How does the timing of taxes on investment returns influence investor judgments?

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ABSTRACT

This study investigates the effect of tax timing on investment decisions. Returns in the form of dividends are taxed when received, while price appreciation is not taxed until the investment is sold (i.e., as a capital gain). In an investment simulation experiment, we find that when taxes are absent, participants invest significantly more in dividend paying stocks, but when taxes are present, preferences reverse, and they invest significantly more in price appreciation stocks. Additionally, in a series of abstract experiments designed to examine *why* tax timing affects investor judgments, we individually isolate three specific effects of tax timing differences, all of which favor price appreciation over dividends, and show individuals 1) prefer less frequent tax bills, 2) prefer to be in control of income recognition, and 3) misperceive the profitability of returns that are displayed cumulatively (i.e., like capital gains) versus one period at a time (i.e., like reinvested dividends).

KEYWORDS: Tax timing, capital gains, dividends, mental accounting, hedonic editing, availability heuristic

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I. INTRODUCTION

There are two main ways equity investments generate returns for investors – stock price appreciation and dividend payments. Prior literature examines why firms pay dividends (e.g., Ed-Dafali, Patel, and Iqbal 2023) and if dividend policy matters to investors (e.g., Graham and Kumar 2006) or influences their judgments and decisions (e.g., Bhattacharya 1979; Hartzmark and Solomon 2019). Further, prior research also considers how taxes influence investor judgments, although for the past two decades, stock price appreciation (i.e., long-term capital gains) and most dividends have been subject to the same tax rate for individual investors.[1] However there is an important tax difference between stock price appreciation and dividends that has not been addressed by prior research: tax timing differences.

Investors pay taxes on dividends each year they are received. On the other hand, with stock price appreciation, taxes are paid only when the investor sells the stock, and the gain is realized. This difference in the timing of tax assessment leads to three implications that we examine in this study: 1) more frequent and smaller tax bills for stocks that pay dividends; 2) more control over when income from price appreciation is recognized, and thus taxes are paid, compared to dividends because firms, and not investors, decide when and whether to pay dividends; and 3) an information display effect caused by the way cost basis[2] and unrealized gains are reported to investors on brokerage statements. We fill a gap in prior literature by examining the effect of these differences on investors' judgments caused by the timing of tax

[1] Prior research (e.g., Ayers, Lefanowicz, and Robinson 2007; Ivkovich, Poterba, and Weisbenner, 2005) has shown investors' choices to sell investments can be influenced by a desire to avoid paying taxes (i.e., the lock-in effect). We, purposefully, designed our experiments so that participant preferences are not examined through the lens of their decision to sell. Thus, our study complements this research by identifying other factors that influence investors' preferences.

[2] Cost, or tax basis, is, essentially, the amount paid to purchase a stock. To the extent a stock is sold for more (less) than its basis, the investor realizes a capital gain (loss) on the sale of the stock.

assessment. Relying on mental accounting, hedonic editing, and the availability heuristic, we hypothesize that each of these differences can cause current investors to inadvertently be more satisfied with stocks that primarily provide returns via price increases (hereafter "appreciated stock") compared to those that provide returns via dividends (hereafter "dividend stock").[3]

Mental accounting theory (Thaler 1985) posits that individuals sort gains and losses arising from like transactions into the same mental account and it is the *net* position of this account that determines feelings of gain or loss. By the nature of the taxing system, the tax on returns from stocks, whether from dividends or capital gains, is necessarily less than the underlying income/gain. Thus, if investors sort investment income and tax costs into the same mental account, the tax loss will be netted against the dividend/capital gain and the net position will still be a gain, leading investors to experience the positive affect associated with being in a gain state. This is consistent with Falsetta and Tuttle (2008), who find that, since individuals plan for and consider the tax consequences of their investing activities, taxes and investing gains are grouped together in the same mental account.

Importantly, to be able to sort tax costs into the same mental account as the positive investment returns, investors must first be able to identify and link the tax effects to the income. When an investor decides to sell appreciated stock, the connection between the action and the future tax consequences are clear, thus the gain and the resulting tax cost are likely seamlessly combined into the same mental account (Evers et al. 2022). Even though the taxes on capital

[3] For ease of prose, we refer to the dividend paying investment as stock. However, these same arguments apply to other investments, such as mutual funds, that make distributions. Unlike individual shares of a company's stock, mutual funds often distribute both dividends and capital gains, and, like stock, mutual fund shares can appreciate in price. Importantly, all mutual fund distributions, whether from capital gains or dividends, are subject to the same tax timing effects as stock that we refer to as "dividend stock." Further, we focus on current, versus prospective investors (Cianci and Falsetta 2008; Harris, Jackson, and Li 2013), because only current investors experience the tax timing differences we examine. We limit our investigation to retail investors, as opposed to institutional investors, because we are focused on how these accounts are reported to investors in their brokerage accounts.

gains may be paid in the future, investors should be keenly aware of the future tax costs when they choose to recognize their gain.

On the other hand, companies, not investors, make the decision to pay dividends, thus the investor is not in control of when dividend income is recognized. In addition, many brokerage firms (e.g., Schwab, Fidelity, Vanguard, etc.) used by retail investors do not notify investors that dividends have been received and often automatically reinvest the dividends in the same underlying stock.[4] Therefore, investors may see their brokerage account balance rise but may not be aware that the increase is from dividends. In this case, the year-end tax bill may be a negative surprise to investors who are unaware of the dividend income, and thus the tax bill will be less likely to be netted with the income. This can be especially true for dividends that are reinvested, because the taxes must be paid with other funds.

Further, dividend stocks will have related tax costs each year, while appreciated stocks only incur a tax cost once, when sold. Investors will have repeated tax losses, and pain, from dividend stocks compared to appreciated stock where, as noted above, taxes are paid only once when the stock is sold, and are more likely to be assigned to the same mental account as the gain. Even if, contrary to Falsetta and Tuttle (2008), taxes on capital gains are not assigned to the same mental account as the income, hedonic editing (Thaler 1999) still predicts a preference for one large loss (i.e., capital gain taxation) to multiple smaller losses (i.e., dividend taxation). Thus we predict these differences in the timing of when taxes are paid and the control of income recognition will lead investors to perceive dividend stocks as less attractive than appreciated stock, even if their investment performance is the same.

[4] We acknowledge that some investors are notified of dividend payments (e.g., Robinhood sends dividend payment notifications), may monitor their brokerage accounts very closely, and/or may consciously choose dividend stocks and thus may not be as affected by the lack of control over income recognition. This possible heterogeneity in investor awareness biases against our hypotheses but does not affect the theory we rely on.

In addition to direct tax effects, tax law can also have an indirect effect on investors' evaluation of stock investments because of how information is presented to investors. Since 2011 (Horn 2013), brokerage firms are required to keep track of investors' cost basis for stocks. Investors see their current portfolio value, along with their cost basis, and the difference between these two numbers is often shown as the unrealized gain amount (see Exhibit 2). Stock price appreciation is reflected in portfolio value but is not included in a stock's cost basis. On the other hand, when dividends are paid and then automatically reinvested, the investor is using the dividends to buy more stock. The purchase of additional stock increases both portfolio value and the cost basis. In the extreme, a stock for which all returns are via dividends will report no unrealized gain. Therefore, compared to appreciated stock, dividend stock will display less unrealized gain to investors making them appear less profitable. Even though investors could do the computations necessary to properly compare the two investments, prior research (Hartzmark and Solomon 2022) and the availability heuristic (Tversky and Kahneman 1973) suggest investors are more likely to naively focus on the observed information without realizing its shortcomings. We predict this will also lead investors to prefer appreciated stock over an equally profitable dividend stock.

To hold the fair market value of dividend stock and appreciated stock equivalent, we assume automatic dividend reinvestment. Reinvesting dividends used to be relatively rare because the procedure was cumbersome and could only be done through companies' dividend reinvestment programs (DRIPs). However, as electronic record-keeping has replaced paper shares and brokerage companies have instituted their own DRIPs, dividend reinvestment has become much easier (Heinzl 2023). In addition, many investment advisors argue that dividend reinvestment results in higher portfolio values and is particularly advisable for younger investors

(Farrington 2023; Miller 2023). Recently, Hackethal, Hanspal, Hartzmark, and Brauer (2024) find evidence that, contrary to prior studies (e.g., Baker, Nagel, and Wurgler 2007), in more recent years, dividend reinvestment is common. Thus, studying automatic dividend reinvestment is timely and important.

We test our predictions with a series of experiments using Connect participants to proxy for retail investors. In the natural world, all the factors we discuss occur simultaneously. Therefore, we first abstract away from the investment setting and examine each of the differences between the taxation of dividend and appreciated stock separately with a series of mini-experiments in a carnival setting. We then conduct a comprehensive investment simulation experiment. The comprehensive experiment is a multi-round experiment where participants earn experimental currency (EC) and then can invest in appreciated stock and/or dividend stock. We manipulate whether investment earnings are subject to tax or not to isolate the effect of taxes on investor preferences. Importantly, participants' compensation for participating in the simulation is based on the amount of EC they earn and the investment decisions they make.

The results of the experiments confirm our predictions. The mini-experiments document that individuals prefer less frequent versus more frequent tax bills, prefer to be in control of income recognition, and fall-prey to an information display effect where they misperceive the profitability of returns that are displayed cumulatively (i.e., like capital gains) versus one period at a time (i.e., like reinvested dividends). Finally, in the simulation experiment, we find that when taxes are absent, participants exhibit a preference for dividend stock, investing over 55 percent, significantly more than half, of their total investment in the dividend stock. However, when taxes, and thus the tax timing effects, are present, preferences flip. Specifically, when taxes are present, participants invest less than 44 percent, significantly less than half, of their total

investment in dividend stock. Thus, our results show that tax timing differences cause investors to prefer appreciated stock over dividend stock.

This study makes both practical and theoretical contributions. We contribute to the literature by isolating and measuring investor reactions to returns from dividends compared to returns from appreciated stocks, which allows us to make causal inferences. In archival studies, there are rarely equivalent investments that only provide returns via dividends or only via stock price appreciation. However, with an experiment we can hold everything about the investments equal except the return form (i.e., dividend or stock price appreciation) and gauge investor reactions to the type of return.

We also extend and complement recent research in finance. Hartzmark and Solomon (2022) show since stock market indices (e.g., Dow Jones, S&P 500) focus on price changes, they do not properly reflect total market returns because these indices ignore returns from dividends. This incomplete information distorts the evaluation of total stock performance (i.e., price changes plus dividend payments) and is reflected in newspaper articles' discussion of stock performance and cash inflows to mutual funds. It also creates a bias in pricing based on dividend policy. We extend this literature and show that even though the overall tax bill is the same, tax timing differences between dividends and capital gains also influences investor preferences.

Practically, our study provides evidence of an unintentional effect of dividend policy and brokerage firms' communication to investors. Specifically, we show that tax timing differences affect investors' relative preference for appreciated versus dividend stock, leading them to be less pleased with dividend stocks, all else equal. The results also have implications for brokerage firms' dividend reinvestment policies, investor communications, and portfolio display choices

II. BACKGROUND, PRIOR RESEARCH, AND HYPOTHESIS DEVELOPMENT

Background

Publicly traded companies choose whether to pay dividends and recently stock repurchase plans have emerged as an alternative or supplement to regular dividend declarations (Breasley, Myers, Allen, and Edmans 2023).[5] According to Breasley et al. (2023), in any given year, approximately 24.1 percent of non-financial companies pay dividends and repurchase shares, 12 percent pay dividends and do not repurchase shares, 23.7 percent repurchase shares and do not pay dividends, and 40.1 percent do neither. Further, financial firms (e.g., banks) are more likely to pay dividends but equally likely as non-financial companies to repurchase shares. There are some very well-known companies that have never paid a dividend (e.g., Berkshire Hathway and Amazon). Thus, there is evidence that companies in the US vary significantly in how they return value to shareholders.

In the US, returns to shareholders are subject to tax. However, the taxation of capital gains and dividend income has varied greatly over time, with capital gains tending to be taxed more lightly than dividend income prior to the 21st century. However, since 2003 (Tax Policy Center 2024), for individual taxpayers (i.e., noncorporate taxpayers), long-term capital gains, from the sale of stocks, bonds, and similar assets, and qualified dividends have been subject to the same tax rate.[6] The US tax system also generally only taxes income when it is realized; thus,

[5] For purposes of our study, a stock repurchase plan has similar features to appreciated stock in that the investor is in control of the timing of the transaction and the tax is determined based on the realized gain (i.e., repurchase price less cost basis) associated with the repurchased stock. The only difference is that instead of selling their shares on the open market, they are selling them back to the company.

[6] Long-term capital gains are gains on capital assets held for more than one year. Qualified dividends are ordinary dividends that meet certain criteria [see IRC Section 1(h)(11)]. According to IRS statistics, based on data from 2021 and 2022, over 75% of ordinary dividends reported on individual tax returns are qualified dividends (available at: https://www.irs.gov/statistics/soi-tax-stats-individual-income-tax-returns). In addition, the vast majority of capital gain recognitions are long-term versus short-term capital gains (e.g., The Congressional Research Center reports that less than 5% of net capital gains in 2007 were short-term gains [Congressional Research Center 2022]). Thus, the assumption that dividends and capital gains will be taxed at the same rate is reasonable. The tax rate that applies to long-term capital gains from investments and qualified dividends depends on how much other income a taxpayer has and can be as low as 0% and as high as 23.8%.

unrealized gains from investments that appreciate are not taxed until the investment is sold. Further, dividends are taxed when paid (i.e., when the dividend is realized), even if the investor reinvests the dividends in additional shares of stock.

A notable exception to the taxation scheme described above applies to investments in retirement accounts like 401ks and Roth IRAs, which are also taxed at different times. Individuals can choose to invest in tax-deferred retirement accounts (e.g., 401ks), where their contributions are made with pre-tax dollars, but all withdrawals, whether from contributions, dividends, interest, or price appreciation, are taxed as ordinary income. Alternatively, individuals can invest in Roth-type plans (e.g., Roth IRAs and Roth 401ks). Contributions to these plans are made with after-tax dollars, however, as long as certain requirements are met, withdrawals are completely tax-free in retirement. The tax timing effects we study do not apply to investments in these types of tax-favored retirement savings plans. See Austin, Bobek, Doxey, and Stinson (2024), Cuccia, Doxey, and Stinson (2022), and Stinson, Doxey, and Rupert (2021), for extensive analyses of how the features of these plans affect investors' spending, savings, and investing choices.

Prior Research

Before developing our hypotheses, we place our study in the extant literature by reviewing prior research in finance and accounting related to our study. First, we discuss prior research examining investors' preferences for dividend paying stock. Second, we review other studies that examine how taxes influence investors' preferences. Lastly, we discuss dividend reinvestment research because it is relevant to our setting and its prevalence has been increasing, making it a timely topic.

Prior Research on Investors' Dividend Preferences

Prior research has extensively investigated companies' dividend policies and investors' preferences for dividend paying stock. Prominent theories on how companies decide whether and how much dividends to pay include the agency costs of free cash flow (Jensen 1986), signaling theory (Bhattacharya 1979; Miller and Modigliani 1961), and catering to "dividend clienteles" (Litzenberger and Ramaswana 1979). However, the focus of our study is not on the decision to pay dividends but rather how the *timing of taxes* on dividends may systematically influence investors' assessment of dividend stock versus appreciated stock.

In addition to research on firm dividend policy, there is a robust stream of research examining investor preferences for dividends versus stock price appreciation, often referred to as high-yield versus low-yield investments. This research contrasts with early work using traditional assumptions that dividend policy should be irrelevant to investors (Miller and Modigliani 1961). Importantly much of the research about investor preferences focuses on dividends retained by the investor and consumed, rather than reinvested. For example, Graham and Kumar (2006) examine the portfolio choices and trading behavior of over 60,000 retail investors for a 6-year period during the 1990s.[7] They find, consistent with Bhattacharya's (1979) modeling of the "bird in the hand" fallacy, a greater preference for high-yield investments amongst older and lower-income investors, with older low-income investors exhibiting the strongest preference for high-yield dividend stocks. Further, younger investors are much more likely to hold dividend paying stocks in tax-deferred versus taxable accounts. Overall they conclude that retail investors consider their marginal tax rates "when making broad asset allocation decisions" (Graham and Kuper 2006, 1322).

[7] Note that this is a period when dividends were taxed at ordinary income rates, while capital gains had a maximum tax rate of 28% until 1997. The sample period for the study ended prior to the 1997 decrease in capital gain rates (to 20%). Therefore, capital gains were taxes more lightly for high-income taxpayers (i.e., those with marginal tax rates over 28%). Additionally, the automatic reinvestment of dividends was uncommon until recently (Heinzl 2023).

Other research suggests a "consumption motive" drives investors' preference for dividend-paying stock by showing that investors are more likely to consume dividend income than unrealized capital gains (Baker et al. 2007). Brauer, Hackenthal and Hanspal (2022, 4809) find evidence consistent with this motive and conclude that some investors view "dividends as a planned source of additional consumption rather than a component of their investments that should be reinvested." Notably, these conclusions are based on data from investors who *receive* cash dividends and exclude investments where dividends are part of an automatic reinvestment plans (i.e., DRIPs).

Taxes and Investors' Preferences

Prior research has acknowledged that differences in how capital gains and dividends are taxed can influence both dividend policy and investor preferences. Some of the earliest work examining how tax affects investor preferences (e.g., Feldstein, Yitzhaki, and Slemrod 1980; Kiefer 1990), examines the lock-in effect. Because price appreciation is not taxed until stock is sold, these taxes represent a cost that investors consider when deciding whether to sell stock. The presence of capital gains tax increases the price necessary to induce shareholders to sell (Ayers, Lefanowicz, and Robinson 2003; Landsman and Shackelford 1995). Prior research has also examined whether relative tax rates between countries influence domestic and foreign investment. As noted by Poterba (2001) evidence on this assertion has generally been mixed. However, notable studies find that changes in relative tax rates between countries do shift investors' portfolio choices (Amiram and Frank 2016; Desai and Dharmapala 2011).

Other research has shown that taxes on returns affect how investors allocate investments. For instance, Falsetta, Rupert, and Wright (2013), relying on mental accounting and hedonic editing theory (Thaler 1999), find that a tax decrease implemented through small, repeated cuts,

versus one large decrease, results in more investment in risky, versus safe, assets. Conversely, tax increases implemented all at once lead to a smaller decrease in investment in risky assets, compared to a tax increase implemented in small, repeated, increases. Campbell, Chyz, Dhaliwal, and Schwartz (2013) find that when shareholder-level taxes are reduced, thus reducing the cost of equity, corporate capital investment increases. Overall this stream of research provides evidence that tax policy influences investors' preferences.

Dividend Reinvestment

As discussed in a previous section, prior research identifies several reasons why some individuals prefer dividend stocks. This research primarily focuses on cash dividends that are retained by investors. Rather than retaining and consuming dividends, investors can reinvest dividends in the same or different investments. They can do this by accumulating dividends in their brokerage accounts, and then buying more shares with the dividends, or they can participate in companies' or brokerage firms' automatic DRIPs. Notably, unlike in prior years, when dividend reinvestment was cumbersome (Heinzl 2023), in recent years, automatic DRIPs are easily set up through brokerage firms for both dividends received from mutual funds and individual stocks.[8] Further, investment advisors routinely recommend dividend reinvestment to enhance portfolio growth, particularly for younger investors (e.g., Farrington 2023; Miller 2023). Thus, automation advancements in the 21st century have led to increases in dividend reinvestment plans.

Recent evidence about the proliferation of dividend reinvestment is sparse. Baker et al. (2007) study a period (i.e., 1988-2001) before many of the innovations noted above and conclude

[8] See for example Vanguard's dividend reinvestment information available here: https://investor.vanguard.com/investor-resources-education/online-trading/reinvest-dividends.

that investors do not typically reinvest dividends. However, Muller-Dethard, Reinhardt, and Weber (2024) study dividend reinvestment from cash dividends deposited in investors' brokerage accounts, as opposed to their checking accounts. Their sample is from German online retail banking customers between 2007 and 2011. They find that 79 percent of dividends deposited into brokerage accounts are eventually reinvested in the same or other investments, although not necessarily immediately. On the other hand, investors who use their checking accounts to settle trades and receive dividends rarely reinvest the dividends. In addition, their dataset *excludes accounts enrolled in automatic dividend reinvestment* because they are interested in the effect of the cash dividend deposit location (i.e., checking account or brokerage account) on reinvestment choices.[9] Further they provide evidence that most investors (71 percent) they surveyed indicate their brokerage firms do have cash accounts, and confirming their archival findings, 76 percent report they primarily reinvest their dividends. Similarly, Hackenthal, et al. (2024) find that dividend reinvestment increased from 58 percent to nearly 75 percent following an educational intervention about the free dividend fallacy in their treatment group while remaining relatively unchanged (53 percent to 58 percent) in the control group. Notably, even without their intervention, dividend reinvestment rates exceeded 50 percent.

In summary, there is recent evidence that dividend reinvestment is common, relatively easy to accomplish, and beneficial for most investors. It is important to note that the tax timing differences we study are not limited to dividends that are reinvested. However, we choose a setting with dividend reinvestment for two reasons. First, most prior literature on investors' preferences for dividends focuses on cash dividends retained by investors, so studying dividend

[9] They also report for some selected mutual funds in their database, the bank offers an automatic reinvestment plan, and this feature is used by more than 90 percent of investors.

reinvestment is timely and important. Second, in our experimental setting, dividend reinvestment allows us to maintain equivalent value for our dividend stock and appreciated stock investments.

Hypothesis Development

In this section we derive hypotheses about the effect on investor judgments of differences between dividends and capital gains caused by the timing of taxation. We rely on several different theories to make our predictions regarding the timing of taxes (H1), the control of income recognition and thus tax payments (H2), and information display effects (H3).

Hypothesis 1

The theory of hedonic editing, derived from mental accounting theory (Thaler 1999) predicts that, due to diminishing sensitivity in the prospect theory value function, individuals prefer one large loss to multiple smaller losses. Similarly, they prefer to experience multiple small gains rather than one large gain. In addition, individuals prefer to net a small loss with a larger gain. Importantly, the ability to integrate gains and losses in this way requires that they are assigned to the same mental account (Evers et al. 2022). Evers et al. (2022) note that for outcomes to be assigned to the same mental account they must overlap on "salient attributes."

If individuals experience tax payments as separate losses, then making a single large tax payment, when the investment is sold, is preferable to making more frequent smaller tax payments each time dividends are paid. See Exhibit 1 for an illustration of the timing of taxes on the different types of returns. On the other hand, if investors net the tax cost with the gain/income that generated the tax payment, then taxes (i.e., a loss) on dividends and capital gains will be netted with the income (i.e., a gain) and overall individuals will experience a net gain. In this case, hedonic editing predicts investors will prefer to recognize multiple smaller

gains from the net dividend income versus one large gain from the net capital gain and thus should prefer dividend taxation timing.

Falsetta and Tuttle (2008) posit that individuals do group taxes and investment gains in the same mental account. They investigate whether individuals' well-known preference for being in a refund versus tax due position when filing their tax returns, the "withholding effect," carries over to investing decisions. Specifically, does being in a tax due (refund) position induce risk-seeking (risk-averse) behavior in an unrelated investing task? They find that even though the investing decision is unrelated to their year-end tax position, individuals are more risk-seeking when in a tax due versus refund position. They argue this is evidence in favor of investing decisions and taxes being in the same mental account, which would suggest a preference for dividend taxation, the recognition of multiple smaller gains, over capital gain taxation.[10]

Despite this, we predict a preference for dividend taxation is unlikely for two reasons. First, the linkage between recognizing a gain on appreciated stock and the resultant tax is quite strong. Thus, it is likely that the capital gain and the related taxes are in the same mental account and investors will only experience a net gain when they sell appreciated stock. However, especially when dividends are reinvested, investors may be unaware they received a dividend, or at the least, receipt of the dividend will be less salient, while the year-end tax bill will be quite salient and will have to be paid with funds from other sources. This suggests that taxes on dividends are less likely to be grouped in the same mental account as the dividend income and

[10] While they did tell participants in their experiment that their investing activities would not change their year-end tax position, there are several features of their experiment that may have facilitated the linking of the tax and investing decisions into the same mental account. First, the investing decision occurred immediately after participants found out whether they were in a refund or tax due position. Second, their withholding position was based on a flip of a coin, and the participant is the one who flipped the coin. Thus the tax and investing activities were close in time and both were under the "control" of the participant. Finally, their experiment only involved investment gains and did not involve dividends. We also agree that investment gains and the related taxes will be grouped in the same mental account.

thus we predict the annual payment of taxes on dividends will be experienced as multiple small losses. Second, there is ample evidence of tax aversion (e.g. Sussman and Olivola 2011; Kessler and Norton 2016), suggesting that in general, paying taxes is viewed as unpleasant and to be avoided. For these two reasons, we predict that the frequent tax payments associated with dividends will cause investors to prefer appreciated stock over dividend stock.[11] Stated formally:

> **H1**: The frequency of tax payments (i.e., frequently or only once) causes investors to prefer appreciated stock to dividend stock.

This first hypothesis is not without tension. Because investors pay tax on dividends annually, it is possible they become accustomed to these taxes. Chen and Rao (2002) show that individuals update their reference point for anticipated events. Thus, to the extent investors anticipate yearly tax costs from dividends, they may have already updated their reference point to incorporate the tax payment and thus it will no longer be painful. This would bias against our hypothesized relationship between frequency and investor preferences.

Hypothesis 2

Another difference between dividend income and capital gain recognition is who *controls* when the income is recognized and therefore when taxes are paid. Investors decide when to sell their stocks. And because they control when stocks are sold, and thus the resulting income recognition, they are aware of the gain from the sale and, presumably, can anticipate the subsequent tax cost. Unlike capital gains from stock sales, firms decide when and whether to pay dividends. Further, as it is more common for brokerages to automatically reinvest dividends, investors are even less likely to be aware a dividend has been paid because there is no cash

[11] We would make the same prediction if gains from appreciated stock and the taxes on the gain are not in the same mental account. In that case the taxes are experienced as a loss and hedonic editing predicts a preference for experiencing one large loss rather than multiple smaller losses.

increase in their account.[12] However, when it comes time to pay taxes, the process of filing a tax return causes investors to be aware of the tax cost associated with the dividend. Thus, investors may not realize they had a dividend payment until they are in the process of paying taxes. Capital gain recognition and the resultant tax bill are under the control of the investor, while dividend recognition and the resultant tax bill are not.

Although not directly related to investing activity, there is a plethora of research that links personal control with higher levels of satisfaction both in the workplace (e.g., Greenberger, Strasser, Cummings and Dunham 1989) and in life (e.g., Ross and Mirowsky 2013). Similarly, related to the tax expense associated with capital gains and dividends, controllability lessens the pain of aversive events (Miller 1979) and individuals prefer control over aversive events (Averill 1973). Accordingly, we predict that lack of control over income and tax expense recognition will also cause investors to be less pleased with dividend payments and more irritated with the resulting tax than gains from appreciated stock and their resulting tax.

While we predict that investors prefer to be in control in general, we further argue that by controlling the sale of stock, investors become aware of both the income and resulting tax payment much earlier than with dividend payments. This awareness can also affect how they perceive both the income and the resulting tax. Prior literature in economics and psychology has proposed that individuals discount the value of events the further those events are from the "here and now" (Trope and Liberman 2010; Lowenstein and Prelec 1992). For both capital gains and dividends, the actual receipt of income always comes before the tax payment. However, what

[12] The free dividend fallacy implies that investors see dividends as a free income-stream separate from the investment (Hartzmark and Solomon, 2019). The findings of Baker, Nagel, and Wurgler (2007), conducted before automatic reinvestment was common among brokerages, support this argument and find that dividends were used to fund consumption, but their finding rely on investors receiving cash dividends. If there is no cash to spend, then investors may not realize that dividends were paid.

can differ is when investors are *aware* of the income and tax payment. For stock sales, individuals are aware of income as it is generated, because they made the explicit decision to sell the stock, which then allows them to anticipate the future tax payment. Here, since the tax payment occurs in the future, investors may discount its effect when netting the income and loss in their investment mental account. If we assume income (I), tax payment (T), and β is the discount applied to future events, then $I - \beta*T$ (Equation 1) describes an investor's mental account in this scenario.

Dividends on the other hand, are the result of firm actions, meaning investors are less likely to be aware of the income until it is time to prepare their tax return, and the awareness of the tax cost triggers awareness of the dividend income. In this scenario, investors become aware of the income and the taxes when taxes are due, even though income was realized previously. If we again assume income (I) and tax payment (T) but let α represent the discount applied to past events, then $\alpha*I - T$ (Equation 2) describes an investor's mental account in this scenario. If we compare Equations 1 and 2, for equivalent amounts of income and tax: $I - \beta*T > \alpha*I - T$ holds if α and/or β are less than 1, as is generally the case with discount rates. This also suggests investors will be more pleased when they are aware of income, and the future tax bill, when it is generated, than if they do not become aware of income until it is time to pay their tax bill. Therefore, we predict that individuals prefer controlling income and that being in control can affect the timeline investors become aware of income and the resulting tax. Stated formally:

> **H2**: Investors are more pleased with an investment where they control the income recognition, and thus tax payment, versus an investment where the firm (or someone else) controls the income recognition, and thus tax payment.

Hypothesis 3

We examine one last important difference created by the tax timing differences between

dividends and capital gains - an indirect, information display effect.[13] As mentioned previously, retail investors typically use brokerage firms to invest, and it is common for these brokerage firms to automatically reinvest dividends. Since 2011 (Horn 2013), brokerage firms have been required to keep track of investors' cost basis for stocks. As illustrated in Exhibit 2, brokerage accounts provide investors with several different data points including their current portfolio value, cost basis, and unrealized gain amount (i.e., the difference between current value and cost basis). Increases in a share's stock price are reflected in the current portfolio value but, since they are unrealized gains, are not included in the cost basis. On the other hand, when dividends are paid and then automatically reinvested, the investor uses the dividend to purchase additional shares of stock. Importantly, this automatic reinvestment of dividends increases both the portfolio value, because more shares are owned, and the cost basis, because the shares are purchased with dividends that have already been taxed.[14] Therefore, compared to appreciated stock, dividend stock will show less unrealized gains, because the value of the stock and the cost basis are both increased by the amount of the reinvested dividends. In the extreme, an investment for which all returns are received from dividends will have no unrealized gain. Thus on a brokerage statement this lack of unrealized gains may cause investors to infer that the dividend stock is less profitable compared to a stock that is otherwise the same, except it returns its gains

[13] We refer to it as an information display effect as opposed to a framing effect because a framing effect occurs when individuals' decisions differ based on the valence of how information is presented (e.g., 40 percent chance of losing versus 60 percent chance of winning). In our setting, different information is being presented based on the type of return provided by the stock and, unlike a framing effect, you cannot infer the information not being presented. For example, in Tversky and Kahneman (1981), their original framing analysis compared participants' choices when they were informed 600 people were at risk of dying and the choices were described as either "200 people will be saved" or "400 people will die." In both these situations you can infer the exact same information - 200 people will live and 400 people will not. In our setting, where the basis of dividend stock is increased for additional purchases, the total return from the original investment is not easily inferred without gathering additional information from prior periods.

[14] On the other hand, if dividends are retained by the investor and not reinvested, then, as noted in Exhibit 2, neither the portfolio value nor the cost basis will increase. Relative to appreciated stock, the dividend stock will not only show less unrealized gain but will also have a lower portfolio value.

to investors via increases in the stock price.[15]

Hartzmark and Solomon (2022) investigate a related, but distinct, information display effect at the market level. They find that investors' perceptions of stock performance are biased because most stock performance index measures only reflect returns from price changes and do not include returns from dividends. Further, they compare the results from the U.S. markets to German markets, which is the only developed market that displays performance using a return index and find the bias does not exist in Germany. They also note that in the U.S. "data on returns are not easy to obtain and are rarely displayed by default" (Hartzmark and Solomon 2022, 344). These results are consistent with the availability heuristic (Tversky and Kahneman 1973), in that investors are likely to naively focus on observed information without realizing its shortcomings (Jain, Walia, Singh, and Jain 2022). Investors are also more likely to rely on readily available and highly salient information (Chen, Cheng, Lin, and Peng 2017). Given that returns from dividends are also difficult to combine with price appreciation returns on individual investor statements, we predict that this difference in information display will lead individuals to prefer appreciated stock over dividend stock, all else equal. Stated formally:

> **H3:** Investors will prefer appreciated stock investments to dividend stock investments because of an information display effect related to the presentation of unrealized gains.

III. METHOD AND RESULTS

Overview

We identified several tax-timing related features that vary between dividend and appreciated stock that may inadvertently lead investors to find appreciated stock more attractive

[15] It is worth noting that given that the taxes have already been paid on the dividends, if an appreciated stock investment and a dividend stock investment have the same current market value, the after-tax value of the dividend stock is strictly more than the appreciated stock. However, as discuss below, we predict that individuals will focus on the presented information and thus will incorrectly assume the appreciated stock is more profitable.

than dividend stock. We measure attractiveness through both revealed preferences and direct questioning.[16] In the natural world, the features we examine co-exist simultaneously. Therefore, to test the hypotheses, we first conduct a series of mini-experiments to examine each hypothesis in isolation. In these experiments we abstract away from dividends, capital gains, and other investing terminology and instead employ a carnival setting where participants play games in which we embed our manipulations. Experiment 1 examines the timing of taxes (H1); Experiment 2 examines the control of income recognition (H2); and Experiment 3 examines the information display effect (H3). Our final experiment, Experiment 4, is an investment simulation that mimics the real-world tax timing and display effects of dividend and capital gain taxation. Experiment 4 combines all the effects discussed in our hypotheses in a more real-world setting so that we can show that overall, tax timing and display effects cause investors to prefer appreciated stock to dividend stock. Below we first describe the participants for the experiments and then we explain the methods and report the results of each experiment. For all experiments except Experiment 4, we only excluded participants who missed a simple attention check.[17]

Participants

Participants for all experiments are recruited from Connect and are required to be at least 18 years old and be in the United States (US).[18] All experiments were conducted in the Spring and Summer of 2024. Demographic information about the participants, payment information,

[16] In none of the experiments do we examine sale of investments, or leaving a carnival game, to avoid merely documenting the lock-in effect (i.e., investors avoid selling investments which trigger tax, [Ayers et al. 2007]) or the dispositional effect (i.e., investors tend to hold onto to losing stocks and sell winning stocks [Shefrin and Statman 1985]).

[17] In Experiment 4, the investment simulation, as reported below, we also exclude participants who failed a comprehension quiz three times.

[18] The study was listed on Connect using the CloudResearch platform, which provides additional participant screening to block duplicate IP addresses, and we screen out participants located outside of the US. In addition, we include procedures to make sure that each participant is only able to participate in one of the experiments. IRB approval was received from the university where the experiments were conducted.

time taken to complete the experiment, and manipulation check failure rates for each experiment are displayed in Table 1. Overall, the demographic profile of the participants is quite similar across experiments with approximately 50 percent male, average age around 38 years old, modal education attainment of a bachelor's degree, and median household income between $50,000 and $69,999. Work experience and tax-filing experience average around 17 years and 13 years, respectively.

Experiment 1 - Tax Timing

Procedures

In this experiment, participants are given tokens to play a carnival game where they choose between two Lucky Wheels. Each wheel requires a fee equal to 20 percent of winnings, and both wheels have the same payout odds. Unknown to participants, the cumulative winnings for spinning the wheels are identical for both wheels and held constant for all participants. To mirror the differences in the timing of tax payments from receiving investment returns in the form of a dividend vs stock price appreciation, we vary *when* participants pay fees on their winnings from the wheels. The first Lucky Wheel collects fees owed after each spin ("Dividend Wheel"); the other Lucky Wheel collects any fees owed only when the player leaves that Lucky Wheel ("Capital Gain Wheel"). Participants are explained the difference between the two wheels and must correctly respond to a quiz ensuring they understand how the carnival game works to continue in the study.[19]

Participants are initially randomly assigned to one of the two wheels and stay on that wheel for three spins. After each spin, those participants assigned to the Dividend Wheel pay

[19] The wheels are described to the participants as the wheel where you pay fees every spin or the wheel where you pay fees when you leave the wheel. We refer to them as the Dividend and Capital Gain Wheels for ease of exposition.

fees on their winnings. After the third spin, the carnival worker takes a break and everyone must leave their wheel, which means participants who were assigned to the Capital Gain Wheel must pay fees on their previous three spins when the carnival worker takes a break.[20] At this point, regardless of the assigned wheel, all players have won the same number of tokens and paid the same amount of fees, the only difference between the conditions is when those fees were paid. The carnival workers then return from break and participants must choose whether to play the Dividend Wheel or the Capital Gain Wheel. After they choose their wheel, they spin the wheel three more times and then the carnival ends. We use both revealed preferences from the wheel choice after Round 3 and post experiment questions (PEQs) to identify which wheel participants preferred. Participants' pay is determined based on the tokens they have when the carnival ends.

Results

The results for Experiment 1 are displayed in Table 2. Table 2, Panel A reports the percentage of participants who chose each wheel after Round 3. Consistent with H1, regardless of starting wheel, based on the results of a one-sample proportion test ($z = 1.656$, $p = 0.045$, one-tailed, all p-values are two-tailed unless otherwise noted), participants are more likely to choose the Capital Gain Wheel (54.2 percent) than the Dividend Wheel (46.8 percent). In our PEQs we asked how they made their choice (see Table 2, Panel D); one of the possible responses is "I chose randomly." In Table 2, Panel B, we repeat the analysis from Panel A, excluding participants who said they chose randomly (n=40); the results suggest a continued preference for the Capital Gain Wheel (55.7 percent vs. 44.3 percent, $z = 2.170$, $p = 0.015$, one-tailed).

Table 2, Panel C reports participants' responses to PEQs about the fees for those who

[20] Participants play the Lucky Wheels with red tokens. They also have blue tokens to pay the "fees" on their winnings. We made this choice so that participants are shown equivalent returns between the wheels (i.e., one wheel doesn't show after-fee winnings while the other wheel has pre-fee winnings). Prior research (Austin et al. 2024) shows that individuals do not fully consider the effect of taxes on pre-tax balances.

started on the Capital Gain Wheel versus the Dividend Wheel. While below the midpoint for both groups, suggesting disagreement with being irritated with the fees, those who started on the Capital Gain Wheel were less irritated than those who started on the Dividend Wheel ($t_{397} = 2.04$, $p = 0.042$).[21] Table 2, Panel D shows that, despite being told that the only difference between the two wheels is when fees are collected, those who chose the Capital Gain Wheel are more likely than those who chose the Dividend Wheel to think their wheel will give them the most tokens ($t_{397} = 2.76$, $p = 0.006$) and that their chosen wheel is more enjoyable ($t_{397} = 5.10$, $p < 0.001$). Finally, Table 2, Panel E reports PEQs for the 195 participants who experienced both wheels ("switchers"). Their responses overall show a preference for the Capital Gain Wheel, which they report as being more enjoyable ($t_{195} = 8.59$, $p < 0.001$), having a preferable fee payment method ($t_{195} = 6.20$, $p < 0.001$), and even more profitable ($t_{195} = 3.51$, $p = 0.001$). Overall, the results of Experiment 1 support H1 and are consistent with a preference for capital gain taxation versus dividend taxation.

Experiment 2 – Control

Procedures

In this experiment we examine the control aspect of dividend versus capital gain recognition. H2 predicts that individuals are more pleased when they are in *control* of income recognition, and thus, the resultant tax bill. We again use a carnival setting to test H2 but now we employ a Balloon Game. Each round, participants win the number of tokens behind a popped balloon. We manipulate whether participants are in control of which balloon is popped (*Control*) and whether they pay fees on the winnings (*Fees*). We include the fee manipulation to assess the incremental effect of fees and to determine whether being in control versus not being in control

[21] It is not that surprising that overall they were not irritated with the fees because for both wheels, fees are less than winnings. Thus participants net a positive number of tokens regardless of their starting wheel or their chosen wheel.

of the fee-generating income recognition influences perceptions. After being informed of the rules, participants must correctly respond to a quiz ensuring they understand how the game works to continue in the study. There are five rounds of balloon popping, after which participants evaluate the Balloon Game and respond to other PEQs.

In the real world, investors exert control over capital gain recognition by deciding *when* to sell stock, while investors do not have control over recognizing dividends because they are paid at the discretion of the firm. We operationalize the concept of control slightly differently in the Balloon Experiment so that we can hold everything else equal (i.e., amount of income and fees, timing of income, etc.). Thus, rather than having control (or not) of *whether* to pop a ballon (i.e., recognize income), participants have control (or not) of *which* balloon is popped (i.e., how much income is recognized).

To implement the control manipulation, we first run the InControl conditions, where the participants are in control of which balloon is popped. These participants are shown nine different colored ballons and then choose a balloon to pop. Participants win the number of tokens behind each balloon they pop, which ranges from 0 – 1,000. The carnival lasts for five rounds and each round the number of tokens behind each of the different balloons is randomized. Therefore, while participants do have some control, in that they can choose the balloon to pop, they do not have control over exactly how much income is recognized.[22] In the NoControl conditions, participants are paired with a participant from the InControl conditions. The participants in the NoControl condition are told they have been paired with another player and each round the other player chooses which balloon to pop and that will determine the number of tokens they win. We use the results of the InControl conditions to determine the balloon choices

[22] Similarly, when investing in appreciated stocks, the market determines the amount of gain associated with an investment, while the investor merely controls if and when they realize the gain.

in the NoControl conditions, both so that we can truthfully inform participants they have no control and so participants win, on average, the same number of tokens at the end of the game. In the FeesPresent (FeesAbsent) conditions, there is a 20 percent fee (no fee) on winnings, and the winnings in the FeesPresent condition are grossed up pre-tax, so after tax the winnings are equivalent between conditions. The dependent variable is collected after the carnival has ended and is a measure of how pleased/aggravated participants felt while playing the Balloon Game (see Appendix 1).

Results

Results for Experiment 2 are presented in Table 3. The primary dependent variable is *Positive Feelings*, which is the mean of four items (Cronbach's alpha = 0.951) assessing how pleased/happy participants felt while playing the Balloon Game.[23] The means by condition are reported in Table 3, Panel A, and the ANOVA results are reported in Table 3, Panel B. The results show that, as expected, participants are more pleased when they are in control ($F_{1,434}$ = 8.33, p = 0.004), and are less pleased when they must pay fees ($F_{1,434}$ = 5.46, p = 0.002). However, the interaction between *Control* and *Fees* is not significant ($F_{1,434}$ = 0.00, p = 0.962). Thus, while participants are more pleased when they are in control, the fees are not more aggravating when they are not in control compared to when they are in control.

Experiment 3 – Display Preferences

[23] As noted in Appendix 1, we also collected items related to negative feelings such as aggravation and irritation. However, overall, participants disagreed with these statements (overall mean [s.d] of 2.02 [1.27]), suggesting that regardless of condition, they enjoyed playing the Balloon Game. In addition, while the means are visually as expected (i.e., those in control are less aggravated than those that are not in control and those who pay fees are more aggravated than those who do not pay fees), none of the means are significantly different between conditions. Therefore we have not tabulated the results for *Negative Feelings.* Further, in addition to collecting the measures of feelings, we also collected an overall measure using a *Pain Face* scale (see Appendix 1), the results for *Pain Face* (untabulated) are similar to the *Positive Feelings* results. Specifically, participants in control of the ballon popping responded more positively to the *Pain Face* scale than those who did not have control (mean 5.76 versus 5.44, $F_{1,434}$ = 9.19, p = 0.003).

Procedures

Experiment 3 is designed to test H3, which predicts an information display effect where appreciated stock appears to be more profitable than dividend stock because the appreciated stock has more unrealized gains. Experiment 3, like Experiment 1, uses two Lucky Wheels. The two Lucky Wheels are displayed side-by-side, much like investments within the same brokerage account. In this experiment, the two Lucky Wheels differ in how they display participants' winnings. The Capital Gain Wheel displays the base tokens from the start of the carnival and shows the winnings cumulatively, like appreciated stocks. The Dividend Wheel updates the base tokens each round and thus displays winnings only for the most recent round, like dividend stocks (see the example in Appendix 2). We randomize which wheel is the Dividend Wheel and which is the Capital Gain Wheel (i.e., 50 percent of the time the East Wheel is the Dividend Wheel and 50 percent of the time the West Wheel is the Dividend Wheel). At the beginning of the experiment, participants are explicitly informed of this difference. There are no fees collected in this experiment because the only purpose is to compare the two different ways returns can be displayed.

Participants spin the wheels five times. The cumulative return of the wheels for the five spins is identical. After the fifth spin, participants are given a "Golden Token" that is worth 1,000 regular tokens. However, the Golden Token must be played on a single wheel, so participants add the Golden Token to only one of the two wheels. This choice reveals their wheel, and display, preference. Again, at the end of the experiment, participants are asked questions about their perceptions of the wheels. Like Experiment 1, participants are informed that their pay is determined based on the tokens they have when the carnival ends.

Results

Results for Experiment 3 are displayed in Table 4. Table 4, Panel A displays the percentage of participants who chose to play their Golden Token on the Capital Gain Wheel versus the Dividend Wheel. We first confirm that participants' choices are unaffected by the placement of the Dividend versus Capital Gain Wheel. Untabulated results indicate that 59.2% (66.0%) of participants chose the Capital Gain Wheel when it was the West (East) Wheel, which is not significantly different ($z = 0.702$, $p = 0.483$). Thus, we test H3 with a one-sample proportion test, which shows that significantly more participants chose to play their Golden Token on the Capital Gain Wheel (62.6%) than the Dividend Wheel (37.4%) ($z = 2.513$, $p = 0.006$, one-tailed), consistent with the prediction in H3.[24]

Table 4, Panel B reports the results of several PEQs. These items are asked after participants play their Golden Token, but before they spin the wheel to reveal their winnings. Regardless of their chosen wheel, participants are equally likely to think the wheel was enjoyable and easy to spin. However, those who chose the Capital Gain Wheel versus the Dividend Wheel are more likely to agree that the "display about winnings was easy to understand" (means of 5.48 vs. 4.76, $t_{97} = 2.21$, $p = 0.030$) and marginally more likely to disagree that they were "confused by the presentation of the winnings on the Lucky Wheels" (means of 3.05 vs. 3.65, $t_{97} = 1.66$, $p = 0.101$). These results suggest that despite the wheels having identical returns, those who chose the Capital Gain Wheel versus the Dividend Wheel appear somewhat more confident in their

[24] As shown in Table 1, Panel B, Experiment 3 was the only experiment with a relatively high manipulation check failure rate (27 percent compared to the next highest for Experiment 1, which was only 4 percent). The manipulation check question for Experiment 3 asked participants, "What was the difference between the wheels?" The possible responses are: the wheels were different colors, the wheels had different possible payouts, the wheels displayed the winnings differently (correct answer), nothing the wheels were identical, and unknown. Twenty-seven of the 99 participants chose some answer other than the correct one. Thus, we also confirm in untabulated analyses that the results still hold when we exclude participants who missed the manipulation check question. Of the 72 participants who correctly responded to the manipulation check, 59.7 percent (41.3 percent) chose the Capital Gain (Dividend) Wheel, which is significantly different ($z = 1.65$, $p = 0.050$, one-tailed).

understanding of the Wheels' displays.[25]

Experiment 4 – All Factors Combined

Experiments 1 – 3 provide support for each of the hypotheses in an abstract setting. However, of primary interest is whether investors will show a preference for appreciated stock investments due to these tax timing differences we identified. Thus, our penultimate experiment, Experiment 4, is conducted in a more realistic investment setting where all the tax timing differences we identified exist simultaneously.

Procedures

Experiment 4 is an investment simulation that is much closer to what investors do in the real world. In all conditions, the setting is a "simulation" where in each of four periods participants receive "earnings" in experimental currency (EC) by completing a slider bar task and then can choose to invest their earnings in one or both of two investments. They can also leave their earnings in the "bank" however the bank does not pay interest. Participants are informed that at the end of the simulation, all investments will be sold, and their EC will be converted to U.S. dollars and paid to them through Connect. Thus, the more EC they have, the more they will get paid. Expected pay was in the range of $2.50 and $6.50 and on average participants received $6.48.

In all conditions, participants are initially endowed with 1,000 shares in each of two companies. The background information of the two companies, referred to as Company A and

[25] In addition to Experiment 3, we also conducted a similar untabulated experiment that was identical to Experiment 3 except: 1) the Dividend Wheel always has better returns than the Capital Gain Wheel; and 2) we added a condition where the two wheels have the same display type, the Dividend Wheel display, but one wheel has better returns than the other. In the condition where the display type of the two wheels is identical, 88 percent of participants chose the wheel with better returns. However, in the condition where the display types are different, only 61 percent of participants chose the wheel with the better returns (i.e., the Dividend Wheel). This difference is significant (X^2 = 19.19 [$p < 0.001$]), suggesting that participants ability to identify the wheel with the better returns was impeded by the display differences.

Company B, is presented to participants, and as shown in Appendix 3 is virtually identical (i.e., the companies are in the same industry, operate in the same countries, "are well-established, but are also growing at a good pace," have financial performance that has kept pace with "the stock market" for the last 20 years, and predicted annual returns of between 7 and 9 percent, etc.). Importantly, the one difference between the two companies is that one provides all returns via stock price increases and has never paid dividends, while the other company provides returns via dividend payments and has not experienced any changes in its stock price. We randomize whether the Capital Gain (Dividend) Company is Company A (B).[26] To keep the returns of the two companies the same, all dividends are automatically reinvested in the stock that paid the dividend. Participants in the Tax condition are also told that "like the outside world" all increases in wealth are taxed. The tax rate in the experiment is 20 percent and participants are told "when you are taxed differs depending on the type of earnings." Earnings from the slider bar task are taxed in the period earned, returns from dividends are taxed in the period they are received, and returns from stock price growth are taxed when the stock is sold. Participants must pass a quiz indicating they understand how the simulation works to be included in the results.

There are four periods in the simulation, although participants are not informed of this in advance. Each period, participants first complete a slider bar task to earn EC by correctly placing the slider bar at the number provided. Participants can successfully complete up to five bars each

[26] To avoid being too obvious, we did differ their initial stock price, where Company A's (Company B's) stock price was 11.23 (11.47). In addition, each company is a "Top Pick" of "3 out of 10 of our favorite analysts." The average analyst rating is 8.82 (Strong Buy) for one company and 8.87 (Strong Buy) for the other company. While we intended to randomize all company information between participants, due to a coding error, participants were always told that the Dividend Company was rated 8.87 and the Capital Gain Company was rated 8.82. This error was consistent for both the Tax and No Tax conditions. Thus, even if it biases towards the dividend company, it does not explain any difference in investment between our conditions. All other company information was randomized as intended. Finally, during the experiment, participants are provided a link that allows them to review the company information whenever they are making investing decisions.

period with after-tax earnings per correct bar varying in the range of 767 – 797 EC.[27] After completing the slider bar task participants are notified of their slider bar earnings for the period. Next, participants see a screen displaying Company A and Company B's percentage return for the period and a reminder of whether the return is in the form of dividends or stock price increases. The next screen displays the participant's Investor Statement, which is designed as a simplified version of a real-world investor statement. See Appendix 3 for an example of the investment earnings announcement after Period 1 and a Period 1 Investor Statement.[28]

The Investor Statement shows the investment activity for the round in EC, including dividends received, stock price growth, dividend reinvestment, and any additional investments made by the participant. The Investor Statement also includes each investment's beginning value, ending share value, ending share quantity, ending investment value, cost, and an unrealized gain column. At the end of Period 4, participants are required to sell their investments, pay any taxes owed, depending on condition, and then their total EC is converted to a cash amount, although participants are not informed of the cash amount until after they respond to PEQs, including evaluating the performance of both Company A and Company B.

Independent Variable

Our primary manipulation of interest is *Tax,* whether the investing returns are or are not subject to tax (TaxesPresent/NoTaxes). We include a NoTaxes condition, to provide a basis for comparison for how tax timing differences between dividends and capital gains affect investor

[27] More than 90 percent of participants completed all five slider bars correctly each period.
[28] The total return of both investments is held constant. However, the returns are not identical each period. We randomly selected seven return values between 8.5% to 9.5% (the 8th return was calculated to ensure identical returns throughout the experiment between the companies). We then assigned these returns to the companies such that, in all conditions, Company A has slightly higher returns in Periods 1 and 4 and Company B has slightly higher returns in Periods 2 and 3. Since we randomize whether Company A or B is the dividend paying company, this allows us to control for any unexpected preferences for a specific return pattern or preference for the company on the right- or left-hand side of the screen, etc.

preferences. Our prediction is that the tax timing differences we describe will favor capital gain over dividend taxation. However, prior research indicates that in some circumstances, unrelated to taxes, investors prefer dividend paying stocks (e.g., Bhattacharya 1979; Hartzmark and Solomon 2019). Thus, to isolate the effect of tax timing differences, our main tests compare the investing preferences of those in the TaxesPresent to the NoTaxes condition. In the TaxesPresent condition, as described previously, dividends are taxed each period and stock price increases are taxed when the stock is sold. Further, when dividends are paid, taxed, and then reinvested, the cost basis of the investment is updated. In the NoTaxes condition, there is no mention of taxes. When determining the earnings from the slider bar task, we ensure after-tax equivalency between the TaxesPresent and NoTaxes conditions.

The cost and gain columns of the Investor Statement are calculated differently for the two different *Tax* conditions. For the TaxesPresent condition, we mimic the presentation of cost basis in the real-world by computing cost as the sum of initial cost, which is the amount originally endowed, plus dividend reinvestment (if any), and each period's purchase of that particular investment. Unrealized gain is the difference between the cost basis and ending value of that investment. This column represents the amount of gain that will be taxed upon sale.[29] In the NoTaxes condition, dividend reinvestment is not included in the cost basis calculation. In this condition, instead of an unrealized gain column, because unrealized gain is a tax concept, participants are shown "Total Investment Gain," which is the difference between the ending

[29] Participants are not permitted to sell their investments until they are forced to at end of the simulation. This design choice is implemented to avoid documenting the well-known lock-in effect (i.e., participants avoid selling investments that trigger additional tax payments). We acknowledge this design choice limits one element of control. However, participants know that they will sell the stock at the end of the simulation so they can anticipate the capital gain on the appreciated stock, as well as the tax on the gain in the TaxesPresent condition.

investment value and the cost column. An example of both the TaxesPresent and NoTaxes Investor Statements are shown in Appendix 3.

Each period, after being shown their Investor Statement, participants in the TaxesPresent condition pay tax on any slider bar earnings and any dividends received. To do this, participants are reminded of their slider bar earnings and dividends and then are required to enter their slider bar earnings and dividends into a "report," then a 20 percent tax owed is calculated and taken from their EC balance. For obvious reasons, those in the NoTaxes condition do not make a tax payment. To keep things consistent between conditions, they are reminded of their slider bar earnings and dividends and are required to enter their slider bar earnings and dividends for the period in a "report." The tax reporting screen is also displayed in Appendix 3. The reporting screen for those in the NoTaxes condition is similar, but we remove all references to tax.

Dependent Variable

After any tax is subtracted from the EC in the bank, participants decide how much of their remaining EC to invest in Company A and/or Company B. On this screen, also displayed in Appendix 3, participants are reminded of the current value, cost, and gain (i.e., the same as in the Investor Statement) of each investment. This is equivalent to the information provided to investors when they log into their brokerage account to make additional investments. Participants can also access the full Investor Statement if they choose. We use this information to reveal their preference for Company A and/or Company B and to determine the dependent variable, *DividendPercent*. *DividendPercent* is computed as the total amount (over 4 periods) invested in the dividend company divided by the total amount (over 4 periods) invested in both companies.[30]

[30] Although participants are told that EC in the bank does not earn interest, on average participants retained around 24% of their earnings in the bank each period. There are no statistically significant (untabulated) differences in the amount of EC retained amongst the rounds or between conditions.

Results

The results for Experiment 4 are displayed in Table 5. Of the 202 participants who completed the experiment we exclude six who failed the comprehension quiz three times and one additional participant who incorrectly responded to the attention check item. Therefore, the results are based on the 195 participants who demonstrated an understanding of the simulation environment and paid attention. As shown in Table 5, Panel A, there is a significant difference for *DividendPercent*, the percentage of participants' cumulative investment in the dividend paying stock, between conditions. In the NoTaxes condition participants invested 55.58 percent in the dividend paying stock, while in the TaxesPresent condition, they invested 43.43 percent in the dividend paying stock, which based on a simple t-test, is significantly different ($t_{193} = 3.867$, $p < 0.001$).

In addition, since we randomize whether Company A or Company B is the dividend paying stock, in Table 5, Panel B we present descriptive statistics for *DividendPercent* by *Tax* condition and by *DividendCompany.* Table 5, Panel C reports ANOVA results. The ANOVA results show that *Tax* is significant ($F_{1,191} = 14.895$, $p < 0.001$) consistent with the results in Table 5, Panel A. In addition, *DividendCompany* is not significant by conventional standards ($F_{1,191} = 2.679$, $p = 0.103$), and the interaction is not significant ($F_{1,191} = 0.836$, $p = 0.362$).[31] In addition, the results of this simulation experiment show that absent taxes, participants exhibit a preference for dividend paying stock, allocating significantly more than 50 percent ($t_{96} = 2.902$, $p = 0.005$) of their total investment purchases to the dividend paying stock. In contrast, for

[31] In untabulated ANOVAs we confirm that the difference in *PercentDividend* between the NoTaxes and TaxesPresent condition holds for each period individually (smallest $F_{1,193} = 5.240$, largest $p = 0.023$, for Period 3) and regardless of whether Company A or Company B is the dividend paying stock (smallest $t_{94} = 2.015$, largest $p = 0.023$, one-tailed). In addition, if we exclude the 87 participants who indicate they have no experience evaluating financial statements, the difference between the TaxesPresent and NoTaxes condition is still significant ($F_{1,106} = 4.332$, $p = 0.040$, untabulated).

participants who were subject to taxes, and the tax timing tax differences we examine, this preference flips. When taxes are present, participants allocate significantly more than 50 percent ($t_{97} = 2.649$, $p = 0.009$) of their total investment purchase to the capital gain stock. Overall, the results of the four experiments show that the tax timing differences between dividends and capital gains lead to a preference for appreciated stocks.

IV. CONCLUSION

This study examines how tax timing differences between the two ways firms return value to shareholders, dividends and price appreciation, can inadvertently affect investor preferences. Dividends are taxed as the dividend payments are received and price appreciation is taxed when the investment is sold, as a capital gain. Relying on mental accounting, hedonic editing, and the availability heuristic, we conduct a series of abstract experiments designed to isolate three different effects of tax timing differences. Results are consistent with our hypotheses and suggest investors 1) prefer less frequent tax bills, 2) prefer to be in control of the timing of income recognition, and 3) misperceive the profitability of returns that are displayed cumulatively (i.e., like capital gains) versus one period at a time (i.e., like reinvested dividends). We then conduct a more realistic investment simulation experiment and show that when tax effects are not a consideration, participants invest more in dividend paying stocks. However, when we introduce the tax timing differences that exist in the US, *investor preferences reverses* and they invest more in appreciated stocks.

This study is not without limitations. First, we do not investigate the effect of tax timing differences on investors' selling preferences. Previous research has documented that the tax costs incurred at the time of sale may cause investors to shy away from selling appreciated stock compared to dividend paying stock (i.e., the lock-in effect; see Ayers et al. 2007). Future

research could examine how combining the lock-in effect with the tax timing differences documented in this study affects investor preferences. Second, it is possible that sophisticated investors are less influenced by the effects we observe. Third, we consider a simplified experimental world where investments do not lose value, and the capital gain tax setting is simplified. Finally, like all experiments, our results rely on the strength of our manipulations. It is possible that, the many other variables besides tax policy that influence investors may mute the effects we document.

Nonetheless, our study contributes to both theory and practice. First, we extend finance research that shows that by separating dividend returns and returns on stock appreciation, stock market indices do not reflect total market returns (Hartzmark and Solomon 2022). We show how tax timing differences related to dividend and stock appreciation returns also affect decisions at the investor level. Second, we contribute to literature by harnessing the benefit of experimental design to make causal inferences about differences in investor reactions to dividends and price appreciation with and without tax effects. Third, we contribute to practical concerns of both regulators and policy makers. Specifically, we show introducing tax timing differences shifts investor preferences away from investing in dividend paying firms to price appreciation firms. These results can inform policy makers of unintended consequences of tax policy. We also inform brokerage houses about a potential consequence of their reinvestment policies and portfolio display choices. Finally, we inform corporate dividend decision makers about another consequence to consider when deciding on firm dividend policy.

APPENDIX 1

Experiment 2 Dependent Variable

After participants finished playing the ballon game they responded to the following items.

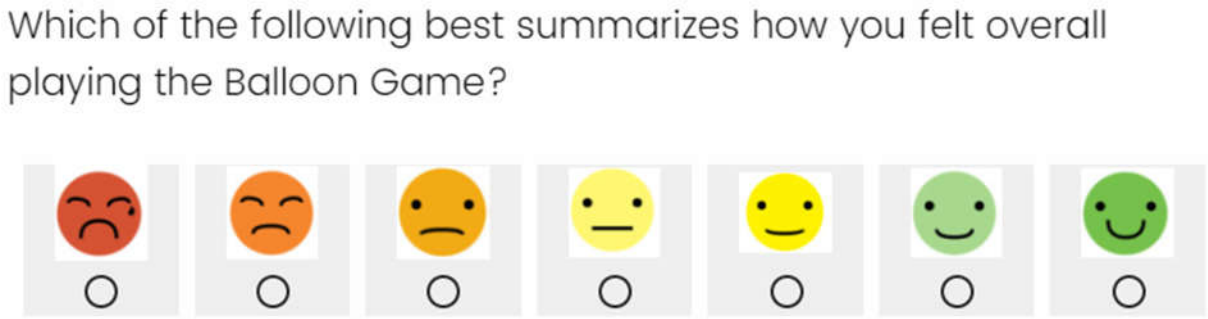
"Instructions: Please think back to how you felt playing the Balloon game when responding to the following items.

Please indicate your level of agreement about whether each statement below reflects something you felt while playing the Balloon Game." Response scale: 7-point likert where 1= strongly disagree and 7= strongly agree.

1. I felt pleased.
2. I felt content.
3. I felt satisfied.
4. I felt happy.
5. I felt aggravated.
6. I felt irritated.
7. I felt frustrated.
8. I felt discouraged.

Note: Factor analysis reveals two separate factors with the positive and negative items loading separately. Therefore, we created two scales, one with the positive items (1-4) with a cronbach's alpha of 0.951 (*Positive Feelings*) and one with the negative items (5-8) with a cronbach's alpha of 0.965 (*Negative Feelings*).

Participants also responded to the pain face scale:

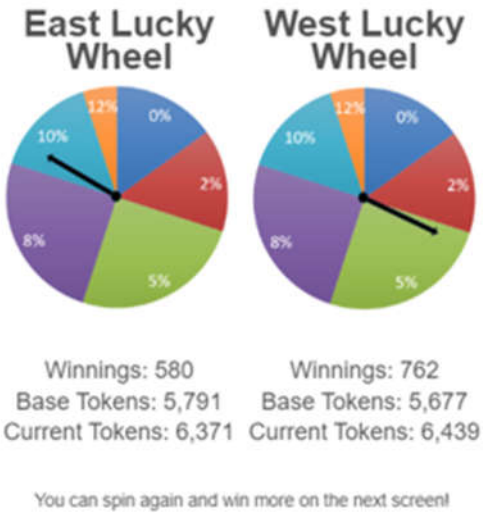


APPENDIX 2

Experiment 3 Lucky Wheel Display

Description provided to participants

Example of different display after Round 2.



Note: The East Lucky Wheel in this example is the Dividend Wheel. The Base Tokens amount updates for the prior spin's winnings and the winnings that are displayed are only for the current spin. The West Lucky Wheel is the Capital Gain Wheel. The Base Tokens stay the same throughout and the winnings that are displayed are the cumulative winnings. The Current Tokens is equal to the winnings plus the base tokens. We randomized which wheel was the Dividend Wheel and which was the Capital Gain Wheel. Further, the overall winnings for the two wheels at the end of the five rounds was the same.

APPENDIX 3

Experiment 4

Information provided to participants about the two companies they could invest in

Company A	Company B
Financial Performance: Stock price: Increases have kept pace with the average return on the stock market in each of the last 20 years. Dividends: None. Allows all returns to be made through stock price increases.	**Financial Performance**: Stock price: No significant changes; Chooses to return all profits via dividends. Dividends: The dividend payment rate has kept pace with the average return on the stock market every year for at least 20 years.
Analysts' Report: Predicted annual return: 7-9% Average Analyst Rating: 8.82 (Strong Buy) Top Pick: 3 out of 10 of our favorite analysts state this is their Top Pick for the next few periods.	**Analysts' Report**: Predicted annual return: 7-9% Average Analyst Rating: 8.87 (Strong Buy) Top Pick: This is the Top Pick for 3 of our 10 favorite analysts.

Note: We randomized whether Company A (B) was the dividend (capital gain) company.

Period 1 Investing Outcome Announcement

Bank Balance: 3,835 EC

Period 1 Investing Outcome

Company A had a Period 1 return of 9.25%, generated by dividends.

Company B had a Period 1 return of 9.01%, generated by stock price increases.

The Investor Statement on the next screen will show how these changes affected your investments.

Period 1 Investor Statement Example (No Tax Condition, before Investing Decision)

Period 1 Investor Statement

Investor Statement	
	Total Account Value: 24,772 EC
Overall Account Changes	
Beginning Balance	22,700 EC
Additional Purchases	0.00
Dividends Received	1,039
Changes from Stock Price	1,033
Ending Balance	24,772 EC

Balance Details

Investment	Beginning Value (in EC)	Ending Quantity	Ending Share Price (in EC)	Ending Value (in EC)	Cost (in EC)	Total Investment Gains (in EC)
Company A	11,230	1,092.50	11.23	12,269	11,230	1,039
Company B	11,470	1,000.00	12.50	12,503	11,470	1,033

Dividends & Activity

Investment	Description	Quantity	Price (in EC)	Amount (in EC)
Company A	Dividends Received and Reinvested	92.50	11.23	+ 1,039

The **Overall Account Changes** section shows a summary of what changed during the period.
Additional Purchases are the purchases you made at the end of the prior period using the EC you had in the bank.
Dividends Received are the dividends that were received and reinvested during the period.
Changes from stock price is the change in the value of your shares because of stock price changes.

The **Balance Details** section shows the detail of what you own including the value at the beginning and end of the period. It also details the total investment gains of each investment. The total investment gains is the difference between the ending value and your cost, which is what you invested in the stock (including your initial endowment and purchases you made with your earnings from your task).

The **Dividends & Activity** section details all dividends received and reinvested as well as information about any purchases and sales you made during the period.

Period 1 Investor Statement Example (Taxes Present Condition, before Investing Decision)

Period 1 Investor Statement

Investor Statement	
	Total Account Value: 24,772 EC
Overall Account Changes	
Beginning Balance	22,700 EC
Additional Purchases	0.00
Dividends Received	1,033
Changes from Stock Price	1,039
Ending Balance	24,772 EC

Balance Details

Investment	Beginning Value (in EC)	Ending Quantity	Ending Share Price (in EC)	Ending Value (in EC)	Cost (in EC)	Unrealized Gains (in EC)
Company A	11,230	1,000.00	12.26	12,269	11,230	1,039
Company B	11,470	1,090.09	11.47	12,503	12,503	0

Dividends & Activity

Investment	Description	Quantity	Price (in EC)	Amount (in EC)
Company B	Dividends Received and Reinvested	90.10	11.47	+ 1,033

The **Overall Account Changes** section shows a summary of what changed during the period.
Additional Purchases are the purchases you made at the end of the prior period using the EC you had in the bank.
Dividends Received are the dividends that were received and reinvested during the period. Since you have to pay taxes on the dividends, reinvesting dividends also increases your cost basis.
Changes from stock price is the change in the value of your shares because of stock price changes.

The **Balance Details** section shows the detail of what you own including the value at the beginning and end of the period. It also details the cost basis and unrealized gains of each investment. The unrealized gains are the amount of gain that would be taxed if you sold all the shares right now.

The **Dividends & Activity** section details all dividends received and reinvested as well as information about any purchases and sales you made during the period.

Period 1 Tax Reporting Screen (Taxes Present Condition)

Period 1 Tax Report

It is time to prepare your tax report. As a reminder, all earnings are taxed at 20%. To aid in your report, we have gathered copies of all relevant information below. Please report all your income.

Please enter the amount of your earnings from Period 1 so that the tax you owe can be calculated.

Slider bar earnings

Dividends

Earnings Statement	
Slide Bars Completed	**Earnings (in EC)**
5	4,785

Investor Dividend Statement	
Investment	Dividends Received (in EC)
Company B	1,033

Note: Participants in the No Taxes condition saw a similar screen, however instead of referring to taxes it merely stated "It is time to prepare a report. To aid in your report, we have gathered copies of all relevant information below. Please report all your income." Then participants entered the information in the same boxes as in the Taxes Present condition. We include this step in the No Taxes condition to keep the two conditions as similar as possible and the salience of the income similar.

Investment Decision Screen (No Tax Condition)

Period 1 Purchase

Current Investment Balance Snapshot			
Investment	Current Value	Cost	Total Investment Gains
Company A	12,269	11,230	1,039
Company B	12,503	11,470	1,033

How much of your available 3,835 would you like to invest in Company A and/or Company B?

Company A
Company B

If you do not want to invest any of your EC please enter "0" in both boxes.

To review the information you received earlier about each firm's outlook, please click here.

If you would like to review your previous Investor Statement, please click here.

Investment Decision Screen (Taxes Present Condition)

Period 1 Purchase

Current Investment Balance Snapshot			
Investment	Current Value	Cost	Unrealized Gains
Company A	12,269	11,230	1,039
Company B	12,503	12,503	0

How much of your available 3,621 would you like to invest in Company A and/or Company B?

Company A
Company B

If you do not want to invest any of your EC please enter "0" in both boxes.

To review the information you received earlier about each firm's outlook, please click here.

If you would like to review your previous Investor Statement, please click here.

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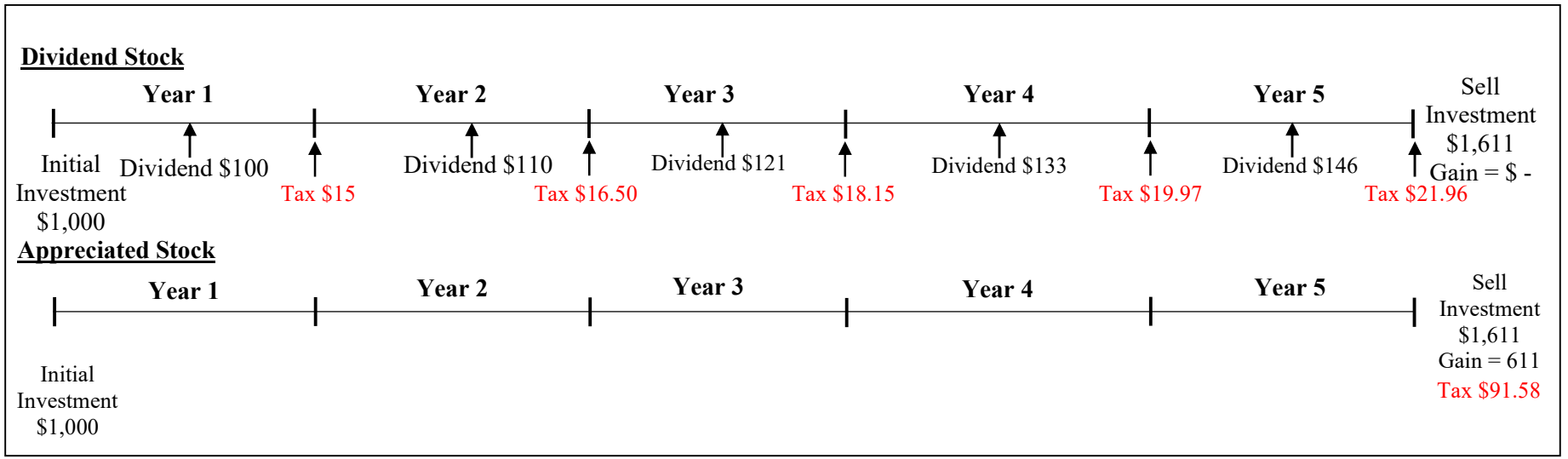
Exhibit 1. Timeline of Transactions: Illustrating the difference in the frequency of tax between two investment types.



In this Exhibit we illustrate the difference in presentation of two identical stocks held for 5 years. The only difference in these stocks is how they provide a 10 percent annual return. Appreciated stock provides return through stock appreciation. Dividend Stock provides returns through the payment of dividends, which are subsequently reinvested in the Dividend Stock.[32] We assume a 15 percent tax rate.

[32] In this illustration, it is important that the dividend is reinvested to maintain portfolio value equivalency with the Appreciated Stock. However, if the dividend were not reinvested, the Dividend Stock's value would be less than the Appreciated Stock and the unrealized gain would still be zero, perhaps exacerbating the biasing effect of paying dividends versus not paying dividends.

Exhibit 2. Illustration of display differences each year.

Year 0 Initial Investment					
	Price	**Quantity**	**Current Value**	**Cost**	**Gain**
Dividend Stock	$1.00	1,000	$1,000	$1,000	$ -
Appreciated Stock	$1.00	1,000	$1,000	$1,000	$ -

Year 1					
	Price	**Quantity**	**Current Value**	**Cost**	**Gain**
Dividend Stock	$1.00	1,100	$1,100	$1,100	$ -
Appreciated Stock	$1.10	1,000	$1,100	$1,000	$100

Year 2					
	Price	**Quantity**	**Current Value**	**Cost**	**Gain**
Dividend Stock	$1.00	1,210	$1,210	$1,210	$ -
Appreciated Stock	$1.21	1,000	$1,210	$1,000	$ 210

Year 3					
	Price	**Quantity**	**Current Value**	**Cost**	**Gain**
Dividend Stock	$1.00	1,331	$1,331	$1,331	$ -
Appreciated Stock	$1.33	1,000	$1,331	$1,000	$ 331

Year 4					
	Price	**Quantity**	**Current Value**	**Cost**	**Gain**
Dividend Stock	$1.00	1,464	$1,464	$1,464	$ -
Appreciated Stock	$1.46	1,000	$1,464	$1,000	$ 464

Year 5					
	Price	**Quantity**	**Current Value**	**Cost**	**Gain**
Dividend Stock	$1.00	1,611	$1,611	$1,611	$ -
Appreciated Stock	$1.61	1,000	$1,611	$1,000	$ 611

This table illustrates the display effect. In this exhibit, multiple years of information is are laid out at once, but investors would only see one of these screens at any given time. The dividends received from the Dividend Stock are reinvested in additional shares, this increases both the Cost and Current Value of the Dividend Stock investment. Because the Cost and Current Value of the Dividend Stock are the same, the displayed Gain is zero, making it appear as if it it is not providing any return. The Appreciated Stock allows returns to come from price appreciation, which increases Current Value, but as no additional stock is purchased, Cost is unchanged. Thus, Appreciated Stock displays its gain cumulatively over the life of the investment.

TABLE 1
Sample Demographics

Panel A: Sample demographics

	Exp. 1 N=397	**Exp. 2** N=438	**Exp. 3** N=99	**Exp. 4** N=195
Gender				
Male	51.1%	50.9%	48.5%	49.2%
Female	48.9%	49.1%	51.5%	50.8%
Age				
Range (in years)	18-80	18-78	18-73	18-80
Mean (sd)	38.41 (12.71)	38.68 (12.13)	38.60 (12.86)	36.98 (11.59)
Education				
High school	11.8%	11.9%	21.2%	17.9%
Some college courses	20.4%	19.9%	19.2%	17.9%
Associate Degree	10.3%	9.1%	9.1%	8.2%
College Degree	40.8%	44.1%	33.3%	44.1%
Master's Degree	12.3%	11.0%	10.1%	10.3%
Doctorate Degree	4.3%	4.1%	7.1%	1.5%
Work Experience				
Range (in years)	0-60	0-54	0-55	0-53
Mean (sd)	16.95 (12.44)	17.10 (11.46)	17.24 (13.35)	15.72 (11.70)
Tax Filing Experience				
Range (in years)	0-60	0-50	0-50	0-45
Mean (sd)	15.56 (12.42)	12.59 (10.75)	12.97 (12.37)	10.37 (10.44)
Household Income				
Less than $30,000	16.4%	15.1%	20.2%	13.8%
$30,000-$49,999	17.9%	19.7%	14.1%	15.4%
$50,000-$69,999	19.6%	18.1%	22.2%	19.5%
$70,000-$99,999	22.7%	19.4%	17.2%	24.5%
$100,000 - $149,999	13.6%	16.7%	17.2%	15.9%
$150,000 or more	9.8%	11.0%	9.1%	8.2%
Prefer not to respond	-			2.6%
Marital Status				
Single	43.3%	38.8%	46.5%	44.1%
Married	36.3%	42.7%	33.3%	32.3%
Living with partner	9.3%	10.3%	9.1%	11.8%
Divorced	9.8%	7.5%	9.1%	10.3%
Widow/Widower	1.3%	0.7%	2.0%	1.5%

This panel displays demographic information for participants in all four experiments. N represents the number of participants included in analyses for each experiment.

Panel B: Other Information

	Exp. 1 N=397	**Exp. 2** N=438	**Exp. 3** N=99	**Exp. 4** N=195
Attn Check Failure N (%)	5 (1%)	5(1%)	4(4%)	1 (<1%)
Man. Check Failure N (%)	19 (4%)	8 (2%)	27 (27%)	6 (3%)
Mean Pay	$2.49	$2.27	$1.99	$6.48
Mean (Median) completion minutes	12.6 (10.8)	8.3 (6.6)	10.5 (8.0)	27 (19)

This panel displays other information about the experiment. Attn Check Failure represents the number (%) of participants who missed a simple attention check (e.g., "choose disagree for this item"); these participants ae excluded from the analyses. Man. Check Failure represents the number (%) of participants who failed at least one of the manipulation or comprehension items. Except for Experiment 4, these participants are included in the reported analyses. We exclude participants in Experiment 4 who failed the comprehension quiz three times. Mean payment and mean (median) time to complete the experiments is also reported

TABLE 2
Experiment 1 Results

Panel A: Wheel Choice (all participants who passed attention check)

	Wheel Chosen (N=397)	
	Capital Gain Wheel	**Dividend Wheel**
Percentage	54.2% (N=215)	46.8% (N=182)
One-sample proportion test Z-score (one-tailed p-value)	z score = 1.656 (p = 0.046)	

This panel displays the percentage of participants who chose to either stay on the Capital Gain Wheel (Dividend Wheel) or switch to the Capital Gain Wheel (Dividend Wheel). The Capital Gain Wheel (Dividend Wheel) is the wheel where fees are paid at the end (every round). Participants' choices are not dependent on which wheel they started on (Chi-Square = 0.127, p = 0.721).

Panel B: Wheel Choice (dropping those who said they chose randomly)

	Wheel Chosen (N=357)	
	Capital Gain Wheel	**Dividend Wheel**
Percentage	55.7% (N=199)	44.3% (N=158)
One-sample proportion test Z-score (one-tailed p-value)	z score = 2.170 (p = 0.015)	

This panel displays the percentage of participants who chose to either stay on the Capital Gain Wheel (Dividend Wheel) or switch to the Capital Gain Wheel (Dividend Wheel). However, we dropped the 40 participants who agreed (responses of 5, 6, or 7) that they chose randomly. Participants' choices are not dependent on which wheel they started on (Chi-Square = 0.273, p = 0.601).

Panel C: PEQs about starting wheel

	Starting Wheel		
	Capital Gain Wheel (N=197)	**Dividend Wheel** (N=199)	**t-stat** (p-value)
I was irritated about paying fees.	3.14 (1.68)	3.51 (1.88)	**2.04 (p=0.042)**
I did not mind paying fees.	4.70 (1.66)	4.47 (1.66)	1.31 (p=0.190)

Cell entries represent means (standard deviation). Responses are on a 7-point disagree/agree scale with higher values indicating greater agreement with statement. The instructions stated: "The following statements are about the first wheel you were spinning, which was [fee at end wheel/fee every round wheel]. Indicate your level of agreement/disagreement which each statement." The last column presents test statistics comparing the means for each item between the participants who started on each of the wheels. All reported *p* values are two-tailed unless stated otherwise.

TABLE 2 (continued)

Panel D: PEQs about chosen wheel

	Chosen Wheel		
	Capital Gain Wheel (N=215)	**Dividend Wheel** (N=182)	**t-stat** (p-value)
Curious about other wheel.	4.41 (1.81)	4.36 (1.90)	0.305 (p=0.761)
Chose randomly.	2.16 (1.31)	2.38 (1.58)	1.49 (p=0.136)
Chose wheel that would give most tokens.	4.49 (1.74)	4.01 (1.72)	**2.76 (p=0.006)**
My chosen wheel more enjoyable.	5.20 (1.31)	4.47 (1.51)	**5.10 (p<0.001)**
I liked how fees were paid on my chosen wheel.	5.59 (1.25)	5.42 (1.27)	1.33 (p=0.185)

Cell entries represent means (standard deviation). Responses are on a 7-point disagree/agree scale with higher values indicating greater agreement with statement. The instructions stated: "During the carnival, you were given a choice between both wheels and chose to [stay on/switch to fee at end wheel/fee every round wheel]. Please indicate your agreement with the following statements to explain why you chose the wheel where [fees are at the end/fees are every round]." Further, if they did not switch wheels, the first item was worded as "I was not curious about the other wheel" and is reverse-coded for purposes of this analysis. The last column presents test statistics comparing the means for each item between the participants who chose each of the two wheels.

Panel E: PEQs for those who experienced both wheels (switchers N = 195)

	Mean (sd)	**t-stat** (p-value)
Which Lucky Wheel was more enjoyable?	5.06 (1.72)	**8.59 (p<0.001)**
Which Lucky Wheel fee payment did you prefer?	4.91 (2.06)	**6.20 (p<0.001)**
Which Lucky Wheel was the most profitable?	4.35 (1.39)	**3.51 (p=0.001)**

Cell entries represent means (standard deviation). Responses are on a 7-point scale anchored with: 1 = "definitely the fee every spin wheel" (Dividend Wheel) and 7 = "definitely the fee at the end wheel." (Capital Gain Wheel). Thus, means greater (less than) 4 represents a preference for the Capital Gain (Dividend) Wheel. The last column presents test statistics comparing the means for each item to the scale mid-point of 4 (labeled "neutral").

TABLE 3
Experiment 2 Results

Panel A: Mean (s.d.) for *Positive Feelings* by Condition

	InControl	NoControl	Total
FeesAbsent	5.70 (1.09) N=107	5.40 (1.20) N=109	5.55 (1.16) N=216
FeesPresent	5.46 (0.98) N=112	5.15 (1.17) N=110	5.30 (1.08) N=222
Overall	5.57 (1.04) N=219	5.27 (1.19) N=219	5.43 (1.13) N=438

This panel presents the mean for *Positive Feelings* by condition. *Positive Feelings* is defined in Appendix 1 as the mean of four items collected on a 7-point likert scale with higher numbers indicating more positive feelings. InControl/NoControl refers to the conditions where participants chose their own balloons to pop or if the balloon choice was made by another participant. FeesAbsent/FeesPresent refers to the conditions where the carnival did not or did charge a 20% fee on winnings.

Panel B: ANOVA *Positive Feelings*

Source	DF	Mean Square	F-statistic	p-value
Control	1	10.317	8.334	< 0.004
Fees	1	6.763	5.463	0.020
Interaction	1	0.003	0.002	0.962
Error	434	1.238		

This panel reports an *ANOVA* for *Positive Feelings* the independent variables are *Control* and *Fees,* and their interaction.

TABLE 4
Experiment 3 Results

Panel A: Wheel Chosen

	Wheel Chosen (N=99)	
	Capital Gain Wheel	**Dividend Wheel**
Percentage	62.6%	37.4%
One-sample proportion test Z-score (one-tailed p-value)	z score = 2.513 (p = 0.006)	

This panel displays the percentage of participants who chose to play their "Golden Token" on each wheel. The Capital Gain wheel displayed winnings for all spins, while the Dividend Wheel displayed winnings for only the current spin. See Appendix 2.

Panel B: PEQs about chosen wheel

	Chosen Wheel		
	Capital Gain Wheel (N=62)	**Dividend Wheel** (N=37)	**t-stat** (p-value)
The display about winnings was easy to understand.	5.48 (1.50)	4.76 (1.72)	**2.21 (p=0.030)**
I was confused by the presentation of the winnings on the lucky wheels.	3.05 (1.62)	3.65 (1.93)	1.66 (p=0.101)
Spinning the wheel was enjoyable.	5.47 (1.35)	5.32 (1.47)	0.49 (p=0.623)
It was easy to spin the wheel.	6.37 (0.68)	6.08 (1.17)	1.58 (p=0.121)

Cell entries represent means (standard deviation). Responses are on a 7-point disagree/agree scale with higher values indicating greater agreement with statement. Participants responded to these statements, which were about both wheels, after they chose which wheel to play their Golden Token on, but before they "spun" the Wheel to see what their winnings were. The instructions stated: "Please indicate your agreement with the following statements." The last column presents test statistics comparing the means for each item between the participants who chose each of the two wheels.

TABLE 5
Experiment 4 Results

Panel A: Mean (sd) for *DividendPercent* by *Taxes* Condition

DividendPercent (N=195)	
NoTaxes Condition (N=97)	**TaxesPresent Condition** (N=98)
55.58% (18.93%)	43.43% (24.55%)
t statistic: 3.867 ($p < 0.001$)	

This panel displays the mean (sd) for *DividendPercent,* the percentage of participants' cumulative amount invested in the Dividend Company divided by the total amount invested in both companies, by condition. In the NoTaxes condition, taxes are not assessed on any income; in the TaxesPresent condition, participants are assessed a 20% tax on all income (slider bar income, dividends, and capital gains).

Panel B: Mean (sd) for *DividendPercent* by *Taxes* and *Company A/B*

	Company A is Dividend Stock	**Company B is Dividend Stock**	**Total**
NoTaxes	54.46% (19.28%) N=49	56.72% (18.69%) N=48	55.58% (18.93%) N=97
TaxesPresent	39.52% (23.08%) N=50	47.50% (25.60%) N=48	43.43% (24.55%) N=98
Total	46.91% (22.46%) N=99	52.11% (22.77%) N=96	49.47% (22.77%) N=195

This table displays the mean (sd) for *DividendPercent* by tax condition and by whether Company A or Company B is the dividend paying stock. In the NoTaxes condition, taxes are not assessed on any income; in the TaxesPresent condition, participants are assessed a 20% tax on all income (slider bar income, dividends, and capital gains).

Panel C: ANOVA *DividendPercent*

Source	DF	Mean Square	F-statistic	p-value
Taxes		0.711	14.895	< 0.000
DividendCompany	1	0.128	2.679	0.103
Interaction	1	0.040	0.836	0.362
Error	191	0.048		

This panel reports ANOVA results for *DividendPercent* the percentage of participants' cumulative amount invested in the Dividend Company divided by the total amount invested in both companies, with independent variables *Taxes* (No Taxes or Taxes Present) and *DividendCompany* (Company A or Company B), and their interaction. This ANOVA is to confirm that which company is the dividend paying stock does not affect the results.