consumption responses. In sum, the intensive margin changes in dividend policy have smaller effects on the consumption response of investors, and extensive changes to payouts are linked to large consumption responses.

4.3. Consumption across asset types

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 7 presents the consumption response (spending ratio and MPC) 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 both stock and fund dividends, (2) respond stronger to stock dividends than to fund dividends, and (3) exhibit the strongest consumption response to German stock dividends. This pattern of the consumption response is similar across dividend-paying assets for both of our measures of consumption. Again, we find that investors who increase consumption in response to dividend payments, do so precisely around the day of its arrival both in case of stock dividends and fund dividends. We do, however, also find a slightly delayed reaction to fund dividends with a coefficient estimate of 7.2% one day after such payments. These observations suggest that investors do respond to fund dividend payments but that some investors are less aware of the exact timing of the payments, potentially reacting in response to a rather unexpected payment and not in anticipation. The pattern we observe for stock dividends, in turn, points much more towards anticipation and planning-behavior. Finally, it is worth highlighting that investors who tie their consumption to dividends appear to have a strong preference to

consume out of dividends from stocks of their home country indicating that consumption-driven portfolio choices like other investment motives (e.g., long-term investment, speculation, entertainment) are similarly affected by investors' preferences for familiar assets. Figure B.5 in the Appendix plots the cumulative MPC estimates by asset type.

4.4. Information receipt and the consumption response to dividends

Our placebo tests help mitigate concerns about a mechanical effect driving the day-zero spending behavior. Another aspect of our setting helps us rule out other potential confounds, namely, that information provided by the bank or the PFM about the dividend itself drives an increase in consumption. In our setting, bank customers are able to receive information about upcoming distributions made by securities via email including, e.g., dividends from stocks or funds, coupon payments from bonds, and any distributions from non-equity funds or warrants. This notification service is part of a broader notification service offered within the online-banking system which investors can opt into.³⁰

We access information on the usage of the notification service on upcoming dividend payments for 25,231 investors of our dividend-investor sample (92.8%). 16,099 of those investors did not receive any notification email during the sample period, because they did not activate the notification service, while 9,132 (36.2%) received at least one email from the bank prior to dividend payments.³¹ In Panel A of Table 8 we present the consumption response around dividend payments of investors who were *not* informed about upcoming dividend payments by their bank via email (Column 2) and of those who did receive an email (Column 3). The table highlights that investors who did not receive this information in fact react more strongly than investors who were informed by consuming 2.9% out of received dividends in the week following dividend arrival. The MPC for mail-receivers is also statistically significant but smaller (1.3%). This suggests that investors inform themselves about upcoming dividend payments and plan to consume out of dividends. We do not find that potentially uninformed investors react upon an unexpected information about upcoming payments by their bank. Panel B of Table 8 further supports this. The table displays the spending

³⁰ Customers do not receive product advertisements or email marketing campaigns through this service. The notification settings offered from the bank can be personalized manually, or individuals can opt to select a default setting which offers a variety of notifications. Overall, there are more than 50 individual notifications related to different products and topics that investors can activate. If customers own a securities account the default option includes a notification service on upcoming dividend payments, interest payments, and any other distributions made by investors' portfolio holdings. By default, investors receive this information one week before the actual payment, however, investors are free to change the timing manually. Thus, investors who own a securities account receive a notification about upcoming dividend payments if they opt into the default notification settings, or if they manually activate the specific notification service.

³¹ 361 (4%) of those manually subscribed to the notification service on upcoming dividend payments while the majority (8,771 investors) indirectly subscribed to it by opting in to a default, more general, notification subscription (see previous footnote).

ratio around the days investors receive notification emails about upcoming dividend payments. We find no pre-payment consumption reaction by investors in response to notification receipt. Only five weekdays after the notification do we find a significant response. This, however, reflects a response to the dividend payments themselves, since 60% of all observed emails are sent out 5 weekdays prior to the actual dividend payment.

5. Understanding the MPC heterogeneity from dividends

We have thus far provided evidence that investors' consumption is sensitive to the arrival of dividend income and that the MPC out of dividends varies substantially. A natural next step is to investigate the potential mechanisms which could drive this heterogeneity. In this section, we first analyze whether financial constraints can explain excess sensitivity and to what extent they underlie the observed heterogeneity of consumption. 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). Third, motivated by theoretical suggestions and empirical evidence on excess sensitivity we test whether behavioral traits such as impatience, planning, and self-control add to the explanation of excess sensitivity. We use survey questions to investigate if investors' self-assessed behavioral traits are associated with variation in the timing and size of consumption from dividends.

A. Liquidity constraints

To test whether excess sensitivity is more prevalent among liquidity constrained households we estimate equations (1) and (2) separately across quintiles of various measures of liquidity constraints and analyze the day-zero coefficients and cumulative one-week Post-MPCs. For each of the measures, we first calculate investor-specific values as monthly averages and then sort investors into quintiles (investor sorts). The results are presented in Table 9. Each coefficient presented in the table represents a separate regression analyzing the response to dividend income conditional on an investor's inclusion into a quintile of the specified liquidity measure.

The first three rows of the table investigate quintiles of checking account balances, liquid assets (checking and savings account balances), and net liquid assets (checking and savings account balances less short-term debt, long-term debt, and credit card balances plus overdraft limits).³² Across rows we observe that the size of the coefficients (day-zero estimates as well as Post-MPC estimates) generally peaks within the first quintiles but remain rather large and statistically

³² 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.

significant across columns. For instance, we find that investors in the 4th (5th) quintile of liquid assets, who hold on average €35,284 (€158,492) in their checking and savings accounts, spend an additional 8.5% (4.6%) on the day they receive dividends as compared to what they usually spend and 1.7% (1.5%) of received dividends in the week following income receipt. We observe a very similar pattern when looking at contemporaneous spending ratios and Post-MPCs across the distribution of investors' net liquid assets, however, for investors in the highest quintile the increase in consumption on day-zero only represents an insignificant fraction of received dividends.

In rows 4 and 5, we normalize level measures of liquid assets 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 5.8% and 8.2%. We also find very similar effects when liquid assets are scaled by average daily total spending (cash-on-hand ratio), thus measuring liquidity in terms of the average number of spending 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 the distribution, who hold more than 50 and 110 days of average daily total spending, increase consumption on dividend payment days by 5.8% and 8.3%, respectively.³³ Finally, in the last row of Table 9 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.³⁴ Again, we find that the effects are not entirely driven by significantly constrained investors. For example, investors in the 5th quintile, who hold on an average €5,714 in their checking accounts right before dividends are paid out, increase consumption by 5.9% on dividend payment days and consume 2.3% of received dividends in the week following income arrival.

While we find that consumption responses are more pronounced among individuals in the lower quintiles, these individuals still hold significant liquidity on average. For instance, individuals belonging to the lowest quintile of cash-on-hand hold €5,528 in checking and savings accounts, or 12 days of spending, at the end of an average month. In fact, only 8.1% (4.3%) of sample investors have negative checking account balances at the end of three (six) consecutive months during the

³³ Recall 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.

³⁴ We compute daily checking account balances by continuing end-of-month checking account balances with an individual's daily in- and outflows.

entire sample period potentially indicating more severe liquidity issues. However, the median investor of this group still holds €1,653 (€2,341) in savings accounts and €5,455 (€4,450) in securities accounts (financial assets that can be 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. MPC heterogeneity by investor characteristics

In Table 10, we follow the same empirical approach as in Table 9 in order to investigate if investor and portfolio characteristics explain the heterogeneity in consumption. The table presents MPC heterogeneity across age, regular income, dividend yield, average number of received dividends per year ('dividend days'), average number of portfolio assets, and the average share of German securities in investors' portfolios ('home share'). We again sort investors by quintiles of the corresponding measure.

We first note that older investors exhibit the strongest day-zero response in terms of spending increases relative to average daily spending (day-zero spending of 9.9%). Day-zero spending ratios are statistically significant across other age groups as well and range from 4.2% (quintile 2) to 7.1% (quintile 1). The Post-MPC out of dividends, however, is larger among younger investors (4.2%) but also statistically significant and economically relevant among older investors. In the next row, we highlight that the day-zero response is more pronounced in lower income quintiles, while higher-income investors consume a larger fraction of their dividends.

Looking across the distribution of dividend yield (dividend income scaled by portfolio size) reveals that day-zero spending ratios increase monotonically with investors' portfolio tilt towards dividend income. Specifically, investors who maximize dividend income for each euro invested into risky assets consume 14.2% more on the day of dividend payments as compared to usual spending. Coefficient estimates in other groups are statistically significant as well and range between 4.3% and 8.6%. We also find that MPCs are more pronounced among those investors who hold high dividend-yielding portfolios. These findings 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.

Investors who hold fewer assets (on average one stock), receive relatively fewer dividend payments (on average one per year), and tilt their portfolios towards German stocks, respond most strongly to payments.³⁵ Overall, investors who are more inclined to exhibit excess sensitivity are typically younger and mid- to high-income investors, receive one or two dividends per year from one German stock, and appear to be trying to maximize their dividend yield.

C. MPC heterogeneity by dividend size

While we find that investors who tilt their portfolios towards dividend income tend to show a higher consumption response, it is important to investigate how the response is impacted by the size of dividend payments. In Table 11 and Figure 7, rather than investor sorts, we measure the consumption response by *payment sorts*. To do so, we sort all of the 194,998 dividend payments we observe in our dataset by their (relative) size and assign them into quintiles of (relative) dividend size. For instance, the upper left panel of Figure 7 shows daily consumption responses (spending ratios) to dividend payments that are less than or equal to €21.00 (quintile one) while the bottom left panel focuses on dividend payments greater than €344.27 (quintile five). It becomes apparent that larger dividends induce a much more pronounced and clear consumption response relative to average daily spending, while day-zero responses to very small dividends are much smaller.

Table 11 presents the corresponding day-zero coefficient estimates showing that very small (large) dividends are associated with a contemporaneous increase in consumption of 4.4% (10.0%). Additionally, the table shows Post-MPC estimates out of dividends of different size. While smaller dividends induce a much less pronounced consumption response both in terms of timing and absolute size, this response, however, is associated with substantial MPCs. In particular, investors who receive dividends equal to or less than €21 consume 97.6% of these dividends in the week following income arrival. With increasing dividend size, the MPC out of dividends decreases monotonically from 33.2% (2nd size quintile) to 7.2% (4th size quintile). Large dividends above €344.27 (5th size quintile) lead to clear and marked consumption responses, but the MPC out of dividends of this size remains comparatively small at 1.7%. Thus, the average MPC out of dividends across the entire sample including all observed dividends masks substantial heterogeneity and is largely driven by high-wealth investors who receive large individual dividend payments. We conclude that investors react more strongly to large dividends in absolute terms but scaled by the much larger size of received dividends the MPC is small.

³⁵ In Appendix Table A.2 we show that our main results, are quantitatively similar when we measure individuals' dividend income as only the largest payment received by month, for those who obtain multiple dividends.

Figure B.6 in the Appendix visualizes these patterns illustrating the monotonic decline (increase) of cumulative MPC estimates (consumption responses in absolute euro terms) across dividend size quintiles. Further, this pattern remains virtually unchanged when looking at the consumption response across quintiles of dividend size scaled by regular income. In this respect, our results are similar to Kueng (2018), who documents that higher-income households for whom the Alaska Permanent Fund dividend represents a small fraction of their income are the main driver of observed excess sensitivity. Nonetheless, contrary to Kueng (2018), we find that MPCs are largely driven by small absolute dividend sizes rather than by small relative dividend sizes (as a fraction of regular income).

We also investigate the interaction of both dividend size and wealth (and number of dividends received per year). To do so, we direct the reader to Table A.8 in the Appendix, where we create double sorts based on quartiles of dividend size and wealth (and number of dividends received per year). We find that the largest responses tend to be concentrated among lower and mid-level wealth and at the lower end of dividend size, but consumption responses are also statistically significant across much of the distribution. For instance, investors in the 3rd quartile of wealth with an average wealth of €77,054 consume 23.1%, 8.2%, and 2.9%, out of their second, third, and fourth quartile (increasing in size) dividends, respectively. That is, the average MPC documented in Section 4.1 among higher-wealth investors masks the fact that these investors also consume a significant fraction of (mid-sized) dividends. Importantly, sorting investors along dividend size and measures of liquidity yields the same conclusions. Panel B suggests that investors who receive few dividends per year that are small show the largest MPC (168%), however, we note statistically and economically significant MPCs across the joint distribution.

Overall, Table A.8 in the Appendix substantiates that excess sensitivity is prevalent across various groups of investors and dividend-portfolios. Our results suggest that most investors increase consumption by around €10-20 relative to average spending around dividend payment days. This response in *absolute* terms does not vary substantially across the distribution of investor characteristics or dividend size. As a result, the *fraction* that is consumed out of dividends, i.e., the MPC, decreases markedly with absolute dividend size, more so than with relative dividend size, wealth or liquid assets.

D. 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 infrequently update as in models of rational inattention (e.g., Caballero, 1995; Sims, 2003; Reis, 2006)? If the former,

investors 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.³⁶

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. Therefore, 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. It 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 thus also substantiates previous results that liquidity constraints cannot entirely explain the effects we observe. Furthermore, given that a significant fraction of the dividend payments we observe come from German companies that mostly pay out dividend three days after the annual general meeting (see Section 2.4), 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.

Do investors actively track the payments of their dividends? We are able to identify such behavior by exploiting online-banking login data allowing us to further investigate the documented planned-consumption channel. We adjust the dependent variable of equation (1) and replace it with an indicator variable which takes on the value of one if the investor logs into his or her bank account on date t . In this framework, the coefficients of interest now measure the likelihood of an investor to log in on a specific day, enabling us to identify potentially unusual login-behavior around days of dividend payments. Figure 8 presents the results. 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. 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.

³⁶ 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.

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 income arrival rather than being driven by inattentive investors who let consumption follow income. While we do find some evidence for this latter interpretation, the planned-consumption channel appears to be much more pronounced.

E. Propensity to save, planning behavior, patience, and self-control

Do behavioral traits such as impatience, self-control issues, or lack of planning aptitude add to the explanation of excess sensitivity to dividends? The seminal literature on consumption smoothing has suggested that these types of traits may underlie excess spending behavior (e.g., Angeletos et al., 2001; Ameriks, Caplin and Leahy, 2003; Gul and Pesendorfer, 2004a, Gul and Pesendorfer, 2004b; Ameriks, Caplin, and Leahy, 2004; Parker, 2017). To test this, we worked with the bank to administer a simple survey to a sub-sample of investors from our dataset. Our survey enables us to test the work of Shefrin and Statman (1984), Thaler and Shefrin (1981), and Shefrin and Thaler (1992) who model self-control in individuals. Shefrin and Statman (1984) 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. The detailed questions can be found in Appendix C.

We first investigate the propensity to save rather than spend and ‘financial planning’ behavior in Panel A of Table 12. Columns 1-3 focus on a question regarding an individual’s self-assessed propensity to spend rather than save, while Columns 4-6 ask subjects if they have a long-term financial plan. We note that day-zero effects are concentrated among those who state that they rather save, and those who have a financial plan. Moreover, MPCs are statistically and economically significant among those who sort into the highest degree of savers and planners. Across columns we also include several rows of summary statistics. We note that subjects who identify as savers and planners are also wealthier, less liquidity constrained, earn higher incomes, and tilt their portfolios towards higher dividend income and more dividend payments per year as compared to spenders and non-planners. This implies that the euro-amount consumed from dividends is also larger for this group of investors as compared to those who identify as spenders and ‘non-planners’.

In Panel B of Table 12, we focus on patience and regret. In Columns 1-3, the survey question asks investors ‘how willing are you to give up something that is beneficial for you today

in order to benefit from that in the future?’ (Falk et al., 2018). They are asked to respond on a scale from 1 ‘Not willing at all’ to 4 ‘extremely willing.’ We find that day-zero spending responses are significant and large across all responses, however, the MPC out of dividends is economically and statistically significant among subjects who are extremely willing to delay benefits today for benefits tomorrow, i.e., investors who self-categorize as *highly patient*. Perhaps unsurprisingly, these investors are also younger, less likely to be retired, and wealthy. Similarly, in Columns 4 and 5 we investigate if investors who state they are likely to make regretful purchases are those more likely to consume from dividend income. Again, we note that contrary to theory and previous empirical studies, investors who state they are unlikely make regretful purchases are those who show the greatest excess sensitivity to dividend income.

To further test whether sophisticated individuals are more likely to exhibit excess sensitivity to dividend payments we use our survey responses to create an index of ‘prudent’ behavior. An index measure of behavior provides the benefit that we can ensure a balanced number of observations, or subjects, into categories and therefore mitigate the concern that our results would be driven by a low number of observations or by under-powering of selected survey responses. We sum up the answers to the four survey questions previously outlined and create a median split to define *imprudent* (below median) and *prudent* (above median) behavior.³⁷ Panel C of Table 12 shows that prudent investors have higher levels of wealth, tilt their portfolios towards larger and more frequently occurring dividends, and consume out of them. Their average MPCs are above 6 percent, in the week following dividend receipt.

Our results from this analysis are insightful as they contrast with theoretical suggestions and empirical evidence documenting a positive relationship between a lack of consumption smoothing and persistent behavioral traits such as a lack of financial sophistication (e.g., Parker, 2017), a lack of financial planning (e.g., Ameriks, Caplin and Leahy, 2003), self-control issues (Angeletos et al., 2001; Gul and Pesendorfer, 2004a; Gul and Pesendorfer, 2004b), and impatience (e.g., Kuchler and Pagel, 2020).³⁸ Hence, our findings are at odds with theoretical models of dividend-investors who consume from these assets as a commitment device (Shefrin and Statman, 1984; Daniel, Garlappi, and Xiao, 2019; Jiang and Sun, 2019). Our results rather suggest that *less* impulsive investors consume a larger fraction of their dividend income precisely around days of its

³⁷ We first scale responses such that the answer coincides with increasing prudence. The index of prudent behavior thus ranges from 4 (lowest score) to 16 (highest score). According to a median split, we define investors as imprudent (prudent) if they score a value of 12 or less (strictly greater than 12).

³⁸ For example, Parker (2017) finds that those who identify as being savers (spenders) spend 0.92% (2.37%) of stimulus payments in the week following the payment. Additionally, households who are more likely to make financial plans and those who are less likely to make regretful purchases show lower MPCs (0.73% vs. 2.25% MPC among financial planners vs. non-planners and 1.81% vs. 2.80% MPC among individuals with high vs. low self-control).

arrival and highlight the fact that explanations of excess sensitivity vary significantly based on the source of income.

Are these findings driven by other investor characteristics or traits? In Appendix Table A.9 we investigate the cross-sectional determinants of prudent behavior. Importantly, we find that differences in consumption responses across survey respondents are not mainly driven by observable demographic characteristics or investment traits. Consistent with descriptive statistics shown in Table 12, we find that prudent investors tend to be wealthier, hold lower dividend-yielding portfolios and allocate a larger fraction of their portfolios to a larger number of stocks. These characteristics would in fact predict *lower* MPCs among prudent investors based on our previous results. In addition, 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.

F. The use and perceptions of dividend income

Thus far our survey results suggest that sophisticated investors are more likely to consume from dividends. In the survey, we further asked investors how they perceive dividend payments, and how they state that the payments are used. In Panel D of Table 12, we investigate consumption responses along investors' responses on how they spend their income from dividends. Consistent with the increased spending behavior from dividends, we note that investors who state that they use their dividend income for 'daily consumption' or 'something special' show the largest one-week MPC following dividend payments. The average MPC for these investors is 8.1% and statistically significant at conventional levels. Approximately half the sample reports that they are likely to save or reinvest their dividends.

A final area we wish to explore is how investors actually perceive dividend income. Is income from dividends expected or unexpected, is it transitory or permanent? In order to understand how the investors in our sample view dividend income, we asked them to complete the following survey statement: 'For me, dividend payments are most comparable to ...' Panel E of Table 12 shows that most investors state that they view dividends as 'an expected bonus' (49.3%) and the fewest (12.3%) consider them to be a payment similar to salary or pension. 14.3% of investors selected 'windfall profits' for dividend income, and 24.1% consider them to be a 'negligible payment.' That more than 60% of investors view dividends as an expected, stable source of income and 14% consider them to be an unexpected *profit* while only 24% view it in a way as theory would predict (i.e., an irrelevant payout) is consistent with Hartzmark and Solomon (2019). Investors might view dividends as extra or 'free' money that increases their portfolio value neglecting the fact that the payout is associated with a price decrease.

What is more, we find that precisely those investors who view dividends as predictable recurring income, show a statistically significant MPC of around 5% and more. In fact, the largest MPC we observe comes from those who state that they treat dividend income as salary or pension. Panel E of Table 12 presents these results. Importantly, these investors are on average older and more likely to be retired, substantially wealthier, and receive almost 9 dividends per year and €256.69 *per* dividend. Thus, within this sub-sample of investors, we do find support for ‘living-off-income’ behavior, whereby older investors view dividends as a regular source of income, tilt their portfolios towards them, and consume out of them (Daniel, Garlappi, and Xiao, 2019). Investors for whom dividends are unexpected and those who view them as negligible do not consume a significant fraction of their dividends in the short-run.

In sum, both survey questions confirm our previous findings. What underlies the observed contemporaneous consumption response is excess sensitivity in response to predictable, anticipated and regular income. Investors who exhibit excess sensitivity to dividend income, are likely to be those who are aware and knowledgeable of their dividends, treat them as a stable and apparently special source of income, and plan to consume from them.

6. Conclusion

A growing body of literature has analyzed household consumption behavior and the link to changes in income and wealth. Generally, this literature suggests that consumption excess sensitivity is driven by liquidity constrained or unsophisticated individuals. A related strand of literature posits that investors may consume from dividends if they wish to tie their consumption to regular dividend payments, potentially because they ‘reach for income’ or because they wish to create a commitment device for overconsumption.

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 investors exhibit excess sensitivity to dividend income; they increase consumption precisely around the days that dividends are paid out. In contrast to existing theory, we find that this excess consumption is driven by more prudent investors. We provide an explanation for the previously documented large MPCs out of dividends that the existing literature has not yet identified comprehensively.

Overall, we provide micro-evidence on how investors consume out of dividends and add to the explanation of why retail investors are more likely to consume from dividends rather than from capital gains. Our results are consistent with investors employing mental accounting practices and following rules of thumb such as ‘consume income, not principal’ (Baker, Nagel, and Wurgler,

2007) and ‘living-off-income’ (Daniel, Garlappi, and Xiao, 2019). The planned-consumption channel we document is consistent with the idea that investors are attracted by the income stream and incorrectly perceive dividends as ‘free’ money (Hartzmark and Solomon, 2019).

Finally, our study shows that previous explanations of excess sensitivity vary dramatically when comparing the consumption reaction to dividend income with the reaction to other sources of 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.

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Table 1: Expenses and consumption

In the following table we present various expense categories used by the Personal Financial Management tool to categorize spending and consumption outflows. Column 1 lists recurring expenses. Columns 2, 3, and 4 list various measures of consumption. Uncategorized non-recurring outflows excluding transfers exclude all uncategorized outflows above €500 and those which are a multiple of €25. Refer to the main text for details on the consumption variables. Credit card expenses within a month are cumulatively settled at the end of a month and appear as such in the PFM. As a result, credit card expenses mechanically appear as end-of-month recurring expenses although their nature may not be recurring.

	Recurring expenses	Non-recurring spending	Durable and non-durable consumption	Non-durable consumption
	(1)	(2)	(3)	(4)
Uncategorized outflows				
Non-recurring outflows		✓		
Non-recurring outflows excl. transfers			✓	
Non-recurring, non-integer outflows ≤ €100				✓
Living				
Groceries		✓	✓	✓
Clothing		✓	✓	
Telephone / Internet / Television / Radio	✓			
Hair Salon / Beauty / Wellness		✓		
Drugstore		✓	✓	✓
Pets		✓	✓	
Cafeteria		✓	✓	
Gifts		✓	✓	
Housing				
Rent expenses	✓			
Energy and water expenses	✓			
Furniture / Housing accessories		✓	✓	
Apartment / Condo / Housing fees	✓			
Domestic help	✓			
Real estate taxes	✓			
Renovation costs		✓	✓	
Leisure and travelling				
Restaurants / Cafes / Bars		✓	✓	✓
Events / Tickets		✓	✓	✓
Sport / Fitness	✓			
Hobbies / Clubs / Associations	✓			
Travel		✓	✓	
Books / Music / Film / Apps		✓	✓	
Electronics / Computer / Games		✓	✓	
Subscriptions	✓			
Transportation				
Auto		✓	✓	
Bicycle		✓	✓	
Motorcycle		✓	✓	
Public transportation		✓	✓	
Taxi		✓	✓	
Gas		✓	✓	✓
Health				
Pharmacy		✓	✓	
Doctors		✓	✓	
Eyeglasses / Contact lenses		✓	✓	
Hospital		✓	✓	

Table 1: Expenses and consumption (continued)

	Recurring expenses	Non-recurring spending	Durable and non-durable consumption	Non-durable consumption
	(1)	(2)	(3)	(4)
Children				
Activities and toys		✓	✓	✓
Children's clothing		✓	✓	✓
Childcare services	✓			
School fees	✓			
Alimony payments	✓			
Education				
Office materials or stationary		✓	✓	
Business travel and expenses		✓	✓	
Tuition fees	✓			
Continuing education		✓	✓	
Insurance premiums and debt				
	✓			
Other outflows				
Cash withdrawals		✓	✓	✓
Online purchases		✓	✓	
Credit card expenses	(✓)			
Donations				
Taxes				

Table 2: Demographic and financial characteristics

In the following table we present means and percentiles for demographic, financial, and portfolio characteristics of investors in our sample. Panel A focuses on demographic information, Panel B on financial assets, and Panel C states portfolio measures. We compare dividend-investors to non-dividend investors in our sample and present a *t*-test of mean values. Variables are either time-invariant (e.g., gender), measured as of July 2019 (e.g., age), or calculated as the monthly average over the entire time series (e.g., total assets). The Herfindahl-Hirschman Index (HHI) is a measure of diversification and defined as the sum of squared portfolio weights. All amounts are in euros unless otherwise noted. *, **, and *** denote significance at the 10%, 5% and 1% level, respectively.

	Dividend-investors						Other investors	Difference in means
	Mean	5 th perc.	25 th perc.	Median	75 th perc.	95 th perc.	Mean	<i>t</i> -test
Panel A: Demographics								
Male	64.9	0.0	0.0	100.0	100.0	100.0	67.6	-2.7***
Age	49.7	27.0	39.0	49.0	59.0	77.0	46.0	3.7***
Married	42.4	0.0	0.0	0.0	100.0	100.0	39.2	3.2***
Years with bank	19.6	3.9	10.9	18.4	25.9	43.3	18.0	1.5***
Employed	53.9	0.0	0.0	100.0	100.0	100.0	53.4	0.5
Civil servant	2.8	0.0	0.0	0.0	0.0	0.0	2.6	0.2
Manager	2.6	0.0	0.0	0.0	0.0	0.0	3.9	-1.4***
Retired	8.0	0.0	0.0	0.0	0.0	100.0	4.4	3.7***
Monthly logins	18.8	3.2	6.4	10.9	21.1	59.9	18.4	0.4
Panel B: Financial assets								
Total assets	118,008	4,140	16,493	46,539	121,779	447,492	74,040	43,968***
Risky assets	73,442	647	4,776	19,421	68,973	318,151	32,072	41,370***
Non-risky assets	44,200	1,478	6,199	15,751	41,609	158,200	41,666	2,534
Dividend assets	52,699	543	4,014	15,603	53,693	222,122	0	52,699***
Panel C: Portfolio statistics								
Equity share	67.5	0.0	33.7	88.5	100.0	100.0	64.1	3.4***
Bond share	6.5	0.0	0.0	0.0	1.0	42.0	7.1	-0.5*
Stock share	44.8	0.0	0.0	31.3	100.0	100.0	39.4	5.4***
Fund share	48.0	0.0	0.0	49.1	95.8	100.0	40.8	7.2***
ETF share	4.0	0.0	0.0	0.0	0.0	28.6	9.8	-5.8***
Home share	39.4	0.0	0.0	22.9	85.5	100.0	19.6	19.9***
Dividend asset share	83.4	31.4	71.8	98.1	100.0	100.0	0.0	83.4***
Dividend stock share	41.2	0.0	0.0	25.3	93.4	100.0	0.0	41.2***
Dividend fund share	42.2	0.0	0.0	34.5	85.4	100.0	0.0	42.2***
Assets (#)	6.2	1.0	1.3	3.0	7.0	21.5	2.5	3.7***
Stocks (#)	3.1	0.0	0.0	1.0	3.0	12.9	1.1	1.9***
Funds (#)	2.5	0.0	0.0	1.0	3.1	9.5	1.0	1.5***
Dividend assets (#)	4.4	1.0	1.0	2.4	5.0	14.3	0.0	4.4***
HHI	0.3	0.0	0.0	0.1	0.5	1.0	0.4	-0.1***
Monthly trades (#)	0.7	0.0	0.0	0.1	0.6	3.2	0.6	0.1**
Investors				27,192			3,522	30,714

Table 3: Consumption and income

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 over the entire time series unless otherwise noted. All inflow and outflow numbers are in euros.

	Mean	5 th perc.	25 th perc.	Median	75 th perc.	95 th perc.
Panel A: Outflows						
Total outflows	12,109.5	1,916.6	4,170.4	6,889.1	12,255.1	35,260.4
Regular spending	1,742.4	87.4	578.2	1,135.3	2,044.0	4,670.4
Non-recurring spending	6,387.1	934.2	2,023.0	3,410.3	6,208.6	19,215.5
Consumption	1,955.4	557.6	1,072.2	1,596.7	2,368.9	4,276.7
Non-durable consumption	1,003.3	224.0	492.4	793.5	1,248.4	2,372.1
Uncategorized outflows	5,213.1	325.8	1,076.1	2,277.0	4,863.2	17,548.6
Savings & investing	2,142.4	0.0	30.3	377.0	1,509.3	8,465.7
Panel B: Non-recurring spending						
Living	296.7	21.8	87.4	190.1	370.6	876.3
Housing	42.9	0.0	0.8	10.5	39.9	169.4
Leisure	155.1	3.9	30.6	76.4	167.4	502.7
Mobility	156.5	3.1	27.0	72.6	147.4	599.0
Health	94.7	0.0	6.9	25.9	74.4	298.8
Children	1.2	0.0	0.0	0.0	0.0	6.2
Occupation	5.0	0.0	0.0	0.0	0.0	18.8
Cash withdrawals	678.9	62.5	255.7	491.8	860.4	1,847.3
Credit card	657.3	0.0	9.7	259.3	793.2	2,648.6
Internet	174.9	0.0	8.4	64.7	215.5	626.0
Other	60.1	1.1	7.9	17.3	39.0	176.4
Consumption days	11.0	5.3	8.3	10.9	13.6	17.1
Panel C: Regular spending						
Insurance	597.5	4.1	126.7	329.9	782.7	1,880.2
Credits	69.8	0.0	0.0	0.0	0.0	66.1
Rent	375.7	0.0	0.0	67.3	586.2	1,435.5
Energy	127.9	0.0	9.5	65.2	179.8	397.6
Regular spending days	2.9	0.7	2.0	2.8	3.8	5.4
Panel D: Inflows						
Total inflows	12,321.5	1,916.3	4,194.5	6,962.2	12,386.7	35,567.2
Regular income (conditional)	4,654.5	985.3	2,443.4	3,733.5	5,711.0	11,413.4
Irregular income	284.2	0.0	11.8	84.6	268.2	1,065.8
Dividend income	68.3	0.6	6.0	22.9	74.0	288.2
Dividend income (annual)	800.4	0.0	53.9	251.2	870.2	3,453.2
Dividend income (per dividend)	213.8	6.6	44.4	126.4	276.8	723.7
Dividend income (% income)	7.9	0.2	1.1	3.2	7.9	28.6
Dividend yield (%)	2.1	0.2	0.8	1.5	2.6	5.2
Dividend days (annual)	3.5	0.8	1.0	2.0	4.0	11.0
Sales proceeds	1,506.8	0.0	0.0	3.6	649.3	5,960.4
Bank transactions	40.5	16.9	27.2	36.6	49.3	77.1
Investors				27,192		

Table 4: The consumption response to dividend payments and regular income arrival

The following table presents the consumption response to dividend payments and regular income arrival. The table shows coefficient estimates (spending ratios) from equation (1) for each day around dividend payments across our three measures of consumption for both dividend income and regular income. Below daily spending ratios we provide the 5 day pre- and post-cumulative MPC estimates as given by equation (2). The table also includes the euro-amount of spending on day-zero (day of dividend or income receipt) for all days (extensive margin) and for consumption days (intensive margin). Robust standard errors are clustered at the individual level. *, **, and *** denote significance at the 10%, 5% and 1% level, respectively.

	All non-recurring spending		Consumption		Non-durable consumption	
	Dividend payments	Regular income arrival	Dividend payments	Regular income arrival	Dividend payments	Regular income arrival
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Spending ratio</i>						
day -1	-0.031*** (0.010)	-0.025*** (0.007)	-0.021*** (0.006)	-0.006 (0.004)	-0.000 (0.008)	-0.015*** (0.005)
day 0	0.061*** (0.012)	0.098*** (0.008)	0.070*** (0.007)	0.048*** (0.005)	0.068*** (0.008)	0.022*** (0.006)
day +1	0.039*** (0.011)	0.246*** (0.008)	0.039*** (0.007)	0.138*** (0.005)	0.030*** (0.008)	0.082*** (0.006)
<i>Cumulative MPC</i>						
Pre-MPC	0.020 (0.040)	0.011*** (0.003)	0.001 (0.004)	-0.001*** (0.000)	0.001 (0.002)	-0.000** (0.000)
Post-MPC	0.198*** (0.042)	0.137*** (0.005)	0.023*** (0.005)	0.011*** (0.001)	0.007** (0.003)	0.004*** (0.000)
<i>Day-zero spending</i>						
Extensive margin	20.319*** (5.205)	37.486*** (3.114)	6.613*** (0.710)	4.926*** (0.573)	3.819*** (0.437)	1.764*** (0.309)
Intensive margin	4.538 (9.995)	48.308*** (5.536)	6.629*** (1.360)	6.269*** (1.022)	4.619*** (1.165)	3.344*** (0.765)
Month-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Day-of-week FE	Yes	Yes	Yes	Yes	Yes	Yes
Week-of-month FE	Yes	Yes	Yes	Yes	Yes	Yes
Holiday FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes
Investors	27,192	23,405	27,192	23,405	27,192	23,405

Table 5: The consumption response to dividend payments by wealth

The following table presents coefficient estimates (spending ratios) from equation (1) by each quintile of wealth (total assets deposited at the bank). Below daily spending ratios we provide the 5 day pre- and post-cumulative MPC estimates as given by equation (2). The table also provides summary statistics across wealth quintiles. Each specification includes month-year, 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.

	Wealth quintiles				
	Q1	Q2	Q3	Q4	Q5
	(1)	(2)	(3)	(4)	(5)
<i>Spending ratio</i>					
day -1	-0.037*	-0.020	-0.024	-0.036***	-0.011
	(0.020)	(0.018)	(0.015)	(0.013)	(0.011)
day 0	0.049**	0.089***	0.076***	0.084***	0.055***
	(0.021)	(0.019)	(0.016)	(0.015)	(0.011)
day +1	0.065***	0.073***	0.066***	0.030**	0.011
	(0.022)	(0.020)	(0.017)	(0.014)	(0.011)
<i>Cumulative MPC</i>					
Pre-MPC	0.003	0.006	0.020	0.002	-0.003
	(0.037)	(0.018)	(0.014)	(0.009)	(0.005)
Post-MPC	0.269***	0.085***	0.065***	0.026***	0.012**
	(0.051)	(0.023)	(0.015)	(0.009)	(0.006)
Mean wealth (€)	6,960	21,479	47,566	102,550	409,095
Mean daily spending (€)	69.98	79.74	85.57	94.95	119.94
Mean dividend size (€)	49.87	98.12	149.20	214.91	346.05
Investors	5,439	5,438	5,439	5,438	5,438

Table 6: The consumption response to changes in dividend payments

The following table presents the consumption response around days of dividend payments by changes in dividend payment policies at the security level. Column 1 presents the baseline result and displays coefficients estimates (spending ratios) from equation (1) including dividend payments from all assets. Column 2 presents estimates from securities which have no change in their dividend policy from the previous year, Column 3 focuses on securities which decrease their dividends per share, and Column 4 focuses on increases from the previous year. Column 5 states the consumption response to newly issued dividend payments from companies or funds that did not issue dividends in the previous year. Below daily spending ratios we provide the 5 day pre- and post-cumulative MPC estimates as given by equation (2). The table also reports the mean dividend size for each type of dividend. Each specification includes month-year, 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.

	Change in dividend payments from previous year				
	All dividends	No change	Decrease	Increase	New dividend issuance
	(1)	(2)	(3)	(4)	(5)
<i>Spending ratio</i>					
day -1	-0.021*** (0.006)	-0.014 (0.022)	0.007 (0.012)	-0.030*** (0.009)	0.085* (0.046)
day 0	0.070*** (0.007)	0.122*** (0.024)	0.060*** (0.013)	0.072*** (0.010)	0.000 (0.044)
day +1	0.039*** (0.007)	0.018 (0.023)	0.008 (0.013)	0.072*** (0.010)	0.192*** (0.055)
<i>Cumulative MPC</i>					
Pre-MPC	0.001 (0.004)	0.011 (0.019)	0.011 (0.010)	0.000 (0.005)	-0.051 (0.036)
Post-MPC	0.023*** (0.005)	0.025 (0.021)	0.042*** (0.010)	0.022*** (0.006)	0.172** (0.072)
Mean dividend size (€)	231.55	184.31	222.28	281.72	159.71
Investors	27,192	9,782	17,224	23,956	3,196

Table 7: The consumption response to dividend payments from various types of dividend-paying assets

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 (spending ratios) from equation (1) including dividend payments from all assets. Columns 2-5 display consumption responses to all individual stock, German stock, foreign stock, and fund dividend payments, respectively. Below daily spending ratios we provide the 5 day pre- and post-cumulative MPC estimates as given by equation (2). The table also reports the mean dividend size for each type of dividend. Each specification includes month-year, 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.

	Type of dividend-paying security				
	All dividends	Stock dividends	German stock dividends	Foreign stock dividends	Fund dividends
	(1)	(2)	(3)	(4)	(5)
<i>Spending ratio</i>					
day -1	-0.021*** (0.006)	-0.037*** (0.009)	-0.049*** (0.010)	0.012 (0.018)	-0.004 (0.009)
day 0	0.070*** (0.007)	0.095*** (0.010)	0.102*** (0.011)	0.057*** (0.019)	0.040*** (0.010)
day +1	0.039*** (0.007)	0.009 (0.009)	0.012 (0.010)	-0.005 (0.018)	0.072*** (0.010)
<i>Cumulative MPC</i>					
Pre-MPC	0.001 (0.004)	-0.005 (0.006)	-0.005 (0.006)	-0.002 (0.020)	0.007 (0.006)
Post-MPC	0.023*** (0.005)	0.030*** (0.007)	0.034*** (0.007)	0.012 (0.024)	0.013** (0.006)
Mean dividend size (€)	231.55	200.74	226.23	133.64	272.67
Investors	27,192	17,706	17,137	3,973	16,754

Table 8: The consumption response to dividend payments by notification receipt

The following table presented in Panel A shows the consumption response around days of dividend payments by various investor groups. Column 1 presents the baseline result and displays coefficients estimates (spending ratios) from equation (1) including all dividend-investors for which we obtain data on whether or not they received notifications about upcoming dividend payments. Column 2 displays consumption responses of investors who do not receive any notification from their bank during the sample period, while column 3 focuses on investors who receive an email notification about upcoming dividend payments at least once during the sample period. Below daily spending ratios we provide the 5 day pre- and post-cumulative MPC estimates as given by equation (2). The table also reports the mean dividend size for each investor group. The table presented in Panel B shows coefficient estimates (spending ratios) from equation (1) around the days that investors receive an email about upcoming dividend payments. Each specification includes month-year, 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.

Panel A: Spending responses around dividend payments

	All investors	Mail non-receivers	Mail receivers
	(1)	(2)	(3)
<i>Spending ratio</i>			
day -1	-0.024*** (0.006)	-0.031*** (0.009)	-0.019** (0.010)
day 0	0.072*** (0.007)	0.072*** (0.009)	0.067*** (0.011)
day +1	0.040*** (0.007)	0.038*** (0.009)	0.041*** (0.011)
<i>Cumulative MPC</i>			
Pre-MPC	0.001 (0.004)	0.005 (0.006)	-0.004 (0.006)
Post-MPC	0.023*** (0.005)	0.029*** (0.007)	0.013** (0.006)
Mean dividend size (€)	231.50	205.33	265.93
Investors	25,231	16,099	9,132

Panel B: Spending responses around mail receipt

	All mail receivers
	(1)
day -1 (mail receipt)	0.014 (0.012)
day 0 (mail receipt)	0.012 (0.012)
day +1 (mail receipt)	0.011 (0.013)
day +2 (mail receipt)	-0.029** (0.012)
day +3 (mail receipt)	-0.030** (0.012)
day +4 (mail receipt)	-0.024** (0.012)
day +5 (mail receipt)	0.047*** (0.012)
Investors	9,132

Table 9: MPC heterogeneity and liquidity constraints

The following table presents day-zero coefficient estimates (day-zero spending ratios) from equation (1) by quintiles of various measures of liquidity constraints. Below day-zero spending ratios we provide the 5 day post-cumulative MPC estimates as given by equation (2). Each specification includes month-year, 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.

	Quintiles of liquidity constraint measure (investor sorts)				
	(1)	(2)	(3)	(4)	(5)
<i>Checking deposits</i>					
	Q1	Q2	Q3	Q4	Q5
Day-zero spending ratio	0.094*** (0.017)	0.087*** (0.017)	0.058*** (0.015)	0.066*** (0.015)	0.055*** (0.014)
Post-MPC	0.042*** (0.011)	0.034*** (0.011)	0.020** (0.009)	0.020** (0.009)	0.017* (0.009)
<i>Liquid assets</i>					
	Q1	Q2	Q3	Q4	Q5
Day-zero spending ratio	0.088*** (0.018)	0.083*** (0.016)	0.062*** (0.016)	0.085*** (0.015)	0.046*** (0.013)
Post-MPC	0.058*** (0.011)	0.052*** (0.013)	0.016* (0.009)	0.017* (0.009)	0.015* (0.008)
<i>Net liquid assets</i>					
	Q1	Q2	Q3	Q4	Q5
Day-zero spending ratio	0.055*** (0.017)	0.100*** (0.017)	0.058*** (0.015)	0.094*** (0.015)	0.046*** (0.013)
Post-MPC	0.042*** (0.015)	0.051*** (0.013)	0.023** (0.010)	0.027*** (0.009)	0.009 (0.008)
<i>Liquid assets to income</i>					
	Q1	Q2	Q3	Q4	Q5
Day-zero spending ratio	0.085*** (0.019)	0.080*** (0.018)	0.043*** (0.016)	0.082*** (0.016)	0.058*** (0.014)
Post-MPC	0.059*** (0.015)	0.059*** (0.021)	0.033** (0.013)	0.019* (0.010)	0.004 (0.008)
<i>Cash-on-hand ratio</i>					
	Q1	Q2	Q3	Q4	Q5
Day-zero spending ratio	0.070*** (0.017)	0.067*** (0.016)	0.058*** (0.015)	0.083*** (0.014)	0.067*** (0.014)
Post-MPC	0.055*** (0.020)	0.053*** (0.016)	0.027*** (0.010)	0.015* (0.008)	0.000 (0.007)
<i>Deposits around dividends</i>					
	Q1	Q2	Q3	Q4	Q5
Day-zero spending ratio	0.057*** (0.017)	0.102*** (0.016)	0.065*** (0.016)	0.067*** (0.015)	0.059*** (0.014)
Post-MPC	0.029** (0.013)	0.031*** (0.011)	0.017* (0.009)	0.016* (0.009)	0.023** (0.009)

Table 10: MPC heterogeneity by investor and portfolio characteristics

The following table presents day-zero coefficient estimates (day-zero spending ratios) from equation (1) by quintiles of various investor and portfolio characteristics. Below day-zero spending ratios we provide the 5 day post-cumulative MPC estimates as given by equation (2). Each specification includes month-year, 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.

	Quintiles of investor and portfolio characteristics (investor sorts)				
	(1)	(2)	(3)	(4)	(5)
<i>Age</i>	Q1	Q2	Q3	Q4	Q5
Day-zero spending ratio	0.071*** (0.017)	0.042*** (0.015)	0.059*** (0.015)	0.056*** (0.015)	0.099*** (0.015)
Post-MPC	0.042*** (0.012)	0.023 (0.015)	0.026** (0.012)	0.028*** (0.010)	0.012* (0.007)
<i>Regular income</i>	Q1	Q2	Q3	Q4	Q5
Day-zero spending ratio	0.076*** (0.016)	0.077*** (0.017)	0.064*** (0.017)	0.069*** (0.017)	0.054*** (0.015)
Post-MPC	0.015* (0.009)	0.003 (0.009)	0.025** (0.011)	0.034*** (0.012)	0.027** (0.012)
<i>Dividend yield</i>	Q1	Q2	Q3	Q4	Q5
Day-zero spending ratio	0.043** (0.018)	0.045** (0.013)	0.056** (0.013)	0.086*** (0.015)	0.142*** (0.020)
Post-MPC	0.027 (0.017)	0.018* (0.011)	0.012 (0.009)	0.026*** (0.008)	0.036*** (0.011)
<i>Dividend days (mean per year)</i>	Q1	Q2	Q3	Q4	Q5
Day-zero spending ratio	0.060** (0.024)	0.070** (0.028)	0.063*** (0.019)	0.066*** (0.014)	0.077*** (0.010)
Post-MPC	0.051*** (0.017)	0.052 (0.035)	0.020 (0.015)	0.020** (0.009)	0.021*** (0.006)
<i>Number of assets</i>	Q1	Q2	Q3	Q4	Q5
Day-zero spending ratio	0.074*** (0.024)	0.068*** (0.023)	0.047*** (0.017)	0.094*** (0.015)	0.070*** (0.010)
Post-MPC	0.068*** (0.021)	0.036 (0.022)	0.026** (0.011)	0.018* (0.010)	0.020*** (0.006)
<i>Home share</i>	Q1	Q2	Q3	Q4	Q5
Day-zero spending ratio	0.020 (0.015)	0.037** (0.017)	0.083*** (0.012)	0.073*** (0.014)	0.133*** (0.025)
Post-MPC	0.002 (0.009)	0.020** (0.010)	0.018** (0.009)	0.020** (0.010)	0.067*** (0.020)

Table 11: MPC heterogeneity and dividend size

The following table presents day-zero coefficient estimates (day-zero spending ratios) from equation (1) by quintiles of absolute dividend size in euro terms and relative dividend size (dividend income scaled by average monthly regular income). Below day-zero spending ratios we provide the 5 day post-cumulative MPC estimates as given by equation (2). Each specification shows the consumption response (spending ratio and cumulative MPC) of investors to only those dividend payments that are within the respective quintile of dividend size. The table also reports how many investors receive at least one dividend of the corresponding size and other summary statistics for each quintile of dividend size. Each specification includes month-year, 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.

	Dividend size quintiles (payment sorts)				
	(1)	(2)	(3)	(4)	(5)
<i>Dividend size</i>	Q1	Q2	Q3	Q4	Q5
Day-zero spending ratio	0.044*** (0.015)	0.066*** (0.015)	0.059*** (0.014)	0.078*** (0.015)	0.100*** (0.015)
Post-MPC	0.976*** (0.353)	0.332*** (0.084)	0.149*** (0.035)	0.072*** (0.016)	0.017*** (0.005)
Mean dividend size (€)	8.94	41.61	104.97	232.62	769.70
Investors	12,566	13,524	13,575	12,883	10,686
<i>Dividend size (% of income)</i>	Q1	Q2	Q3	Q4	Q5
Day-zero spending ratio	0.047*** (0.016)	0.052*** (0.016)	0.060*** (0.016)	0.081*** (0.016)	0.097*** (0.016)
Post-MPC	0.823*** (0.316)	0.175* (0.092)	0.150*** (0.036)	0.045*** (0.015)	0.013** (0.005)
Mean dividend size (€)	13.63	58.10	136.64	275.34	664.92
Mean dividend size (% of income)	0.20	0.96	2.59	6.38	32.94
Mean monthly income (€)	6,894	6,147	5,328	4,398	2,838
Investors	9,926	11,138	11,551	11,109	8,501

Table 12: Survey measures of behavior and consumption from dividends

The following table presents day-zero coefficient estimates (day-zero spending ratios) from equation (1) by response to survey questions. Below day-zero spending ratios we provide the 5 day post-cumulative MPC estimates as given by equation (2). In Panel A, Columns 1-3 focus on a question regarding an investor's self-assessed propensity to save rather than spend money, while Columns 4-6 focus on a question about financial planning. In Panel B, we focus on survey questions on patience and regret. In Panel C, we construct a 'prudence index' that combines answers to all four savings-related survey questions displayed in Panels A and B. Panel D focuses on how respondents spend dividend income and Panel E focuses on how respondents view dividend income. The detailed questions can be found in Appendix C. The table also provides summary statistics across investor groups defined by survey responses. Each specification includes month-year, 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.

Panel A: Saving and Planning

	Are you more of a spender or a saver?			Have you set up a long-term financial plan for you (and your family)?		
	<i>Spend or rather spend</i>	<i>Rather save</i>	<i>Save</i>	<i>No, not thought about, or never thought about</i>	<i>Yes</i>	<i>Yes, and follow it</i>
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Spending response</i>						
Day-zero spending ratio	0.105 (0.071)	0.137*** (0.035)	0.136*** (0.035)	0.070 (0.074)	0.132*** (0.049)	0.137*** (0.029)
Post-MPC	0.022 (0.042)	0.026 (0.024)	0.061*** (0.023)	0.009 (0.037)	0.058 (0.041)	0.040** (0.019)
<i>Summary statistics</i>						
Wealth (€)	90,747	122,794	144,042	94,225	109,969	141,428
Cash-on-hand	72	100	124	117	109	103
Income (€)	4,360	4,706	4,361	3,507	4,450	4,831
Age	55.08	54.93	54.84	52.60	52.68	56.25
Retired	16.44	10.31	14.90	15.94	9.60	13.99
Average daily spending (€)	91.41	91.84	83.90	79.34	89.82	91.09
Mean dividend size (€)	181.78	212.59	215.85	183.14	198.27	219.65
Dividend yield (%)	1.97	2.29	1.88	1.76	1.94	2.16
Dividend days (annual)	3.34	4.60	5.45	3.42	4.04	5.25
Investors	284	833	810	238	400	1,233

Panel B: Patience and Regret

	Are you willing to give up something that benefits you today, so you can benefit more in the future?			Do you sometimes make purchases that you later regret?	
	<i>Not at all or not much</i>	<i>Willing</i>	<i>Extremely willing</i>	<i>Often or occasionally</i>	<i>Rarely or never</i>
	(1)	(2)	(3)	(4)	(5)
<i>Spending response</i>					
Day-zero spending ratio	0.165*** (0.052)	0.111*** (0.035)	0.101** (0.040)	0.113*** (0.036)	0.146*** (0.031)
Post-MPC	0.041 (0.035)	0.030 (0.024)	0.057** (0.029)	0.030 (0.024)	0.048** (0.020)
<i>Summary statistics</i>					
Wealth (€)	124,652	118,053	145,105	127,774	126,312
Cash-on-hand	107	105	101	99	112
Income (€)	4,420	4,599	4,547	4,378	4,592
Age	58.79	53.92	52.30	55.72	54.99
Retired	18.33	11.09	11.73	16.31	12.15
Average daily spending (€)	89.84	89.67	85.42	91.13	86.98
Mean dividend size (€)	217.43	208.52	199.12	206.92	214.02
Dividend yield (%)	1.88	1.80	1.89	1.84	2.22
Dividend days (annual)	4.20	4.53	5.84	4.76	4.71
Investors	470	979	425	816	1,168

Panel C: Prudence

	Prudent behavior survey index	
	<i>Imprudent</i>	<i>Prudent</i>
	(1)	(2)
<i>Spending response</i>		
Day-zero spending ratio	0.108*** (0.035)	0.134*** (0.035)
Post-MPC	0.024 (0.025)	0.061*** (0.023)
<i>Summary statistics</i>		
Wealth (€)	116,477	138,369
Cash-on-hand	99	108
Income (€)	4,561	4,650
Age	54.51	54.03
Retired	13.20	11.07
Average daily spending (€)	90.37	87.86
Mean dividend size (€)	197.85	215.88
Dividend yield (%)	1.83	1.84
Dividend days (annual)	4.26	5.36
Investors	868	865

Panel D: Dividends and spending

What did you do with the majority of your last dividend payment?			
	<i>Save or reinvest</i>	<i>Daily consumption or something special</i>	<i>Nothing specific</i>
	(1)	(2)	(3)
<i>Spending response</i>			
Day-zero spending ratio	0.112*** (0.032)	0.124** (0.056)	0.167*** (0.049)
Post-MPC	0.031 (0.020)	0.081** (0.037)	0.051 (0.041)
<i>Summary statistics</i>			
Wealth (€)	150,148	115,694	106,448
Cash-on-hand	107	80	115
Income (€)	4,764	3,814	4,747
Age	53.38	59.27	54.99
Retired	11.71	20.63	11.90
Average daily spending (€)	87.14	90.86	91.63
Mean dividend size (€)	208.34	272.06	185.20
Dividend yield (%)	1.68	2.21	2.59
Dividend days (annual)	5.61	4.48	3.99
Investors	918	307	519

Panel E: Dividend income

For me, dividend payments are most comparable to ...				
	<i>Salary or pension</i>	<i>Expected bonuses</i>	<i>Windfall profits</i>	<i>Negligible payments</i>
	(1)	(2)	(3)	(4)
<i>Spending response</i>				
Day-zero spending ratio	0.230*** (0.062)	0.072** (0.031)	0.105 (0.054)	0.186*** (0.061)
Post-MPC	0.062** (0.026)	0.047** (0.024)	0.005 (0.038)	0.034 (0.051)
<i>Summary statistics</i>				
Wealth (€)	207,611	133,522	94,744	110,308
Cash-on-hand	96	111	96	101
Income (€)	4,342	4,575	4,157	5,024
Age	56.95	55.49	53.23	53.57
Retired	16.82	13.96	14.35	9.67
Average daily spending (€)	89.44	90.47	83.47	88.76
Mean dividend size (€)	256.69	233.05	192.00	159.35
Dividend yield (%)	1.73	1.96	1.63	2.57
Dividend days (annual)	8.97	5.03	3.37	3.66
Investors	214	856	249	418

Figure 1: Spending over time

The figures below plot the distribution of regular spending, non-recurring spending, consumption, and non-durable consumption over an average month. Sample size is 27,129 dividend-investors.

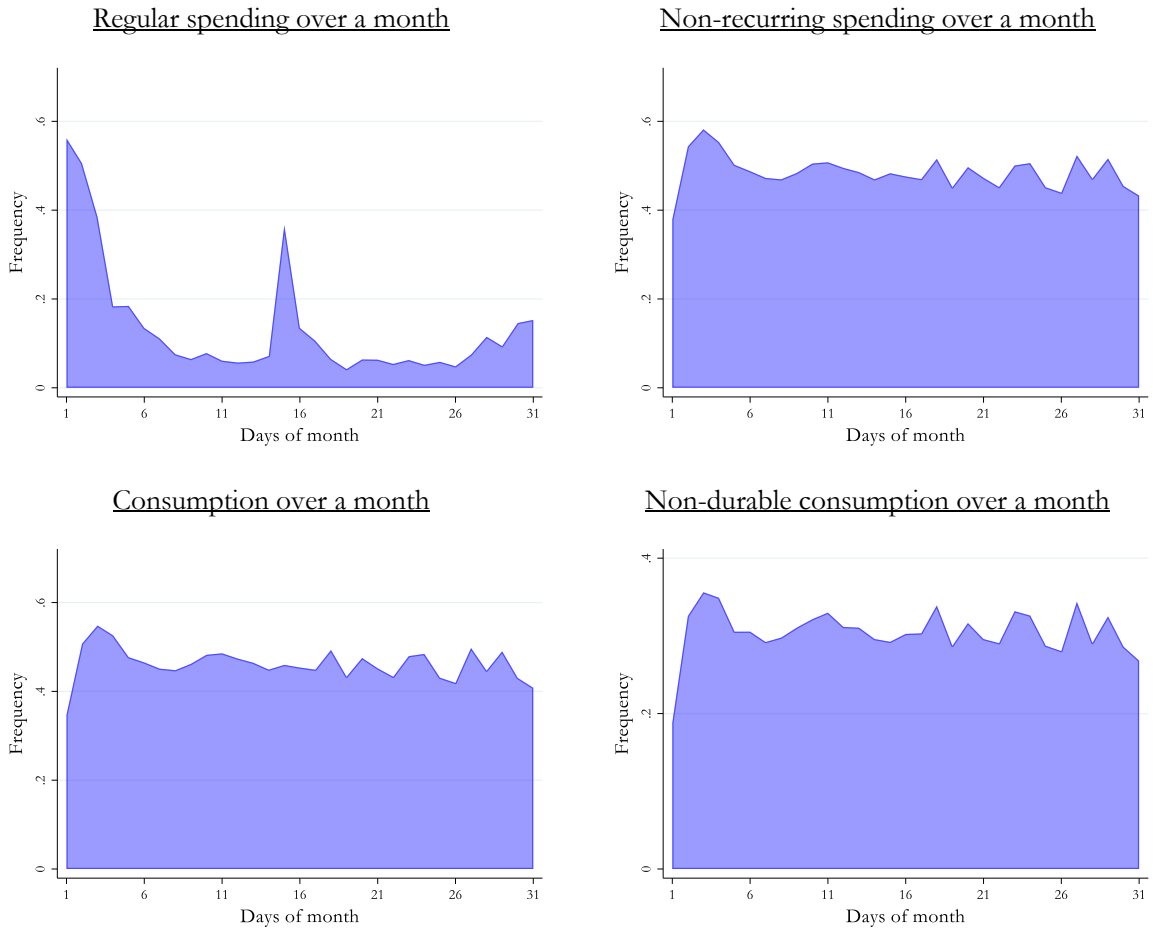


Figure 2: Income over time

The figures below plot the distribution of regular income and irregular income over an average month in the upper panels. The other panels show the distribution of dividend income over an average month and year as well as over the entire sample period. The plots separate stock dividend income and fund dividend income. Sample size is 27,129 dividend-investors.

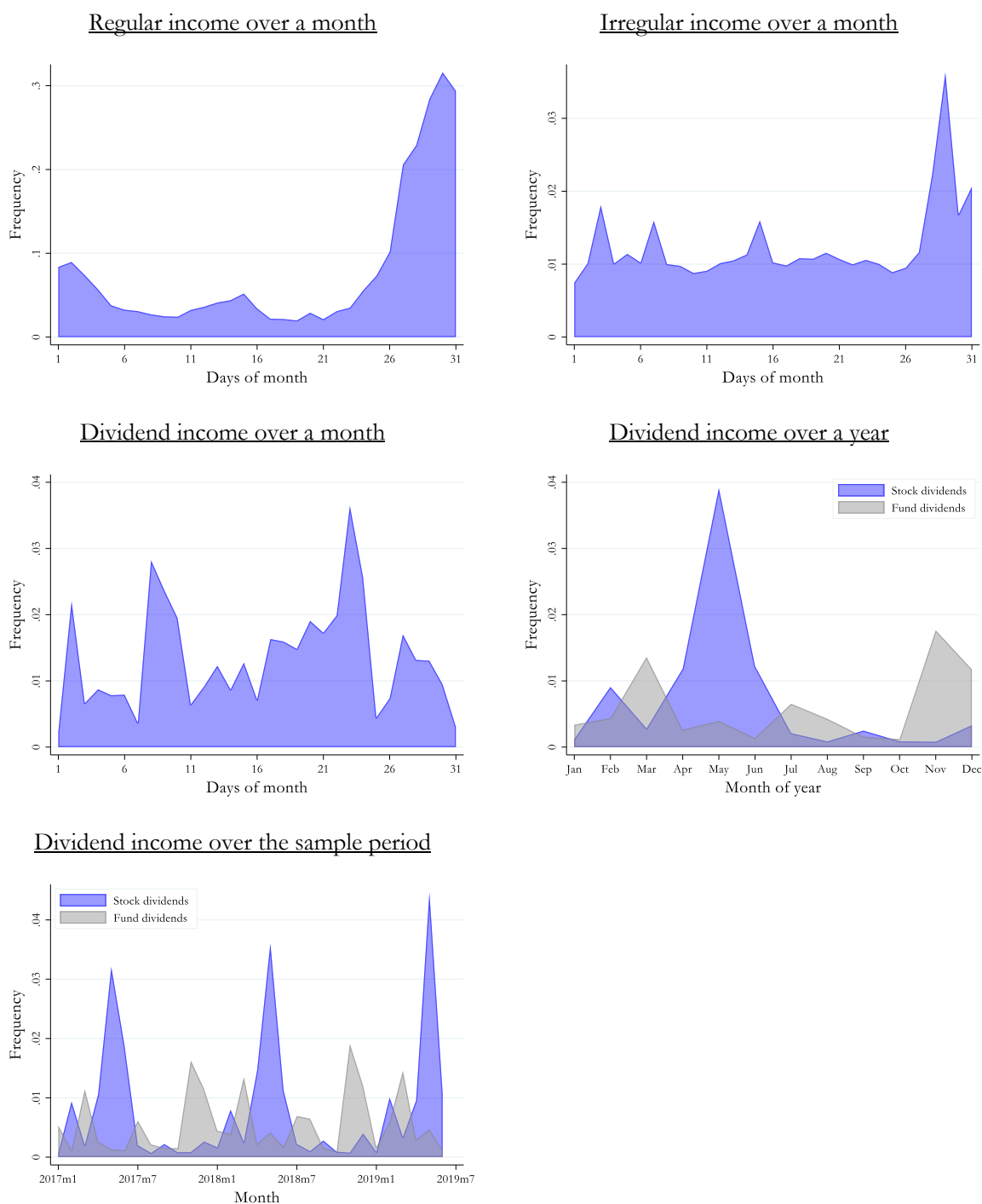
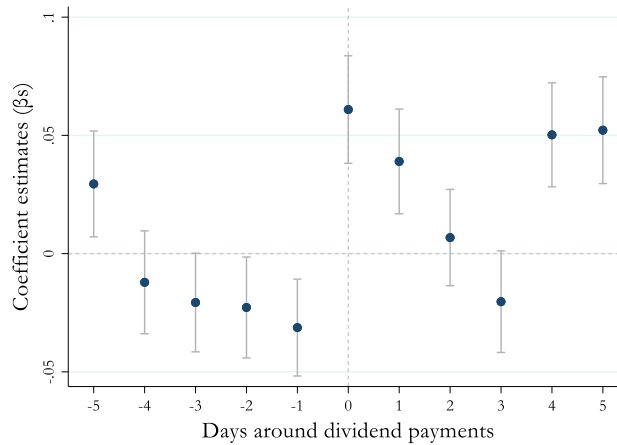


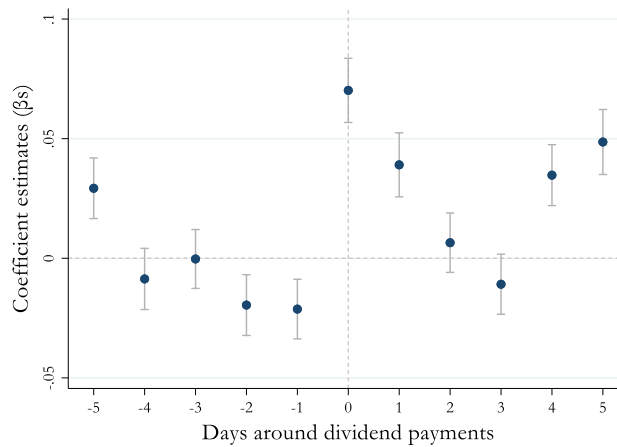
Figure 3: The consumption response to dividend payments

The figures below plot coefficient estimates from equation (1) on the y -axis. The x -axis states the days around dividend payments. Panels A, B, and C show the percentage deviation from average daily non-recurring spending, consumption, and non-durable consumption, respectively. 95% confidence intervals are plotted around coefficient estimates. Each specification includes month-year, day-of-week, week-of-month, holiday, and individual fixed effects. Robust standard errors are clustered at the individual level. Sample size is 27,129 dividend-investors.

Panel A: Non-recurring spending



Panel B: Consumption



Panel C: Non-durable consumption

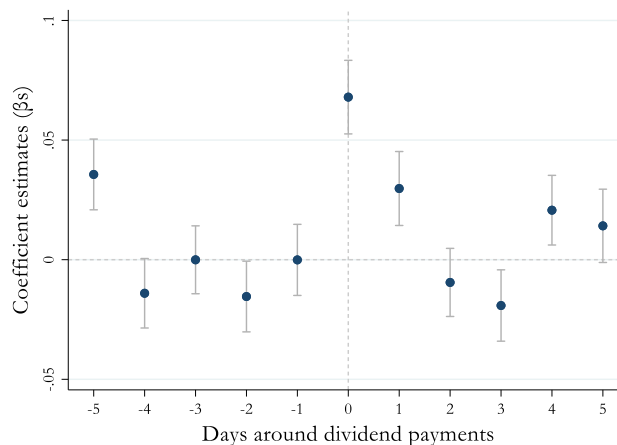
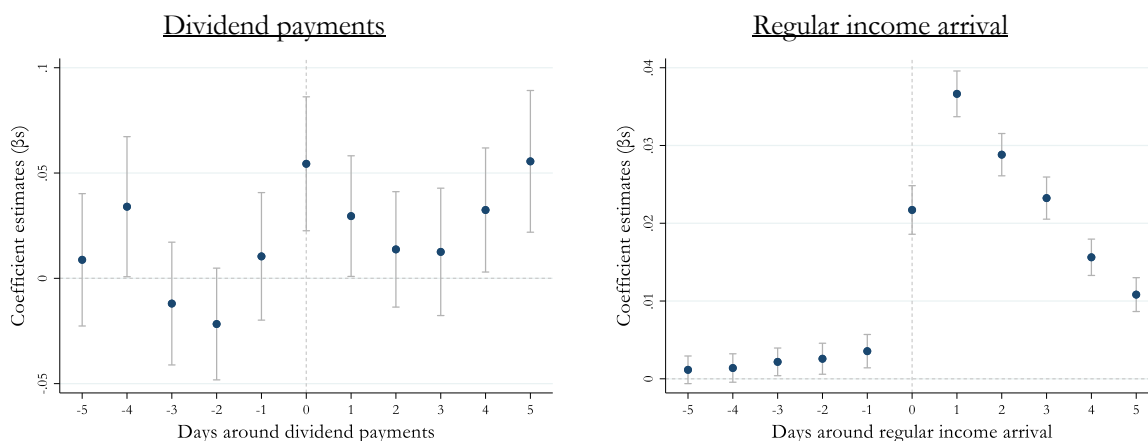


Figure 4: The MPC out of dividend payments and regular income

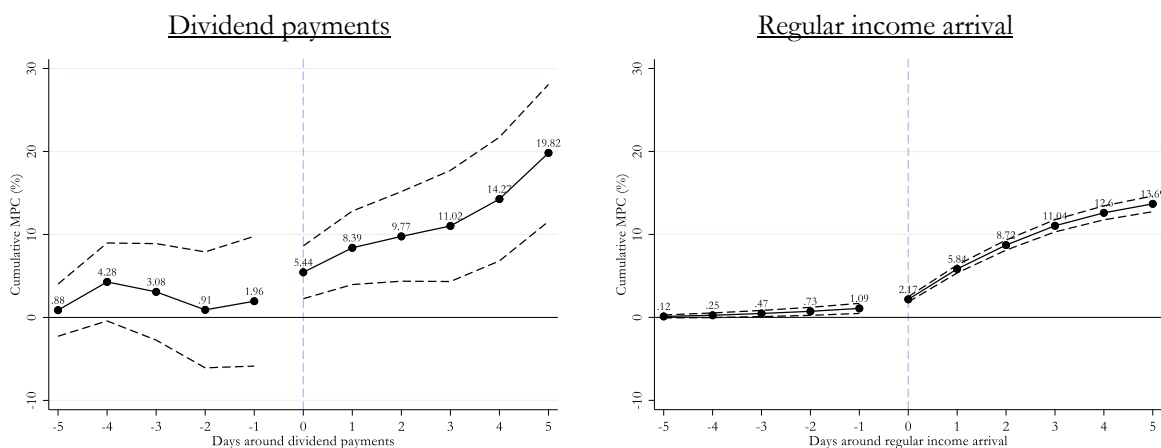
The figures below plot individual coefficient estimates ("Daily MPC") and pre- and post-cumulative coefficient estimates ("Cumulative MPC") from equation (2) on the y-axis. Results are plotted for our three measures of consumption: non-recurring spending (Panel A), consumption (Panel B), and non-durable consumption (Panel C) The x-axis shows the days around dividend payments and regular income arrival, respectively. 95% confidence intervals are plotted around (cumulative) coefficient estimates. Each specification includes month-year, day-of-week, week-of-month, holiday, and individual fixed effects. Robust standard errors are clustered at the individual level. Sample size is 27,129 dividend-investors of which 23,405 are included in the analysis of consumption responses to regular income arrival.

Panel A: Non-recurring spending

Daily MPC

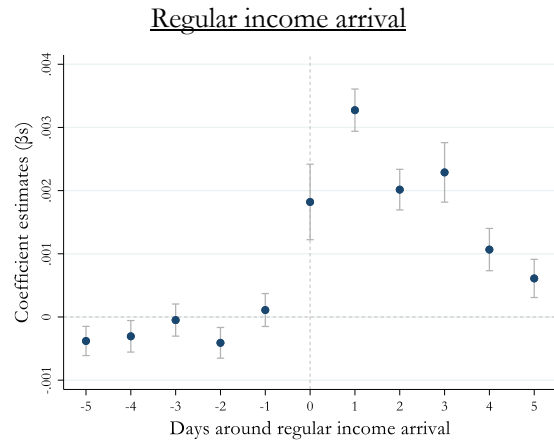
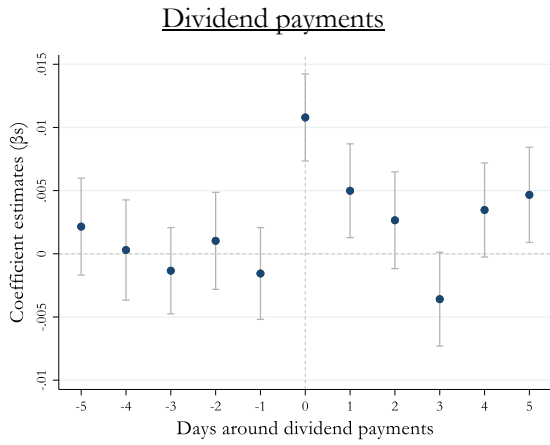


Cumulative MPC

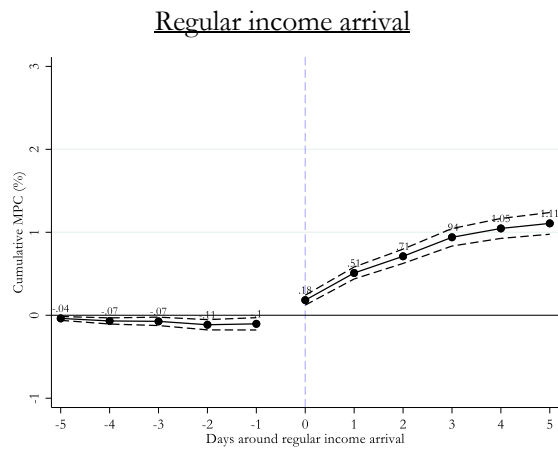
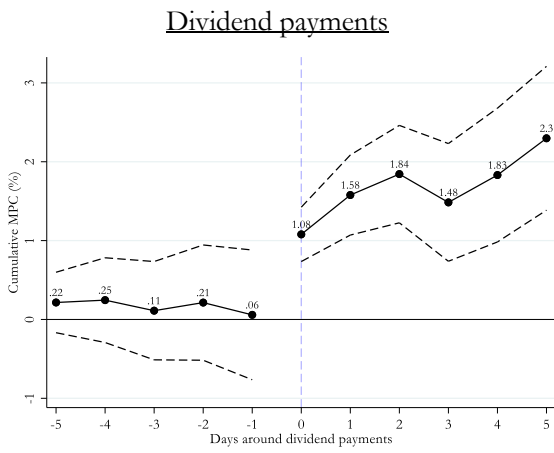


Panel B: Consumption

Daily MPC



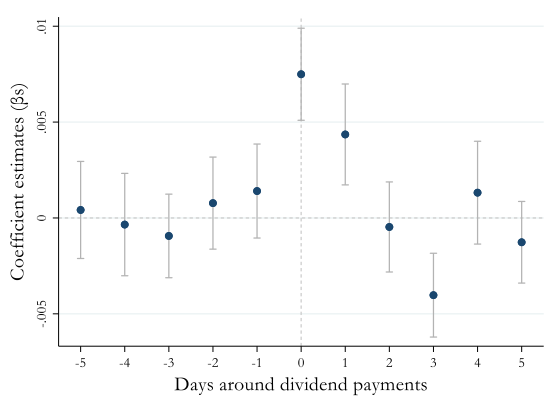
Cumulative MPC



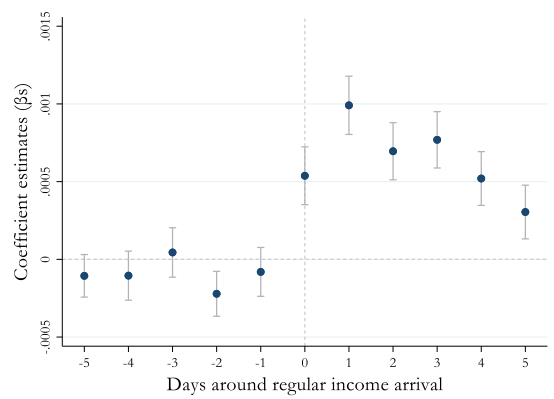
Panel C: Non-durable consumption

Daily MPC

Dividend payments

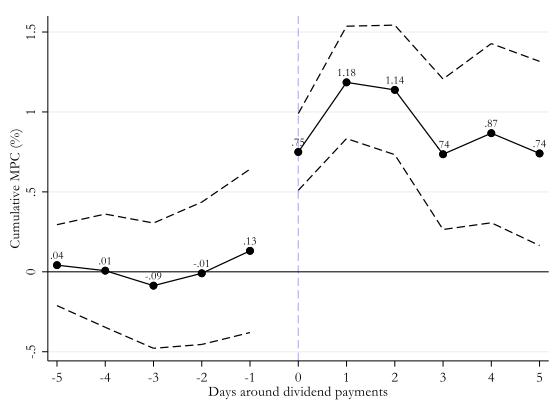


Regular income arrival



Cumulative MPC

Dividend payments



Regular income arrival

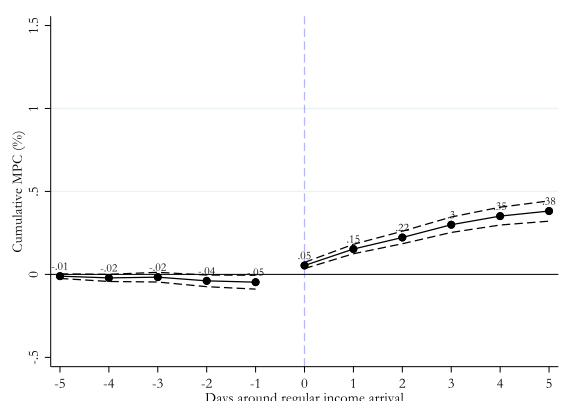
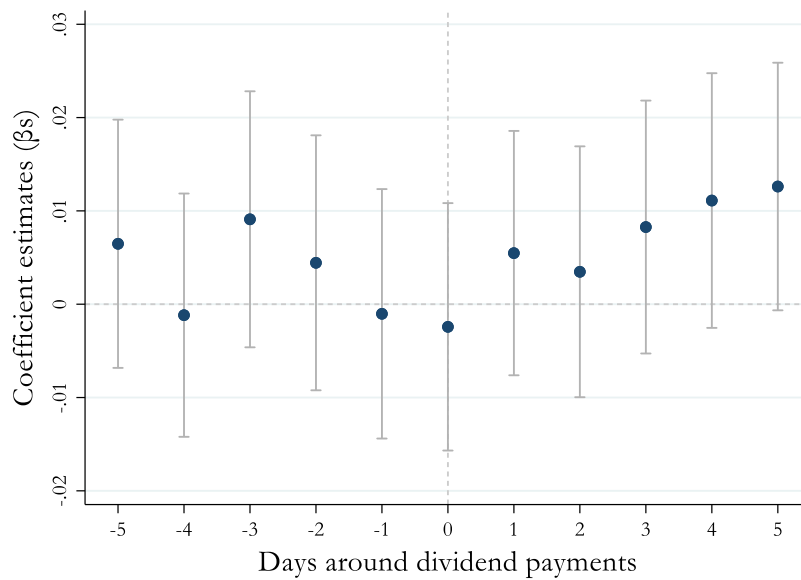


Figure 5: The consumption response to placebo dividend payments

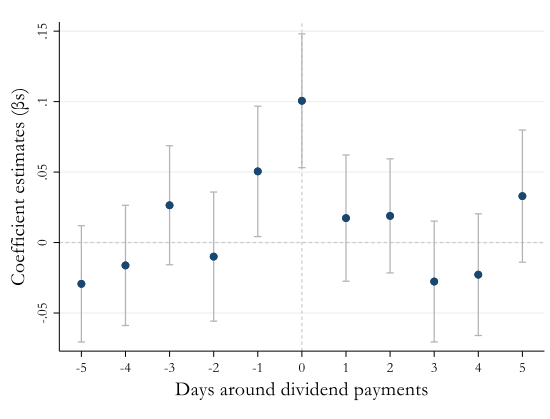
This figure plots coefficient estimates from equation (1) on the y -axis. The x -axis shows the days around dividend payments. 95% confidence intervals are plotted around coefficient estimates. In Panel A the figure plots investors' consumption responses to placebo dividend payment dates. Placebo dividend payment dates are randomly generated payment dates within the same month of the actual date that an investor receives a dividend. Sample size is 27,129 dividend-investors. Panel B plots the consumption response of a matched sample of dividend-investors and non-investors over the year 2017. The groups are matched along several individual characteristics such as age, wealth, income, and consumption. Refer to Appendix D for the exact matching procedure. Sample size is 5,828 dividend-investors and 5,828 matched non-investors. Each specification includes month-year, day-of-week, week-of-month, holiday, and individual fixed effects. Robust standard errors are clustered at the individual level.

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

Matched dividend-investors on dividend payment dates



Matched non-investors on dividend payment dates

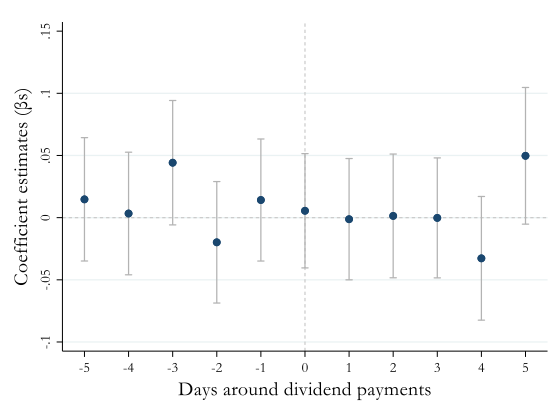
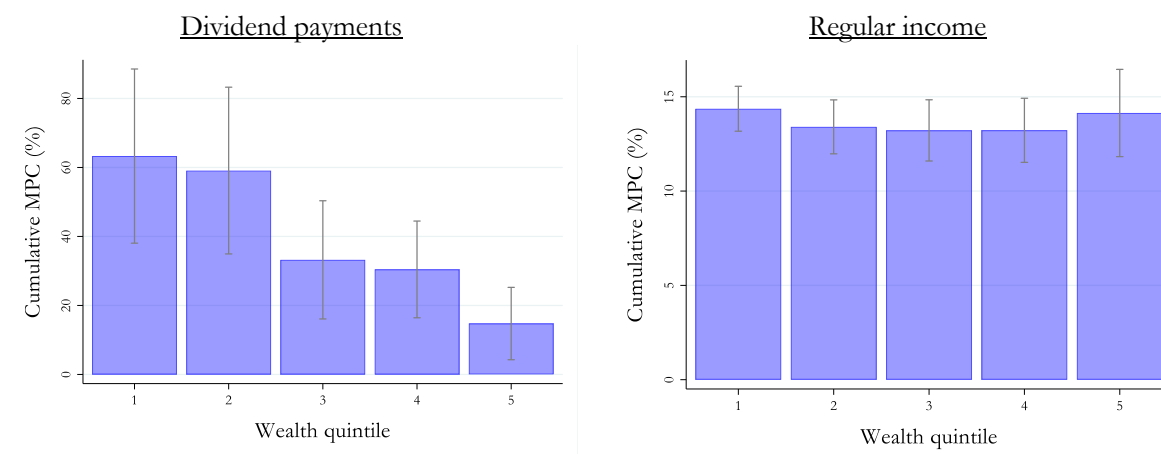


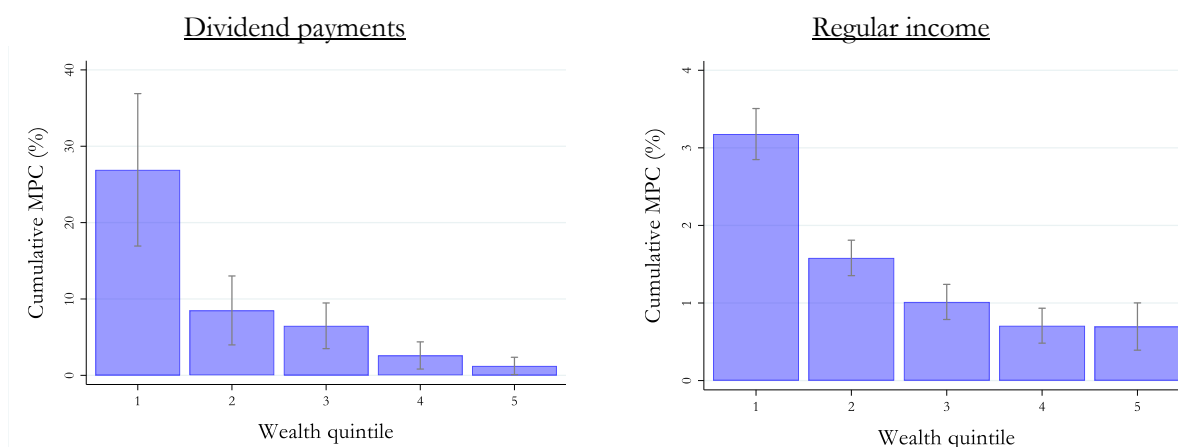
Figure 6: The cumulative spending response to dividend payments and regular income across wealth quintiles

The figures below plot the post-cumulative MPC from dividend payments and regular income as given by equation (2) by wealth quintile on the y -axis. Panels A, B and C show the cumulative response for non-recurring spending, consumption, and non-durable consumption, respectively. 95% confidence intervals are plotted around cumulative coefficient estimates. Each specification includes month-year, day-of-week, week-of-month, holiday, and individual fixed effects. Robust standard errors are clustered at the individual level. Sample size is 27,129 dividend-investors of which 23,405 are included in the analysis of consumption responses to regular income arrival.

Panel A: Non-recurring spending



Panel B: Consumption



Panel C: Non-durable consumption

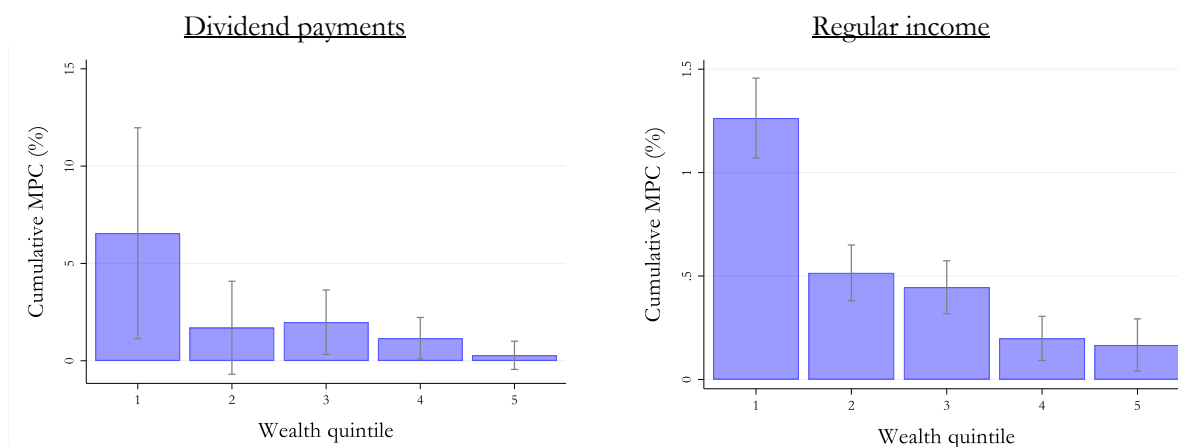


Figure 7: Consumption response by dividend size

The figures below plot coefficient estimates from equation (1) by quintile of absolute dividend size on the y-axis. Within each quintile of dividend size, we investigate the consumption response of investors only to those dividends that are within the respective size quintile. The x-axis states the days around dividend payments. 95% confidence intervals are plotted around coefficient estimates. Each specification includes month-year, day-of-week, week-of-month, holiday, and individual fixed effects. Robust standard errors are clustered at the individual level. Sample size is 12,566, 13,524, 13,575, 12,883, and 10,686 investors who receive at least one dividend within quintile 1, 2, 3, 4, and 5 of dividend size, respectively.

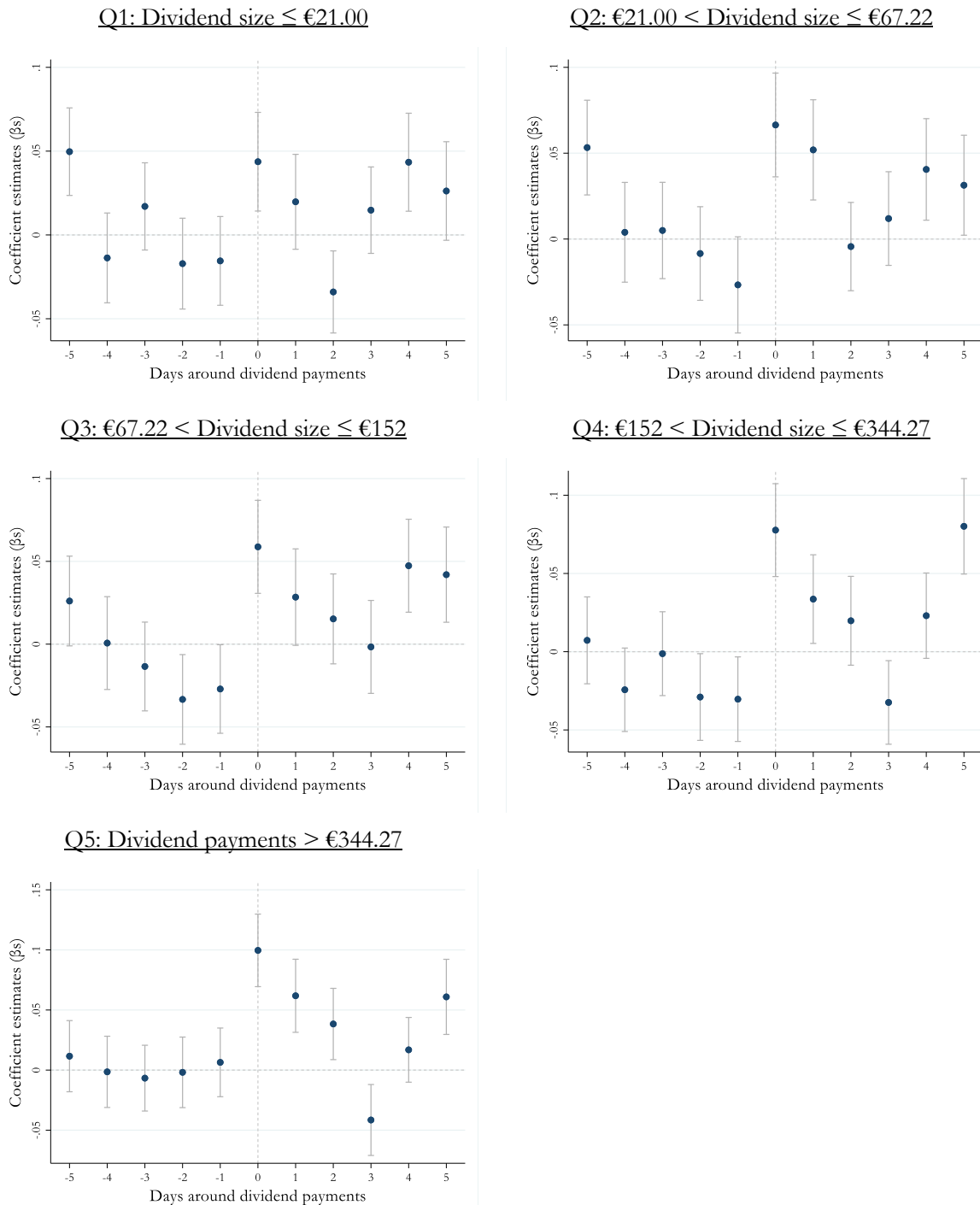
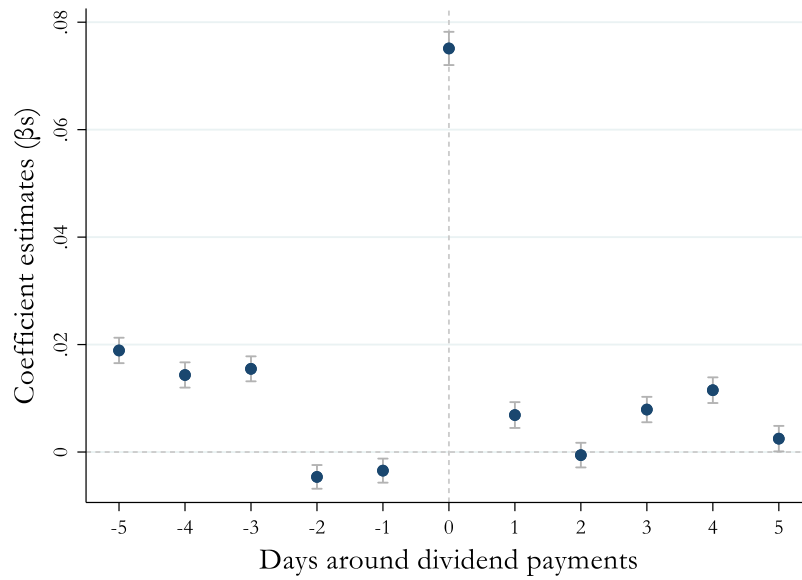


Figure 8: Bank account login behavior around dividend payments

The figure below plots the coefficient estimates from equation (1) on the y -axis where the dependent variable is an indicator variable which takes the value of one if the investor logged into his or her bank account on date t . The x -axis shows the days around dividend payments. 95% confidence intervals are plotted around coefficient estimates. The sample consists of a subset of the universe for which there exists accurate login data (26,951 investors). Each specification includes month-year, day-of-week, week-of-month, holiday, and individual fixed effects. Robust standard errors are clustered at the individual level.



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