Educating Investors about Dividends

ANDREAS HACKETHAL, TOBIN HANSPAL, SAMUEL M. HARTZMARK, and KONSTANTIN BRÄUER*

August 2, 2024

ABSTRACT

We educate investors about the benefits of dividend reinvestment and costs of misperceiving dividends as free income. The intervention increases planned dividend reinvestment in survey responses. Using trading records, we observe a causal increase in dividend reinvestment in the field of roughly 50 cents for every euro received. This holds relative to investors' prior behavior and various control samples. Investors who learned the most from the intervention update their trading the most. The results suggest the free dividends fallacy is a significant source of dividend demand. Our study demonstrates that simple, targeted, and focused educational interventions can affect investment behavior.

*Hackethal is with Goethe University Frankfurt and Leibniz Institute SAFE, Hanspal is with WU Vienna University of Economics and Business and Vienna Graduate School of Finance, and Hartzmark is with Boston College Carroll School of Management and the NBER. We are thankful for comments from Laurent Calvet and Samuli Knüpfer, discussions by Xing Huang, Jurgen Huber, Rachel Nam, and audiences at Boston College, Deutsche Bundesbank, EDHEC Nice, IHS Vienna, Leibniz Institute SAFE, Tilburg University, University of Bremen, University of Kentucky Finance Conference 2024, University of St. Gallen, the Austrian Working Group on Banking and Finance, and WU Vienna. This study was preregistered at aspredicted.org (#65009). We received ethics approval from Goethe University Frankfurt. We thank our partners at a bank for their collaboration and the data necessary to conduct this research. We gratefully acknowledge research support from the Leibniz Institute for Financial Research SAFE.

One of the most important economic decisions people make is their investment decisions. Accordingly, economists have studied many attributes of this decision, both by elucidating a framework describing how they should optimally be made by rational actors and also by exploring how real world investors actually make them. In doing so, a variety of trading behaviors at odds with the optimal behaviors described by classic theory have been uncovered. Given the significance of investment decisions, perhaps the most important question when seeing people make predictably suboptimal trading choices is how to get them to improve them, yet there has been minimal progress in understanding how to get investors to change their behavior and make better decisions.

This paper examines whether a focused educational intervention is able to induce behavior closer to what theory says is optimal for a specific investing behavior, the behavioral demand for dividends. While Miller and Modigliani (1961) famously showed that receiving a dividend should be irrelevant for investors, a large literature documents that investors generally treat dividends differently from other sources of payouts leading to suboptimal performance on a variety of dimensions (Harris, Hartzmark, and Solomon (2015); Hartzmark and Solomon (2019); Braeuer, Hackethal, and Hanspal (2022)). We find that a brief interactive quiz that educates on the proper financial intuition of thinking about dividends leads to changes in both investor survey responses on how dividends are perceived, and, perhaps more importantly, in their subsequent investing behavior.

Dividend demand is an ideal candidate for a simple and focused intervention. A leading explanation for this demand is the free dividends fallacy, that investors wrongly view the dividend as distinct from the price level and thus fail to realize that dividends are not free money, but rather come directly at the expense of price. This fallacy is likely rooted in ignorance, suggesting education can alleviate the bias. Such behavior is costly as it typically leads to sub-par performance through a lack of reinvestment, higher taxes (in many countries), and buying overpriced stocks when dividend demand is high. Thus decreasing this behavior should make these investors achieve better after-tax performance, increase market exposure, and increase savings.

To try and help investors understand the fallacy and avoid these costs, we partnered with a large German bank to attempt to educate investors on thinking about dividends. Germany is an

ideal place for our intervention as German firms tend to pay one large dividend annually in the spring (often referred to as the 'Dividend Season') making the payouts large and salient (Braeuer, Hackethal, and Hanspal (2022)). In addition to allowing us to randomize investors into treatment groups, the bank provided data on trading behavior from before and after the treatment. Thus, the setting allows us to identify both between-treatment differences in outcomes, as well as within-investor differences in investment behavior across a relatively long time-series of trading data.

We sampled investors who plausibly might be holding stocks based on behavioral demand for dividends, focusing on those who held stocks of large German firms expected to distribute dividends. Investors who were randomized into our treatment condition received an email describing the basic logic of dividend irrelevance and the difference in performance with and without dividend reinvestment. Investors were asked to click on a link to learn more and take a survey in return for a 10 euro gift card. The survey included further information and a brief interactive quiz to solidify the concepts and underscore these messages. Some investors were randomized into a zero-touch group and received no communications. It may be that an email on the subject of dividends focuses investors' attention around the payout compared to investors who do not receive such a communication. We therefore ran a placebo treatment which invited investors to a survey about dividends via an email with the same subject, but where neither the email nor the survey explain the benefits of dividend reinvestment.

Our results first point to large treatment effects in elicited plans for dividend reinvestment via the survey. We find that the probability that an investor plans to reinvest some of their dividends increases by approximately 11 percentage points for those exposed to the reinvestment treatment message compared to the placebo treatment. Our reinvestment treatment also positively affects plans for reinvestment at the intensive margin, increasing the fraction of dividends planned to reinvest by 10 percentage points, relative to mean pre-treatment stated reinvestment of 38%. We also asked investors about their preferences for tools and devices related to dividend reinvestment. Investors who were exposed to the reinvestment treatment are 20 percentage points more likely to opt for a fund which reinvests rather than distributes and are 13 percentage points more likely to

state they would prefer that their dividends are automatically reinvested.

We then move to how investors actually change their trading following the intervention. To examine investors' reinvestment behavior, we measure the marginal propensity to reinvest (MPR) into equities following dividend receipt. This measures the amount that investors trade for each euro of dividends received. The MPR of investors in the reinvestment treatment is approximately 45 cents greater than the placebo per euro of dividend received in the same week. These accounts do not have an option to auto-reinvest dividends, so this reflects active trading decisions. Reinvestment need not occur immediately. When we examine reinvestment over the following month we find that treated investors reinvest 65 cents more of each euro of dividends received. This partially reflects decreased reinvestment by the placebo group in the post period which is not present for the zero-touch group. Compared to the zero-touch group, the reinvestment treatment MPR is about 30 cents more per euro.

Our study examines the post-intervention reinvestment behavior over three dividend seasons, the year of the intervention (2021) and the following two years (2022 and 2023). If the effect is driven by a salient intervention with a specific request for a behavioral modification, i.e. reinvestment, the treatment could have a short term effect that influences behavior in the intervention year, but be subsequently forgotten and not influence future behavior. If the effect is driven through education that the free dividend fallacy is a mistake, the effect should be persistent. We find similar effects over all three dividend seasons, consistent with this intervention having a long term effect through educating investors. When examining the long-term development of account balances we find no evidence of a decrease, which could have indicated that consumption was shifted away from dividends, but would have overall increased. Thus the large and persistent effect is consistent with this intervention allowing investors to achieve more savings.

If the root cause of the free dividend fallacy is ignorance, than our intervention should have the largest impact on the behavior of those who learned the most from our intervention. The evidence we find illustrates such a pattern. Investors who provided incorrect responses to the dividends-quiz, who stated they learned something new, or found the information informative, increased

reinvestment behavior by a significantly larger amount than other participants.

If portfolio allocations prior to the intervention were motivated by the free dividend fallacy and our intervention effectively teaches that this is a mistake, this should decrease demand for dividend payments in the post period. Consistent with this we find that the overall dividend yield of treatment portfolios is about 7% (20 bps) lower compared to the pre-period and placebo investors. Our intervention did not suggest lowering the dividend yield of a portfolio, so this represents an organic response based on a newfound understanding of a prior behavioral mistake. It is consistent with investors conceptually understanding the mistake they were educated on, rather than simply implementing the specific behavior suggested.

One potential concern is that investors in the reinvestment treatment are, in some unobservable capacity, different. Recall that while assignment to groups is randomized, participation in the survey is not. This could bias our results if investors who receive and act on the reinvestment invitation were *a priori* more likely to change their behavior at the time of the treatment by increasing the reinvestment of their dividends compared to participants of the placebo group, zero-touch group and their prior behavior. We argue that this is unlikely. We can control for prior behavior, so such a change cannot be accounted for by any fixed characteristic. As discussed at length in Section IV.A, it also seems unlikely to be driven by selection related to the propensity to respond to emails between the placebo and the treatment group. Perhaps most importantly, our setting allows us to examine trading records across a long time series, thus we can compare reinvestment prior to the treatment between groups. We find that investors sampled, and those who participated, are highly similar across observable dimensions, including reinvestment prior to the treatment. Finally, we note that investors who participated in a survey regardless of the treatment are highly similar in behavioral measures captured in the survey before and after the the information treatment.

Our study contributes to the literature investigating educational interventions and field behavior. Recent survey papers find conflicting evidence of whether or not various general financial literacy interventions affect downstream behavior (Fernandes, Lynch Jr, and Netemeyer (2014); Kaiser et al. (2021)). While these studies focused on trying to educate on the broad concept of

general financial literacy (e.g., numeracy, inflation, compounding interest rates, and risk diversification), we take a more narrow approach.[1] Fewer studies have focused on *investor* education attempting to improve arguably suboptimal trading decisions.[2]

Survey or laboratory experiments which are designed to affect investment behavior, particularly in the field, are sparse, but growing. Laudenbach et al. (2024) survey brokerage clients in Germany and provide information about the historical auto-correlation of market returns to study how beliefs in mean reversion or return persistence affect portfolio choice in the field. Haaland and Næss (2023) inform investors of a social trading platform about the historical performance of index funds and observe a reallocation away from individual stocks in the short term.

Relatedly, our study contributes to a growing number of information provision studies. These survey-interventions have been used to examine household expectations about inflation and house prices (Fuster et al. (2018); Coibion et al. (2020)), macroeconomic growth (Roth and Wohlfart (2020); Coibion, Gorodnichenko, and Kumar (2018)), and investor beliefs about the stock market Laudenbach et al. (2024); Andre, Schirmer, and Wohlfart (2023); Beutel and Weber (2023); Hanspal, Weber, and Wohlfart (2021); Schnorpfeil, Weber, and Hackethal (2024).[3] As opposed to most of these studies, the information treatment in our setting is in itself a financial literacy intervention aimed at changing investors' behavior in the field.

Finally, our study contributes to a literature examining the behavioral demand for dividends. Existing work has focused on documenting the existence of dividend clienteles (Graham and Kumar, 2006; Daniel, Garlappi, and Xiao, 2021), investors' consumption response from dividends (Baker, Nagel, and Wurgler, 2006; Di Maggio, Kermani, and Majlesi, 2020; Braeuer, Hackethal, and Hanspal, 2022), and behavioral explanations for investors' preferences for dividends (Shefrin

[1] Such studies examine how interventions translate into savings and borrowing decisions in the field (i.e., stock market participation, retirement planning, and debt management).

[2] An exception is in the domain of retirement savings where several studies have shown employees are inert in their retirement planning and nudges generally improve retirement savings (e.g., Carroll et al. (2009); Beshears et al. (2015); Choi et al. (2017); Kinnerud and Lorentzon (2022)).

[3] A number of related studies link survey or experimental measures to administrative data on individual investors without a specific treatment outcome, i.e., measured versus manipulated behavior (Fernandes, Lynch Jr, and Netemeyer, 2014). For example, Andersen et al. (2020, 2024); Ameriks et al. (2020); Meeuwis et al. (2022); Giglio et al. (2021a,b); Hanspal and Wagner (2023), among others.

and Statman, 1984; Hartzmark and Solomon, 2019). The effectiveness of a simple educational intervention on dividend demand helps to understand the source of behavioral demand for dividends. Certain theories of dividend demand involve investors who comprehend the appropriate economic logic surrounding dividends. For example, investors could use dividends to discipline a self control problem or to engage in hedonic editing of gains and losses (e.g. Shefrin and Statman, 1984), not because they think about dividends incorrectly, but because they understand the appropriate logic and can use it to solve a different behavioral bias. Our intervention should have no impact on the behavior of such investors because they would understand the information without it. Further, investors could be rationally holding dividend paying assets as part of an optimal strategy. Our intervention should again have no impact on such investors. More basic explanations of dividend demand, such as the free dividends fallacy, likely stems from confusion and a lack of education about the basic economic intuition surrounding dividends (Hartzmark and Solomon, 2019). Thus our findings suggest the free dividends fallacy likely is an important driver of dividend demand.

The task of educating to understand and implement better investing behavior is a broad and daunting one. Such educational interventions are long, expensive, difficult and are likely to achieve at best uncertain results.[4] The inherent difficulty of this task likely explains why there have been so few interventions trying to get investors to make better decisions. Our findings suggest that some financial decisions can be improved with a targeted intervention. Identifying which behaviors respond to what type of interventions represents an important line of future research.

I. Experiment

A. Experiment design and description

The goal of our experiment was to provide targeted information necessary to improve the behavior of investors suffering from the free dividends fallacy. We attempted to do so in the most

[4]Even after multiple finance classes taught by leading finance academics, many are skeptical that MBA students at elites schools actually understand the logic behind the investment framework they are taught or actually make better decisions.

parsimonious and effective manner given our medium of communication.

The goal was to impart simple messages accompanied with straightforward suggested actions to improve decisions. We wanted subjects to understand that dividends came at the expense of the price level, which means that you should not consume them or treat them differently from share price appreciation. This point was solidified in our treatment by examples of the influence of reinvestment on long run performance. This was accompanied with a suggestion that reinvestment, absent needs for consumption you would be willing to do through selling some stock, was a good thing to do.

The goal was intentionally narrow. While some economic intuition is explained, a deeper understanding of economics is not what we are trying to achieve. We hoped people would understand these specific points in this specific setting. While much more circumscribed in influence then a general understanding of the economics underlying Miller and Modigliani (1961), this narrow goal with a straightforward ask seems more likely to be achievable in the context in which we are working.

In the first stage of our main treatment, which we call the reinvestment treatment, subjects are sent an email. These are sent to bank customers from the bank's marketing email address and feature a subject line relating to dividends and an incentivized offer to participate in research being conducted in partnership with Goethe University Frankfurt. The email explains that when dividends are paid out, they are done so at the expense of the price and the firms' share price normally decreases by the dividend size. It also provides a concrete example by showing that popular stock market indices such as the DAX differ by a significant magnitude when comparing the price change index to the total return index where dividends are reinvested. The email explains that investors attempting to achieve the performance of the total return index should be reinvesting, rather than consuming dividend payouts. The email asks investors to complete a short survey about how they perceive dividends and offers a ten euro amazon voucher if completed.

Respondents who followed this link were first asked about the amount of received dividends and the fraction reinvested in 2020, the year prior to the intervention. After responding to these

questions participants were given further information about the costs of the free dividends fallacy and the benefits of reinvestment. To make this more salient and to encourage learning through direct feedback, subjects were presented with quiz questions related to dividends and then immediately received a detailed answer to each question. The benefits of such an intervention are twofold. First, the quiz serves as a mechanism which enables us to provide longer-form information about the benefits of dividend reinvestment while holding subjects' interest. Second, the respondents' quiz answers provide measures of prior knowledge about dividends. This approach was created in attempt to make the information and intuition concrete, while helping map abstract knowledge into concrete financial choices (e.g. Bu et al., 2021; D'Acunto et al., 2019; Ilut and Valchev, 2020).

For example, the first question presented to subjects was 'what generally happens to the price of a share just before the dividend is distributed to investors?' Investors could chose: a) The share price falls by approximately the amount of the dividend b) Nothing c) The share price increases slightly d) Not sure. Regardless of whether the investor chose the correct (choice A) or incorrect option, they saw an intuitive explanation describing why the price decreases. It stated that: "If the dividend is still part of a firm's balance sheet, it is reflected in the share price. When the dividend is paid out, it is transferred from the company to the investor and is consequently no longer included in the company's share price. What does this mean for investors? Dividends are not 'additional income' because they come directly from the share price. After dividend payouts, investors are typically as rich as before. So if the dividend is distributed, the portfolio value decreases."

The second question attempted to demonstrate the impact on long run performance with dividend reinvestment and without dividend reinvestment. To do so it gave the approximate current level of the DAX index in March 2021 of 15,000 (which includes dividend reinvestment) and asks what level they think it would have been without dividend reinvestment. The correct answer is about 6,500 points. With the accompanying explanation, this is meant to demonstrate the power of reinvestment and the loss from not considering dividends as a part of overall performance. The explanation concludes by stating: "Anyone who has withdrawn and spent all dividends from DAX companies since 1988, only holds half as much in equity assets today."

The third question was meant to illustrate dividend irrelevance using the concept of a home-made dividend. Using intuitive language it asked whether an investor should care if cash came from dividends or from a share sale. The attempt was to emphasize that if investors did not want to make a home-made dividend, they should want to reinvest a received dividend. The explanation concludes "If a partial sale is not desired, reinvestment should be made." After the three quiz questions we had a lessons learned section. The attempt here was to briefly summarize and solidify the message from the quiz questions. The section stated:

> *To sum up: Dividends are not "additional income" because they are directly deducted from the share price. If dividends are not reinvested, this is comparable to the partial sale of shares... So if you want to benefit fully from the compounding and realize the full performance of a securities investment, you should reinvest dividends in securities.*

Following the quiz, we asked about subjects' plans for reinvestment in 2021. We note that if this was our only variable of interest (as in many standard lab or survey-based experiments) we would be concerned about experimenter demand biasing the responses.[5] For educational interventions where the goal is to shift behavior however, in many ways the goal of the educator is to use such experimenter demand effects to induce changes in behavior. Given that we observe investors' actual trading decisions subsequent to survey completion, this offers a valuable baseline to compare investors' intended behavior (survey responses) with their actual behavior.

In addition to survey outcomes, the bank also provided us with anonymized trading data on individual investors. With this we can examine trading behavior around dividends in both 2020 (prior to the intervention) and 2021 through 2023 (after the intervention). Further, this allows analysis of investors in our zero-touch condition who cannot respond to our survey and investors in our other conditions who choose not to take the survey.

While we can randomize traders into treatments, we cannot control who actually clicks on a link in an email and partakes in our intervention. Thus we need further steps to ensure that our empirical findings reflect the causal effect of our intervention, rather than endogenous selection of

[5] See Bergman et al. (2020) for a discussion of such concerns.

those responding to our survey (See Section IV.A for a more detailed discussion of our results and selection concerns). This treatment on its own allows for a comparison of survey responses on prior behavior in 2020 and planned behavior in 2021 within investor. Further, it allows for a comparison of these investors investing decisions relative to all of the other investors in our dataset. This leaves concerns that there was a time varying shock that hit these specific investors from 2020 to 2021. It could also be that the subset of investors who completed the survey are not comparable to the other investors based on unobservable attributes.

To overcome these empirical concerns, we ran a separate treatment which we term the placebo treatment. Subjects randomized into this treatment received a similar email asking them to participate in research through a short, incentivized survey. This email was designed to be generally similar to that in the reinvestment treatment other than it lacked information about the free dividends fallacy and the advice on how to counteract it. Aside from this information, the invitation text, text related to the survey instrument and surveyors, and the financial incentive to participate (10 EUR) were similar. The hope with this email was to get a similar group of investors to those in the reinvestment treatment to serve as a comparable control group.

In addition, in the reinvestment treatment of the survey we asked subjects if they learned something new and found the information informative. In both the placebo and reinvestment treatments we also elicited investors' preferences for future automated reinvestments as an added feature (because such an option was not available at the time) and information regarding the timing and size of dividends. See Appendix Table A.3 for a basic overview of the survey modules presented to the reinvestment treatment group and the placebo control group. The survey for both groups ended with a series of background questions related to demographics, stock market expectations and risk appetite, and an opportunity to provide contact information for future emails and information and for the participation incentive. These questions provide control variables, but also further dimensions upon which we can examine who responds to our intervention. As one example, our educational intervention should have the biggest impact on those that did not understand dividend irrelevance prior to our survey and we can test whether this is the case.

Our experiment was conducted in two tranches in early May 2021. The first invitation emails were sent in the first week of May and the second tranche followed one week later. Participants completed the survey from May 5th to June 1st, 2021. 57% of the sample completed the survey on May 5th and by May 12th, 93% of the sample had completed it. 95 Observations were excluded from the placebo and reinvestment treatment groups (6.11% and 6.49% respectively) at onset from subjects who started, but did not complete the survey. All investors in both tranches 1 and 2 and regardless of their treatment group were incentivized with 10 euro vouchers to Amazon.de.

II. Data and setting

We partnered with a large German bank that offers a full range of retail banking and brokerage services. The bank provides us with comprehensive, anonymized, data that include customer demographics, account statistics, security transactions, and categorized current account transactions. Customer demographic information include age, gender, marital status, employment status, and ZIP code. Data include information on banking relationships, such as length of relationship, number of branch visits during the last 12 months, and types of banking products used. We observe monthly financial balances of customers' bank accounts, 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. End-of-month portfolio holdings, as well as individual trading records, enable us to identify dividend income and other income from investments. We supplement our holdings and trading records by matching security-level information on ISIN to third party data provider Refinitiv/EIKON Datastream for information on returns, prices, distributed dividends per share (DPS), and payment and announcement dates. In general our data and setting is highly similar to that described in Braeuer, Hackethal, and Hanspal (2022) with the exception of our survey intervention and sample of investors, as described further below.

Several aspects of the institutional setting warrant a brief discussion. As described in further detail in Braeuer, Hackethal, and Hanspal (2022), the current tax regime in Germany is such that

investors should not have a preference for dividends over capital gains. In contrast to the United States, dividends and capital gains are always taxed at the same rate of 25% (capital gains tax). For German stocks, information on the size of upcoming dividend payments is publicly released 4 weeks before the payment. The majority of German companies pay out annual dividends as opposed to quarterly payments, which are common in the United States. Most of these firms pay out their dividends in spring, particularly during the April-May dividend season. Figure I shows the average dividends received per week and illustrates the 4 weeks per year we use as the dividend season. The figure shows that each of the bars depicting the average received dividends per week during the dividend season are at least double those occurring elsewhere throughout the year.

A. Sample

Our sample is based on criteria to target investors who could be exhibiting behavioral demand for dividends. We begin with a universe of investors who have an active account with the brokerage arm of the retail bank. Investors at the bank with portfolio value in excess of 100,000 EUR are termed high-wealth account holders and have access to a bank advisor. Both self-directed clients and advised clients execute individual trades and make active decisions about their portfolios. The inclusion of both groups of investors results in a sample of investors similar to those studied in Braeuer, Hackethal, and Hanspal (2022). To be included in our sample, high-wealth investors needed to hold at least one DAX-listed firm which was expected to distribute a dividend during the month of May 2021. Similarly, self-directed investors were included if they had single-stock holdings with recent trading activity. From both investor types we randomly allocate to a zero-touch group, a placebo treatment, and a reinvestment treatment.

For our main analyses we create a dataset by first identifying dividends received by investors in the sample. Specifically, we start with end-of-month holdings records to identify dividend-paying equities from stocks and mutual funds. We identify securities that pay dividends by matching ISIN codes with returns, prices, dividends per share (DPS), and payment and announcement dates from Refinitiv/EIKON Datastream. We sum received dividends by date and use daily trading records

aggregated by calendar week to identify active portfolio changes. Our sample includes monthly holdings and intra-month transactions from September 2019 through July 2023. We use this data to build an unbalanced panel over time. Our analyses excludes all transactions which are executed by a robo-advisor or a savings plan, both of which investors may select into.

From our sampling procedure we end up with a zero-touch group of 8,327 investors, 6,637 investors who receive the placebo treatment email and invitation, and an over-sampled group of reinvestment treated investors who receive the reinvestment email (21,023 investors). Appendix Table A.2 provides these tabulations. From the placebo group 615 investors completed the survey (9.2%) and 792 from the reinvestment treatment email (3.8%). The differences in completion rate are likely due to differences in the length of email invitation and the length of the actual survey, as described in previous section. Our main analysis sample focuses on investors who maintain an active securities account and state that this bank is their main bank or brokerage account.[6] In the analyses that follow, this group is our main sample, however we show in a multitude of specifications and robustness checks that our results are economically and statistically meaningful regardless of the sample selection. Again, note Appendix Table A.2 for these various sample sizes.

B. Descriptive statistics

Table I provides descriptive information on our sample. The first three columns of Panel A includes all investors sampled for our experiment. Column 1 comprises those randomly allocated to the zero-touch group, Column 2 the placebo treatment and Column 3 the reinvest treatment. These columns show mean values of various demographics, namely gender, age, marital status, years with this bank, employment characteristics, and participation in other bank products. We note that investors from the three groups appear to be highly similar across these dimensions. Columns 4 and 5 shows investors who completed the survey from the placebo and reinvestment treatments respectively. Investors within these two groups appear to be highly similar to each other and differ slightly in various dimensions from those who do not participate in the survey.

[6] Other investors hold multiple brokerage and checking accounts, which masks and attenuates the reinvestment behavior which is observable in our dataset.

Panel B and C summarizes investors' portfolio holdings and trading activity. Investors who participated in the treatment groups have more wealth, risky assets, and thus risky asset share compared to those who did not participate and those in the zero-touch group. They also are more likely to hold funds and ETFs. These investors hold a higher number of assets and make slightly more trades. All investors in the sample hold about 70-75% of their risky assets in securities which pay dividends, of which, about 50% is in single-stocks. In general, investor groups appear to be similar across holdings and trading activity. However, to reduce these potential confounds, we control for a variety of observable characteristics in our analyses.

We also show in Appendix Table A.4 that investors in our sample do not differ in their risk attitudes or market expectations between the reinvestment treatment and the placebo control group.

III. Results

A. Planned reinvestment

The first step of our analysis examines survey questions to understand how our intervention affected investors' beliefs and understanding of dividends and dividend irrelevance. We examine a number of questions to see if investors in the reinvestment treatment answer differently from those in the placebo. Consistent with our reinvestment treatment meaningfully educating participants, Figure II illustrates that participants in the reinvestment treatment were significantly more likely to disagree with a statement that wrongly equates dividend payments as leaving you wealthier.

Next we investigate investors' stated plans about investing dividends. The left figure in Panel A of Figure III shows planned reinvestment. The two bars to the left, labeled 2020, show the average of a reinvestment variable equal to 1 if the respondents stated that the prior year, they reinvested some of their dividends. The left bar shows that 53% of investors in the placebo treatment claimed to reinvest the prior year while 58% in the reinvestment treatment did. The 95% confidence bars illustrate that the difference between these two estimates is not statistically significant. The two bars to the right, labeled 2021, show what respondents say they will do in the coming year. The

planned reinvestment for those in the placebo treatment is virtually unchanged (58%), but in the reinvestment treatment the point estimate increases to nearly 75%.

Panel A of Table II examines this relation more formally using regression analysis. The dependent variable, the same as described above, is regressed on *Post,* equal to 0 if the response is about 2020 and equal to 1 if it is about 2021, *Treatment*, equal to 1 for the reinvestment treatment and 0 for the placebo, and *Treatment* × *Post*, the interaction between the two. *Treatment* × *Post,* is the coefficient of interest, the difference between the reinvestment and placebo group after controlling for the difference in base rates in 2020. We find a coefficient of 10 to 11 percentage points with and without controls, both significant at the 1% level. This indicates that participants in the reinvestment condition were significantly more likely to state that they planned to reinvest relative to those in the control and relative to what they said they had done the prior year.

Next we move from the binary decision of reinvesting at all, to the fraction of a dividend investors planned to reinvest. The right figure in Panel A of Figure III repeats the same analysis, but focuses on the fraction of a dividend investors say they reinvested. The first two bars show that in 2020 investors reported reinvesting about 40% (39% for the placebo and 44% for reinvestment) of their dividends. The final two bars show that this number is virtually unchanged, 43%, for the placebo treatment, but increases to 57% for the reinvestment treatment. Columns 3 and 4 of Table II show that in regressions, the reinvestment treatment positively affects plans for reinvestment at the intensive margin. Investors who saw the reinvestment treatment, on average, increase the planned fraction of dividends to be reinvested by about 9.5 percentage points after including controls.

In our survey experiment we also asked investors about their preferences for tools and devices related to dividend reinvestment. We asked subjects to imagine that they wanted to save 100 euro per month for the next 20 years and if they would chose to do so with a distributing fund or with a reinvesting fund.[7] Panel B of Figure III plots the results graphically. It shows that about 60%

[7]The translated text of the question was "Suppose you wanted to save 100 per month for the next 20 years e.g. for your retirement or for the education of your children. You can choose to invest your money in either a fund that pays out all dividends received (distributing fund) or invest in a fund that reinvests all dividends (reinvestment fund). Which fund would you choose? Distributing fund: I want to receive the dividends. Reinvestment fund: I want the dividends to be automatically reinvested by the fund."

of those in the placebo group want a fund that reinvests, but approximately 82% of those in the reinvestment treatment would opt for a reinvesting fund. Columns 1 and 2 of Table II Panel B show this 20 percentage point gap is significant and survives controls.

Finally, we examine if investors in the treatment have a greater preference for automatic reinvestment of dividends. The survey asks if investors would like dividends to be automatically reinvested. The dependent variable is one if they respond yes. Both the left panel of Panel B of Figure III and the regression coefficients in Columns 3 and 4 of Table II Panel B show that those in the reinvestment treatment are about 12 percentage points more likely to state they would prefer that their dividends are automatically reinvested.

B. Reinvestment and field behavior

While the prior section illustrates that respondents say their behavior will be different in surveys, it is unclear to what extent this translates into actual trading decisions. There is always a concern with survey responses that they do not translate into actions. For example, it could be that respondents gave the answer they thought the experimenters thought was right, even though they didn't actually believe it. At a more basic level, it could be the survey responses reflected actual desire and knowledge gleaned from the survey at the time, but this was simply forgotten by the time actual decisions had to be made. In the next section we explore if these affects translate into differences in real-world investment behavior. We find large effects in actual trading decisions.

B.1. Empirical strategy

The main message of our intervention is on the importance of not treating a dividend as separate from the price level and the benefits of dividend reinvestment. Thus the main variable of interest we examine is to what extent investors take dividends and reinvest them back into the stock market. Given the experimental design, differences in the propensity to reinvest based on treatment group can be interpreted as the causal affect on investors' propensity to reinvest dividends in the field.

Our empirical strategy is to examine various types and timing of dividends and relate their

arrival to active portfolio choices around a tight window. Specifically, we relate the euro-amount of received dividends, to gross and net portfolio transactions, which provide a marginal propensity to reinvest (MPR) measure. We relate this measure between treatment and placebo-control (zero-touch) groups in pre- and post-treatment periods. Thus, our main variables of interest are interaction terms of these variables which provide us with the difference in MPR between groups, or the additional euro-amount invested into equities from one euro of received dividends. To be precise, we estimate the following baseline equation:

$$Y_{trades\,i,t} = \beta_1[Dividends_{type\,i,t} \times \mathbb{I}(Treatment_i) \times Post_t] + \theta_{i,t} + t_w + \gamma_i + u \tag{1}$$

Our preferred analysis specifies time, t, in calendar weeks, such that we relate received dividends to portfolio changes during the contemporaneous 5-day window and the subsequent 4 weeks (cumulative 1 month) similar to Braeuer, Hackethal, and Hanspal (2022). We examine various outcome measures, $Y_{trades\,i,t}$: net transactions, gross purchases and sales. We control for time-varying investor control variables, $\theta_{i,t}$, which includes monthly portfolio values, and for investor-fixed effects, γ_i. $Post_t$ takes the value of one in weeks within or after an investor has received the email invitation to the survey experiment for investors in the treatment or the placebo groups. This corresponds with calendar weeks 19 and 20, reflecting the fact that the email campaign was sent in two waves. For the the zero-touch control group, we set the post period to weeks greater than or equal to 19 (week of May 3rd, 2021). The parameter of interest, β, therefore provides the difference in the MPR from securities which distributed dividends after investors interacted with our intervention, by treatment group, and between the pre-period and post-period.

We examine various classifications of dividends. One is simply to measure all dividends received throughout the entire year, which we indicate as $Dividends_{All}$. We focus our intervention on Germany in part because the dividend season is a time where dividends are concentrated and highly salient. Thus we also examine the dividends received during the spring dividend season and indicate this as $Dividends_{Season}$.[8] We also include $Dividends_{Other}$, which captures all other

[8] As noted in Figure I, the majority of received dividends fall within calendar weeks 18 through 21. Specifically

dividends received throughout the year, and all relevant interaction terms (e.g., with time and group trends). To minimize the effect of extreme outliers, *Dividends* is bottom truncated under 100 EUR and winsorized at the 99th percentile. Net transactions are winsorized at the 1st and 99th percentile and investors' aggregated purchases and sales are then correspondingly adjusted to reflect their (winsorized) net transactions.[9]

B.2. Reinvestment decisions

Figure IV shows our main result. The figure reports the $Dividends \times Treatment \times Post$ coefficient in Equation 1 for the dividend season.[10] Each bar represents the difference in cumulative dividend reinvestment into net equity purchases in each week following a dividend payment. The left most bar shows dividend reinvestment in the week the dividend was received (week 0), while the right most bar shows the cumulative reinvestment occurring the month after the dividend was received (weeks 0 through 4). Panel A uses the placebo as the control group and Panel B uses the zero-touch as the control group. Thus each bar represents how much more of a dividend that the reinvestment group reinvests relative to the control group as well as their own MPR prior to the treatment.

Across all specifications and relative to each control group we find that investors in the reinvestment treatment exhibit a higher MPR after the treatment. Using placebo investors as the control group in Panel A, we see that in the week a dividend is received, investors in the reinvestment treatment reinvest about 50 cents more per euro of dividend received post treatment. This peaks over the next couple of weeks and at the end of the month these investors invest about 65 cents more. Using the zero-touch investors as a control group in Panel B we see a similar pattern that is

we indicate the dividend season with a variable which takes the value of one during these weeks and interact it with the euro amount of dividends received.

[9]The majority of investors in the sample either only purchase or only sell within a weekly time period, however approximately 1% of investor-week observations show sizeable transactions in both directions. For these observations, purchases (sales) are capped at their (winsorized) net transaction amount. This reduces potential bias from large transactions and allows purchases and sales to map back to net transaction amounts. Appendix Figure A.4 presents a thorough treatment of alternative winsorization specifications and shows that our results are robust to various treatments of outliers.

[10]These bars report the MPR during the dividend season, $Dividends_{Season}$, with $Dividends_{Other}$ included in the regression but not reported.

slightly muted. The MPR of reinvestment treated investors is about 20 percentage points higher in the week it was received and about 30 percentage points higher after a month.

Table III presents the results more formally using regressions based on Equation 1. The table reports the $Dividends \times Treatment \times Post$ coefficients for reinvesting dividends into net equity purchases in the contemporaneous week, week 0. Thus it illustrates investors' marginal propensity to reinvest after the intervention compared to before the intervention and compared to the control group. The control group is the placebo group in Panel A and the zero-touch group in Panel B. Columns 1 and 3 control for investors' monthly holdings and provide the group differences between the treatment and control (zero-touch) group. In Columns 2 and 4 we include investor-fixed effects in addition to controlling for monthly portfolio value.

Examining all received dividends together, $Dividends_{All}$, in Columns 1 and 2 we see that investors reinvested about 24 cents more per euro received relative to the placebo group and about 8 cents more relative to the control group, all marginally insignificant. We run our study in Germany in part because the dividend season means that there is one specific time period each year where dividend payment is clustered. By examining all time periods together we are examining the month or so per year with high dividend payments and high dividend salience combined with the majority of weeks with minimal payments and attention.

To focus on the most relevant time period for German investors, namely the dividend season, the next two columns disaggregate dividends into dividends from the dividend season, $Dividends_{Season}$, and dividends received throughout the year, $Dividends_{Other}$. The $Dividends_{Other}$ coefficient is consistent with a noisily estimated zero, which makes sense given this is a period when few dividends are received and dividends are not particularly salient. Focusing on the dividend season we find economically and statistically strong results. We find an average MPR of about 47 cents for each euro of received dividends during the dividend season relative to the placebo, and 17 cents relative to the control. The results suggest that investors change their reinvestment behavior when the majority of dividends are received, during the dividend season.

Table IV breaks down the effect into both buys and sells relative to the placebo group.[11] Panel A shows that the 47 cents more per euro into net-equity positions following the treatment largely comes from an increase in buying. Panel B examines the cumulative monthly effect, showing that after one month treatment investors reinvest 64 cents more per euro. Columns 2 and 3 show this is largely driven by purchases.

Our analysis thus far has examined winsorized data, but of course alternative choices could be made. Figure A.4 explores the influence on these choices on the results of same week reinvestment from Table III Column 4. The top left graph shows why winsorisation is necessary. With raw data outliers push our implied MPR to above 5 EUR relative to the placebo group and close to 1 EUR relative to the zero-touch. If investors are trading amounts orders of magnitude higher than the dividends received, this behavior likely is not reflective of dividend reinvestment. The top middle graph shows the winsorised results from the Table III. The top right graph drops rather than winsorizes the extreme observations. Consistent with these extremes being unrelated to dividend reinvestment, we find similar results after truncation. The bottom graphs examines alternative strategies. The bottom left winsorises more tightly at 95% and finds slightly larger estimates than the baseline for both groups. The bottom middle looks at instances where dividends received are within ten times the amount transacted and finds larger estimates, while the bottom right limits to transactions within 1.5 times the dividends received and finds somewhat similar results to the baseline. While normalization choices have a marginal influence on our estimated magnitudes, a variety of reasonable choices illustrate materially similar patterns.

Our main analysis utilizes a number of different sources of variation which we now separately examine to better understand the effects that we document. Specifically we examine how reinvestment changed across treatment groups in Figure V and within treatment groups over time in Figure VI. Figure V shows the cumulative MPR in the pre-intervention dividend season in 2020 (left figure), while the right figures examine the three post-intervention dividend seasons of 2021-2023. Regressions are run using data from this time period with variables for $Dividends \times Treatment$ and

[11] Appendix Table A.5 provides the same analysis relative to the zero-touch control group.

Dividends × *Control* reported. The reinvestment treatment is shown in red, the placebo-control group in blue and the zero-touch control group in green.

Pre-intervention, investors in the reinvestment treatment do not meaningfully reinvest and, if anything, divest slightly more than the dividend amount. Though this is a noisy estimate that is only marginally significantly different from zero at the 10% level. Investors in the placebo group show slightly positive reinvestment rates, but the wide error bars show this is statistically indistinguishable from zero reinvestment. Examining the zero-touch control group, for which we have much more data, the green bars are barely perceptible. This indicates for this group we have a fairly precisely measured lack of reinvestment. Post treatment however, a more clear pattern emerges. Post-intervention placebo investors continue to not reinvest, and if anything seem to slightly divest and the zero-touch group continues with a fairly precisely measured lack of reinvestment. In contrast, reinvestment treated investors reinvest dividends after the treatment. Relative only to the control group MPR during the post period, dividend reinvestment monotonically increases each week. A month after receiving dividends, investors in the reinvestment treatment reinvest about 20 cents more per euro received compared to either control group.

In Figure VI we explore variation in the MPR before and after our intervention within treatment type. Thus each bar represents the coefficient *Dividends* × *Post* from a regression using the data from the specific treatment. The blue bars in Panel A show point estimates that suggests placebo investors' MPR decreased, though the wide error bars mean we can't reject after a month that there was no difference in MPR in the post period compared to the post. The (lack of) visible green bars in Panel B suggests there was no meaningful change in MPR for the zero-touch group. The red bars display strong evidence of reinvestment peaking at about 50 cents per euro after 2 weeks and ending around 30 cents per euro after the full month.

These figures help to illustrate the patterns observed in Figure IV and the difference in magnitudes between using the placebo or the zero-touch group as the control. Both panels show estimates peaking after week 2 and declining slightly after. The following figures show this is not driven by post-treatment behavior (which is monotonic for the reinvestment treatment), but rather

the marginally significant pre-treatment variation. In our main specification, we consistently find higher MPRs for the reinvestment group when compared to the placebo group rather than the zero-touch group. The figures shows that the zero-touch comparison is roughly zero, while the placebo is negative. Thus the positive reinvestment effect seems larger compared to the lower reinvestment for the placebo compared to the lack of change for the zero-touch.

This section has presented numerous estimates of the influence of the reinvestment treatment on MPR. While there is variation in magnitudes across specifications and arguments about the relative merits of each, the overall takeaway is consistent. The educational intervention induced a significant increase in the reinvestment of dividends.

IV. Discussion

A. Selection concerns

While the setting allows us to randomize investors into receiving certain emails, it does not allow us to randomize who opens them and completes the survey. This means that our results may not reflect the influence of our intervention, but rather reflects the endogenous selection of a certain type of investor. Perhaps such an investor would have engaged in the given trading behavior without the intervention. Our survey was designed to mitigate this concern along a variety of dimensions.

Ex-ante, perhaps the most likely selection concern was that certain investors reinvest more dividends and are also more likely to respond to our survey. While we can control for observables, such a concern clearly could be driven by variables which we do not observe. Our setting allows a direct test of this as we observe trading behavior for investors before the intervention as well as after the intervention. This allows us to test how different trading decisions were after our intervention compared to how the same investor behaved before our intervention. Thus we are able to rule out any fixed characteristic of investor type that can account for our results.

Thus, an explanation based on selection must include selection based on a time varying shock. Under such an explanation, the investors in our treatment condition who responded to the survey

also changed their behavior that year and decided to reinvest dividends. This change needs to have occurred post the 2020 trading data we observe. Again, we can control for observables, and allow for different impact of them in 2020 compared to 2021-2023, so the explanation needs to be driven by non-observable characteristics. If this shock was correlated with the likelihood of clicking on an email with dividends in the title, or of the willingness to complete a survey for a gift card, the placebo sample should exhibit similar characteristics. While the placebo treatment clearly cannot be identical to the treatment, it was designed to be as close as possible on all characteristics other than the educational intervention in order to provide a baseline comparison against this concern.

We do observe differences in click rates between the two treatments, where subjects who received and opened the placebo email clicked the survey at a higher rate (14.1%) than the reinvestment treatment (6.6%). Email open rates were nearly identical (36.5% for the reinvestment treatment and 36.9% for the placebo) and completion rates conditional on clicking were highly similar (93.5% in the reinvestment and 93.8% in the placebo treatment). The main difference between the two emails is the additional text in the treatment. It is likely that many of the investors had to scroll down to click the link in the reinvestment treatment in their email clients, while investors in the placebo treatment generally did not have to do so. We included this text because we thought that if we also received data on individual level email open rates it would be interesting to see if the text of an email alone had an effect. This would represent a larger sample with a weaker treatment which we were unsure whether there would be a meaningful effect. This was our mistake as the bank can only provide aggregated email open rates according to its privacy policy which means we cannot test for such an effect in our data. We did not predict the email length effect, otherwise we would have included more text in the placebo. While this might result in slight differences on unobservables between the two treatments, it is not obvious why this difference would be correlated with a time varying preference for dividend reinvestment.

Further, we can examine variation in changes in behavior based on the dividend literacy of respondents. Investors who understood the message of our intervention prior to the intervention would not change their behavior if they didn't learn anything. Along a variety of measures (See

Section IV.B), we find that it is investors who learned the most who change their behavior the most in response to our treatment. The most straightforward selection story is that investors who learned about reinvestment in 2021 and decided that they would reinvest more in 2021 than in 2020 prior to our intervention, were also more likely to respond to our survey. Our finding that the results are driven by investors who learned the most goes in the opposite direction of this explanation.

Our paper cannot rule out all potential selection stories, but the remaining explanation is fairly narrow. In order to explain our results, the explanation must have the following components

1. A time varying shock that influenced respondents in 2021, but was not relevant in 2020. This shock must be orthogonal to any fixed investor characteristic or time-varying impact of observable variables.

2. This shock needs to influence the type of person who responds to our reinvestment treatment email, but not influence those who respond to the placebo email. Thus explanations such as willingness to complete a survey for a gift card or responding to an email with a given subject (which included the word dividends) cannot explain our result. Further the shock does not influence those who do not receive an email.

3. This selection was a time-varying shock to reinvestment treatment respondents who had a low level of dividend literacy before our intervention (both based on self reporting and survey responses). Thus it cannot be investors who learned about the importance of dividend reinvestment prior to our intervention.

B. What is learned from the treatment?

Investors may hold dividend paying assets for various reasons. For example, some investors view dividend payment as a proxy for safety or value. Other investors may hold dividends as a self control mechanism (Shefrin and Statman (1984)). Such investors understand dividend irrelevance and thus shouldn't change their behavior based on our treatment. On the other hand, investors that are confused by the concept of dividend irrelevance will learn something new from our treatment. If

our intervention changes behavior by educating people on the mistake of the free dividends fallacy, then it should be the group that did not understand it before that alters their behavior.

Our intervention allows us to examine whether investors who updated their prior understanding of dividends, are those who are more likely to adjust plans and field behavior. We examine this relation in Table V based on heterogeneity in dividend literacy from the survey quiz, thus the sample contains only investors in the reinvestment treatment arm of the intervention. In Panel A we first examine planned reinvestment of dividends. The dependent variable is the change in the planned fraction of dividends reinvested. We create indicator variables based on investors' score on the three dividend-question quiz and Likert-scale responses to survey statements about what investors learned from the quiz. The variable *Low dividend literacy* indicates investors who had one or zero of the quiz questions correct (approximately 29.5% of investors). The variable *Informative* indicates investors who provided an above median score for 'I found this information informative,' and *Learned new* indicates an above median score for 'I learned something new.'

Columns 1 and 2 show a statistically insignificant relationship between dividend literary as measured by our quiz and the change in *planned* reinvested from 2020 to 2021. However, Columns 3 and 4 show a strong positive relationship between planned reinvestment and the survey question related investors' learning from the survey quiz. Investors who indicated that they learned something new (above the median level) plan to invest 7.7 percentage points more of their dividends back into equities compared to those providing lower scores. These relationships are shown in Figure VIII, where we plot the raw values of investors' quiz scores (values of 0, 1, 2, or 3) and Likert-scale responses (values of 1-7) with changes in planned reinvestment rates. Similarly, Columns 5 and 6 of Table V indicate that investors agreeing with the statement 'I found this information to be informative' (above the median level) is associated with an unconditional (conditional) increase of 10.8 (8.2) percent points in planned dividend reinvestment relative to the prior year. A single standard deviation from the mean increase results in an approximate 3.8 percentage point increase in planned reinvested dividends. These magnitudes are economically meaningful as the mean planned change in reinvestments is 10.2 percentage points for the reinvestment group, and 1.4 percentage

points for the placebo treatment group.

We also examine the effect of literacy and learning on the extensive margin of planned reinvestment behavior. Appendix Table A.7 notes that those who rate the information as informative are almost 10 percentage points more likely to plan reinvestment at the extensive margin, the effect on dividend literacy and those who stated that they learned the most are less striking, however.[12]

One important question, is whether these patterns carry through to field behavior. We examine this in Panel B of Table V. The dependent variable in Columns 1-3 is net transactions in the contemporaneous week of dividend receipt, while in Columns 4-6 it is gross purchases. Again, the variables of interest are indicator variables created from investors' survey responses. We interact each of these variables post-treatment indicator to understand how treatment heterogeneity affects the MPR out of dividends received during the dividend season, $Dividends_{Season}$.

We note that investors with low quiz scores, arguably those who got the most out of the information treatment increase reinvestments into equities by an additional 11 percentage points (Column 1) relative to those who answered all quiz questions correctly. In Column 3 we also observe an economically and statistically relevant association between investors who stated that they learned something new and net purchases, compared to those who perhaps already knew about the benefits to dividend reinvestment. As in previous tables, Columns 4-6 indicate the response is larger when looking at gross purchases to equity positions.

C. Decay effects of educational treatments

The literature is generally consistent in finding relatively large and significant decay effects of financial literacy treatment education on downstream field behavior (Kaiser et al., 2021; Fernandes, Lynch Jr, and Netemeyer, 2014). In Figure VII and Table VI we examine in more detail to what extent the effects of our intervention decay over time. Figure VII plots the difference in the cumulative 1-month marginal propensity to reinvest (MPR) for the reinvestment treatment relative to the placebo treatment. We disaggregate the sample by the dividend season for each year 2021-

[12] Appendix Table A.7 also highlights that our results at the intensive margin are relatively insensitive to controlling for investor-fixed effects rather than for controlling for time-invariant characteristics (Columns 4-6).

2023, i.e., the dividend seasons following the intervention in 2021 and the pre-period of 2020, to examine if there is a decay in the treatment effect over time. We note, starting with the left panel that the treatment effect relative to the placebo control group on the MPR back into all equities is positive for each dividend season through 2023. The right panel shows a similar positive and persistent effect relative to the zero-touch control group.

Table VI presents similar results in a regression framework. We examine the contemporaneous MPR out of various dividends between the placebo-control group and the reinvestment treatment group. In general, we note that the effect of our treatment seems to persist to some extent in the two dividend seasons after our treatment. This suggests that the longstanding effect of our simple, yet effective intervention appears to be somewhat powerful.[13]

D. Portfolio effects of the treatment

Another dimension that we can examine is which assets investors allocate money towards after the intervention. This differs from the outcomes we have examined so far, as specific security choices were not directly addressed in the treatment content. Thus whether or not people change their portfolio composition after the intervention helps to illustrate what lessons investors may have learned from our treatment.

The most narrow scope for learning from our treatment is that investors learned that they should reinvest dividends back into the portfolio. This was an explicit message in our intervention and is consistent with our results. If this is the only message that we were able to impart, we would consider our intervention a success. With that said, it would limit what could be addressed by such interventions to settings where there was a specific well-defined behavioral ask.

On the other hand, it could be that investors learned the slightly broader message that the free dividends fallacy was a mistake. Said differently, perhaps investors in our treatment actually learned some of the intuition behind Miller and Modigliani (1961) dividend irrelevance. If this is

[13] Appendix A.8 highlights that interaction between decay effects and heterogeneity in dividend literacy within the reinvestment treatment group. The table shows that our previous discussion on who learns from and reacts from the intervention show a longstanding, albeit declining, effect over time.

the case we might expect other behaviors, that were not directly discussed, to also change.

If investors suffer from the free dividends fallacy, one reason (among others) that they hold dividend paying assets is because they view it as providing an income stream of free money. If such an investor learns not to think about dividends in this way, then the investor will no longer want a dividend paying stock for this reason. Thus, the portfolio of an investor who does not suffer from the free dividend fallacy will likely have a lower dividend yield than one who does, all else equal.

Table VII explores whether this is the case by examining the dividend yield of portfolios and subsequent transactions. The first column focuses on investors' end-of-month portfolio holdings. We calculate the value-weighted dividend yield of the portfolio based on security-level payments over the prior 12 months. The $Treatment \times Post$ variable in Column 1 indicates that investors in the reinvestment treatment during the post period have a portfolio with a dividend yield about 20 bps lower than the placebo group and the pre-period. The average dividend yield in this sample is about 3%. This means reinvestment treatment investors decrease the dividend yield of their portfolio by roughly 7 percent.

Many investors do not exhibit significant turnover, so this behavior will likely manifest itself through what new positions are purchased. Columns 2 and 3 examines this and finds that positions added to the portfolio have a dividend yield 32 basis points lower. This is consistent with investors who no longer value a stock for its free dividend income stream and decreasing their demand accordingly.

The results suggest that investors learned not only the specific behavior to counteract a bias, but also learned something of the logic of the bias itself. This resulted in changing portfolio composition in a way that is consistent with overcoming the bias, but that was not explicitly suggested. The results are hopeful for future interventions in that they suggest a targeted intervention can succeed in imparting actual educational lessons that investors can utilize in ways not directly imagined and suggested by the educator.

E. Influence on wealth

While the reinvestment treatment successfully increased reinvestment, on its own this need not lead to more optimal behavior and higher wealth. This section discusses further results suggesting that the increase in reinvestment seems consistent with overcoming a behavioral bias and thus, from an ex-ante perspective, increasing future wealth.

The key question when evaluating the expected influence on savings behavior is what else these investors changed as they increased reinvestment. For example, assume that dividends were used to solve a self control problem (e.g. Shefrin and Statman (1984)). If our treatment increases reinvestment by removing this self control tool, investors would actually increase consumption out of other assets and save less than they had before. It could also be that investors cease to consume out of their dividends and reinvest them, but consume the same amount funded through selling securities. Such an investor may achieve some tax benefits and hopefully would no longer base consumption decisions on dividend income, but overall savings would be similar. A variety of evidence suggests that dividends are treated as free money thereby making investors more likely to consume dividends, rather than other sources of wealth. If investors consume dividend payments on expenses they would not otherwise make, the increased reinvestment will change how investors perceive this money and thus make it associated with greater savings.

The testable prediction between these three scenarios is what happens to savings once investors start to reinvest dividends. We explore this by examining investors' portfolio values in Figure IX. Panel A plots this relative to the placebo group and Panel B plots portfolio value relative to the zero-touch group. We use monthly holdings and regress the Euro value of the portfolio on a treatment dummy interacted with the months since the intervention. Both figures show that the portfolio value grew for the treated group relative to either comparison group in point estimates. With that said, the estimates are noisy. This is to be expected as the influence of increasing dividend reinvestment on increasing savings, as in the third scenario above, will have a large magnitude over a long period of time (see below), but over a two year period will be small compared to the volatility

of portfolio performance. Even with this noise, the graph does effectively rule out that savings decreased with reinvestment. While we cannot definitively rule out that consumption remained the same, the evidence is consistent with increased reinvestment and a lack of increasing consumption from other sources leading to increased savings.

If investors are reinvesting dividends and increasing their savings, we can give a rough back of the envelope calculation of the long-run influence of such behavior on savings. Investors in our sample receive a dividend yield of roughly 3% and our results suggest that treated investors reinvest about half of the dividends received and did not meaningfully reinvest prior to the treatment. Thus, we assume they reinvest 1.5% of this dividend and keep it in savings. We compare such a reinvesting investor to a dividend consuming investor that does not reinvest the dividend and consumes the whole amount. In the back of the envelope spirit, we assume an annual market price appreciation of 5% and a total return of 8% (5% plus the 3% dividend yield). Thus the reinvesting investor would have expected savings increases of 6.5% per year while the dividend consuming investor would have increases of 5%. If they invested for 30 years, the consuming investor would see their initial investment increase by 432%, while the reinvesting investor would see an increase of 661%. Alternative assumptions will yield different estimates, but the message will be similar in that the retiring reinvestment investor will have significantly more money in expectation than the dividend consuming investor.[14] While these calculations are back of the envelope, if investors actually reinvest their dividends and decrease their consumption, they will end up with significantly more wealth over their lifetime.

V. Conclusion

In this study, we test if a focused educational intervention can induce behavior closer to what canonical finance theory says is optimal for investor demand for dividends. While dividends should be irrelevant for investors, a large literature has documented that investors generally treat dividends

[14] For example, let's assume that investors added 10,000 euros to their portfolio every year and we keep the market return parameters the same. After 30 years the consuming investor would retire with 707,608 euros while the reinvesting investor would have 929,892 euros.

differently from other sources of income. Our brief interactive quiz that educates on the proper financial intuition of thinking about dividends leads to changes in both investor survey responses on how dividends are perceived and in their subsequent investing behavior. Compared to investors who saw the placebo message, reinvestment-treated investors reinvest about 50 cents more per euro received of dividends. This effect persists not only at the time of the treatment, but also over the subsequent two dividend seasons.

We test the hypothesis that investors who updated their prior understanding of dividends the greatest, are those who are more likely to adjust plans and field behavior. The evidence we find suggests that not only did these patterns become apparent in the planned measures of reinvestment from the survey, but they also carried through to field behavior: We find that investors who provided incorrect responses to the dividends-quiz increased reinvestment behavior in the months following the intervention. Similarly, those who stated specifically that they learned something new, or found the information informative, increased reinvestment.

Our study contributes to the literature which investigate educational interventions and field behavior. While other studies generally focus on broad topics of general financial literacy, we examine a specific bias exhibited by investors. Recent survey papers find conflicting evidence of whether or not various general financial literacy interventions affect downstream behavior (Fernandes, Lynch Jr, and Netemeyer (2014); Kaiser et al. (2021)). Our study documents that targeted interventions can improve the investment choices and allocations made by retail investors. Our setting suggests that a variety of simple investing mistakes can be shifted. The free dividends fallacy is likely driven by a lack of attention and ignorance of a simple concept. These settings can likely be influenced by simple 'nudges.' Which seems likely to other important investor mistakes such as ignoring fees, ignoring taxes, trading too much, viewing zero commission trades as 'costless,' etc.

These types of interventions should follow in future work alongside further examination of investors' consumption decisions, other trading responses, longer time horizons, and out of sample settings with distributing funds.

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VI. Figures

Figure I: Seasonality in distributed dividends

Notes: The figures below plot the average received dividends by week across all samples. The grey shaded region indicates the definition of the dividend season which encompasses calendar weeks 18 through 21.

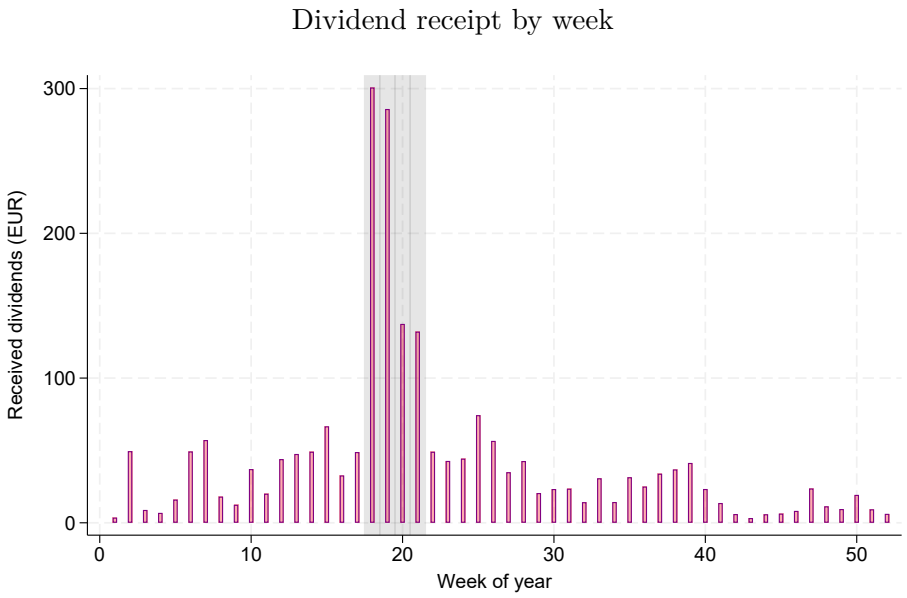


Figure II: Survey-based learning from reinvestment treatment

Notes: The figure above plots a histogram subjects' responses to a survey statement regarding the use of dividends. The survey asks subjects if they agree or disagree with the statement that 'dividends are comparable to interest payments, e.g., fixed-term deposit accounts or bonds.' Subjects provided a Likert-scale response from 1 to 7 where 1 indicates 'completely disagree,' while a 7 indicates that the subject 'completely agrees' with the statement. We plot responses for the treatment group (red) and the placebo group (blue). Additional responses to related statements are found in Appendix Figure A.3.

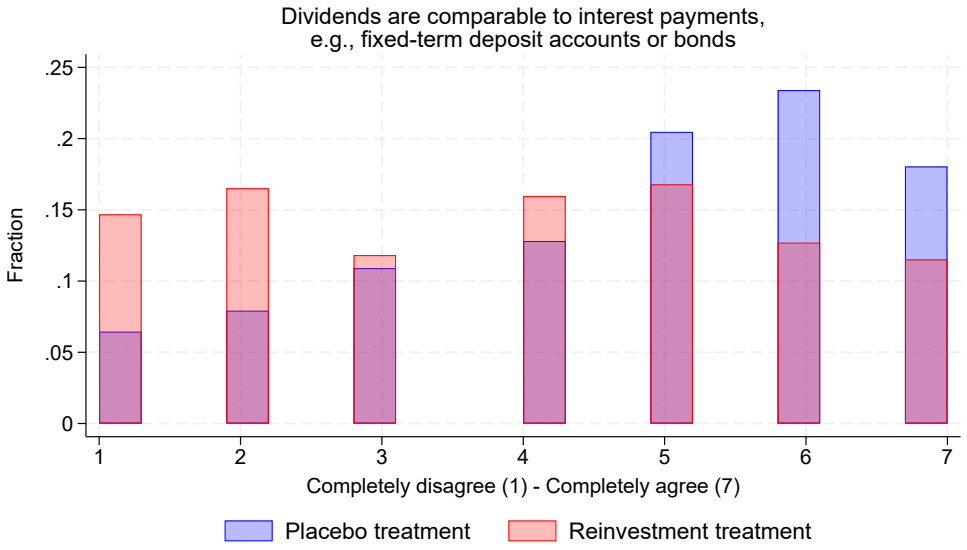
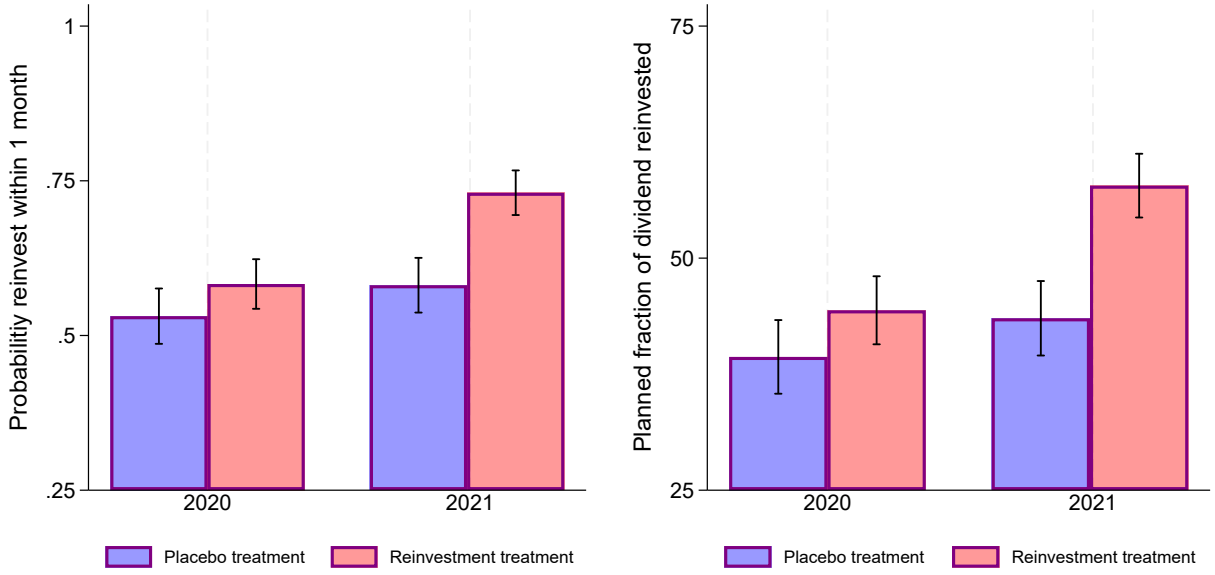


Figure III: Survey-based planned reinvestment by treatment

Notes: This figure plots planned reinvestment decisions elicited in the survey by treatment groups. Investors in the placebo treatment are shown in blue while those in the reinvestment treatment are shown in red. In Panel A, the left figure plots the fraction of the sample who indicated they had reinvested a fraction of their dividends in 2020 in the first two bars and they were planning to reinvest some fraction in 2021, following the intervention, in the right two bars. The figure at right plots the fraction of the dividends reinvested in 2020 or the amount planned to be reinvested in 2021. In Panel B, the left figure plots the fraction of investors in the sample who would prefer to invest in a fund that reinvests dividends rather than distributes them. The figure at right plots the fraction of investors who state they have a preference for automatic reinvestments of dividends. The sample for all figures includes investors who completed the survey, denote the bank as their main brokerage account, and received a dividend in May. 95% Confidence intervals are shown in black.

Panel A: Planned dividend reinvestment



Panel B: Preferences for reinvestment tools

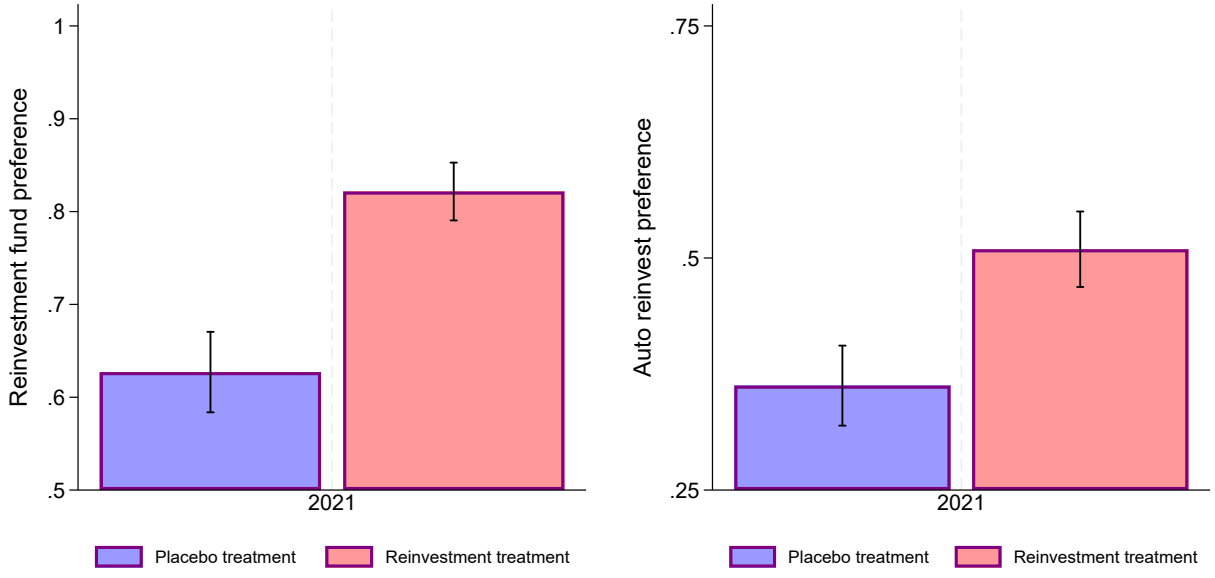
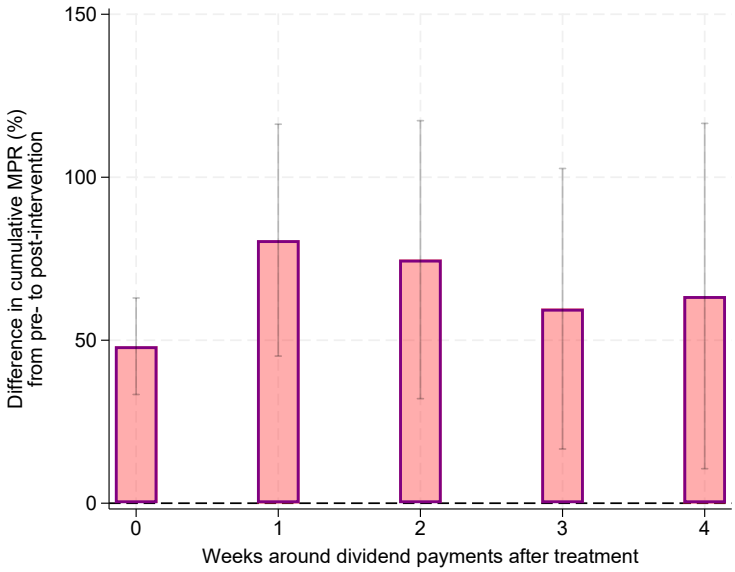


Figure IV: Impact of reinvestment treatment on marginal propensity to reinvest

Notes: The figure below plots the cumulative marginal propensity to reinvest (MPR) for the reinvestment treatment and the placebo treatment (Panel A) relative to the pre-treatment period. Panel B plots the MPR from the reinvestment treatment and the zero-touch control group. The plots feature our main specification using Equation 1. Each bar shows a coefficient on $Dividends \times Treatment \times Post$ examining dividends paid out in the dividend season. The left hand side variable is the cumulative net equity purchases made between the week of dividend payment, week 0, measured to the number indicated on the x-axis. All specifications control for portfolio wealth, time- and individual-fixed effects. 90% confidence intervals are displayed.

Panel A: Compared to placebo control group



Panel B: Compared to zero-touch control group

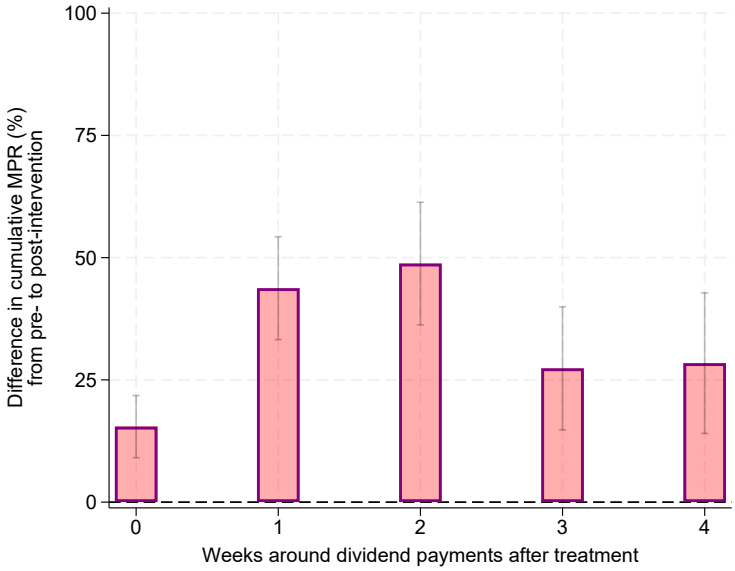
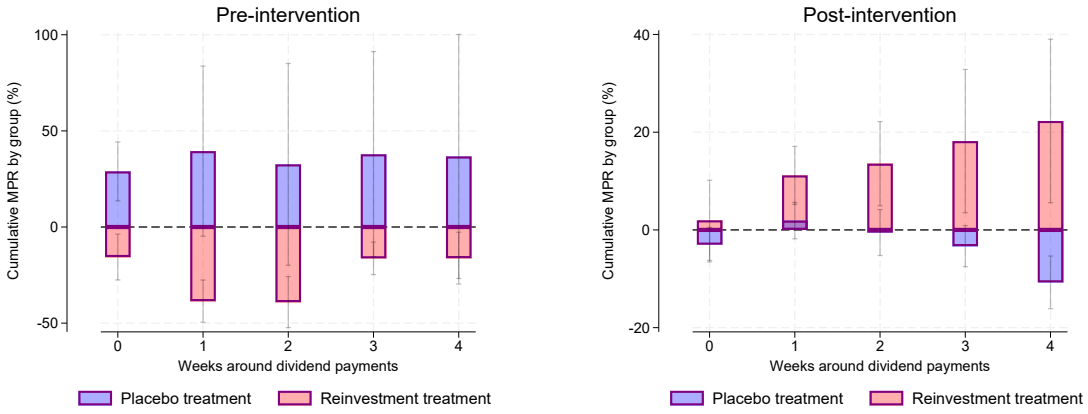


Figure V: Marginal propensity to reinvest across treatment groups

Notes: The figure below plots the cumulative marginal propensity to reinvest (MPR) for the reinvestment treatment relative to the placebo treatment group (Panel A) and the zero-touch control group (Panel B). Each column shows two regression coefficients on $Dividends \times Treatment$ and $Dividends \times Control$ examining dividends paid out in the dividend season. The left hand side variable is the cumulative net equity purchases made between the week of dividend payment, week 0, measured to the number indicated on the x-axis. All specifications control for portfolio wealth, time- and individual-fixed effects. 90% confidence intervals are displayed.

Panel A: Compared to placebo control group



Panel B: Compared to zero-touch control group

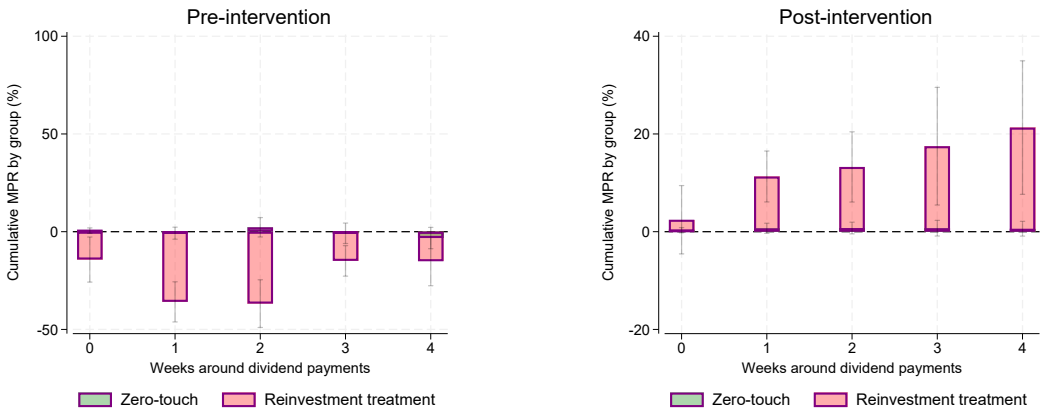
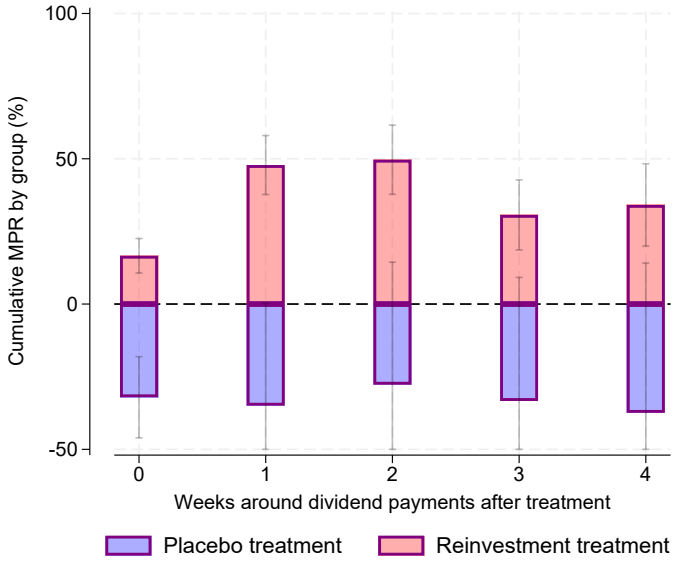


Figure VI: Marginal propensity to reinvest into equities within treatment group

Notes: The figure below plots the cumulative marginal propensity to reinvest (MPR) for the reinvestment treatment and the placebo treatment (Panel A) relative to the pre-treatment period. Panel B plots the MPR from the reinvestment treatment and the zero-touch control group. Each column shows two regression coefficient on $Dividends \times Post$ examining dividends paid out in the dividend season. The left hand side variable is the cumulative net equity purchases made between the week of dividend payment, week 0, measured to the number indicated on the x-axis. All specifications control for portfolio wealth, time- and individual-fixed effects. 90% confidence intervals are displayed. Confidence intervals where the low range is less than 50 are truncated for display purposes. These values are not significantly different from zero.

Panel A: Compared to placebo control group



Panel B: Compared to zero-touch control group

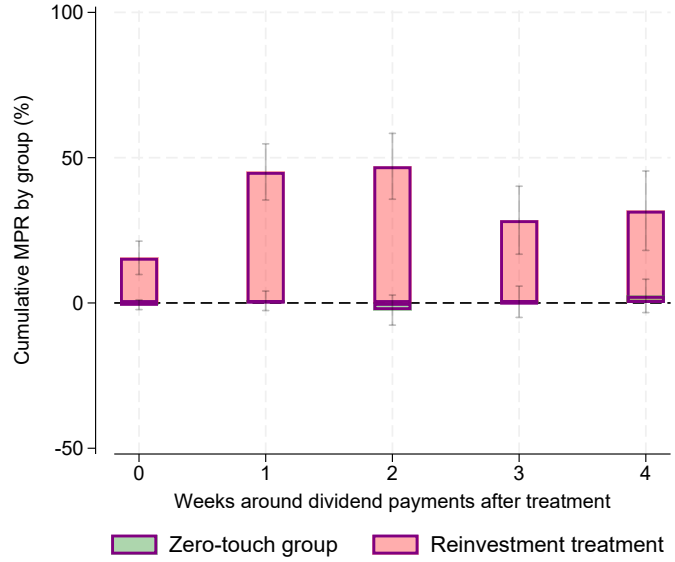


Figure VII: Decay effects of treatment

Notes: The figure below plots the difference in the cumulative marginal propensity to reinvest (MPR) for the reinvestment treatment relative to the placebo treatment (left) and relative to the zero-touch group (right), relative to the pre-treatment period in cumulative net equity purchases. The plots feature our main specification in Equation 1 examining dividends paid out in the dividend season. $Dividends \times Treatment \times Post$ is reported separately for each year 2021-2023, i.e., the dividend seasons following the intervention, to examine if there is a decay in the treatment effect over time. All specifications are cumulative MPRs over weeks 0 through 4 and control for portfolio wealth and individual fixed effects. 90% confidence intervals are displayed.

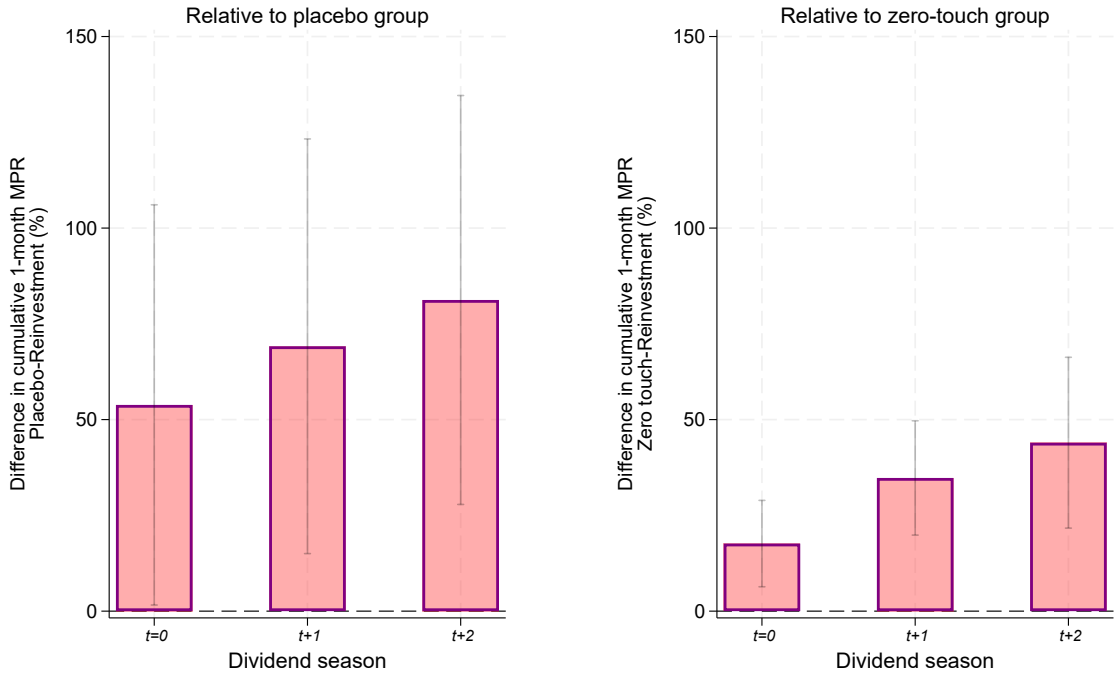


Figure VIII: Survey-based planned MPR by dividend literacy

Notes: This figure plots investors' survey-based marginal propensity to reinvest based on their interaction with the reinvestment treatment. The top figure plots the change in the fraction of dividends reinvested from 2020 to 2021 as elicited in our survey on the y-axis. The reinvestment fraction is elicited in May during the treatment and asks respondents about the amount they reinvested in 2020 and how much they plan to reinvest in 2021. The x-axis plots respondents' score (0-3) of the three dividend reinvestment questions in the reinvestment treatment. The bottom figures plot the change in planned reinvestment on the y-axis by terciles of subjects' Likert-scale responses to the survey statements after the reinvestment treatment *"I found this information to be informative"* (left) and *"I learned something new"*(right). The graphs in are generated from bivariate regressions without additional control variables.

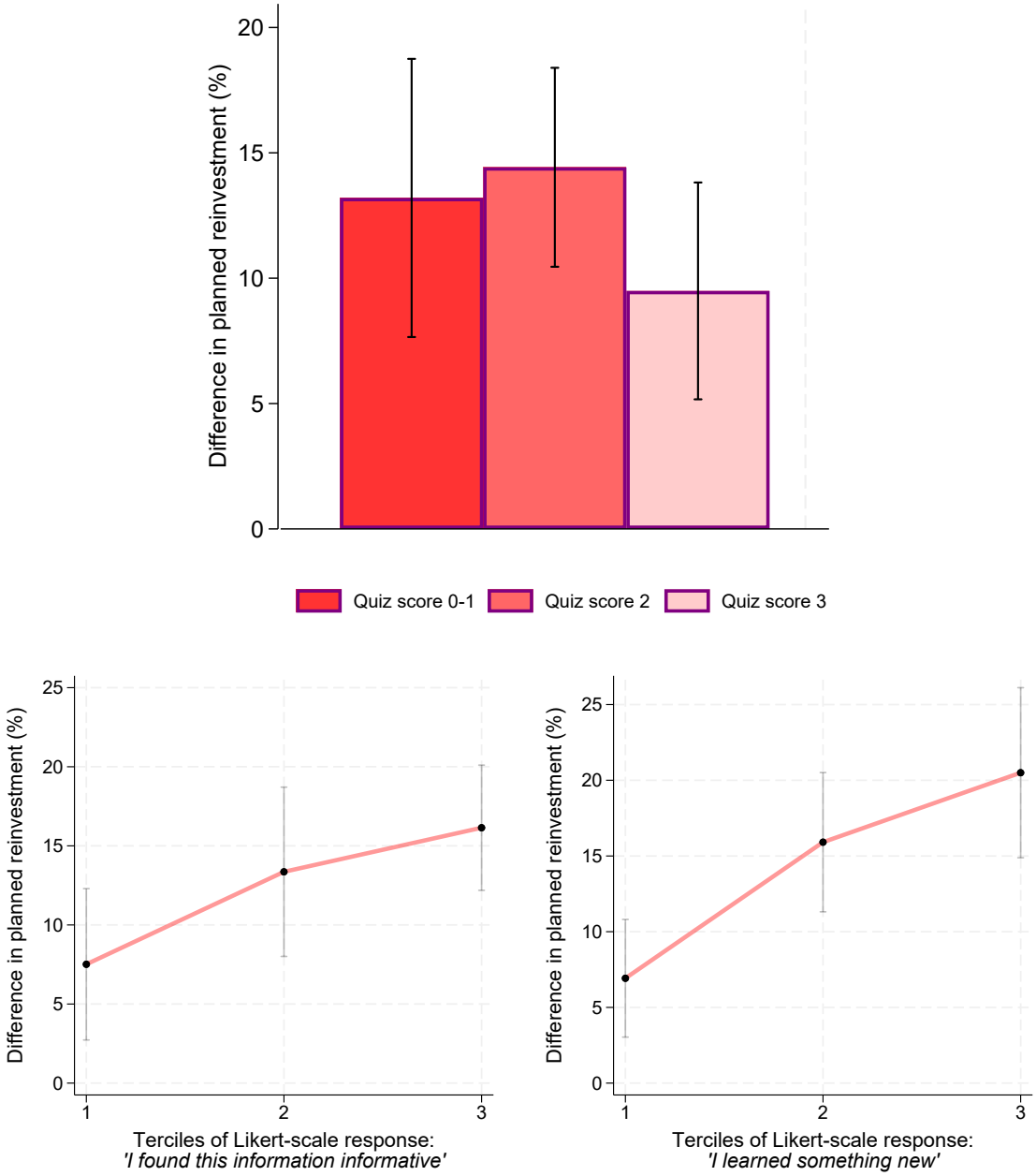
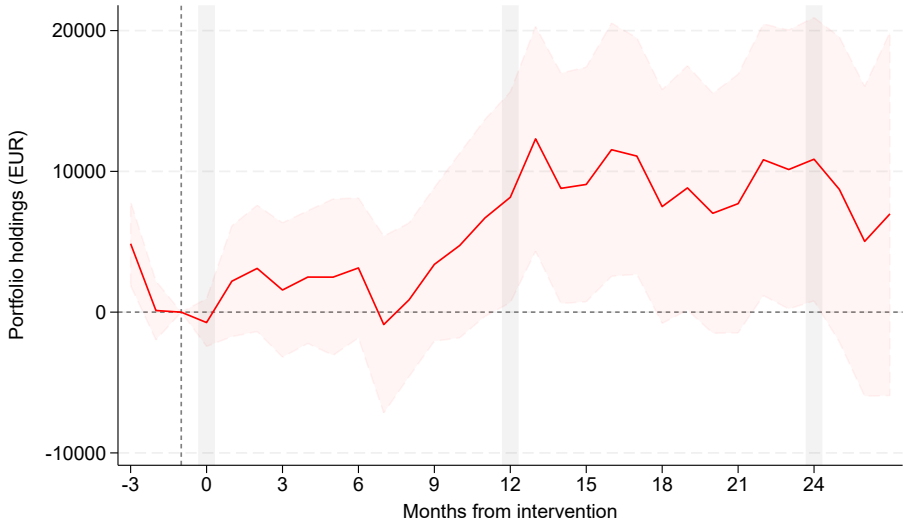


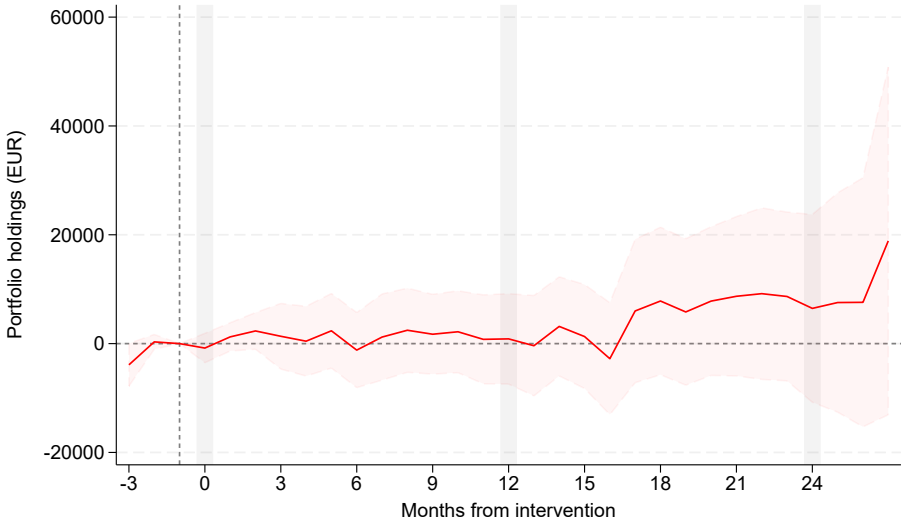
Figure IX: Portfolio value over time

Notes: The figure below plots the difference in the total portfolio value of investors in the reinvestment treatment group relative to the placebo control group (top) and the zero-touch control group (bottom). Portfolio values are trimmed at the 2.5 and 97.5 percentiles. The dashed horizontal line indicates the baseline month, $t-1$ months from the intervention. The shaded grey bars indicate the dividend seasons throughout the sample (the months of May). The x-axis is in months since the intervention in May 2021. The specifications includes time- and individual-fixed effects and the baseline month is $t-1$ months since the intervention. Standard errors are clustered at the investor level.

Panel A: Relative to placebo group



Panel B: Relative to zero-touch control group



VII. Tables

Table I: Descriptive statistics

Notes: In the following table, we present mean values for variables related to demographics (Panel A), portfolio characteristics (Panel B), and the trading activity (Panel C) of investors in our sample. 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. The sample consists of all investors sampled as part of the intervention, conditional on having an active brokerage account, and comprise our main sample for analysis. The columns are separated by the zero-touch group, the sampled group for the placebo and reinvestment treatment, and those within those groups which participated and completed the survey. Appendix Table A.1 provides this table all sampled bank customers in our sample prior to any sample restrictions.

Panel A: Demographics

	Sampled			Participated	
	Zero touch mean	Placebo mean	Reinvest mean	Placebo mean	Reinvest mean
Male	0.69	0.71	0.71	0.79	0.79
Age	50.94	51.67	50.89	52.26	50.13
Married	0.47	0.47	0.46	0.46	0.42
Years with bank	16.56	16.72	16.77	17.21	16.96
Employed	0.43	0.43	0.43	0.42	0.44
Civil servant	0.03	0.03	0.03	0.03	0.04
Manager	0.02	0.02	0.02	0.01	0.02
Retired	0.15	0.16	0.14	0.17	0.14
Student	0.08	0.08	0.08	0.06	0.08
Credit card	0.30	0.29	0.30	0.28	0.31
Portfolio holder	0.97	0.97	0.96	1.00	1.00
Savings account	0.11	0.12	0.11	0.14	0.11
Mortgage holder	0.04	0.04	0.04	0.04	0.04
Observations	8327	7252	21815	480	583

Panel B: Portfolio holdings

	Sampled			Participated	
	Zero touch mean	Placebo mean	Reinvest mean	Placebo mean	Reinvest mean
Total assets	95,382.69	132,589.89	101,182.13	197,135.06	145,400.74
Risky assets	74,382.92	108,939.42	78,138.68	179,743.36	126,321.79
Credit volume	4,109.16	4,397.39	4,317.88	5,823.47	5,997.35
Non-risky assets	26,575.57	29,709.52	26,805.66	29,711.82	26,292.03
Fund holder	0.50	0.53	0.50	0.62	0.65
ETF holder	0.26	0.29	0.26	0.39	0.42
Equity share	0.83	0.84	0.84	0.86	0.85
Bond share	0.04	0.04	0.04	0.05	0.04
Stock share	0.59	0.63	0.61	0.67	0.58
Fund share	0.32	0.30	0.32	0.27	0.35
ETF share	0.12	0.11	0.12	0.11	0.15
Home share	0.44	0.46	0.44	0.47	0.40
Dividend asset share	0.71	0.74	0.71	0.78	0.76
Dividend stock share	0.48	0.53	0.49	0.59	0.51
Dividend fund share	0.23	0.21	0.22	0.19	0.25
Assets (#)	6.74	10.03	7.17	17.33	12.22
Stocks (#)	4.39	7.03	4.70	12.60	8.07
Funds (#)	1.83	2.27	1.88	3.57	3.32
HHI	0.38	0.32	0.37	0.22	0.23
Monthly trades	3.86	4.12	3.92	4.41	3.93
Total trades	60.96	74.61	70.58	91.21	84.63
Observations	8327	7252	21815	480	583

Panel C: Trading activity

	Sampled			Participated	
	Zero touch mean	Placebo mean	Reinvest mean	Placebo mean	Reinvest mean
Total trades	60.92	74.53	70.51	91.21	84.63
Monthly trades	3.86	4.11	3.92	4.41	3.93
Monthly purchases	2.60	2.69	2.53	3.06	2.76
Monthly sales	1.25	1.33	1.32	1.34	1.15
Months w/ purchases	11.82	13.12	13.11	15.98	16.83
Months w/ purchases	10.66	11.81	11.83	14.75	15.66
Months w/ sales	4.21	5.01	4.67	6.57	5.77
Monthly trade vol.	23,272.90	23,454.75	25,776.62	19,777.42	16,138.80
Monthly purch. vol.	12,765.55	12,667.38	13,073.52	11,011.54	8,798.04
Monthly sale vol.	10,358.66	9,869.17	10,890.39	8,705.59	7,257.44
Observations	6326	5760	16576	442	530

Table II: Planned reinvestment decisions: survey evidence

Notes: This table examines investors' planned reinvestment behavior between treatment groups elicited from the survey. Panel A examines reinvestment of dividends into equities. The dependent variable in Columns 1 and 2 is an indicator which takes the value of one if survey respondents indicated that they had reinvested a fraction of their dividends in 2020 and were planning to reinvest some fraction in 2021, following the intervention. In Columns 3 and 4 it is the fraction of the dividend reinvested in 2020 and the planned amount in 2021. In Panel B, the dependent variable in Columns 1 and 2 is an indicator which takes the value of one if subjects indicated that they would prefer to invest in a fund that reinvests dividends rather than distributes them. In Columns 3 and 4 it indicates investors who state they would have a preference for automatic reinvestments of dividends. The sample across all specifications includes investors who completed the survey. Across columns we estimate an OLS linear probability regression model and control for the following variables: *Age, gender, marital status*, survey measures of *dividends received last year and expected dividends* in the current year, *the euro value of portfolio holdings*, and indicators for *retired, student, holding a credit card, mortgage,* and *savings account*. Even numbered columns include survey date-fixed effects. In all specifications we estimate robust standard errors clustered at the investor level.

	Marginal propensity to reinvest		Fraction reinvested (%)	
	(1)	(2)	(3)	(4)
Treatment × Post	0.10***	0.11***	9.27***	9.56***
	(0.02)	(0.02)	(1.99)	(1.95)
Reinvestment treatment	0.05*	0.08**	5.02*	5.45*
	(0.03)	(0.03)	(2.75)	(2.80)
Post	0.05***	0.05***	4.16***	3.28**
	(0.02)	(0.02)	(1.42)	(1.39)
Age		-0.00**		-0.36***
		(0.00)		(0.13)
Male		0.06*		6.13*
		(0.04)		(3.29)
Credit card		0.06*		2.85
		(0.03)		(3.13)
Savings account		0.04		3.84
		(0.04)		(3.86)
Mortgage holder		0.01		8.95
		(0.07)		(6.70)
Online brokerage user		-0.02		0.24
		(0.03)		(3.19)
Married		-0.00		1.00
		(0.03)		(2.69)
Retired		-0.05		0.59
		(0.05)		(4.67)
Student		-0.01		-4.66
		(0.06)		(5.92)
Dividends recieved 2021		0.09***		8.37***
		(0.02)		(1.99)
Dividends recieved 2020		-0.04**		-7.88***
		(0.02)		(1.96)
Portfolio holdings		0.00*		0.00
		(0.00)		(0.00)
Survey date FE	N	Y	N	Y
R-squared	0.024	0.089	0.027	0.080
Observations	2,126	1,902	1,966	1,902

Panel B: Preferences for reinvestment tools

	Reinvestment fund preference		Auto reinvest preference	
	(1)	(2)	(3)	(4)
Reinvestment treatment	0.19***	0.20***	0.15***	0.12***
	(0.03)	(0.03)	(0.03)	(0.03)
Age		-0.00**		-0.00
		(0.00)		(0.00)
Male		-0.00		0.01
		(0.04)		(0.04)
Credit card		-0.00		0.02
		(0.03)		(0.04)
Savings account		-0.02		0.10**
		(0.04)		(0.05)
Mortgage holder		-0.03		0.00
		(0.07)		(0.08)
Online brokerage user		-0.00		-0.01
		(0.04)		(0.04)
Married		-0.00		0.01
		(0.03)		(0.03)
Retired		-0.04		-0.09
		(0.06)		(0.05)
Student		-0.02		0.05
		(0.06)		(0.07)
Dividends recieved 2021		-0.02		-0.07***
		(0.02)		(0.02)
Dividends recieved 2020		-0.00		0.01
		(0.02)		(0.02)
Portfolio holdings		-0.00		-0.00
		(0.00)		(0.00)
Survey date FE	N	Y	N	Y
R-squared	0.048	0.107	0.022	0.129
Observations	1,063	951	1,063	951

Table III: The marginal propensity to reinvest: field behavior

Notes: The tables below shows the difference in the marginal propensity to reinvest (MPR) for the reinvestment treatment relative to the placebo control group (Panel A), or relative to the zero-touch control group (Panel B), relative to the pre-treatment period. This table examines reinvestment in the week the dividend is received (week 0). Each number represents a regression coefficient of a variant of $Dividends \times Treatment \times Post$ from equation 1. Columns 1-2 across panels examines the MPR from all dividends, Columns 3-4 decompose all dividends into the variables $Dividends_{Season}$ which examines the MPR from dividends paid out during calendar weeks 18-21 and $Dividends_{Other}$, which comprise all other dividends. The outcome variable across all specifications and panels is total net transaction volume. Columns 1 and 3 control for investors' monthly portfolio holdings while Columns 2, and 4 also include investor-fixed effects. The analysis focuses on our main sample of investors who also indicate that the bank is their main bank and brokerage. All specifications cluster standard errors at the investor level.

Panel A: Relative to placebo group

	Net transactions			
	(1)	(2)	(3)	(4)
$Dividends_{All} \times Treatment \times Post$	0.24	0.24		
	(0.20)	(0.19)		
$Dividends_{Season} \times Treatment \times Post$			0.46***	0.47***
			(0.09)	(0.09)
$Dividends_{Other} \times Treatment \times Post$			-0.07	-0.06
			(0.28)	(0.26)
Individual FE	N	Y	N	Y
Controls	Y	Y	Y	Y
R-squared	0.01	0.03	0.01	0.03
Observations	100,609	100,602	100,609	100,602

Panel B: Relative to zero-touch group

	Net transactions			
	(1)	(2)	(3)	(4)
$Dividends_{All} \times Treatment \times Post$	0.07	0.08		
	(0.16)	(0.17)		
$Dividends_{Season} \times Treatment \times Post$			0.18***	0.17***
			(0.05)	(0.04)
$Dividends_{Other} \times Treatment \times Post$			-0.02	-0.07
			(0.23)	(0.23)
Individual FE	N	Y	N	Y
Controls	Y	Y	Y	Y
R-squared	0.01	0.03	0.01	0.03
Observations	1,170,388	1,170,135	1,170,388	1,170,135

Table IV: Further evidence on the marginal propensity to reinvest: field behavior

Notes: The tables below shows the difference in the marginal propensity to reinvest (MPR) for the reinvestment treatment relative to the placebo treatment relative to the pre-treatment period. Our main specification examines the MPR $Dividends_{Season}$ which examines the MPR from dividends paid out during calendar weeks 18-21. These dividend payouts were targeted in our intervention and comprise dividends that are paid out in the anticipated 'dividend season.' At the same time, we control for all other dividends, $Dividends_{Other}$. In Panel A we examine the contemporaneous effect of dividend receipt on net transactions (Column 1), purchases (Column 2) and sales (Column 3) at the investor-calendar week level. Panel B provides 5-week cumulative estimates. All panels feature our main specification which focuses on our main sample of investors who also indicate that the bank is their main bank and brokerage. All specifications control for portfolio wealth and individual fixed effects.

Panel A: Immediate effect of treatment

	Net transactions	Purchases	Sales
	(1)	(2)	(3)
$Dividends_{Season} \times Treatment \times Post$	0.47***	0.28*	-0.19
	(0.09)	(0.15)	(0.12)
$Dividends_{Other} \times Treatment \times Post$	-0.06	0.01	0.07
	(0.26)	(0.25)	(0.12)
Individual FE	Y	Y	Y
Controls	Y	Y	Y
R-squared	0.03	0.11	0.10
Observations	100,602	100,602	100,602

Panel B: Cumulative estimates (1 month)

	Net transactions	Purchases	Sales
	(1)	(2)	(3)
$Dividends_{Season} \times Treatment \times Post$	0.64**	0.59**	-0.04
	(0.32)	(0.26)	(0.32)
$Dividends_{Other} \times Treatment \times Post$	-0.33	0.88	1.20
	(0.55)	(1.49)	(1.47)

Table V: Dividend literacy and MPR in survey-based and field data

Notes: This table examines investors' planned and field reinvestment behavior based on heterogeneity in dividend literacy from the survey quiz. Panel A examines survey-based planned reinvestment of dividends. The dependent variable is the change in the planned fraction of dividends reinvested. Columns 2, 4, and 6 control for survey-date fixed effects and a set of individual-level controls (see Table III for details). Panel B examines reinvestment behavior in the field by survey heterogeneity. The dependent variable in Columns 1-3 is gross purchases into equities, while in Columns 4-6 it is net transactions into equities. The variables of interest are indicator variables for *Low dividend literacy* (0 or 1 questions correct), *Informative* (above median score in found informative) and *Learned new* (above median score for learned something new). In Panel B, we interact these variables with the MPR from the dividends received in the dividend season. We control for all other dividends, $Dividends_{Other}$. The sample across all specifications includes investors who were in the reinvestment treatment, completed the survey, and denote the bank as their main brokerage. In all specifications we estimate robust standard errors clustered at the investor level.

Panel A: Planned reinvestment

	Change in MPR					
	(1)	(2)	(3)	(4)	(5)	(6)
Low literacy	0.55	-1.59				
	(3.20)	(3.21)				
Informative			7.65***	7.70***		
			(2.59)	(2.69)		
Learned new					10.83***	8.15***
					(2.64)	(2.72)
Survey date FE	N	Y	N	Y	N	Y
Controls	N	Y	N	Y	N	Y
R-squared	0.00	0.09	0.01	0.11	0.03	0.11
Observations	522	522	522	522	522	522

Panel B: Reinvestment behavior in the field

	Net transactions			Purchases		
	(1)	(2)	(3)	(4)	(5)	(6)
$Dividends_{Season} \times Low\,literacy \times Post$	0.11**			0.87***		
	(0.05)			(0.32)		
$Dividends_{Season} \times Informative \times Post$		0.02			0.15	
		(0.05)			(0.20)	
$Dividends_{Season} \times Learned\,new \times Post$			0.10**			0.58**
			(0.05)			(0.29)
Individual FE	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y
R-squared	0.04	0.04	0.04	0.16	0.16	0.16
Observations	101,531	101,531	101,531	101,531	101,531	101,531

Table VI: Decay effects of the intervention

Notes: This table examines investors' marginal propensities to reinvest (MPR) into equities in the dividend seasons following the intervention in 2021. Specifically we disaggregate the full sample by year (dividend season) in order to examine the decay effects of the information treatment over time. The outcome variable in Columns 1-2 is net transaction volume (purchases/sales) into any security (e.g., our main specification from previous tables). In Columns 3-4 it is gross purchases. In Columns 1 and 3 we examine the MPR from all dividends into any equities and in Columns 2 and 4 we disaggregate the variable into $Dividends_{Season}$ which examines the MPR from dividends paid out during calendar weeks 18-21, and all other dividends, $Dividends_{Other}$. In these specification we exclude observations from year 2019.

	Net transactions		Purchases	
	(1)	(2)	(3)	(4)
$Dividends_{All} \times Treatment \times 2021$	0.29*		0.17	
	(0.17)		(0.16)	
$Dividends_{All} \times Treatment \times 2022$	0.41*		0.39	
	(0.22)		(0.24)	
$Dividends_{All} \times Treatment \times 2023$	0.40*		0.42**	
	(0.21)		(0.21)	
$Dividends_{Season} \times Treatment \times 2021$		0.33***		0.24**
		(0.12)		(0.12)
$Dividends_{Season} \times Treatment \times 2022$		0.53***		0.40**
		(0.13)		(0.18)
$Dividends_{Season} \times Treatment \times 2023$		0.55***		0.40***
		(0.11)		(0.14)
$Dividends_{Other} \times Treatment \times 2021$		0.54*		0.21
		(0.28)		(0.28)
$Dividends_{Other} \times Treatment \times 2022$		0.19		0.44**
		(0.19)		(0.21)
$Dividends_{Other} \times Treatment \times 2023$		0.00		0.19
		(0.25)		(0.29)
Individual FE	Y	Y	Y	Y
Controls	Y	Y	Y	Y
R-squared	0.03	0.03	0.11	0.11
Observations	96,573	96,573	96,573	96,573

Table VII: Impact of the reinvestment treatment on dividend yield

Notes: The tables below examines the dividend yield of investors' portfolios and trades in the treatment group compared to those in the placebo control group. In Column 1 the dependant variable is the value-weighted end-of-month dividend yield of investors' portfolio holdings. Dividend yield is defined monthly at the security level (single stocks, funds, and ETFs) by dividing the previous 12-month total dividends by the previous end of month holding value. As in previous, *Treatment* indicates investors in the reinvestment treatment group compared to those in the placebo control group. The interaction term with *post* provides the difference in portfolio yield from pre- to post-periods between the control and treated group in basis points. Columns 2 and 3 examines the dividend yield of purchases made in the post-period. Specifically, Column 2 is the value-weighted dividend yield of all purchases, in Column 3 it is value-weighted dividend yield of purchases of assets *not held* in the portfolio in the months prior to the intervention. Coefficients represent differences in basis points. All specifications are clustered at the investor-level.

	Yield portfolio	Yield purchases	Yield new purchases
	(1)	(2)	(3)
$Treatment \times Post$	-0.20**		
	(0.09)		
$Treatment$		-0.32***	-0.23**
		(0.11)	(0.11)

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

A. Appendix

A. *Figures*

Figure A.1: Information provision in survey experiment

Notes: The figure below provides translations of the subject line, text, and exhibits from the emails which were sent to the investor sample inviting them to complete the survey. Panel A is the email associated with the reinvestment treatment, while Panel B is the placebo control group. For confidentiality reasons, we have changed the text slightly, redacted a few details (indicated by xxx), and have used a generic version of the figure from the email.

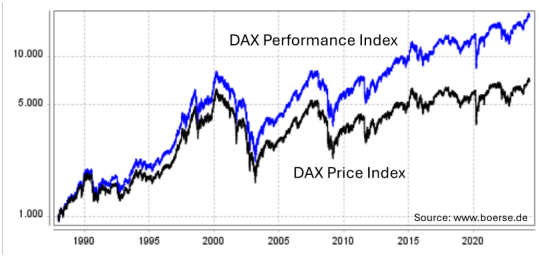
Panel A: Reinvestment treatment

Subject: What to do with dividends payment? Participate in a survey by xxx University and get a 10 Euro xxx voucher

Dear Mr/Mrs «Name»,

Many shareholders fail to consider that when a dividend is paid, the share price generally falls by the amount of the dividend. The money is merely transferred from the securities account to the bank account as part of the dividend distribution and doesnât change the investment return for shareholders. If shareholders want to keep their asset allocation constant and benefit from future equity returns also on paid-out dividends, they should reinvest those dividends. A look at the DAX shows how important this reinvestment is for long-term investment success: In the calculation of the classic DAX, the so-called DAX Performance Index, dividends are in fact reinvested. This index was quoted at around 15,000 points at the end of March. In contrast, the so-called Dax Price index does not include dividend reinvestments and, consequently, was quoted at below 7,000 points at the end of March. Both indices started at 1,000 points in 1988. An investment in the DAX with all dividends reinvested is therefore worth more than twice as much today.

New findings from xxx University show that in practice many investors do not reinvest their dividend payments but spend them on consumption, thus forfeiting long-term returns.



How do you handle dividend payments? Do you reinvest or do you spend the money? What are your experiences around the topic of dividends?

xxx University invites you to participate in a short survey to answer these questions. You have been randomly selected to participate. As a thank you for supporting the research, you will receive a 10-Euro voucher. You will need about 10 minutes to complete the survey.

Please complete the survey by xxx and enter your e-mail address at the end. A few days after the end of the survey you will receive your voucher by e-mail.

Use the following link to access the survey at xxx University: «LINK TO SURVEY»

Panel B: Placebo treatment

Subject: What to do with dividends payment? Participate in a survey by xxx University and get a 10 Euro voucher.

Dear Mr / Mrs «Name»

Every year, dividend payments are paid in the spring. Financial research still does not fully understand why dividends are an important factor in the selection of securities for some investors, but not for others. There is a lack of information on the experiences of real investors.

xxx University invites you to participate in a short survey on the topic of dividends. You have been randomly selected to participate. As a thank you for supporting our research, you will receive a 10-Euro voucher. You will need about 5 minutes to complete the survey.

Please complete the survey by xxx and enter your e-mail address in the last step. A few days after the end of the survey you will receive your voucher by e-mail.

Use the following link to access the survey at xxx University: «LINK TO SURVEY»

Figure A.2: Reinvestment and Placebo Treatment Text

Notes: The figure below provides translations of the survey used for the reinvestment treatment and the placebo treatment. Participants in the reinvestment treatment saw the whole survey while the participants in the placebo treatment saw only sections A and C. The translation was done using google translate followed by light editing for clarity. For confidentiality reasons, we have changed the text slightly and redact a few details (indicated by xxx). We also include a few clarifying comments which we enclose in brackets [].

Welcome to our survey on the topic of dividends.

[Legal disclosure about data usage inserted here] xxx

Start the survey by clicking Next

[PART A: Questions prior to reinvestment treatment]

Have you received any dividends from stocks in the past year?

- Yes
- No
- Not Sure

How many euros of dividends did you receive in total last year?

- Below 25€
- 25-100€
- 100-250€
- 250-500€
- 500-1000€
- More than 1000€
- Not Sure

[Subjects answering Yes to receiving dividends in the past year]

What share of your last year's dividend did you reinvest in securities right after payment of the dividends, that is, one month after receiving them?

Please state the share as a percentage and answer with values from 0 to 100.

[Subjects that did not answer Yes to receiving dividends in the past year]

Suppose you had received dividends last year. What share of your last year's dividend would you have reinvested in securities right after payment of the dividends, i.e. within one month after receipt?

Please state the share as a percentage and answer with values from 0 to 100.

[PART B: The Reinvestment Treatment]

In the following three short questions, you will have the opportunity to test your knowledge about dividends. After each question you will receive an answer along with an explanation for that answer.

[Question 1]

Let's start with the first question: What generally happens to the price of a share just before the dividend is distributed to investors?

- a) The share price falls by approximately the amount of the dividend
- b) Nothing
- c) Share price increases slightly
- d) Not Sure

[Question 1 Solution]

That is correct! [if a) selected] / You were unsure or incorrect about this question [if b), c), or d) selected]

On the day after the Annual General Meeting, the so-called "ex-dividend day," a share is traded without the right to the dividend. On this day, the share price typically falls by the amount of the dividend. A few days later, the dividend is paid out to investors.

This so-called "dividend discount" can be explained as follows: If the dividend is in the corporate coffers, it is reflected in the share price. When the dividend is paid out, it is transferred from the company's coffers to the investors' coffers and is consequently no longer included in the company's share price.

What does this mean for investors? Dividends are not an "additional income" because they come directly from the share price - just like the slice from the picture above. After dividend payouts, investors are typically as rich as before.

[The picture displayed was similar to the picture used in this article
https://www.chicagobooth.edu/review/dividends-are-not-free-money-though-lots-investors-seem-think-they-are]

So if the dividend is distributed, the deposit value decreases. Once the slice is eaten, less remains.

[Question 2]

To calculate the German DAX index, dividends are reinvested. There is also the so-called "DAX price index", which does not take dividends into account. Both started at 1,000 points in 1988 and the standard DAX index WITH dividends was at around 15,000 points at the end of March 2021.

What was the approximate level of the DAX price index WITHOUT dividends at the end of March 2021?

- a) 6,500
- b) 11,000
- c) 15,000
- d) 19,500
- e) Not Sure

[Question 2 Solution]

That is correct! [if a) selected] / You were unsure or incorrect about this question [if b), c), d), or e) selected]

The DAX price index without dividends stood at just under 6,500 points at the end of March 2021. Since the DAX was launched in 1988, the DAX with dividends has more than doubled in value compared with the DAX price index thanks to reinvestment.

What does this mean for investors? Anyone who has withdrawn and spent all dividends from DAX companies since 1988, only holds half as much in equity assets today.

Leaving dividends "lying around" in the bank account also means a loss of return: on the payment day, part of the capital originally invested moves from the securities account to the bank account as part of the dividend distribution and remains there without any chance of return. Reinvesting means that the dividends also work for investors again.

[Question 3]

What do you think of the following statement:

From an investor's point of view, dividend payments hardly differ from the sale of shares. Leaving aside taxes and transaction costs, in both cases part of the portfolio is converted into cash. So if you don't want to sell shares, you should also reinvest dividends.

- True
- False
- Not Sure

[Question 3 Solution]

That is correct! [if True selected] / You were unsure or incorrect about this question [if False or Not Sure selected]

Since dividend distributions typically decrease the value of your investment by the amount of dividends paid, the distribution is comparable to a partial sale of the respective investment.

What does this mean for investors? Investors should be aware that when they receive a dividend, part of the capital they originally invested is now no longer invested - analogous to a partial sale, because here, too, part of their capital flows from the securities account into the bank account. If a partial sale is not desired, reinvestment should be made.

[Post Question Summary]

Lessons Learned

To sum up:

Dividends are not "additional income" because they are directly deducted from the share price.

If dividends are not reinvested by the investor, this is comparable to a partial sale of shares. From a tax point of view, there is no significant difference here, and transaction costs are of little significance in practice.

So if you want to benefit fully from the compound interest effect and realize the full performance of a securities investment, you should reinvest dividends in securities.

[Reinvestment treatment feedback]

To what extent do you agree with the following statements in regard to the preceding explanations of dividends?

- The contents were understandable without difficulty
- I will share the information with friends who are interested in equity investment
- The statements are informative for private investors
- I doubt the statements that have been made

[PART C: Questions subsequent to reinvestment treatment]

Are you expecting to receive stock dividends this year, or have already received stock dividends this year?

- Yes
- No
- Not Sure

How many euros do you expect to receive from dividends this year?

- Below 25€
- 25-100€
- 100-250€
- 250-500€
- 500-1000€
- More than 1000€
- Not Sure

[Subjects answering Yes to expecting to receive stock dividends this year]: What share of your dividends do you think you will reinvest in securities this year right after the payment of the dividends, that is, within a month after receiving them?

Please state the share as a percentage and answer with values from 0 to 100.

[Subjects that did not answer Yes to expecting to receive stock dividends this year]: Suppose you will receive dividends this year. What do you think, what share of your dividends will you reinvested in securities right after payment of the dividends, that is, within one month after receiving them?

Please state the share as a percentage and answer with values from 0 to 100.

Imagine you wanted to save 100€per month for the next 20 years (e.g. for your retirement or for the education of your children). You can choose to invest your money in either a fund that pays out all dividends received (distributing fund) or invest in a fund that reinvests all dividends (reinvestment fund).

Which fund would you choose?

- Distributing fund: I want to receive the dividends
- Reinvestment fund: I want the dividends to be automatically reinvested by the fund

Please complete the following sentence.

For me, dividends are most comparable to ...

- regular salary
- regular pension payments
- expected bonus payments
- unexpected profits
- negligible payments such as those used for transactions or operations

To what extent do you agree with the following statements? [Each statement was rated on a Likert scale from 1 (I don't agree at all) to 7 (I fully agree)

- Dividend payments are comparable to interest payments, for example from fixed-term deposit accounts or bonds.
- Stock prices can fluctuate. Therefore, continuous and stable dividend payments provide a good hedge against such unpredictable fluctuations even in times of crisis.
- Shares with a high dividend yield (dividend relative to share price) are generally more attractive than those with a low dividend yield.
- It is always better to use dividend payments for consumer spending instead of using proceeds from the sale of securities.
- Companyâs shares that pay high dividends are very attractive, especially in the current low-interest environment.

To what extent do you agree with the following statements? [Each statement was rated on a Likert scale from 1 (I don't agree at all) to 7 (I fully agree)]

- The dividends I receive influence my savings and consumption decisions.
- When I receive a dividend payment, I always know which company it comes from.
- I always actively follow current news about companies in which I am invested.
- My investments in securities are mainly for long-term wealth accumulation and not for short-term speculation.

Is it generally important for you to be informed about upcoming dividend payments?

- Yes, and that is why I always inform myself
- Yes, it would be desirable if I were informed about dividend distributions
- No, I am not interested
- No, I do not receive any dividends and this will remain the same in the future

Would you like your dividends to be automatically reinvested?

- Yes, and that is why my dividends are already automatically reinvested

- Yes, that would be desirable for the future
- No, I do not want to reinvest my dividends
- No, I do not care about that
- No, I do not receive any dividends and this will remain the same in the future

Finally, we are going to ask you to answer 7 short, concluding questions

When making personal savings or investment decisions: How would you describe your risk attitude? [Rated on a Likert scale from 1 (Not willing to take risks) to 7 (Very willing to take risks)]

How risky do you perceive it is to invest money in equities or equity funds in the current market situation? [Rated on a Likert scale from 1 (Not risky at all) to 7 (Very risky)]

To what extent do you agree with the following statements? [Each statement was rated on a Likert scale from 1 (I don't agree at all) to 7 (I fully agree)]

- My personal financial literacy is good
- I prefer spending money rather than putting it aside
- I have made a long-term financial plan for myself (and my family)
- I am willing to give up on something today in order to benefit more from it in the future
- It often happens that I spend money on things that I would rather not have bought in retrospect

When was the last time you took note of the current status of your securities account?

- Today
- Yesterday
- In the last week
- 1 to 4 weeks ago
- 1 to 6 months ago
- more than 6 months ago

Is your account at xxx your main securities account?

- Yes, the securities account at xxx is my main account
- No, a securities account at another bank is my main account
- I do not have a securities account

Do you have a checking account at xxx and is this your main checking account?

- Yes, the checking account at xxx is my main account
- No, a checking account at another bank is my main account
- I do not have a checking account

Now we would like to know a little more about how you see the future. Please complete the following sentence.

I do believe stock market prices over the next 12 months compared to the last 12 months will ...

- decline sharply
- decline
- stay the same
- increase
- increase sharply

[End of Survey. Respondents followed prompts on how to receive their gift certificate]

Figure A.3: Beliefs and preferences about dividends

Notes: The figures below plot histograms of subjects' responses to survey statements regarding the use of dividends. Subjects provided Likert-scale responses from 1 to 7 where 1 indicates 'completely disagree,' while 7 indicates that the subject 'completely agrees' with the statement. We plot responses for the treatment group (red) and the placebo group (blue).

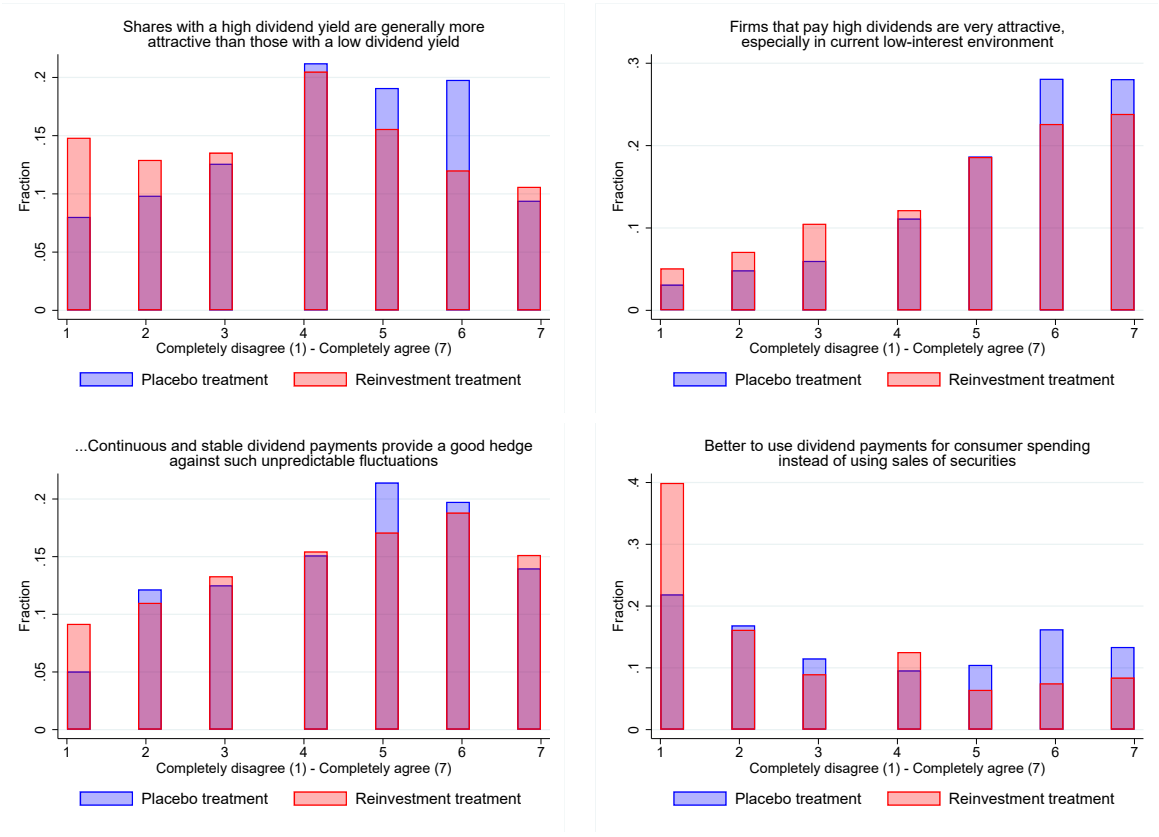
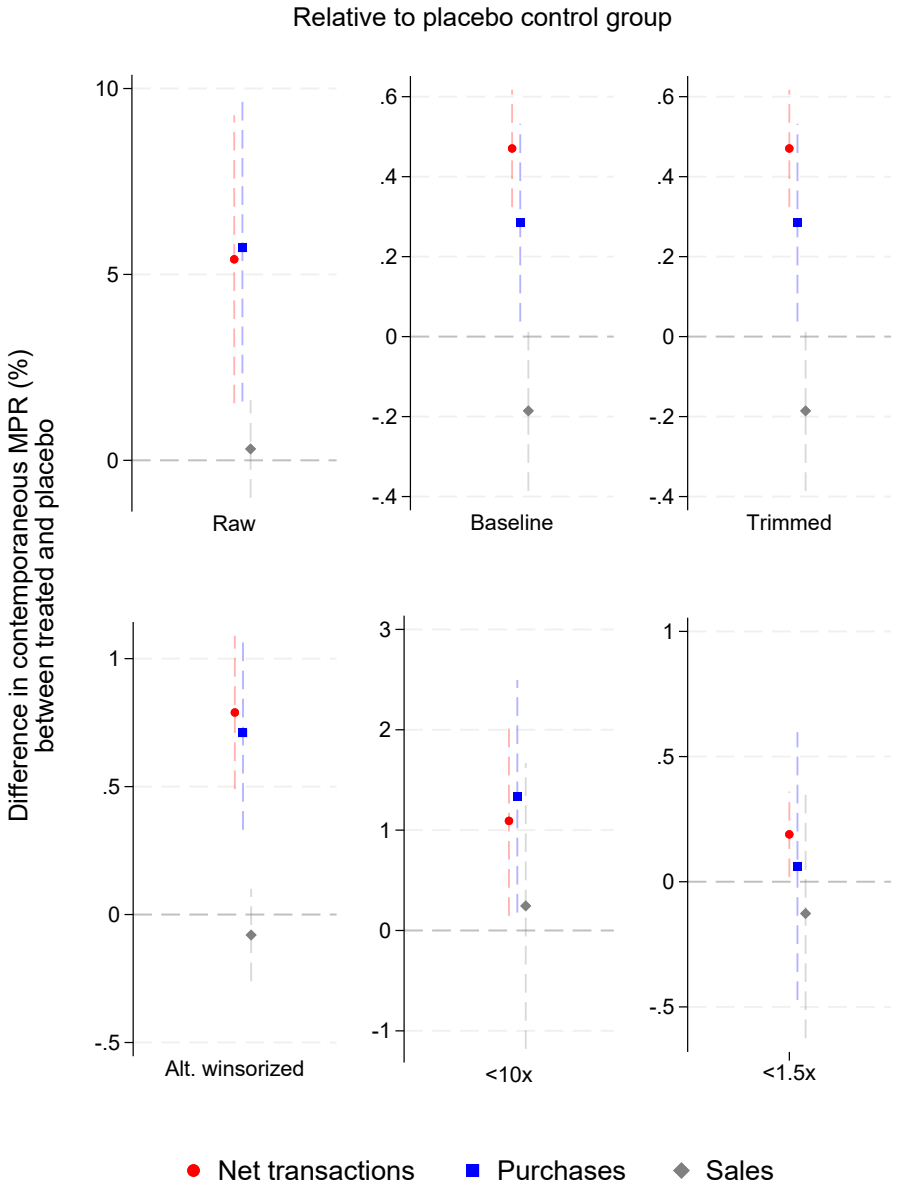


Figure A.4: Alternative winsorization treatments

Notes: The figures below plot our main specification from Column 5 of Table III with alternative winsorization treatments. The top left plot is the raw data with no winsorization, where the red circle symbol is the difference in MPR from pre- to post-treatment between treated and placebo groups for net transactions. The blue square is gross purchases and the gray diamond is gross sales. The top middle plot is our baseline and preferred specification. The top right panel is the same specification with trimmed outliers rather than winsorized. The bottom left plot winsorizes the 95th percentiles of both purchases and sales which then sums to generate a net transaction variable. The bottom middle (right) excludes any dividend-days when raw absolute net transactions exceeds 10x (1.5x) received dividends. The second panel provides the same plots relative to the zero-touch control group.



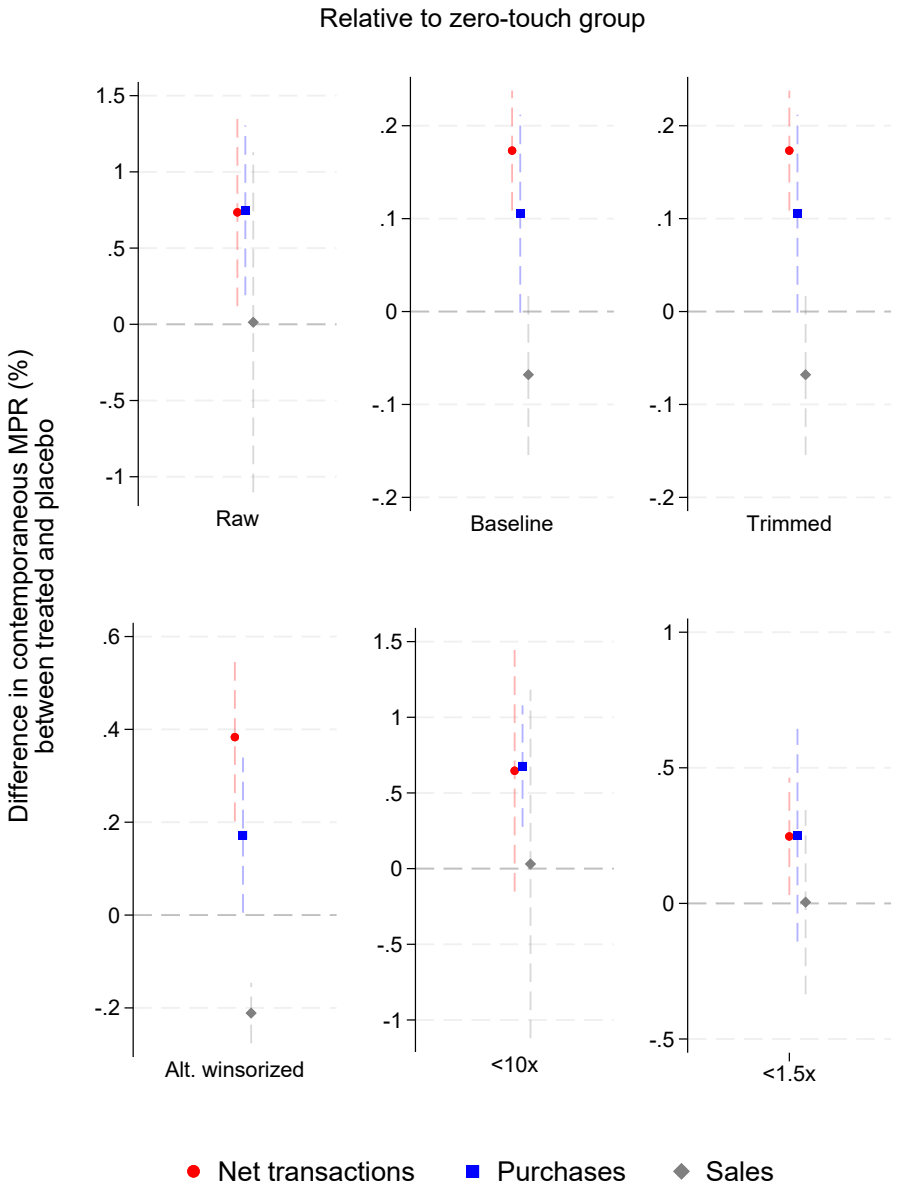
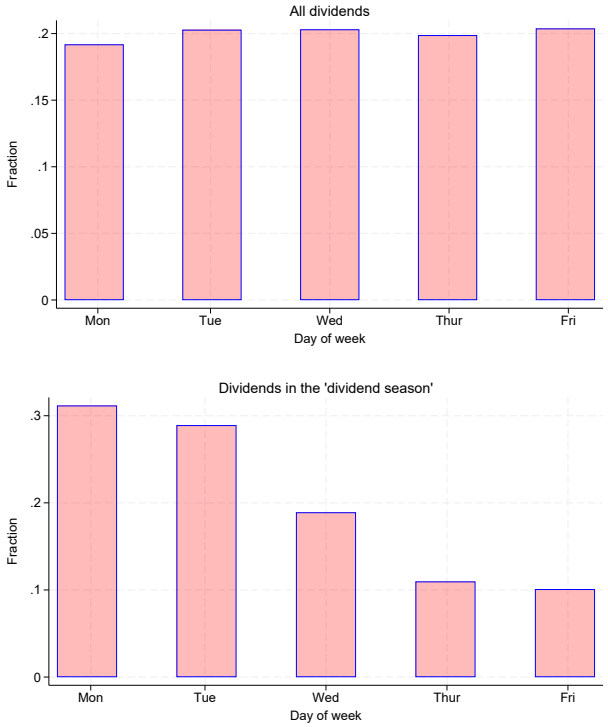

Relative to zero-touch group
Difference in contemporaneous MPR (%) between treated and placebo
Raw
Baseline
Trimmed
Alt. winsorized
<10x
<1.5x
Net transactions
Purchases
Sales

Figure A.6: Received dividends and day of the week

Notes: The figure below plots received dividends by day of the week of investors in our sample. The first figure plots all received dividends from 2019-2023, and the second plots the dividends received during the dividend season.



B. Tables

Table A.1: Descriptive statistics

Notes: In the following table, we present mean values for variables related to demographics (Panel A), portfolio characteristics (Panel B), and the trading activity (Panel C) of investors in our sample. 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. The sample consists of all investors sampled as part of the intervention. The columns are separated by the zero-touch group, the sampled group for the placebo and reinvestment treatment, and those within those groups which participated and completed the survey.

Panel A: Demographics

	Sampled			Participated	
	Zero touch mean	Placebo mean	Reinvest mean	Placebo mean	Reinvest mean
Male	0.69	0.71	0.71	0.78	0.81
Age	50.94	51.67	50.89	52.51	49.45
Married	0.47	0.47	0.46	0.46	0.43
Years with bank	16.56	16.72	16.77	16.79	16.24
Employed	0.43	0.43	0.43	0.42	0.44
Civil servant	0.03	0.03	0.03	0.03	0.05
Manager	0.02	0.02	0.02	0.01	0.02
Retired	0.15	0.16	0.14	0.18	0.13
Student	0.08	0.08	0.08	0.07	0.09
Credit card	0.30	0.29	0.30	0.27	0.29
Portfolio holder	0.97	0.97	0.96	0.97	0.98
Savings account	0.11	0.12	0.11	0.13	0.10
Mortgage holder	0.04	0.04	0.04	0.04	0.04
Observations	8327	7252	21815	615	792

Panel B: Portfolio holdings

	Sampled			Participated	
	Zero touch mean	Placebo mean	Reinvest mean	Placebo mean	Reinvest mean
Total assets	95,382.69	132,589.89	101,182.13	176,869.76	129,532.65
Risky assets	74,382.92	108,939.42	78,138.68	157,997.14	110,647.38
Credit volume	4,109.16	4,397.39	4,317.88	5,533.80	5,086.85
Non-risky assets	26,575.57	29,709.52	26,805.66	29,250.05	24,712.90
Fund holder	0.50	0.53	0.50	0.61	0.63
ETF holder	0.26	0.29	0.26	0.38	0.41
Equity share	0.83	0.84	0.84	0.84	0.84
Bond share	0.04	0.04	0.04	0.05	0.04
Stock share	0.59	0.63	0.61	0.64	0.57
Fund share	0.32	0.30	0.32	0.29	0.36
ETF share	0.12	0.11	0.12	0.12	0.16
Home share	0.44	0.46	0.44	0.45	0.40
Dividend asset share	0.71	0.74	0.71	0.76	0.75
Dividend stock share	0.48	0.53	0.49	0.56	0.50
Dividend fund share	0.23	0.21	0.22	0.20	0.25
Assets (#)	6.74	10.03	7.17	17.35	10.78
Stocks (#)	4.39	7.03	4.70	12.74	6.98
Funds (#)	1.83	2.27	1.88	3.54	3.07
HHI	0.38	0.32	0.37	0.23	0.25
Monthly trades	3.86	4.12	3.92	4.45	3.78
Total trades	60.96	74.61	70.58	92.03	78.31
Observations	8327	7252	21815	615	792

Panel C: Trading activity

	Sampled			Participated	
	Zero touch mean	Placebo mean	Reinvest mean	Placebo mean	Reinvest mean
Total trades	60.92	74.53	70.51	92.03	78.20
Monthly trades	3.86	4.11	3.92	4.45	3.77
Monthly purchases	2.60	2.69	2.53	3.04	2.65
Monthly sales	1.25	1.33	1.32	1.39	1.10
Months w/ purchases	11.82	13.12	13.11	15.83	16.24
Months w/ purchases	10.66	11.81	11.83	14.53	15.07
Months w/ sales	4.21	5.01	4.67	6.38	5.53
Monthly trade vol.	23,272.90	23,454.75	25,776.62	18,062.77	15,041.13
Monthly purch. vol.	12,765.55	12,667.38	13,073.52	10,072.08	8,166.81
Monthly sale vol.	10,358.66	9,869.17	10,890.39	7,933.02	6,725.70
Observations	6326	5760	16576	553	704

Table A.2: Sample sizes and groups

Notes: The table below provides the sample sizes and descriptions of various groups in the sample.

Group	Description	Sampled	Main specifications
0	Zero-touch control	8,327	7,257
1	Sampled placebo treatment	6,637	6,131
2	Participated placebo treatment	615	480
3	Sampled reinvestment treatment	21,023	19,011
4	Participated reinvestment treatment	792	583

Table A.3: Survey description

Notes: The table below provides a basic overview of the survey experiment and the differences between the reinvestment treatment and the placebo control group. See the Online Appendix for more information and detailed survey modules.

Survey module or question	**Reinvestment treatment**	**Placebo control**
Amount of dividends received 2020 Approximate percent of dividends reinvested in 2020	✓	✓
Dividends Quiz (3 questions and answers) I learned something from the quiz (agree/disagree) I found the content on the quiz informative agree/disagree)	✓ ✓ ✓	✗ ✗ ✗
Amount of dividends expected in 2021 Approximate percent of dividends planned reinvested in 2021	✓	✓
Preferences for reinvestment vs distributing funds Preferences for auto reinvest option	✓	✓
Generic dividends statements: Dividends are similar to ...(salary, bonus, profit, irrelevant payment) Dividends are important for spending (agree/disagree) Knowledge of which firms issue received dividends Pursue information related to the stocks in portfolio Portfolio is for long-term wealth vs short term	✓	✓
General questions on financial literacy, risk preferences, and expectations	✓	✓
Opt-in for 10 euro voucher and closing	✓	✓

Table A.4: Survey balance tests

Notes: The table below tests investors' long run expectations (Columns 1-2), risk tolerance (Columns 3-4), and risk perceptions (Columns 5-6), via survey questions for the treatment and placebo control groups.

	Long run expectations		Risk tolerence		Risk perceptions	
	(1)	(2)	(3)	(4)	(5)	(6)
Reinvestment treatment	0.080	0.064	0.048	0.056	-0.096	-0.139
	(0.062)	(0.064)	(0.106)	(0.112)	(0.118)	(0.120)
Age		-0.004		0.004		0.006
		(0.003)		(0.006)		(0.006)
Male		-0.234***		0.110		0.295*
		(0.071)		(0.154)		(0.157)
Num. received dividends		-0.015		0.046*		-0.046
		(0.016)		(0.028)		(0.033)
Credit card		0.117		0.278*		0.165
		(0.081)		(0.149)		(0.164)
Savings product user		-0.111		-0.073		0.217
		(0.097)		(0.167)		(0.164)
Mortgage holder		0.046		0.509*		0.254
		(0.158)		(0.280)		(0.340)
Online brokerage user		-0.095		-0.131		-0.196
		(0.086)		(0.137)		(0.159)
Married		0.033		-0.060		-0.216*
		(0.071)		(0.117)		(0.127)
Retired		0.081		-0.264		-0.446**
		(0.101)		(0.200)		(0.210)
Student		0.047		0.034		-0.379
		(0.141)		(0.190)		(0.333)
Micro status		0.013		0.032		0.018
		(0.013)		(0.021)		(0.023)
Total assets		0.000		0.000		-0.001
		(0.001)		(0.001)		(0.001)
Survey date FE	No	Yes	No	Yes	No	Yes
R-squared	0.003	0.095	0.000	0.056	0.001	0.100
Observations	497	497	497	497	497	497

Table A.5: The marginal propensity to reinvest in gross and net transactions (zero-touch)

Notes: The tables below shows the difference in the marginal propensity to reinvest (MPR) for the reinvestment treatment relative to the zero-touch group relative to the pre-treatment period. Our main specification examines the MPR from all dividends, as well as $Dividends_{Season}$ which examines the MPR from dividends paid out during calendar weeks 18-21. These dividend payouts were targeted in our intervention and comprise dividends that are paid out in the anticipated 'dividend season.' In Panel A we examine the contemporaneous effect of dividend receipt on net transactions (Column 1), purchases (Column 3) and sales (Column 4) at the investor-calendar week level. Panel B provides 5-week cumulative estimates. All specifications control for portfolio wealth and individual fixed effects.

Panel A: Immediate effect of treatment

	Net transactions	Purchases	Sales
	(1)	(2)	(3)
$Dividends_{Season} \times Treatment \times Post$	0.17***	0.11	-0.07
	(0.04)	(0.06)	(0.05)
$Dividends_{Other} \times Treatment \times Post$	-0.07	0.05	0.12
	(0.23)	(0.29)	(0.13)
Individual FE	Y	Y	Y
Controls	Y	Y	Y
R-squared	0.03	0.11	0.11
Observations	1,170,135	1,170,135	1,170,135

Panel B: Cumulative estimates

	Net transactions	Purchases	Sales
	(1)	(2)	(3)
$Dividends_{Season} \times Treatment \times Post$	0.28***	0.11	-0.17
	(0.09)	(0.17)	(0.18)
$Dividends_{Other} \times Treatment \times Post$	0.12	-0.45	-0.57
	(0.44)	(0.45)	(0.42)

Table A.6: The marginal propensity to reinvest in gross and net transactions (all dividends)

Notes: The tables below shows the difference in the marginal propensity to reinvest (MPR) for the reinvestment treatment relative to the placebo treatment relative to the pre-treatment period. This specification examines the MPR from *all dividends*. In Panel A we examine the contemporaneous effect of dividend receipt on net transactions (Columns 1-2), purchases (Column 3) and sales (Column 4) at the investor-calendar week level. Panel B provides 5-week cumulative estimates. All panels feature the specification stemming from Column 1 of Panel A in Table III. All specifications control for portfolio wealth and individual fixed effects.

Panel A: Immediate effect of treatment

	Net transactions	Purchases	Sales
	(1)	(2)	(3)
$Dividends_{All} \times Treatment \times Post$	0.24	0.19	-0.05
	(0.19)	(0.20)	(0.14)
Individual FE	Y	Y	Y
Controls	Y	Y	Y
R-squared	0.03	0.11	0.10
Observations	100,602	100,602	100,602

Panel B: Cumulative estimates (1 month)

	Net transactions	Purchases	Sales
	(1)	(2)	(3)
$Dividends_{All} \times Treatment \times Post$	0.33	0.92	0.59
	(0.33)	(0.70)	(0.75)

Table A.7: Heterogeneity in dividend literacy and planned behavior

Notes: This table examines investors' planned reinvestment behavior based on heterogeneity in dividend literacy from the survey quiz. Panel A examines planned reinvestment of dividends. The dependent variable in Columns 1-3 is the change in the propensity to reinvest, in Columns 4-6 it is the change in the planned fraction of dividends reinvested. The variables of interest are indicator variables for *Low dividend literacy* (0-1 questions correct), *Informative* (above median score in found informative) and *Learned new* (above median score for learned something new) interacted with a year 2021 indicator. In all specifications we control for individual investor fixed effects and estimate robust standard errors clustered at the individual level.

Panel A: Planned reinvestment

	Δ Marginal propensity to reinvest			Δ Fraction reinvested (%)		
	(1)	(2)	(3)	(4)	(5)	(6)
$Learned\,new \times Post$	0.13***			10.83***		
	(0.05)			(3.80)		
$Low\,literacy \times Post$		0.00			0.55	
		(0.06)			(4.61)	
$Informative \times Post$			0.05			7.65**
			(0.05)			(3.72)
Investor FE	Y	Y	Y	Y	Y	Y
R-squared	0.800	0.796	0.796	0.876	0.872	0.874
Observations	1,166	1,166	1,166	1,078	1,078	1,078

Table A.8: Heterogeneity in dividend literacy and decay effects

Notes: This table examines investors' reinvestment behavior in the field, based on heterogeneity in dividend literacy from the survey quiz. The dependent variable in Columns 1-3 is net transactions, in Columns 4-6 it is gross purchases into equity. In Panel B it is net investments and gross purchases into Allianz equity. The variables of interest are indicator variables for *Low dividend literacy* (0-1 questions correct), *Informative* (above median score in found informative) and *Learned new* (above median score for learned something new) interacted with dividend season indicators and the euro value of received dividends, $Dividends_{Season}$ (Panel A), and Allianz dividends, $Dividends_{Allianz}$ (Panel B). In all specifications we control for individual investor fixed effects and estimate robust standard errors clustered at the individual level.

Panel A: Reinvestment behavior

	Net transactions			Purchases		
	(1)	(2)	(3)	(4)	(5)	(6)
$Dividends_{Season} \times Learned\,new \times 2021$	0.20			0.85*		
	(0.26)			(0.47)		
$Dividends_{Season} \times Learned\,new \times 2022$	0.15			-0.19		
	(0.17)			(0.29)		
$Dividends_{Season} \times Learned\,new \times 2023$	0.39**			0.48**		
	(0.17)			(0.19)		
$Dividends_{Season} \times Low\,literacy \times 2021$		-0.07			1.41***	
		(0.22)			(0.33)	
$Dividends_{Season} \times Low\,literacy \times 2022$		0.30			0.16	
		(0.22)			(0.28)	
$Dividends_{Season} \times Low\,literacy \times 2023$		0.23*			0.14	
		(0.14)			(0.21)	
$Dividends_{Season} \times Informative \times 2021$			0.83**			1.30**
			(0.39)			(0.65)
$Dividends_{Season} \times Informative \times 2022$			0.54			0.76
			(0.42)			(0.64)
$Dividends_{Season} \times Informative \times 2023$			0.57*			0.33
			(0.30)			(0.41)
Individual FE	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y
R-squared	0.04	0.04	0.04	0.23	0.23	0.23
Observations	53,511	53,511	53,511	53,511	53,511	53,511