The ETF Tax Advantage and Firm Payout Policy*

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Abstract

This study investigates the impact of the ETF tax advantage on firm payout policy. Compared to traditional mutual funds, ETFs have a unique ability to shield their investors from paying taxes on capital gains distributions, but this advantage does not extend to dividend payouts. Consequently, we hypothesize that ETFs discourage portfolio firms from paying dividends to provide higher after-tax returns for their investors and thereby gain market share. Consistent with our prediction, we find a robust negative relation between ETF ownership and dividend payouts. Cross-sectionally, we find the effect is stronger for ETFs with a greater capacity to mitigate investors' capital gains taxes via "heartbeat" trades and those with a greater incentive to cater to tax-sensitive institutional clients. Evidence from tests using plausibly exogenous variation in tax-advantaged ownership indicates the relation is causal. Moreover, we find that firms with high ETF ownership substitute repurchases for dividends as an alternative payout method that preserves' ETFs' tax advantage. Overall, our findings suggest that the unique tax structure of ETFs, combined with their increasing prevalence, meaningfully influences corporate policy.

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1. Introduction

In this study, we investigate the relation between exchange-traded fund (ETF) ownership and firm payout policy. One of the most important financial innovations in recent decades, ETFs have exhibited extraordinary growth in the marketplace. Between 2010 and 2023, total assets under management by U.S. ETFs grew from $992 billion to $8.1 trillion, and ETFs currently account for roughly 30% of U.S. equity trading volume (Investment Company Institute, 2021, 2024). One key factor contributing to the rise of ETFs is their unique ability to avoid distributing realized capital gains to investors and hence, significantly reduce or eliminate the resulting tax liabilities (Moussawi et al., 2022).[1] However, ETFs' ability to mitigate investors' taxes applies only to capital gains distributions and does not extend to dividends paid by portfolio firms, which are passed through as taxable income to investors (just as for traditional mutual funds). Consequently, ETF investors are economically better off when ETF portfolio firms refrain from paying dividends. We consider the implications of this arrangement for corporate payout policy. Our central hypothesis is that, as a result of the ETF tax advantage with respect to capital gains (but not for dividends), higher ETF ownership leads to reduced dividend payouts among portfolio firms.

In traditional mutual funds, there are two commonly occurring events that trigger capital gains realization for investors, leading in turn to tax liabilities. First, when an investor redeems shares, the fund typically must sell some of its holdings to obtain the cash necessary to satisfy the redemption. Such sales often generate realized capital gains, which are then distributed to the fund's non-redeeming investors resulting in a tax liability. Second, when a traditional fund rebalances its holdings, sales of appreciated securities generate realized capital gains that are

[1] Moussawi et al. (2022) find the tax efficiency of ETFs improves investors' after-tax returns by an average of 0.92% per year relative to traditional mutual funds, and that this tax efficiency has been a key factor driving the recent capital migration from mutual funds to ETFs.

distributed and taxed to the fund's investors. However, the unique structure of ETFs allows them to avoid triggering capital gains realizations in both instances. When an investor redeems shares in an ETF, the ETF performs an "in-kind" exchange of stock with an authorized participant in lieu of selling shares for cash, thereby avoiding the realization of capital gains.[2] Moreover, when rebalancing their holdings, some ETFs employ so-called "heartbeat" trades to maximize their ability to wash away capital gains distributions that would otherwise trigger tax liabilities for the fund's investors (Kashner, 2017; Moussawi et al., 2022).

Although ETFs offer investors a substantial tax advantage over traditional mutual funds with respect to capital gains distributions, they have no corresponding advantage with respect to dividend distributions. When a fund's portfolio firm pays dividends, traditional mutual funds and ETFs alike distribute the dividends out to their investors, resulting in a tax liability. Consequently, larger dividend payments by portfolio firms dilute the tax advantage of ETFs relative to other fund types, making them less attractive to investors. Based on recent work suggesting that passive investors can significantly influence corporate-level decisions (e.g., Appel et al., 2016; Brav et al., 2022), we conjecture that ETF managers discourage portfolio firms from paying large dividends. By doing so, ETFs can provide a higher after-tax return which can attract and retain high-net-worth and other tax-sensitive investors, and thus increase their assets under management.

To test our prediction that higher ETF ownership leads to reduced dividend payouts among portfolio firms, we first examine the association between ETF ownership and dividends over the period 2000-2022. Controlling for firm characteristics as well as industry and year fixed effects,

[2] Authorized participants are financial institutions with the authority to buy and sell ETF shares directly with the ETF (i.e., in the primary market rather than through the secondary market). Section 2.1 contains a more detailed discussion of the typical ETF structure.

we find a significantly negative relation between ETF ownership and total dividend payouts.[3] Economically, an interquartile increase in ETF ownership is associated with an 18.0% reduction in total dividends, relative to the sample mean. Moreover, the results are robust to controlling for time-varying industry shocks as well as firm fixed effects. The findings are consistent with higher ETF ownership leading portfolio firms to refrain from paying dividends.

To better understand the nature of the relation between ETF ownership and dividend payouts, we separately examine special dividends and regular dividends. Prior work suggests that regular dividends are recurring or "sticky" whereas special dividends are more sporadic and are viewed as more discretionary by the market (e.g., Hanlon and Hoopes, 2014). Indeed, although we find a significantly negative relation between ETF ownership and both special and regular dividends, we find that the magnitude of the effect is larger for special dividends. Economically, an interquartile increase in ETF ownership is associated with a 21.1% relative reduction in special dividends, and a 15.9% relative decline in regular dividends. The evidence suggests ETFs have a greater ability to influence firms' special dividends as compared to regular dividends, consistent with their discretionary nature.

Next, we conduct two cross-sectional analyses based on ETF characteristics. First, we exploit the heterogeneity in ETFs' *ability* to shield investors from capital gains taxes. Specifically, we consider the ability of individual ETFs to engage in "heartbeat" trades; a technique that allows funds to wash away even very large capital gains realizations (e.g., those generated from large-scale portfolio rebalancing). Executing heartbeat trades requires the assistance of market makers and authorized participants, and only some ETFs meet the qualifications to engage in such trades.[4]

[3] A small proportion of ETFs (approximately 2%) are designed to hold firms with high dividend yields (e.g., Vanguard High Dividend Yield ETF). We exclude these dividend-oriented ETFs from our main measure of ETF ownership as our central prediction does not apply for these funds.
[4] We discuss heartbeat trades in more detail in Section 2.1.

We classify ETFs as "heartbeat ETFs" if they exhibit a high intensity of heartbeat trades in recent years; otherwise they are classified as "non-heartbeat ETFs." Examining ownership by both groups, we find a robust negative relation between heartbeat ETF ownership and dividend payouts, but no relation between non-heartbeat ETF ownership and dividend payouts. The findings indicate that the ETFs that discourage portfolio firms from paying dividends are also the ones with the greatest ability to mitigate investors' capital gains taxes.

Second, we examine the heterogeneity in ETFs' *incentives* to shield investors from capital gains taxes based on their investor base. If ETFs' shareholders are tax-sensitive, they are more likely to prefer capital gains to dividends to avoid income tax, which will incentivize ETFs to engage in payout policies of the portfolio firms. We first identify tax-sensitive institutional investors (e.g., those with high-net-wealth individuals and hedge funds as clients) based on their Form ADV, following prior literature (Jin, 2006; Dambra et al., 2025). Then, we classify ETFs as "tax-sensitive" or "tax-insensitive" based on their relative holdings of shares by these tax-sensitive institutional investors. Our results suggest that the dividend payouts are both negatively related to tax-sensitive and tax-insensitive ETF ownership. However, the relation between tax-sensitive ETF ownership and dividends is more significant. Collectively, our findings are consistent with the idea that ETFs that discourage portfolio firms from paying dividends are also the ones with the highest abilities and incentives to mitigate investors' capital gains taxes.

Next, we investigate the possibility that firms that refrain from paying dividends in response to ETF ownership choose to repurchase stock as a substitutive form of payout to shareholders. Although share repurchases may trigger capital gains realizations, ETFs' unique tax structure enables them to "wash away" such gains without creating large tax liabilities for ETF investors. We test our conjecture in two steps. First, employing panel data analysis, we find a

positive relation between ETF ownership and share repurchases. Second, we perform a two-stage procedure to show that firms who cut dividends in response to ETF ownership (i.e., the first stage) simultaneously increase repurchases (i.e., the second stage), consistent with firms substituting one payout method for another. Moreover, we find that the magnitude of the increase in repurchases associated with higher ETF ownership is comparable to the reduction in total dividends associated with such ownership, further suggesting a substitution between the two forms of payout.

The tests up to this point establish a robust negative relation between ETF ownership and dividend payouts, but they do not necessarily indicate a causal link. For instance, the findings could be the result of ETFs choosing to invest in low-dividend paying stocks (i.e., reverse causality). Although ETFs typically track a specific index which limits their ability to select individual stocks (and thus somewhat allays reverse causality concerns), it is possible that ETFs tend to be constructed to track indices consisting of relatively low-dividend paying stocks. We aim to overcome this concern and provide causal evidence of the effect of ETF ownership on dividend payouts by exploiting changes in the Vanguard index funds' share class structure as a quasi-exogenous shock to ETF-*like* tax-advantaged ownership. While typical index funds cannot offer an ETF share class, Vanguard has filed a patent in 2001 that allows the issuance of ETF share class, which was approved in 2005 (Colon, 2023). This dual-class structure enables Vanguard index funds to enjoy the same tax benefit as ETFs. Therefore, when Vanguard issues ETF shares, the ownership by index funds effectively acts as an increase in ETF-*like* ownership, providing a plausibly exogenous increase in tax-advantaged investor base. Employing this setting, we find that increases in tax-advantaged ownership through Vanguard index funds' launch of ETF shares lead to significant reductions in special dividends paid by portfolio firms and increases in repurchases (although there is no significant impact on total dividends). As a supplemental analysis, we also

exploit quasi-exogenous increases in ETF ownership through changes in Russell 1000/2000 index assignments, following recent literature that circumvents the estimation bias problem (Ben-David et al. 2018; Appel et al. 2022). These results, presented in our Online Appendix, suggest that increases in ETF ownership leads to statistically significant reduction in special dividends, and increase in repurchases. Collectively, our findings suggest plausibly causal evidence that ETF ownership directly reduces dividend payouts by portfolio firms.

To shed light on a channel through which ETFs may influence corporate payout decisions, we investigate voting behavior by ETFs. Specifically, we explore whether ETFs discourage portfolio firms from paying dividends by examining funds' voting behavior following dividend payouts. Consistent with our conjecture, we find that ETFs are significantly more likely to oppose management when firms paid high dividends in the previous year, especially for compensation proposals. Taken together, these findings suggest that ETFs strongly prefer portfolio firms to refrain from paying dividends and that they voice their displeasure with large dividend payments by voting against management.

In our last set of tests, we explore two implications of our findings. First, we examine a potential regulatory implication at the firm level by studying how ETF ownership can affect firms' response to tax-related regulatory shifts. Specifically, we exploit a setting in which many firms paid out large special dividends in anticipation of an increase in individual-level dividend tax rates. Hanlon and Hoopes (2014) find a surge in special dividends in the final months of 2012 as firms sought to take advantage of the lower tax rates just before the tax hike set to take effect at the start of 2013. We conjecture that firms with substantial ETF ownership were less likely to make special dividend payments during this period as ETF investors are better off accruing capital gains, regardless of the dividend tax rate. Consistent with our prediction, we find that the spike in special

dividends in the final months of 2012 was significantly attenuated for firms with higher ETF ownership. Economically, an interquartile increase in ETF ownership offset 40.5% of the increase in firms' propensity to pay a special dividend during the final months of 2012. This suggests how firms can potentially respond to ETFs' preferences for capital gains over dividends when facing regulatory changes.

Second, we explore the implications of dividend payout policies at the fund level by studying fund flows into ETFs. We leverage the idea that the tax advantage of ETFs has been a key driver of capital inflows into ETFs, especially by tax-sensitive investors (Moussawi et al., 2022). Given that the tax efficiency cannot be achieved if the portfolio firms are paying dividends (as opposed to capital gains distributions), we examine whether investors are less likely to invest in ETFs with high dividend yields. Consistent with our prediction, we find that ETFs receive less fund inflows in the following three years if they pay more dividends. Economically, an interquartile increase in dividends issued by ETFs leads to 18.3% decrease in net future fund flows.

Our study makes three main contributions. First, we add to the emerging literature on the effects of exchange-traded products (Madhavan, 2016; Lettau and Madhavan, 2018); a topic on which the SEC has called for more research (Piwowar, 2017).[5] Prior work has primarily considered capital market effects of ETF ownership, including price discovery, liquidity, information transfer, and volatility (Israeli et al., 2017; Ben-David et al., 2017, 2018; Bhojraj et al., 2020; Glosten et al., 2021; Zou, 2025). To our knowledge, we are the first to study the effects of ETFs' unique tax features on corporate-level decisions (i.e., real effects). Specifically, we find that firms adjust corporate payout in response to ETF tax incentives. In addition to informing the SEC, our findings contribute to the ongoing policy debate over whether Congress should shut down ETFs' ability to

[5] In 2017, SEC commissioner Michael Piwowar stated that research on the effects of exchange traded products "is still a nascent field, and one in which we need more discussion and discovery."

shield investors from capital gains taxes.[6] Given the dramatic growth of ETFs in recent years, it is critical to understand the implications of pervasive ETF ownership for corporate behavior.

Second, we contribute to the literature investigating the relation between investor-level taxes and corporate payout policy. Researchers in accounting, finance, and economics have long investigated the question of whether investor-level taxes matter for corporate payout (e.g., Chetty and Saez, 2005; Blouin et al., 2011; Hanlon and Hoopes, 2014), and if so, whose taxes matter (e.g., Jacob and Michaely, 2017; Krupa and Utke, 2022). To answer such questions, one first needs to understand the heterogeneity in investors' tax preferences (e.g., Sikes, 2014). Although individual investors are considered tax-sensitive, institutional investors are typically classified as either tax-sensitive (e.g., investment advisers with high net-worth clientele) or tax-insensitive (e.g., tax-exempt pensions and endowments). We study a relatively new and increasingly important type of investor that does not fit neatly into the existing camps. Whereas ETFs are largely tax-insensitive to capital gains, they are fully tax-sensitive to the receipt of dividends. This dichotomy creates unique tax incentives, and we explore the impact of those incentives on corporate payout.

Our third contribution is to the literature on tax-efficient investing and investor fund flows. Prior work has found that mutual funds disclosing higher after-tax returns receive higher inflows, indicating that investors respond to after-tax returns (Bergstresser and Poterba, 2002). As a result, studies have found that active mutual funds held primarily by tax-sensitive investors choose investment strategies that result in lower tax burdens than funds held primarily by tax-insensitive investors (Sialm and Starks, 2012; Sialm and Zhang, 2020). We extend prior work by providing evidence of an alternative strategy to minimize investors' tax burdens: influencing portfolio firms'

[6] In September 2021, U.S. Senate Finance Committee Chairman Ron Wyden released a legislative proposal that would tax ETFs' use of in-kind transactions that currently allows ETFs to avoid triggering capital gains realizations. See the article "Democratic tax proposal takes aim at ETFs" *The Wall Street Journal* (September 16, 2021).

payout policies. To the extent ETFs can discourage portfolio firms from paying dividends, they can maximize their tax advantage over traditional mutual funds and attract increased fund flows.

2. Institutional Background and Hypothesis Development

2.1 The ETF tax advantage

Under the Investment Act of 1940, investment funds are required to pass through any capital gains realizations and dividends to their investors. Consequently, when traditional mutual funds incur capital gains realizations from sales of securities arising from rebalancing portfolios or meeting investor redemptions, such gains flow through to investors and result in a tax liability. The Tax Reform Act of 1969 created an opportunity for funds to avoid making such capital gains distributions if they satisfied investor redemption requests by providing stocks "in-kind" to investors rather than cash.[7] However, traditional mutual funds are generally unable to take advantage of the "in-kind" provision in redemptions due to a minimum size threshold requirement and the fact that investors typically prefer receiving cash over securities (e.g., Agarwal, Ren, Shen, and Zhao, 2023). The above constraints have severely limited the ability of traditional mutual funds to take advantage of the in-kind exchange provision.

Although in-kind redemptions are rare for traditional mutual funds, they are a fundamental feature of ETFs. The structure of ETFs allows fund sponsors (e.g., Vanguard, State Street, BlackRock) to engage in in-kind transactions with authorized participants in the fund's primary market. Since ETF managers choose which securities to distribute, they distribute assets with significant unrealized gains, allowing them to avoid triggering a capital gains realization and resulting tax liability for the fund's investors. Prior work has noted that such a strategy has turned

[7] The in-kind redemption rule was codified as Section 852(b)(6) of the U.S. Internal Revenue Code of 1986.

ETFs into investment vehicles offering better after-tax returns than individual retirement accounts (IRAs) funded with after-tax contributions (Colon, 2017).

In recent years, some ETFs have adopted a strategy to "turbocharge" the tax efficiency of in-kind redemptions (Colon, 2017). Portfolio rebalancing sometimes generates realized capital gains so large they overwhelm the fund's ability to wash away the gains based on the normal volume of redemptions. In such cases, some ETFs are able to employ a strategy called a "heartbeat" trade, which allows ETFs to essentially manufacture redemptions that wash out capital gains that would otherwise be realized (Kashner, 2017). Although not all ETFs have the ability to execute heartbeat trades, those that do can effectively wipe out any capital gains realizations that would otherwise be distributed and taxable to the fund's investors.

2.2 Background on investor-level taxes and corporate payout policy

A substantial literature in accounting, finance, and economics has examined whether investor-level taxes (i.e., taxes on dividends and capital gains) matter for corporate payout. Early evidence in the area was mixed, with some studies finding a material effect of taxes on firm payout (e.g., Chetty and Saez, 2005; Blouin et al., 2011; Desai and Jin, 2011) whereas others suggested taxes have relatively little impact and are typically dominated by other considerations (Allen and Michaely, 2003; Brav et al., 2005, 2008).[8] However, recent studies employing more powerful settings to isolate the tax effect have had more success linking investor-level taxes to firm payout. For instance, Hanlon and Hoopes (2014), examining the effects of anticipated increases in the dividend tax rate, find a large spike in the number and magnitude of special dividends paid in the

[8] One influential study, Chetty and Saez (2005), shows that a historic dividend tax rate cut contained in the Jobs and Growth Tax Relief and Reconciliation Act of 2003 (JGTRRA) was followed by a large increase in dividends, evincing a strong link between taxes and payout. However, studies by Julio and Ikenberry (2004) and Edgerton (2013) suggest the post-JGTRRA increase in dividends cannot be solely attributed to the dividend tax cut. Moreover, surveys of corporate executives indicate that they generally consider investor-level taxes to be of second-order importance in payout decisions compared to other factors such as the stability of future cash flows (Brav et al., 2005, 2008).

final months of 2010 and 2012, just before the rate increases were to take effect. Jacob and Michaely (2017), employing detailed data on the ownership structure and tax status for all closely held corporations in Sweden, find a large increase in dividends following a 2006 dividend tax cut. Overall, recent work points to taxes playing a meaningful role in firm payout decisions.

A follow-up question that researchers have begun to grapple with is *whose* taxes matter for corporate payout. One component of this question relates to understanding the heterogeneity in investors' tax preferences. For instance, early work tended to classify investors into two buckets: tax-sensitive individuals or tax-insensitive institutions (e.g., Dhaliwal et al., 1999; Lie and Lie, 1999; Brav et al., 2005). However, more recent work by Sikes (2014) and Blouin et al. (2017) has shown there is considerable variation in the tax preferences of institutions, with some exhibiting tax-sensitivity (e.g., investment advisers with high net-worth clientele) whereas others are tax-insensitive (e.g., pensions, endowments). Understanding the tax preferences of different investor groups is critical to assessing the responsiveness of corporate payout to investor-level taxes.

A second dimension to the question of whose taxes matter for corporate payout is the degree of investor influence over firm decisions. In the extreme case, investors are also corporate insiders with the direct authority to make payout decisions. For instance, Hanlon and Hoopes (2014) show that firms with substantial inside ownership exhibited the strongest propensity to pay special dividends prior to the scheduled tax hikes in 2011 and 2013, consistent with corporate insiders making payout choices based on their own tax interests.[9] However, recent work suggests that large institutional investors hold considerable sway over corporate decisions generally (e.g., Brav et al., 2022), and surveys of corporate executives find that institutional investors' preferences

[9] Studying the tension between corporate insiders and institutional investors around the 2011 and 2013 scheduled tax increases, Krupa and Utke (2022) find that some tax-insensitive institutions act as monitors, constraining insiders from paying dividends purely for their own tax benefit.

are a major factor in most firms' payout choices (Brav et al., 2005; Graham, 2022). To the extent that large institutional investors express their payout preferences to managers of portfolio firms (e.g., repurchase shares instead of paying dividends), managers are apt to listen.

2.3 Background on after-tax returns and fund inflows

Mutual funds typically generate three types of taxable income for investors who do not sell their shares: (1) dividends (which are paid out by portfolio firms and passed through the fund to investors), (2) short-term realized capital gains, and (3) long-term realized capital gains. For a taxable investor in traditional mutual funds, the three types of taxable income can create a significant tax "drag" on investors' after-tax returns, even if the investor does not sell any shares in the fund.[10] For instance, Sialm and Zhang (2020) examine the performance of U.S. equity mutual funds from 1990-2016 and conclude that investor-level taxes dragged down investors' average pretax return of 8.49% to an after-tax return of 7.39%; a cost comparable in magnitude to the average fund expense ratio.[11] Moreover, prior work finds that after-tax returns more strongly predict future fund inflows than pretax returns, consistent with investors placing greater weight on after-tax returns (Bergstresser and Poterba, 2002).[12]

The unique ETF structure provides a substantial tax advantage over traditional mutual funds by enabling ETFs to "wash away" short-term and long-term capital gains realized at the fund level, essentially eliminating the portion of ETF investors' overall tax burden arising from capital gains. Hence, ETF investors' remaining tax burden is almost entirely due to dividends paid by portfolio firms that are passed through the fund to investors. Examining returns from 1993-2017,

[10] For investors in the highest tax bracket around the end of our sample period, the short-term (long-term) federal capital gains tax rate was 43.4% (23.8%), whereas the top tax rate on qualified dividends was 23.8%.
[11] Prior work suggests the tax consequences of different investment strategies can lead to large differences in after-tax returns (Bergstresser and Pontiff, 2013). Recognizing the importance of after-tax returns to investors, many active funds have catered their investment styles to match their investors' tax preferences (e.g., Sialm and Starks, 2012).
[12] SEC rules require mutual funds and ETFs to disclose pretax and after-tax returns in their prospectuses (SEC, 2017).

Moussawi et al. (2022) find that whereas investors in active mutual funds incurred an average tax burden of 0.96% per year, ETF investors incurred an average tax burden of just 0.42% per year, which is largely attributable to dividends. Further, Moussawi et al. (2022) show that ETFs' tax advantage has accelerated the market-wide shift away from active mutual funds and index funds, leading to increased market share for ETFs.

2.4 Hypothesis development

The unique tax efficiency of ETFs derives from their ability to wash away capital gains on appreciated securities. However, ETFs have no corresponding tax advantage with respect to dividends paid by portfolio firms, which are passed through to investors as taxable income. Hence, tax-sensitive investors in ETFs are economically better off when portfolio firms refrain from paying dividends and any increases in firm value are reflected in appreciation of the firm's stock (or alternatively, firms distribute cash by repurchasing shares).[13]

Recent work by Moussawi et al. (2022) suggests that the rapid growth in the popularity of ETFs has been driven, in part, by the relative tax advantage enjoyed by investors compared to investing in traditional mutual funds. Because the ETF tax advantage is eroded when portfolio firms pay substantial dividends, we argue that ETFs prefer portfolio firms to minimize dividend payouts. In this way, ETFs can increase their attractiveness to high-net-worth investors and increase their market share. Thus, we hypothesize that ETFs discourage portfolio firms from paying dividends. Moreover, ETFs are likely to have greater influence on corporate-level decisions when they are larger stakeholders in the firm. Hence, we state our hypothesis as follows:

H: *Firms with greater ETF ownership make lower dividend payouts.*

[13] ETF investors also benefit from the fund's ability to wash away capital gains if portfolio firms repurchase shares instead of paying dividends. We consider this possibility in Section 4.5 below.

Notwithstanding the above arguments, whether ETFs influence portfolio firms' payout policy is ultimately an empirical question. As discussed above, some prior work finds that investor-level taxes are not a major consideration for firms' payout decisions, particularly when insider ownership is low (e.g., Hanlon and Hoopes, 2014). In addition, prior findings are mixed as to whether passive investors enjoy significant influence over corporate-level decisions (e.g., Appel et al., 2016; Brav et al., 2022). Ex ante, it is unclear whether ETFs have sufficient sway to alter corporate payout policy.

3. Sample Selection, Variable Construction, and Research Design

3.1 Sample selection

We draw information from FactSet to obtain ETF ownership and daily ETF flows that are used to identify ETFs that intensively use heartbeat trades. Specifically, we download monthly global equity ETF holdings, and drop Exchange-traded Commodities and Exchanged-traded Notes. We focus on ETFs that are listed on U.S. exchanges and whose baskets contain U.S. stocks. We also obtain institutional ownership data from FactSet. Our stock sample includes firms listed on the NYSE, AMEX, or NASDAQ with CRSP share codes 10 or 11. Stock return and accounting data are from the intersection of the CRSP and Compustat. To calculate total dividends, we use the distribution dataset in CRSP. We exclude small-cap stocks with prices less than $5. To alleviate the effects of outliers, we winsorize all continuous variables at the 1 and 99 percent levels. Table 1 presents our sample selection procedure. Our final sample consists of 63,556 firm-years spanning from 2000 to 2022.

3.2 Variable construction

3.2.1 ETF ownership

Our main independent variable of interest, *ETF*, is obtained from FactSet ETF Ownership data, where we aggregate the ETF ownership at the stock-month level. We then merge the data with Compustat Fundamentals data to compute *ETF*, defined as the ETF holdings of the firm at the beginning of the fiscal year.

$$ETF_{i,m} = \sum_{j} ETF\ Holdings_{j,i,m} \quad (1)$$

$ETF\ Holdings_{j,i,m}$ is the percentage of firm *i*'s shares held by ETF *j* at year-month *m*. As we conduct our analysis at the firm-year level, we match monthly ETF ownership to the beginning of the most recent fiscal year for each firm. To ensure the ownership data is not stale, we further require the ETF and institutional holdings data to be within the previous 6 months of the fiscal year-end date. We note that a small proportion of ETFs (approximately 2% of total ETFs by ownership) are intentionally designed to cover dividend-paying stocks as their investment objective (e.g., Vanguard High Dividend Yield ETF), and therefore are unlikely to seek to discourage firms from making dividend payouts. We separately compute ownership for these dividend-oriented ETFs (*ETF_Div*) and exclude them from our main measure of ETF ownership (*ETF*).[14]

In the first cross-sectional analysis, we explore whether our results vary based on ownership by heartbeat-ETFs versus other ETFs (non-heartbeat ETFs). To identify ETFs that intensively use heartbeat trades, we first identify heartbeat trades following Moussawi et al. (2022). Then, we define high-intensity heartbeat ETFs as those that are in the top decile of heartbeat trades based on their magnitude over the past three years.[15] Furthermore, we test whether tax-sensitive/tax-insensitive ETFs will make a difference to our results. To identify ownership by tax-sensitive ETFs, we first identify tax-sensitive institutional investors of these ETFs based on the

[14] We manually identify dividend-oriented ETFs based on their fund names. We include *ETF_Div* as a control variable throughout our analyses.
[15] We measure the magnitude by scaling the flow of the heartbeat trade by the assets under management.

SEC file Form ADV, following Dambra et al. (2025). Then, we define tax-sensitive ETFs as those that are in the top decile of percentage shares held by tax-sensitive institutional investors.

3.2.2 Dividend payouts and stock repurchases

Following prior literature, (e.g., Brown et al., 2007; Hanlon and Hoopes, 2014; Ferri and Li, 2020), our baseline measure for dividends is computed as the total cash dividends paid during the year scaled by total assets at the beginning of the year (*TotalDiv*). We define special dividends as distributions with CRSP codes 1262 or 1272 whereas regular dividends are distributions with CRSP codes 1232, 1212, 1222, or 1242 (e.g., DeAngelo et al., 2000; Hanlon and Hoopes, 2014). We scale both special dividends and regular dividends by total assets at the beginning of the year (*SpecDiv* and *RegDiv*, respectively). We measure stock repurchases as the aggregate amount of common stock repurchased during the year less shares issued, scaled by total assets at the beginning of the year (*Repurchase*).

3.2.3 Control variables

We control for factors that are potentially correlated with both ETF ownership and firms' payout policy decisions. Specifically, we control for the firm's market capitalization (*LN(Size)*), growth potential (*BTM*), performance based on stock returns during the past year (*PastRet*), sales growth (*SalesGrowth*), the presence of an operating loss (*Loss*), and total institutional ownership less ETF ownership (*IO*). We also control for ownership by dividend-oriented ETFs (*ETF_Div*) as described in Section 3.2.1. Appendix A contains details on variable construction.

3.3 Summary statistics

In Table 2 Panel A, we present descriptive information for the sample of 63,556 firm-year observations spanning from 2000 to 2022 used in our main analyses. Our average firm distributes 1.16%, 0.09%, and 0.87% of its total assets every year as total dividends, special dividends, and

regular dividends, respectively. In terms of ownership, approximately 5.12% of the outstanding shares are held by ETFs during our sample period, on average. This can be broken down into two components, where 1.76% are held by heartbeat ETFs and 3.44% are held by non-heartbeat ETFs, or 0.44% are held by tax-sensitive ETFs and 4.60% are held by tax-insensitive ETFs. We also find that institutional investors hold approximately 56% of the outstanding shares, and ownership by dividend ETFs is small (0.14% of outstanding shares) and skewed to the right. Our average firm repurchases approximately 1.65% of total assets annually.

3.4 Research design

We first examine the association between lagged ETF ownership and dividend payouts through the following regression:

$$Dividend_{i,t} = \beta_1 ETF_{i,t-1} + \sum_j \beta_j Controls_{i,t-1} + Fixed\ Effects + \epsilon_{i,t-1} \quad (2)$$

Dividend refers to total dividends (*TotalDiv*), special dividends (*SpecDiv*), and regular dividends (*RegDiv*) paid out by the firm *i* at year *t*, scaled by total assets at the beginning of the year. *ETF* refers to ownership by ETFs at the beginning of the fiscal year. We include a vector of control variables as outlined in section 3.2.3, and conduct our tests using different fixed effect structures, including industry and year fixed effects, industry × year fixed effect, and firm and industry × year fixed effects to control for time-invariant industry or firm characteristics and unobservable time period effects.

4. Main Results

4.1 ETF ownership and dividend payouts

We start our analysis by examining the association between total dividend payouts and ETF ownership. Table 3 Panel A presents the results from estimating Eq. (2). Columns (1)-(3) report the results using industry and year fixed effects, industry × year fixed effects, and firm and

industry × year fixed effects, respectively. In column (1), the coefficient on *ETF* is negative and significant (coef.= -0.0298; t-stat.= -4.41), indicating lower total dividend payouts by firms with relatively high ETF ownership. Economically, an interquartile increase in ETF ownership is associated with an 18.03% decrease in total dividend payouts, relative to the sample mean.[16]

Columns (2) and (3) reveal similar results after controlling for time-varying industry shocks as well as firm fixed effects. Specifically, columns (2)-(3) both show significantly negative coefficients on *ETF* (coef.= -0.0337; t-stat.= -4.72 and coef.= -0.0236; t-stat.= -3.32). We also find the coefficient on *ETF_Div* is significantly positive, confirming that firms with higher ownership by dividend-oriented ETFs pay more dividends.

Next, we utilize the nature of different types of dividends to further explore the role of ETFs. Relative to regular dividends, special dividends do not commit firms to an ongoing dividend payout level and are viewed by the market as more discretionary in nature (e.g., Hanlon and Hoopes, 2014). We explore how firms change their payout policies with respect to special dividends and regular dividends in response to ETF ownership. To do so, we estimate Eq. (2) using *SpecDiv* and *RegDiv* as dependent variables, respectively.

Table 3 Panel B presents the results of the relation between ETF ownership and special dividend payouts. Columns (1)-(3) report the results using industry and year fixed effects, industry × year fixed effects, and firm and industry × year fixed effects, respectively. In column (1), the coefficient on *ETF* are negative and significant at the 10% level (coef. = -0.0027; t-stat.= -1.88), indicating firms with higher ETF ownership pay lower special dividends. In column (2)-(3), with firm and industry × year fixed effects, the coefficient on *ETF* is negative and significant at the 5% level (coef.= -0.0033; t-stat.= -2.15 and coef.= -0.0038; t-stat.= -2.25). Economically, an

[16] (0.0781-0.0079)*0.0298 / 0.0116 = 0.1803.

interquartile increase in ETF ownership is associated with a 21.06% decline in special dividends, relative to the sample mean.

In columns (4)-(6) of Table 3 Panel B, we examine the relation between ETF ownership and regular dividend payouts. In columns (4) and (5), the coefficients on *ETF* are negative and significant at the 1% level (coef. = -0.0197; t-stat.= -4.00 and coef.= -0.0230; t-stat.= -4.47), indicating firms with higher ETF ownership pay lower regular dividends. In column (6), with firm and industry × year fixed effects, the coefficient on *ETF* is negative and significant at the 5% level (coef.= -0.0093; t-stat.= -2.02). Economically, an interquartile increase in ETF ownership is associated with a 15.90% decline in regular dividends, relative to the sample mean. Overall, the results in Table 3 provide support for our hypothesis that higher ETF ownership leads portfolio firms to refrain from paying dividends. However, the relative economic magnitudes suggest that special dividends are more impacted by ETFs than are regular dividends, consistent with their discretionary nature.

4.2 Cross-sectional analysis: Ownership by ETFs employing heartbeat trades

To strengthen our inference that firms with higher ETF ownership pay lower dividends for tax-motivated reasons, we examine whether our results are more pronounced for ETFs that engage in frequent heartbeat trades to wash away capital gains tax liabilities. The idea is that some ETFs have a "turbocharged" ability to mitigate investors' capital gains tax liabilities via heartbeat trades (Colon, 2017), leading to a heightened preference for capital gains (as opposed to dividends) by investors in those ETFs. Hence, we expect that greater ownership by ETFs employing a high intensity of heartbeat trades will place greater downward pressure on dividend payouts by portfolio firms. We test our conjecture by estimating a modified Eq. (2) in which we split total ETF ownership into two separate components: Ownership by ETFs engaging in frequent heartbeat

trades (*ETF_Heartbeat*), and ownership by other ETFs (*ETF_NonHeartbeat*). ETFs are classified as high-intensity heartbeat ETFs if the magnitude of their heartbeat trade flows is in the top decile of all ETFs over the prior three years.[17]

Table 4 Panel A presents the results. Columns (1)-(3) of Table 4 Panel A present the results using industry and year fixed effects, industry × year fixed effects, and firm and industry × year fixed effects, respectively. In the first column, the coefficient on *ETF_Heartbeat* is negative and significant at the 1% level (coef. = -0.0790; t-stat.= -5.23), whereas the coefficient on *ETF_NonHeartbeat* is insignificant (coef.= -0.0009; t-stat.= 0.09). Results from an F-test show that the difference between the two coefficients is significant (*p*-value < 0.01). Columns (2)-(3) yield similar inferences. The results indicate that the negative effect of ETF ownership on dividend payouts is driven by ETFs that frequently employ heartbeat trades to wash away capital gains. In other words, it is the ability of ETFs to mitigate investors' capital gains taxes that underlies the observed negative relation between ETF ownership and dividend payouts.

4.3 Cross-sectional analysis: Ownership by tax-sensitive ETFs

To further support the idea that ETFs' tax advantage relates to payout policies of portfolio firms, we examine whether our results are more pronounced for ETFs held by tax-sensitive institutional investors. The idea is that ETFs vary in their institutional investor base. For instance, institutional investors that cater to high-net-wealth individuals and hedge funds likely prefer low-income-tax investment strategies (e.g., Moussawi et al. 2022; Dambra et al. 2025), which includes holding ETFs as part of their asset allocation. Therefore, those ETFs held primarily by tax-sensitive institutional investors likely have a heightened preference for capital gains (as opposed

[17] Although we define high-intensity heartbeat ETFs using the top decile, Table 2 shows that ownership by such ETFs constitutes more than one-third of total ETF ownership. This finding suggests that high-intensity heartbeat ETFs are popular among investors and consequently make up a disproportionately large share of the ETF market.

to dividends). We expect that greater ownership by ETFs with stronger presence of tax-sensitive institutional clients will place greater downward pressure on dividend payouts by portfolio firms. We estimate a modified specification of Eq. (2), where we split ETF ownership (*ETF*) into two separate components: ownership by tax-sensitive ETFs (*ETF_TaxSensitive*), and ownership by other ETFs (*ETF_TaxInsensitive*). An ETF is classified as "tax-sensitive" if the percentage of shares held by tax-sensitive institutional investors is in the top decile of all ETFs. [18] We also control for the variable *TaxSensitiveOwn* to mitigate the confounding concern that the above results are driven by the direct impact of tax-sensitive institutional investors over firms, where *TaxSensitiveOwn* is the percentage of shares of a given firm held by tax-sensitive institutional investors. The results of our estimation are reported in Table 4 Panel B.

Table 4 Panel B presents the results. Columns (1) and (4), (2) and (5), (3) and (6) present the results using industry and year fixed effects, industry × year fixed effects, and firm and industry × year fixed effects, respectively. Throughout various specifications, we find that both tax-sensitive and tax-insensitive ETF ownership is negatively associated with dividends. More importantly, the negative relationship between tax-sensitive ETF ownership and dividends is statistically stronger than that of tax-insensitive ETFs. For instance, in column (1) , the coefficient on *ETF_TaxSensitive* (coef. = -0.1120; t-stat.= -4.01) and *ETF_TaxInsensitive* (coef.= -0.0213; t-stat.= -3.21) are both negative and significant at the 1% level. Results from the F-test show that the difference between the two coefficients is significant (p-value < 0.01). Our findings suggest that the negative relationship between ETF ownership and dividend payouts is driven primarily by tax-sensitive institutional investors who favor capital gains over dividend income.

[18] To identify tax-sensitive institutional investors, we examine the SEC Form ADV. Following prior literature, we define an institutional investor as tax sensitive if a 13F filer reports non-zero high-net-worth client and hedge funds (Jin, 2006; Dambra et al., 2025).

4.4 ETF ownership and corporate stock repurchases

In this section, we investigate the role of ETF ownership in corporate stock repurchases. We conjecture that firms refraining from paying dividends due to the presence of ETF owners may choose to repurchase stock as a substitutive form of payout to shareholders. Given ETFs' unique ability to wash away capital gains realizations, share repurchases allow portfolio firms to distribute cash to shareholders (thus mitigating concerns about empire-building, etc.) but are unlikely to generate a significant tax liability for ETF investors. We test our proposition in two steps: (1) using panel data analysis to understand the relation between ETF ownership and share repurchases; and (2) with a two-stage least squares approach to directly link any reduction in dividends to any increase in repurchases.

Table 5 Panel A displays the results from estimating Eq. (2) using share repurchases (*Repurchase*) as the dependent variable. Columns (1)-(3) report the results using industry and year fixed effects, industry × year fixed effects, and firm and industry × year fixed effects, respectively. In columns (1)-(2), we find that the coefficients on *ETF* are positive and significant (coef. = 0.0162; t-stat.= 2.06 and coef.= 0.0153; t-stat.= 1.90), denoting a positive relation between ETF ownership and share repurchases. In column (3), which includes firm and industry × year fixed effects, the coefficient on *ETF* is positive but falls short of statistical significance at conventional levels (coef.= 0.0051; t-stat.= 0.59). Economically, an interquartile increase in ETF ownership is associated with a 6.89% increase in share repurchases, relative to the sample mean. Moreover, we find that the magnitude of the increase in share repurchases associated with higher ETF ownership is comparable to the reduction in total dividends associated with such ownership. Specifically, an interquartile increase in ETF ownership is associated with a reduction in dividends of 0.209% of total assets and an increase in share repurchases of 0.113% of total assets.

To further investigate the possibility that firms substitute share repurchases for dividends in response to higher ETF ownership, we conduct a two-stage analysis. Table 5 Panel B presents the results. In the first stage, we estimate Eq. (2) using total dividends as the dependent variable to obtain a predicted value for dividend payouts in response to ETF ownership. Columns (1), (3), and (5) show a negative and significant coefficient on *ETF*, denoting that higher ETF ownership is associated with lower dividend payouts. In the second stage, we regress share repurchases (*Repurchase*) on predicted dividend payouts (*Pred_TotalDiv*) in response to ETF ownership. Column (2) shows a negative and significant coefficient on *Pred_TotalDiv* (coef.= -0.5430; t-stat.= -1.81), indicating that firms with lower dividend payouts in response to ETF ownership exhibit higher share repurchases. In other words, the same firms that reduce dividend payouts in response to ETF ownership tend to exhibit increased share repurchases, indicating a substitutive relation between the two forms of payout. Columns (4) and (6) present similar results.

Overall, the findings in Table 5 indicate that greater ETF ownership leads to more share repurchases among portfolio firms. Moreover, the evidence suggests that firms with substantial ETF ownership tend to substitute share repurchases for dividends as their preferred method of payout to shareholders; a strategy that permits firms to distribute excess cash while allowing ETF investors to maximize their after-tax returns.

4.5 Tests of causal inference: tax-benefit ownership changes using Vanguard Index Fund setting

Our results so far suggest that ETF ownership is negatively related to portfolio firms' dividend payouts, and positively related to repurchases. However, a concern with our tests so far is that we cannot fully claim this relation to be causal. For instance, it is possible that ETFs choose to cover firms that innately pay low dividends, instead of influencing their portfolio firms' payout policies. To alleviate this concern, we examine a novel setting that provides quasi-exogenous

variation in ETF ownership, using a stacked DiD identification (Baker et al., 2022). Our focus is on Vanguard's patent of the dual-class structure, which has granted *only* Vanguard index funds to issue ETF share classes since 2000 (Colon, 2023). A key institutional feature is that shareholders of both the original Vanguard index funds and the newly issued ETF share classes can enjoy the tax advantage; thus, the issuance of ETF share class by these index funds effectively increases ETF-*like*, tax-advantaged ownership.[19] Exploiting this feature, our treated group consists of firms held by existing Vanguard index funds that later issued an ETF share class. We conservatively exclude Vanguard dual-class funds whose ETF share class was issued on the same date as the corresponding index fund share class, as the decision to invest in a new firm may be related to firm characteristics such as tax status and payout policies. In contrast, the decision to issue an additional ETF share class is more likely a fund-level decision for Vanguard and an exogenous factor for individual firms already in the Vanguard index funds' portfolio.

To identify the holdings by these funds, we first identify 65 Vanguard index funds that have issued ETF share classes as a result of the patent. Out of the 65, we find that 11 Vanguard index fund share classes are issued at least one month before corresponding ETF share classes. We then exclude Vanguard FTSE Developed Markets ETF and Vanguard Total International Stock ETF, due to their international-diversified portfolio covering only five and eight U.S. stocks, respectively. We also exclude Vanguard Total Stock Market Index Fund ETF, because ETFs are still at their early stage in 2001. This leaves us with eight index funds, which have launched ETF classes in January 26, 2004 and September 7, 2010 (dates of treatment). We identify the treated firms as those that were part of the index funds' portfolio one month before the ETF share class

[19] While the dual-class structure itself does not guarantee the tax-advantage like that of the ETF, mutual funds are able to offload low tax-basis securities when Authorized Participants redeem their shares. This enables mutual fund shareholders (who share the same investment vehicle as that of ETF shareholders) to access the same tax benefits (Colon 2023).

was issued.[20] We estimate that the shock has led to an increase in tax-advantaged ownership by 0.6 percentage points and 1.2 percentage points across the two treatments, representing an increase by 55% and 28% relative to the pre-period, respectively.

We address concerns raised in the recent econometrics literature that a staggered DiD approach can produce biased estimates if there is heterogeneity in the treatment effect depending on when an observation is treated or how long it takes for the treatment effect to fully manifest (Baker et al., 2022; Goodman-Bacon, 2021). We first create cohort-specific datasets. We assign the Vanguard index funds with ETF share classes issued in the same year to the same cohort, so there are two cohorts in total. Each of the two cohorts includes all observations that fall between two years before and two years after the Vanguard ETF share class issuance, excluding the event year. We keep only the treated firms and all firms that are never treated as our control group. Then, we stack these cohort datasets together and calculate an average effect across all Vanguard index funds. Finally, we run the following stacked regression specification:

$$SpecDiv(TotalDiv)_{i,t} = \beta_1 Vanguard_{i,t} \times Post_{i,t} + \sum_j \beta_j Controls_{i,t-1} + Fixed\ Effects + \epsilon_{i,t} \quad (3)$$

Vanguard is the treatment indicator set to one if firms are held by the treated Vanguard index funds in the month before related ETF share class issuance, and zero otherwise. *Post* is an indicator equal to one for years after the ETF share classes were issued. We additionally include *Non-Vanguard ETF Own*, the percentage of shares held by ETFs except for the Vanguard index fund-related ETFs, as a control variable. The other controls are the same as the main results.

Table 6 Panel A presents the results of Eq. (3). Columns (1) to (3), Columns (4) to (6), and Columns (7) to (9) present results for total dividends, special dividends, and repurchases, respectively. While columns (1) to (3) indicate no significant changes in total dividends, columns

[20] We exclude stocks added to the index fund portfolio after ETF share class issuance.

(4) to (6) suggest that firms held by Vanguard index funds decreased special dividends after the shock. Furthermore, estimates in column (7) to (9) show that the coefficient on *Vanguard*×*Post* is positive and significant at the 1% level (coef.= 0.0073; t-stat.= 6.74 and coef.= 0.0071; t-stat.= 6.32 and coef.= 0.0043; t-stat.= 3.53), illustrating an increase in stock repurchases for treated firms. Our results are particularly salient in columns (6) and (9), where we refine the control group to be within the same industry as the treated firms by including industry×year×cohort fixed effects.

To validate the parallel trends assumption, we re-run Eq. (3) modified to include separate indicators to capture each year in [t-2, t-1] and [t+1, t+2], respectively (interacted with *Vanguard*). We use t-1 as the benchmark year, so the coefficient of *Pre2*, *Post1*, and *Post2* shows the difference between dividends and repurchases of treated firms compared to control firms relative to the year t-1. Results are presented in Table 6 Panel B. Overall, we do not find differential effects prior to the treatment, where the reduction in special dividends (increase in repurchases) take into effect starting from the second year (first year) after the event. Collectively, our findings indicate that higher ETF ownership suppresses dividend payouts and promotes repurchases. In our Online Appendix, we complement our findings by utilizing another setting that provides plausibly exogenous variation in ETF ownership: changes in Russell 1000/2000 index assignments (Ben-David et al., 2018). Following the research design suggested in recent literature that avoids potential pitfalls that can create estimation bias in implementing this test (Appel et al., 2019, 2022), we continue to find a decrease in special dividends and increase in repurchases following an increase in ETF ownership.

5. Additional Analyses

5.1 Mechanism: Dividend payouts and ETF voting patterns

In this section, we investigate voting behavior by ETFs to shed light on the channel through which funds may exert their influence corporate payout decisions. We proceed in two steps. First, we examine ETFs' voting behavior across all proposals at the firm level. Second, we consider ETFs' voting behavior at the proposal level.

First, we investigate the possibility that ETFs are more likely to vote against management proposals when firms make substantial dividend payouts. The idea is that ETFs may employ their votes against management proposals as a potential threat to discipline managers, and deter them from paying out dividends. To test our conjecture, we estimate the following regression:

$$OppositionScore_{i,t} = \beta_1 TotalDiv_{i,t-1} + \sum \beta_j Controls_{i,t-1} + Fixed\ Effects + \epsilon_{i,t} \quad (4a)$$

OppositionScore is defined at the firm-year level to measure the propensity of ETFs to vote against management on all items proposed in future shareholder meetings. Specifically, for each shareholder meeting, we count the number of items opposed by at least one ETF by the total number of items covered in the meeting and divide by the total number of items in the meeting. An average of this measure is computed for all meetings held during the year to compute the score. Hence, *OppositionScore* represents the average fraction of items voted against by at least one ETF in shareholder meetings after the firm's fiscal year-end.[21] Matching our main sample of firm-years with ISS Voting Analytics database yields 29,334 firm-years. The mean value of *OppositionScore* is approximately 19%, denoting that on average, approximately one out of five items in a given shareholder meeting is opposed by one or more ETFs.

Table 7 Panel A presents the results from estimating Eq. (4a). Columns (1)-(3) report the results using industry and year fixed effects, industry × year fixed effects, and firm and industry × year fixed effects, respectively. In columns (1)-(2), the coefficients on *TotalDiv* are positive and

[21] To ensure that ETFs have sufficient time to be informed about the firms' dividend policies and fundamentals, we require a minimum of six months between firms' fiscal year-end and future shareholder meetings.

significant at the 5% level (coef. = 0.0018; t-stat.= 2.31 and coef.= 0.0019; t-stat.= 2.36), indicating that ETFs are more likely to oppose management proposals in future shareholder meetings after a firm makes a large dividend payment. In column (3), with firm and industry × year fixed effects, the coefficient on *TotalDiv* is positive and significant at the 1% level (coef.= 0.0027; t-stat.= 3.47). Economically, a one standard deviation increase in total dividends leads to a 3% increase in *OppositionScore*, relative to its sample mean.

Next, we test the propensity of ETFs to vote against the management if the firms pay out high dividends at the vote level by estimating the following equation:

$$Opposition_{v,t} = \beta_1 DivPay_{v,t-1} + \sum \beta_j Controls_{i,t-1} + Fixed\ Effects + \epsilon_{v,t} \quad (4b)$$

Opposition is an indicator set equal to one if the ETF voted against the proposal, and zero otherwise. *DivPay* refers to *Ch_DivPay* and *Start_Div*; where *Ch_DivPay* is the change of total dividends scaled by the beginning-of-year assets in a given fiscal year and *Start_Div* is an indicator set to one if a firm did not pay dividends in the previous year, but paid dividends in the current year, and zero otherwise. We conduct this test using all proposals and compensation-related proposals, respectively.

Table 7 Panel B presents the results from estimating Eq. (4b) using all proposal sample. Columns (1) and (3), columns (2) and (4) report the results using fund fixed effects and industry × year fixed effects and fund × industry × year fixed effects, respectively. In column (1), the coefficients on *Ch_DivPay* are positive and significant at the 5% level (coef. = 0.0204; t-stat.= 1.97), indicating that ETFs are more likely to oppose management proposals in future shareholder meetings after a firm makes a large dividend payment. Economically, a one standard deviation increase in *Ch_DivPay* leads to a 0.69% increase in the probability of opposing all management-

sponsored proposals. Using *Start_Div* as the independent variable, columns (3)-(4) yield similar results.

Table 7 Panel C present the results from estimating Eq. (4b) using compensation-related proposals. Columns (1) and (3), columns (2) and (4) report the results using fund fixed effects and industry × year fixed effects and fund × industry × year fixed effects, respectively. Columns (1)-(2) all reveal positive and significant coefficients on *Ch_Div* of larger coefficient than Table 7 Panel B, indicating that ETFs are significantly more likely to oppose the management compensation proposal if firms issue large amount of dividends in previous year. Columns (3)-(4) present similar results. These findings confirm that ETFs' voting behavior on dividend proposals aligns with the tax incentives of ETF investors. Viewed together, the findings in Table 7 suggest that ETFs discourage managers from paying dividends, at least in part, through their voting behavior.

5.2 Implications

5.2.1 Firm Response to Dividend Tax Rate Changes: Evidence from 2012 Tax Hike

In this section, we explore implications of ETF ownership by looking at two additional settings. First, we study the regulatory implications. Motivated by our findings on ETFs and special dividends, we follow Hanlon and Hoopes (2014) and exploit a setting where some firms paid out large special dividends in anticipation of an increase in individual-level dividend tax rates. We explore the role of ETFs in firms' payout responses during the final months of 2012, as firms sought to take advantage of the lower dividend tax rates just before anticipated increases set to take effect at the start of 2013. From the perspective of ETF investors (who are sensitive to dividend taxes but largely insensitive to capital gains taxes), the optimal outcome is not a shift in the timing of dividend payouts, but rather no dividend payouts at all. Hence, we predict that firms

with higher ETF ownership leading up to the 2013 tax increases make relatively lower special dividend payouts, compared to firms with lower ETF ownership.

Employing firm-month data from 2000-2013, and we test our proposition by estimating the following model:

$$\begin{aligned} \textit{Special Dividends}_{i,m} = {} & \beta_1 \textit{NovDec2012}_{i,m} + \beta_2 \textit{NovDec2012}_{i,m} \times \textit{ETF}_{i,t-1} \\ & + \beta_3 \textit{ETF}_{i,t-1} + \sum_j \beta_j \textit{Controls}_{i,t-1} + \textit{Fixed Effects} + \epsilon_{i,m} \end{aligned} \tag{5a}$$

Table 8 presents the results of our estimation. Column (1) reports the results using *Special Dividends* as the dependent variable and controlling for industry, year, and month fixed effects. We first confirm that the coefficient for the main effect of *NovDec2012* is positive and significant (coef.= 0.0034; t-stat.= 4.33), validating the findings of Hanlon and Hoopes (2014) that firms increased special dividends just before the dividend tax hikes. In addition, we find the coefficient on *NovDec2012 × ETF* is negative and significant (coef.= -0.0206; t-stat.= -1.85), denoting that high ETF ownership had a dampening effect on firms' special dividend payouts before the tax increase. Economically, an interquartile increase in ETF ownership offsets approximately 35.3% of the increase in special dividends occurring the final two months of 2012. The results in columns (2)-(3) are similar when controlling for industry × year × month fixed effects as well as both firm and industry × year × month fixed effects.

Columns (4)-(6) repeat the above analysis using *Special Dividends Ind* as the dependent variable. *Special Dividends Ind* is an indicator variable set equal to one if the firm paid a special dividend during the month, and zero otherwise. The results for *Special Dividends Ind* are consistent with those for *Special Dividends*. Namely, the last two months of 2012 exhibit a large increase in firms' propensity to pay a special dividend, but the effect is offset for firms with substantial ETF

ownership. Economically, an interquartile increase in ETF ownership offsets approximately 40.5% of the increase in firms' propensity to pay a special dividend during the final months of 2012.

Overall, the findings in Table 8 suggest that the previously documented spike in special dividend payouts in the final months of 2012 (Hanlon and Hoopes, 2014) were significantly muted for firms with substantial ETF ownership. The evidence is consistent with ETFs pressuring firms to refrain from paying special dividends; payouts which dilute the benefit of ETFs' unique ability to wash away capital gains realizations for tax purposes.

5.2.2 Investor Response: Evidence from Fund Flows

Next, we explore the implications of dividend payout policies by exploring fund flows into ETFs. Our analysis is motivated by the idea that the tax advantage of ETFs has been a key driver of capital inflows into ETFs, especially by tax-sensitive investors (Moussawi et al., 2022). Given that the tax efficiency cannot be achieved if the portfolio firms are paying dividends (as opposed to capital gains distributions), we examine whether investors are less likely to invest in ETFs with high dividend yields. Specifically, we run the following regression at the fund-year level:

$$Fundflow_{v,t} = \beta_1 DivPay_{v,t-1} + \sum \beta_j Controls_{v,t-1} + Fixed\ Effects + \epsilon_{v,t} \quad (5b)$$

Fundflow is the ratio of the average net fund flows over the next three years, scaled by total net assets at the beginning of the current year. *DivPay* refers to total dividends paid by ETFs in a year scaled by total net assets of ETFs at the end of year. We conduct this test at the ETF-year level.

Table 9 presents the results from estimating Eq. (5b). Columns (1), (2), and (3)-(4) report the results using fund fixed effects, year fixed effects, and fund and year fixed effects, respectively. In columns (1)-(2), the coefficients on *DivPay* are positive and significant at the 1% level and 10% level, respectively (coef. = -17.3851; t-stat.= -5.76 and coef. = -3.4733; t-stat.= -1.89), indicating that ETFs pay more dividends in the current year will receive less net fund flow in the following

three years. In column (3), with fund and year fixed effects, the coefficient on *DivPay* is negative and significant at the 5% level (coef.= -6.0990; t-stat.= -1.99). Economically, an interquartile increase in dividends issued by ETFs leads to an 18.28% decrease in net fund flow. Column (4) add controls and yield similar results. Overall, Table 9 suggests that investors sensitive to income taxes will less likely to invest in ETFs paying high dividends.

6. Conclusion

This study investigates the relation between ETF ownership and firm payout policy. ETFs have a unique ability to shield their investors from paying taxes on capital gains distributions, but not on dividend distributions. As a result, we predict that ETFs discourage portfolio firms from paying dividends in order to provide a better after-tax return for their investors, which can help them gain market share from traditional mutual funds. Our results suggest a robust negative relation between ETF ownership and both special and regular dividends. In the cross-section, we find the effect is concentrated among ETFs with a greater capacity to wash away investors' capital gains taxes via "heartbeat" trades, and those with a greater incentive to cater to tax-sensitive institutional clients. To provide causal evidence, we exploit plausibly exogenous shocks to tax-advantaged ownership using the implementation of Vanguard index funds' unique dual class structure; we find increased *ETF-like* ownership leads to lower special dividend payout. We also find evidence that firms with high ETF ownership substitute share repurchases for dividends as an alternative form of payout that preserves ETFs' tax advantage. We find that ETFs voice their displeasure with management of high dividend-paying firms by opposing them on a wide range of issues. Last, our findings suggest that the relation between ETF ownership and payouts have implications on firms' response to regulatory tax changes and fund flows.

Our findings are important for several reasons. First, we contribute to ongoing policy discussions in two important domains: (1) the SEC's assessment of the consequences from the rapid growth of exchange traded products in the marketplace (e.g., Piwowar, 2017), and (2) whether Congress should amend the tax law to restrict ETFs' use of the in-kind exchange, thereby ending their tax advantage over traditional mutual funds. Our evidence indicates that firms change their real decisions (i.e., payout policy) in ways that allow ETF investors to reduce their tax burdens; an important consideration for the SEC as well as one with implications for the government's ability to raise tax revenue. Our second contribution is to the literature on taxes and payout policy. We shed light on an increasingly important type of investor with a unique tax structure that does not fit neatly into the existing categories of tax-sensitive or tax-insensitive institutions. Third, we contribute to the literature on tax-efficient investing and investor fund flows. Whereas prior work has found that funds choose investment strategies to reduce investors' tax burdens (and thereby increase after-tax returns), we show that funds may seek to improve investors' after-tax returns by influencing portfolio firms' payout decisions in ways that reduce investors' tax burdens.

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Appendix A. Variable definitions

This table provides a detailed description of the procedures used to compute each variable used in the analyses. The data are obtained through Compustat, CRSP, FactSet, and ISS Voting Analytics. All continuous variables are winsorized at the 1st and 99th percentiles.

Primary dependent variables:

Variable	Definition
TotalDiv	Dollar amount of dividends divided by total assets (*at*) at the beginning of the year. We compute dollar amount of dividends by identifying *event* variable equal to "DIST" in CRSP distribution data, and sum up monthly dollar value per share (*divamt*) multiplied by shares outstanding (*shrout*) throughout the entire year.
SpecDiv	Dollar amount of special dividends divided by total assets at the beginning of the year. We identify special dividends as distributions with CRSP distribution codes 1262 or 1272.
RegDiv	Dollar amount of regular dividends divided by total assets at the beginning of the year. We identify special dividends as distributions with CRSP distribution codes 1232, 1212, 1222, or 1242.
Repurchase	Total stock repurchases (*prstkc*) minus the product between number of options exercised (optexd) and average stock price during the year, divided by total assets at the begging of the year. We use total stock repurchases (*prstkc*) for years before 2004 when number of options exercised is unavailable. Negative values are replaced with 0.

Primary independent variables:

Variable	Definition
ETF	Number of shares held by ETFs, divided by number of shares outstanding. We exclude dividend-oriented ETFs in computing the number of shares held.
LN(Size)	Natural logarithm of market value of equity, computed as number of shares outstanding (*csho*) multiplied by fiscal year-end share price (*prcc_f*).
BTM	Book-to-market ratio, computed as book value of equity (*ceq*) divided by market value of equity.
PastRet	Annual stock return of the firm.
SalesGrowth	Change in sales, scaled by lagged sales (*sale*).
Loss	An indicator equal to one if net income (*ni*) is less than 0, and zero otherwise.
IO	Shares held by institutional investors divided by shares outstanding obtained from FactSet. We exclude shares held by ETFs.
ETF_Div	Number of shares held by dividend ETFs, divided by number of shares outstanding.
ETF_Heartbeat	Number of shares held by high-intensity heartbeat ETFs divided by shares outstanding. We define high-intensity heartbeat ETFs as those that are in the upper decile in terms of magnitude of heartbeat trades over the past 3 years.
ETF_NonHeartbeat	Percentage of shares held by ETFs (*ETF*) minus percentage of shares held by high-intensity heartbeat ETFs (*ETF_Heartbeat*).

Appendix A. Variable definitions (continued)

Primary independent variables (continued):

Variable	Definition
ETF_TaxSensitive	Number of shares held by tax-sensitive ETFs divided by shares outstanding. We define tax-sensitive ETFs as those that are in the upper decile in terms of the percentage of shares held by tax-sensitive institutional investors, where the tax-sensitive institutional investors are defined as investment advisers who need to file SEC file Form ADV and have high-net worth individuals or hedge funds clients.
ETF_TaxInsensitive	Percentage of shares held by ETFs (*ETF*) minus percentage of shares held by tax-sensitive ETFs (*ETF_TaxSensitive*).
TaxSensitiveOwn	Number of shares held by tax-sensitive institutional investors divided by shares outstanding, where the tax-sensitive institutional investors are defined as investment advisers who need to file SEC file Form ADV and have high-net worth individuals and hedge funds clients.
Vanguard	An indicator equals one if the firm is held by Vanguard funds with both earlier-issued ETF share classes and later-issued index fund share classes, and zero otherwise.
Non-Vanguard ETFOwn	Percentage of shares held by ETFs (*ETF*) minus percentage of shares held by Vanguard ETFs with both earlier-issued ETF share classes and later-issued index fund share classes.

Voting analyses variables:

Variable	Definition
OppositionScore	Average number of items opposed by the ETF divided by the total number of items throughout all meetings in the year. For each shareholder meeting, we count the number of items where at least one ETF opposes and divide by the total number of items each meeting. Then, we compute the average of the measure for all meetings in a given year.
Oppose	An indicator equal to one if the fund voted against the proposal.

Changes in dividend tax regimes variables (firm-year-month level):

Variable	Definition
Special Dividends	Special dividends scaled by total assets.
Special Dividends Ind	An indicator equal to 1 if the firm paid a special dividend in that month.
NovDec2012	An indicator equal to 1 for all firm/month observations in November and December of 2012.

Appendix A Variable definitions (continued)

Fund flow variables

Variable	Definition
FundFlow	The average net fund flows over the next three years, scaled by total net assets at the beginning of the current year.
DivPay	Total dividends paid by ETFs in a year scaled by total net assets at the end of each year.
SD_Ret	Annual standard deviation of the ETF monthly price returns.
Ret	Natural logarithm of one plus the annual price return of the ETFs.
TaxBurden	Yearly average of adjusted monthly tax burden per share, where the adjusted tax burden is defined as the sum of tax on long-term capital gain and short-term capital gain per month minus style-average tax burden.
Expense	Yearly average of adjusted monthly adjusted expense ratio, where the adjusted monthly expense ratio is defined as the dollar amount of total fee per ten thousand asset-under-management per month minus style-average expense ratio.
Age	Natural logarithm of one plus the number of months since the ETF was launched.
TNA	Natural logarithm of total net assets of ETFs in millions.

Table 1. Sample selection

Description	No. of obs dropped	No. of obs remaining
Obtain data from Compustat and CRSP, from 2000 to 2022		162,619
Keep NASDAQ, NYSE, and AMEX firms, with share codes 10 & 11	(66,824)	95,795
Remove small-cap stocks (share price < $5)	(19,951)	75,844
Remove firms with missing control variables	(12,288)	63,556
Final Sample (firm-years)		**63,556**

Table 2. Summary statistics

This table presents descriptive information for the sample of 63,556 firm-year observations spanning from 2000 to 2022 used for main analyses. See Appendix A for variable definitions.

Variables	Mean	Std Dev	P25	P50	P75	N
Dependent Variables						
TotalDiv	0.0116	0.0258	0	0	0.0122	63,556
SpecDiv	0.0009	0.0064	0	0	0	63,556
RegDiv	0.0087	0.0165	0	0	0.0104	63,556
Repurchase	0.0165	0.0399	0	0	0.0107	63,556
OppositionScore	0.1931	0.2382	0	0	0.1000	24,620
Oppose	0.7766	0.4166	1	1	1	5,022
FundFlow	2.0925	5.7960	-0.1749	0.3450	1.6212	9,681
Independent Variables						
ETF	0.0512	0.0543	0.0079	0.0341	0.0781	63,556
LN(Size)	6.7799	1.8986	5.4276	6.6917	8.0169	63,556
BTM	0.5508	0.3955	0.2665	0.4795	0.7542	63,556
PastRet	0.1063	0.5016	-0.1712	0.0682	0.3125	63,556
SalesGrowth	0.1394	0.3429	-0.0085	0.0777	0.1990	63,556
Loss	0.1976	0.3982	0.0000	0.0000	0.0000	63,556
IO	0.5632	0.3168	0.3321	0.6386	0.8099	63,556
ETF_Div	0.0014	0.0049	0	0	0.0001	63,556
ETF_Heartbeat	0.0176	0.0216	0	0.0080	0.0292	63,556
ETF_NonHeartbeat	0.0334	0.0357	0	0.0208	0.0508	63,556
ETF_TaxSensitive	0.0044	0.0066	0	0.0008	0.0071	63,556
ETF_TaxInsensitive	0.0460	0.0521	0.0056	0.0277	0.0684	63,556
TaxSensitiveOwn	0.0603	0.0781	0.0070	0.0358	0.0813	63,556
Vanguard	0.5460	0.4979	0	1	1	16,411
Non-Vanguard ETFOwn	0.0312	0.0335	0.0087	0.0221	0.0428	16,411
DivPay	0.0146	0.0147	0.0001	0.0126	0.0221	9,681
SD_Ret	0.0562	0.0362	0.0349	0.0471	0.0655	9,681
Ret	0.0576	0.2574	-0.0154	0.0779	0.1722	9,681
TaxBurden	-0.0004	0.0035	-0.0008	-0.0002	0.0000	9,681
Expense	-4.1172	23.5773	-18.1828	-4.3636	9.3524	9,681
Age	3.9939	0.9330	3.4340	4.1589	4.7185	9,681
TNA	5.2204	2.1134	3.7082	5.1200	6.6498	9,681

Table 3. ETF ownership and dividend payouts

This table reports the results from the following regression:

$$Dividends_{i,t}=\beta_1 ETF_{i,t-1} + \sum\beta_j Controls_{j,i,t-1} + Fixed\ Effects + \epsilon_{i,t-1}.$$

Panel A (Panel B) presents the results using *TotalDiv (SpecDiv* and *RegDiv)* as the dependent variable. *TotalDiv, SpecDiv, RegDiv* is defined as the dollar amount of total, special, and regular dividends paid divided by total assets at the beginning the year, respectively. *ETF* is defined as number of shares held by ETFs divided by number of shares outstanding. *Controls* refers to a vector of control variables: *LN(Size), BTM, PastRet, SalesGrowth, Loss, IO*, and *ETF_Div*. Columns (1), (2), and (3) show the results using industry and year fixed effects, industry × year fixed effect, and industry × year and firm fixed effects, respectively. The *t*-statistics are reported below coefficient estimates in parentheses and are calculated based on standard errors clustered by firm. *, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively. See Appendix A for detailed variable definitions.

Panel A: Total Dividends

Dependent Variable: *TotalDiv*				
	Pr. Sign	(1)	(2)	(3)
ETF	-	-0.0298***	-0.0337***	-0.0236***
		(-4.41)	(-4.72)	(-3.32)
LN(Size)		0.0015***	0.0016***	0.0036***
		(6.94)	(6.90)	(10.40)
BTM		-0.0083***	-0.0084***	-0.0028***
		(-11.59)	(-11.05)	(-5.09)
PastRet		0.0015***	0.0013***	0.0019***
		(8.06)	(6.87)	(9.27)
SalesGrowth		-0.0063***	-0.0063***	-0.0025***
		(-16.41)	(-15.75)	(-6.94)
Loss		-0.0085***	-0.0086***	-0.0021***
		(-19.27)	(-18.81)	(-6.63)
IO		-0.0112***	-0.0114***	-0.0032***
		(-11.71)	(-11.26)	(-3.75)
ETF_Div		0.8512***	0.9320***	0.3094***
		(14.37)	(14.97)	(7.65)
N		63,552	63,552	63,552
Year FE		Yes	No	No
Industry FE		Yes	No	No
Industry-Year FE		No	Yes	Yes
Firm FE		No	No	Yes
R-Squared		16.89%	19.51%	57.10%

Table 3. ETF ownership and dividend payouts (continued)

Panel B: Special and regular dividends

Dependent Variable:		*SpecDiv*			*RegDiv*		
Pr. Sign		(1)	(2)	(3)	(4)	(5)	(6)
ETF	-	-0.0027*	-0.0033**	-0.0038**	-0.0197***	-0.0230***	-0.0093**
		(-1.88)	(-2.15)	(-2.25)	(-4.00)	(-4.47)	(-2.02)
LN(Size)		-0.0001***	-0.0001***	0.0003***	0.0015***	0.0015***	0.0019***
		(-3.59)	(-3.27)	(4.54)	(8.69)	(8.55)	(8.14)
BTM		-0.0008***	-0.0009***	-0.0004***	-0.0059***	-0.0060***	-0.0025***
		(-6.17)	(-5.85)	(-2.70)	(-12.67)	(-12.07)	(-8.05)
PastRet		0.0004***	0.0004***	0.0004***	0.0006***	0.0004***	0.0007***
		(7.49)	(6.65)	(7.28)	(5.74)	(3.74)	(7.01)
SalesGrowth		-0.0004***	-0.0004***	-0.0002**	-0.0046***	-0.0045***	-0.0011***
		(-4.98)	(-5.11)	(-2.33)	(-19.41)	(-18.39)	(-7.74)
Loss		-0.0008***	-0.0008***	-0.0003***	-0.0065***	-0.0066***	-0.0015***
		(-10.56)	(-10.46)	(-4.06)	(-22.35)	(-21.83)	(-9.36)
IO		-0.0012***	-0.0012***	-0.0002	-0.0079***	-0.0080***	-0.0017***
		(-4.59)	(-4.46)	(-1.01)	(-11.55)	(-11.20)	(-3.59)
ETF_Div		0.0073	0.0098	-0.0005	0.8156***	0.8921***	0.2960***
		(0.82)	(1.02)	(-0.06)	(16.92)	(17.67)	(9.86)
N		63,552	63,552	63,552	63,552	63,552	63,552
Year FE		Yes	No	No	Yes	No	No
Industry FE		Yes	No	No	Yes	No	No
Industry-Year FE		No	Yes	Yes	No	Yes	Yes
Firm FE		No	No	Yes	No	No	Yes
R-Squared		3.36%	6.62%	31.05%	26.62%	29.25%	77.85%

Table 4. Ownership by ETFs employing heartbeat trades and ownership by tax-sensitive ETFs

Panel A reports the results from the following regression:

$$TotalDiv_{i,t}=\beta_1 ETF\_Heartbeat_{i,t-1} + \beta_2 ETF\_Non\ Heartbeat_{i,t-1} + \sum\beta_j Controls_{j,i,t-1} + Fixed\ Effects + \epsilon_{i,t-1}.$$

TotalDiv refers to total dividends paid divided by total assets at the beginning the year. *ETF_Heartbeat* (*ETF_NonHeartbeat*) is defined as the number of shares held by ETFs with high (low) intensity in heartbeat trades, divided by the number of outstanding shares. Controls refer to a vector of control variables: *LN(Size)*, *BTM*, *PastRet*, *SalesGrowth*, *Loss*, *IO*, and *ETF_Div*. Columns (1), (2), and (3) show the results using industry and year fixed effects, industry × year fixed effect, and industry × year and firm fixed effects, respectively.

Panel B reports the results from the following regression:

$$Total\ Div_{i,t}=\beta_1 ETF\_TaxSensitive_{i,t-1} + \beta_2 ETF\_TaxInsensitive_{i,t-1} + \sum\beta_j Controls_{j,i,t-1} + Fixed\ Effects + \epsilon_{i,t-1}.$$

ETF_TaxSensitive (*ETF_TaxInsensitive*) is defined as the number of shares held by tax-sensitive (tax-insensitive) ETFs, divided by the number of outstanding shares. *TaxSensitiveOwn* is defined as the number of shares held by tax-sensitive institutional investors, divided by the number of outstanding shares. The *t*-statistics are reported below coefficient estimates in parentheses and are calculated based on standard errors clustered by firm. *, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively. See Appendix A for detailed variable definitions.

Panel A: Heartbeat Trade

Dependent Variable: *TotalDiv*				
	Pr. Sign	(1)	(2)	(3)
ETF_Heartbeat (β_1)	-	-0.0790***	-0.0882***	-0.0436***
		(-5.23)	(-5.62)	(-3.74)
ETF_NonHeartbeat (β_2)		0.0009	0.0003	-0.0114
		(0.09)	(0.03)	(-1.13)
LN(Size)		0.0015***	0.0015***	0.0036***
		(6.74)	(6.67)	(10.37)
BTM		-0.0083***	-0.0084***	-0.0027***
		(-11.60)	(-11.04)	(-5.03)
PastRet		0.0015***	0.0013***	0.0019***
		(8.10)	(6.90)	(9.26)
SalesGrowth		-0.0063***	-0.0063***	-0.0025***
		(-16.42)	(-15.74)	(-6.95)
Loss		-0.0085***	-0.0085***	-0.0021***
		(-19.22)	(-18.73)	(-6.60)
IO		-0.0110***	-0.0112***	-0.0031***
		(-11.53)	(-11.05)	(-3.73)
ETF_Div		0.8564***	0.9389***	0.3117***
		(14.53)	(15.14)	(7.70)
p-value for β1-β2=0		<0.01	<0.01	0.014
N		63,552	63,552	63,552
Year FE		Yes	No	No
Industry FE		Yes	No	No
Industry-Year FE		No	Yes	Yes
Firm FE		No	No	Yes
R-Squared		16.95%	19.58%	57.11%

Table 4. Ownership by ETFs employing heartbeat trades and ownership by tax-sensitive ETFs (continued)

Panel B: Tax-sensitive ETFs

Dependent Variable: *TotalDiv*							
	Pr. Sign	(1)	(2)	(3)	(4)	(5)	(6)
ETF_TaxSensitive (β_1)	-	-0.1120***	-0.1029***	-0.0560***	-0.1101***	-0.1008***	-0.0560***
		(-4.01)	(-3.47)	(-2.90)	(-3.95)	(-3.40)	(-2.91)
ETF_TaxInsensitive (β_2)		-0.0213***	-0.0253***	-0.0209***	-0.0206***	-0.0247***	-0.0207***
		(-3.21)	(-3.58)	(-2.90)	(-3.11)	(-3.49)	(-2.88)
TaxSensitiveOwn					0.0083***	0.0084***	0.0009
					(2.88)	(2.88)	(0.43)
LN(Size)		0.0015***	0.0015***	0.0036***	0.0015***	0.0015***	0.0036***
		(6.60)	(6.61)	(10.38)	(6.77)	(6.79)	(10.30)
BTM		-0.0084***	-0.0085***	-0.0028***	-0.0083***	-0.0084***	-0.0028***
		(-11.69)	(-11.16)	(-5.16)	(-11.67)	(-11.12)	(-5.17)
PastRet		0.0015***	0.0013***	0.0019***	0.0014***	0.0012***	0.0019***
		(8.08)	(6.91)	(9.29)	(7.65)	(6.43)	(9.30)
SalesGrowth		-0.0062***	-0.0062***	-0.0024***	-0.0062***	-0.0062***	-0.0024***
		(-16.27)	(-15.64)	(-6.92)	(-16.24)	(-15.61)	(-6.92)
Loss		-0.0085***	-0.0085***	-0.0021***	-0.0083***	-0.0084***	-0.0021***
		(-19.22)	(-18.77)	(-6.65)	(-19.28)	(-18.80)	(-6.63)
IO		-0.0110***	-0.0112***	-0.0030***	-0.0116***	-0.0119***	-0.0031***
		(-11.18)	(-10.91)	(-3.58)	(-11.66)	(-11.35)	(-3.72)
ETF_Div		0.8480***	0.9289***	0.3104***	0.8463***	0.9272***	0.3109***
		(14.33)	(14.92)	(7.64)	(14.34)	(14.93)	(7.63)
p-value for β1-β2=0		<0.01	0.012	0.081	<0.01	0.013	0.079
N		63,556	63,556	63,552	63,556	63,556	63,552
Year FE		Yes	No	No	Yes	No	No
Industry FE		Yes	No	No	Yes	No	No
Industry-Year FE		No	Yes	Yes	No	Yes	Yes
Firm FE		No	No	Yes	No	No	Yes
R-Squared		16.91%	19.52%	57.11%	16.96%	19.57%	57.11%

Table 5. ETF ownership and corporate stock repurchases

Panel A reports the results from the following regression:

$$Repurchase_{i,t} = \beta_1 ETF_{i,t-1} + \sum \beta_j Controls_{j,i,t-1} + Fixed\ Effects + \epsilon_{i,t-1}.$$

Repurchase is defined as total repurchases minus the product between the number of options exercised and average stock price during the year, divided by total assets at the beginning of the year. *ETF* is defined as the number of shares held by ETFs divided by number of shares outstanding. *Controls* refers to a vector of control variables: *LN(Size), BTM, PastRet, SalesGrowth, Loss, IO, and ETF_Div*. Columns (1), (2), and (3) show the results using industry and year effects, industry × year fixed effect, and industry × year and firm fixed effects, respectively.

Panel B reports the results from the following regression, using *Repurchases* as the dependent variable.

$$Repurchase_{i,t} = \beta_1 \widehat{TotalDiv}_{i,t-1} + + \sum \beta_j Controls_{j,i,t-1} + Fixed\ Effects + \epsilon_{i,t-1}.$$

The *t*-statistics are reported below coefficient estimates in parentheses and are calculated based on standard errors clustered by firm. *, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively. See Appendix A for detailed variable definitions.

Panel A: Repurchases

Dependent Variable: *Repurchase*				
	Pr. Sign	(1)	(2)	(3)
ETF	+	0.0162**	0.0153*	0.0051
		(2.06)	(1.90)	(0.59)
LN(Size)		0.0036***	0.0036***	0.0071***
		(13.85)	(13.43)	(12.56)
BTM		-0.0104***	-0.0109***	0.0028***
		(-13.07)	(-13.16)	(3.49)
PastRet		0.0001	0.0003	-0.0004
		(0.48)	(1.04)	(-1.22)
SalesGrowth		-0.0061***	-0.0063***	-0.0042***
		(-12.22)	(-12.08)	(-8.02)
Loss		-0.0116***	-0.0116***	-0.0056***
		(-23.67)	(-22.30)	(-11.55)
IO		-0.0001	0.0005	-0.0020
		(-0.08)	(0.44)	(-1.49)
ETF_Div		-0.3645***	-0.3332***	-0.3387***
		(-7.62)	(-6.57)	(-6.60)
N		63,552	63,552	63,552
Year FE		Yes	No	No
Industry FE		Yes	No	No
Industry-Year FE		No	Yes	Yes
Firm FE		No	No	Yes
R-Squared		13.48%	16.61%	42.24%

Table 5. ETF ownership and corporate stock repurchases (continued)

Panel B: Two-stage Analysis: Substituting stock repurchases for dividends

Dependent Variable:		*TotalDiv*	*Repurchase*	*TotalDiv*	*Repurchase*	*TotalDiv*	*Repurchase*
	Pr. Sign	(1)	(2)	(3)	(4)	(5)	(6)
ETF	-	-0.0298***		-0.0337***		-0.0236***	
		(-4.41)		(-4.72)		(-3.32)	
Pred TotalDiv	-		-0.5430*		-0.4556*		-0.2147
			(-1.81)		(-1.70)		(-0.57)
LN(Size)		0.0015***	0.0045***	0.0016***	0.0043***	0.0036***	0.0079***
		(6.94)	(9.75)	(6.90)	(10.17)	(10.40)	(5.68)
BTM		-0.0083***	-0.0149***	-0.0084***	-0.0148***	-0.0028***	0.0022
		(-11.59)	(-5.42)	(-11.06)	(-5.82)	(-5.09)	(1.59)
PastRet		0.0015***	0.0010*	0.0013***	0.0009*	0.0019***	-0.0000
		(8.06)	(1.78)	(6.87)	(1.96)	(9.27)	(-0.01)
SalesGrowth		-0.0063***	-0.0095***	-0.0063***	-0.0092***	-0.0025***	-0.0047***
		(-16.42)	(-4.89)	(-15.76)	(-5.27)	(-6.94)	(-4.52)
Loss		-0.0085***	-0.0163***	-0.0086***	-0.0155***	-0.0021***	-0.0061***
		(-19.28)	(-6.13)	(-18.82)	(-6.47)	(-6.63)	(-6.49)
IO		-0.0112***	-0.0062*	-0.0114***	-0.0047	-0.0032***	-0.0027
		(-11.71)	(-1.71)	(-11.26)	(-1.41)	(-3.75)	(-1.49)
ETF_Div		0.8511***	0.0977	0.9320***	0.0914	0.3094***	-0.2723**
		(14.37)	(0.39)	(14.97)	(0.38)	(7.65)	(-2.22)
Results of first-stage F-test		19.45		22.31		11.01	
N		63,552	63,552	63,552	63,552	63,552	63,552
Year FE		Yes	Yes	No	No	No	No
Industry FE		Yes	Yes	No	No	No	No
Industry-Year FE		No	No	Yes	Yes	Yes	Yes
Firm FE		No	No	No	No	Yes	Yes
R-Squared		16.89%	N/A	19.51%	N/A	57.10%	N/A

Table 6. Tests of causal inference: Vanguard ETF and index fund ownership changes

Panel A reports the results from the following regression using *TotalDiv (SpecDiv* and *Repurchase)* as the dependent variable.

$$Dividends_{i,t}=\beta_1 Vanguard\times Post_{i,t}+\beta_2 Vanguard_{i,t-1}+\sum\beta_j Controls_{j,i,t-1}+Fixed\ Effects+\epsilon_{i,t-1}.$$

TotalDiv and *SpecDiv* are defined as the dollar amount of total and special dividends paid divided by total assets at the beginning of the year, respectively. *Repurchase* is defined as total repurchases minus the product between number of options exercised and average stock price during the year, divided by total assets at the beginning of the year. *Vanguard* is defined as whether the firm is held by Vanguard funds with both earlier-issued ETF share classes and later-issued index fund share classes, and *Post* is defined as whether the Vanguard fund has issued its index fund share class in a given year. *Controls* refers to a vector of control variables: *LN(Size), BTM, PastRet, SalesGrowth, Loss, IO, ETF_Div,* and *NonVanguard ETFOwn*. Columns (1), (2), and (3) show the results using industry and year effects, industry × year fixed effect, and industry × year and firm fixed effects, respectively.

Panel B reports the results from the following regression using *TotalDiv (SpecDiv* and *RegDiv)* as the dependent variable.

$$Dividends_{i,t}=\beta_1 Vanguard\times Pre2_{i,t}+\beta_2 Vanguard\times Post1_{i,t}+\beta_3 Vanguard\times Post2_{i,t}+\sum\beta_j Controls_{j,i,t-1}+Fixed\ Effects+\epsilon_{i,t-1}.$$

Pre2 is defined as whether it is the second year before a Vanguard fund issued its index fund share class. *Post1* (*Post2*) is defined as whether it is the first (second) year after a Vanguard fund issued its index fund share class. The *t*-statistics are reported below coefficient estimates in parentheses and are calculated based on standard errors clustered by firm. *, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively. Control variables are omitted for brevity. See Appendix A for detailed variable definitions.

Panel A: Stacked DiD

Dependent Variable:		*TotalDiv*			*SpecDiv*			*Repurchase*		
	Pr. Sign	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Vanguard × *Post*	-	0.0003	-0.0001	-0.0004	-0.0167	-0.0337*	-0.0409**	0.0073***	0.0071***	0.0043***
		(0.53)	(-0.17)	(-0.60)	(-0.90)	(-1.71)	(-1.98)	(6.74)	(6.32)	(3.53)
Vanguard		0.0000	0.0001		0.0047	0.0100		-0.0029**	-0.0029**	
		(0.01)	(0.17)		(0.26)	(0.57)		(-2.33)	(-2.29)	
N		16,411	16,411	16,411	16,411	16,411	16,411	16,411	16,411	16,411
Controls		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE		Yes	No	No	Yes	No	No	Yes	No	No
Year FE		Yes	No	No	Yes	No	No	Yes	No	No
Industry×Year FE		No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Firm FE		No	No	Yes	No	No	Yes	No	No	Yes
R-Squared		17.00%	17.24%	60.25%	4.96%	6.07%	26.87%	13.08%	13.32%	37.90%

Table 6. Tests of causal inference: Vanguard ETF and index fund ownership changes (continued)

Panel B: Parallel Trends

Dependent Variable:		*TotalDiv*			*SpecDiv*			*Repurchase*		
Pr. Sign		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Vanguard × *Pre2*	-	0.0001	-0.0000	-0.0003	-0.0020	0.0002	0.0002	0.0013	0.0015	0.0004
		(0.14)	(-0.03)	(-0.55)	(-0.13)	(0.01)	(0.01)	(0.99)	(1.06)	(0.30)
Vanguard × *Post1*		0.0009	0.0004	-0.0001	0.0200	0.0062	0.0023	0.0076***	0.0074***	0.0044***
		(1.14)	(0.50)	(-0.07)	(0.94)	(0.27)	(0.09)	(5.70)	(5.32)	(2.97)
Vanguard × *Post2*		-0.0002	-0.0007	-0.0012	-0.0594**	-0.0776***	-0.0920***	0.0083***	0.0083***	0.0046***
		(-0.24)	(-0.84)	(-1.43)	(-2.25)	(-2.71)	(-3.11)	(6.04)	(5.69)	(2.99)
Vanguard		-0.0000	0.0002		0.0059	0.0102		-0.0035***	-0.0036***	
		(-0.02)	(0.17)		(0.30)	(0.52)		(-2.68)	(-2.67)	
N		16,411	16,411	16,411	16,411	16,411	16,411	16,411	16,411	16,411
Controls		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE		Yes	No	No	Yes	No	No	Yes	No	No
Year FE		Yes	No	No	Yes	No	No	Yes	No	No
Industry×Year FE		No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Firm FE		No	No	Yes	No	No	Yes	No	No	Yes
R-Squared		16.99%	17.24%	60.25%	4.99%	6.11%	26.94%	13.08%	13.31%	37.89%

Table 7. Dividend payouts and ETF voting

Panel A reports the results from the following firm-year level regression:

$$OppositionScore_{i,t}=\beta_1 TotalDiv_{i,t-1} + \sum\beta_j Controls_{i,t-1} + Fixed\ Effects + \epsilon_{i,t}.$$

OppositionScore is defined as the average fraction of items voted against by at least one ETF in shareholder meetings during the year. *TotalDiv* is defined as the dollar amount of total dividends paid divided by total assets at the beginning of the year. *Controls* refers to a vector of control variables: *LN(Size)*, *BTM*, *PastRet*, *SalesGrowth*, *Loss*, *IO*, *ETF_Div*, and *NonVanguardETFOwn*. Columns (1), (2), and (3) show the results using industry and year effects, industry × year fixed effect, and industry × year and firm fixed effects, respectively.

Panel B (Panel C) reports the results from the following ETF-year-vote level regression using all (compensation-related) proposals:

$$Opposition_{i,t,v}=\beta_1 DivPay_{i,t-1}+ \sum\beta_j Controls_{i,t-1} +Fixed\ Effects+\epsilon_{i,t,v}.$$

Opposition is an indicator equal to 1 if the ETF vote against the proposal. *DivPay* refers to *Ch_DivPay* and *Start_Div*. *Ch_DivPay* is defined as the change of opening asset-scaled total dividends. *Start_Div* equals to one if not paid dividends in the previous year, but paid dividends this year, and zero otherwise. Controls refers to a vector of control variables: *Ch_LN(Size)*, *Ch_BTM*, *Ch_PastRet*, *Ch_SalesGrowth*, *Ch_Loss*, *Ch_IO*, and *Ch_ETF_Div*. Columns (1) and (3) present the results using fund and industry×year fixed effects, and Columns (2) and (4) present the results using fund×industry×year fixed effects. The t-statistics are reported below coefficient estimates in parentheses and are calculated based on standard errors clustered by firm. *, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively. See Appendix A for detailed variable definitions.

Panel A: ETF voting on management-sponsored proposals

Dependent variable:		*OppositionScore*		
	Pr. sign	(1)	(2)	(3)
TotalDiv	+	0.0018**	0.0019**	0.0027***
		(2.31)	(2.36)	(3.47)
LN(Size)		0.0685***	0.0679***	0.0650***
		(24.28)	(23.69)	(7.72)
BTM		0.0043*	0.0044	0.0040
		(1.70)	(1.64)	(1.26)
PastRet		0.0050***	0.0056***	0.0010
		(2.97)	(3.12)	(0.53)
SalesGrowth		0.0050***	0.0056***	-0.0025
		(3.16)	(3.38)	(-1.48)
Loss		0.0041**	0.0033*	-0.0008
		(2.44)	(1.87)	(-0.44)
IO		-0.0361***	-0.0350***	-0.0162***
		(-11.19)	(-10.67)	(-3.28)
ETF_Div		0.0007	-0.0000	0.0058***
		(0.40)	(-0.00)	(2.74)
N		29,334	29,334	29,334
Industry FE		Yes	No	No
Year FE		Yes	No	No
Industry × Year FE		No	Yes	Yes
Firm FE		No	No	Yes
R-Squared		23.70%	24.30%	38.50%

Table 7. Dividend payouts and ETF voting (continued)

Panel B: Relation between dividend payouts and ETF opposition (ETF-year-vote level, all proposals)

Dependent Variable: *Opposition*					
	Pr. Sign	(1)	(2)	(3)	(4)
Ch_DivPay	+	0.0204**	0.0063		
		(1.97)	(0.60)		
Start_Div	+			0.0124***	0.0119***
				(11.21)	(9.98)
Ch_LN(Size)		0.0096***	0.0082***	0.0096***	0.0082***
		(8.63)	(6.83)	(8.54)	(6.70)
Ch_BTM		0.0199***	0.0185***	0.0198***	0.0184***
		(15.06)	(12.85)	(15.03)	(12.80)
Ch_PastRet		-0.0018***	-0.0020***	-0.0018***	-0.0020***
		(-10.43)	(-9.42)	(-10.51)	(-9.55)
Ch_SalesGrowth		-0.0057***	-0.0049***	-0.0058***	-0.0049***
		(-9.01)	(-7.80)	(-9.04)	(-7.83)
Ch_Loss		0.0031***	0.0037***	0.0031***	0.0038***
		(8.44)	(9.50)	(8.64)	(9.73)
Ch_IO		0.0291***	0.0299***	0.0289***	0.0297***
		(9.80)	(9.55)	(9.74)	(9.48)
Ch_ETF_Div		-0.6318***	-0.6218***	-0.6149***	-0.6060***
		(-14.19)	(-13.11)	(-13.89)	(-12.87)
N		8,394,078	8,394,078	8,394,078	8,394,078
Fund FE		Yes	No	Yes	No
Industry × Year FE		Yes	No	Yes	No
Fund × Industry × Year FE		No	Yes	No	Yes
R-Squared		4.70%	7.80%	4.70%	7.80%

Table 7 Dividend payouts and ETF voting (continued)

Panel C: Relation between dividend payouts and ETF opposition (ETF-year-vote level, compensation proposals)

Dependent Variable: *Opposition*					
	Pr. Sign	(1)	(2)	(3)	(4)
Ch_DivPay	+	0.0470**	0.0451**		
		(2.30)	(2.05)		
Start_Div	+			0.0106***	0.0101***
				(5.14)	(4.74)
Ch_LN(Size)		-0.0217***	-0.0278***	-0.0216***	-0.0277***
		(-8.24)	(-9.74)	(-8.20)	(-9.74)
Ch_BTM		0.0273***	0.0225***	0.0273***	0.0225***
		(9.41)	(7.62)	(9.43)	(7.63)
Ch_PastRet		-0.0117***	-0.0126***	-0.0117***	-0.0126***
		(-13.97)	(-13.81)	(-13.99)	(-13.85)
Ch_SalesGrowth		-0.0102***	-0.0077***	-0.0102***	-0.0077***
		(-5.98)	(-4.57)	(-6.00)	(-4.59)
Ch_Loss		0.0063***	0.0062***	0.0064***	0.0062***
		(6.26)	(5.88)	(6.29)	(5.92)
Ch_IO		0.0593***	0.0590***	0.0593***	0.0589***
		(9.70)	(8.96)	(9.70)	(8.95)
Ch_ETF_Div		-0.9987***	-1.1227***	-0.9855***	-1.1107***
		(-8.78)	(-9.47)	(-8.67)	(-9.36)
N		694,569	694,569	694,569	694,569
Fund FE		Yes	No	Yes	No
Industry × Year FE		Yes	No	Yes	No
Fund × Industry × Year FE		No	Yes	No	Yes
R-Squared		8.60%	8.90%	8.60%	8.90%

Table 8. Effect of ETF ownership on the 2012 spike in special dividends

This table reports the results from the following firm-year-month level regression:

$$SpecDiv_{i,t,m} = \beta_1 NovDec2012_{i,t,m} + \beta_2 NovDec2012_{i,t,m} \times ETF_{i,t-1} + \beta_3 ETF_{i,t-1} + \sum \beta_j Controls_{j,i,t-1} + Fixed\ Effects + \epsilon_{i,t,m}$$

Columns (1) to (3) report the results using *SpecDividends* as the dependent variable, defined as the dollar amount of special dividends paid divided by total assets in a month. Columns (4) to (6) report the results using *Special Dividends Ind*, an indicator equal to one if the firm paid out special dividends in a month. *NovDec2012* is an indicator equal to 1 for all firm/month observations in November and December of 2012. *ETF* is defined as the number of shares held by ETFs divided by number of shares outstanding. *Controls* refer to a vector of control variables: *LN(Size), BTM, PastRet, SalesGrowth, Loss, IO,* and *ETF_Div*. Columns (1) and (4) show the results using industry, year, and month fixed effects, Columns (2) and (5) show the results using industry × year × month fixed effects, and Columns (3) and (6) show the results using industry × year × month and firm fixed effects, respectively. The t-statistics are reported below coefficient estimates in parentheses and are calculated based on standard errors clustered by firm. *, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively. See Appendix A for detailed variable definitions.

Dependent variable:		*Special Dividends*			*Special Dividends Ind*		
	Pr. sign	(1)	(2)	(3)	(4)	(5)	(6)
NovDec2012	+	0.0034***			0.0520***		
		(4.33)			(8.42)		
NovDec2012 × *ETF*	-	-0.0206*	-0.0261**	-0.0262**	-0.3627***	-0.3320***	-0.3303***
		(-1.85)	(-2.09)	(-2.09)	(-4.06)	(-3.47)	(-3.46)
ETF		-0.0016**	-0.0014*	-0.0009	-0.0118	-0.0113	-0.0006
		(-2.20)	(-1.93)	(-0.88)	(-1.26)	(-1.13)	(-0.04)
LN(Size)		-0.0001**	-0.0000**	0.0000	-0.0002	-0.0002	0.0005
		(-2.36)	(-2.09)	(0.52)	(-0.55)	(-0.52)	(0.97)
BTM		-0.0001***	-0.0001***	-0.0000	-0.0003***	-0.0004***	-0.0003
		(-4.15)	(-4.03)	(-1.41)	(-2.69)	(-2.85)	(-1.64)
PastRet		0.0000***	0.0000**	0.0000	0.0004***	0.0003***	0.0003***
		(3.14)	(2.46)	(1.34)	(5.29)	(4.57)	(4.18)
SalesGrowth		-0.0000**	-0.0000*	-0.0000	-0.0002*	-0.0001	0.0001
		(-2.21)	(-1.84)	(-0.67)	(-1.80)	(-1.64)	(0.96)
Loss		-0.0000**	-0.0000**	-0.0000	-0.0005***	-0.0005***	-0.0001
		(-2.36)	(-2.31)	(-0.75)	(-6.19)	(-6.42)	(-1.36)
IO		-0.0001**	-0.0001***	0.0000	-0.0011***	-0.0011***	0.0003
		(-2.32)	(-2.60)	(0.84)	(-3.56)	(-3.65)	(1.56)
ETF_Div		-0.0000**	-0.0000	0.0000	-0.0003***	-0.0002*	-0.0001
		(-2.09)	(-0.64)	(0.33)	(-2.90)	(-1.81)	(-0.44)
N		469,596	469,596	469,596	469,596	469,596	469,596
Industry FE		Yes	No	No	Yes	No	No
Year FE		Yes	No	No	Yes	No	No
Month FE		Yes	No	No	Yes	No	No
Industry × Year × Month FE		No	Yes	Yes	No	Yes	Yes
Firm FE		No	No	Yes	No	No	Yes
R-Squared		0.21%	2.31%	4.27%	0.93%	3.62%	7.39%

Table 9. Relation between Dividend Yield and ETF Fund Flows

This table reports the results from the following regression:

$$FundFlow_{f,t}=\beta_1 DivPay_{f,t-1} + \sum\beta_j Controls_{f,t-1} + Fixed\ Effects + \epsilon_{f,t-1}.$$

FundFlow is defined as the yearly average of net fund flow in the current and next two years divided by total net assets at the beginning of the year. *DivPay* is defined as total dividends paid by ETFs in a year scaled by total net assets at the end of each year. *Controls* refer to a vector of control variables: *SD_Ret*, *Ret*, *TaxBurden*, *Expense*, *Age*, and *TNA*. Columns (1), (2), and (3) and (4) show the results using fund fixed effects, year fixed effect, and fund and year fixed effects, respectively. The *t*-statistics are reported below coefficient estimates in parentheses and are calculated based on standard errors clustered by firm. *, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively. See Appendix A for detailed variable definitions.

Dependent Variable: *FundFlow*					
	Pr. Sign	(1)	(2)	(3)	(4)
DivPay	-	-17.3851***	-3.4733*	-6.0990**	-6.3864***
		(-5.76)	(-1.89)	(-1.99)	(-2.59)
SD_Ret					1.1141
					(1.02)
Ret					0.3878***
					(3.95)
TaxBurden					-4.0529
					(-0.73)
Expense					-0.0100**
					(-2.19)
Age					-0.5286***
					(-8.07)
TNA					-1.1010***
					(-23.64)
N		9,681	9,681	9,681	9,681
Fund FE		Yes	No	Yes	Yes
Year FE		No	Yes	Yes	Yes
R-Squared		26.70%	1.30%	31.50%	57.10%