Pro-Environment Securities Lending Style

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Abstract

The equity lending supply of brown firms is concentrated among one-fourth of mutual fund holders, with 70% being passive fund lenders. Using novel position-level equity lending data, I document the securities lending channel of sustainable investing. Pro-environment lenders, primarily composed of politically liberal passive funds, tilt lending supply toward brown stocks. They also actively recall shares and support E&S proposals at brown firms' proxy meetings. At the firm level, ownership by pro-environment lenders alleviates short-sale constraints and enhances brown stocks' price efficiency. My findings highlight how passive funds express non-pecuniary preferences through forming securities lending habitats.

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1 Introduction

The asset management industry has witnessed a significant shift in recent years: the concurrent rise of passively managed portfolios and the surge in sustainable investing. More than half of the assets in the U.S. equity fund sector are passively managed by the end of 2022. At the same time, institutional investors are increasingly integrating environmental and climate considerations into their investment decisions (Krueger, Sautner, and Starks, 2020). However, embedding pro-environment incentives within passive portfolios presents a challenge. By design, passive funds replicate benchmark indices, leaving little room for discretionary portfolio adjustments. As a result, widely used sustainable investing strategies, such as divestment or portfolio tilts, are largely incompatible with the passive fund model. In this paper, I show that securities lending – an often overlooked but economically significant aspect of passive fund operations – is actively employed by some passive fund managers to promote their pro-environment preferences.

How does the securities lending channel of sustainable investing operate for passive funds? Passive funds with pro-environment preferences may form securities lending habitats by strategically supplying browner stocks in their portfolio to short sellers in the equity lending market. Such a lending style constitutes a "portfolio tilt" toward brown stocks (in the language of Pastor, Stambaugh, and Taylor (2023)) within the fund's securities lending operations. A persistent preference for lending brown stocks expands the lendable supply and eases short-sale constraints for these stocks. Consequently, short sellers can more swiftly and effectively voice their negative assessment of brown firms through shorting, thereby exerting impact on these firms. Moreover, an expansion in the lendable supply of brown stocks can itself serve as a disciplining device, independent of shorting demand. Increased availability of lendable shares facilitates short selling threats against brown firms, discouraging corporate managers from engaging in activities disfavored by capital markets (Massa, Zhang, and Zhang, 2015; Chang, Lin, and Ma, 2019).

Anecdotal evidence suggests that some securities lenders do, in fact, incorporate ESG-related information into their decision-making process. In a survey of brokers and asset managers conducted by Ernst & Young, 90% of respondents consider ESG compatible with securities lending, and one-third employ an ESG specialist in their securities lending programs.[1] In private discussions with

[1] See https://www.paslaonline.com/downloads/esgresources/ESG-EY-report-202004-FINAL.pdf.

a securities lending trader at a large agent lending desk, I also confirm that certain institutional asset owners impose explicit ESG-related lending criteria, restricting their available lending supply to securities of certain ESG profiles. Pro-environment lending preferences can also be inferred from asset managers' public disclosures. For instance, Blackrock explicitly states in a securities lending report that it actively manages and balances ESG risk within its securities lending programs.[2] The data supports Blackrock's claims: in my sample, passive funds affiliated with Blackrock consistently behave in a more pro-environment manner in their securities lending operations (i.e., these funds tend to tilt their lending supply toward brown stocks).

In this paper, I provide the first evidence of the securities lending channel of sustainable investing at work. I obtain novel position-level mutual fund equity lending data and document that the effective lending supply of brown stocks is concentrated in only one-fourth of the mutual fund shareholders, with 70% of the lenders being passive funds. Motivated by this empirical pattern, I identify pro-environment lenders (PELs) as funds that tilt their lending supply toward relatively browner portfolio stocks. I present three main findings. First, the political orientation of passive fund emerges as the most robust determinant of a passive fund's PEL status, whereas common financial incentives such as fund returns and flows have little explanatory power. This suggests that pro-environment lending styles are likely driven by non-pecuniary motives. Second, at the granular portfolio position level, PELs consistently reveal a preference for lending brown stocks, after controlling for shorting demand and fund family-level lending policies. Further, PELs do not appear to forgo engagement opportunities for the brown stocks they lend; they actively recall these stocks to exercise their voting power when E&S proposals are on the agenda at shareholder meetings and vote favorably on such proposals. Lastly, the presence of PELs carries important asset pricing implications: brown stocks with higher ownership by PELs exhibit relaxed short-sale constraints and display improved informational efficiency. I also offer some suggestive evidence on how brown firms' cost of capital may be affected by PEL ownership.

In this paper, I construct a novel dataset of position-level securities lending information from regulatory filings for a sample of U.S. passive equity funds between 2019Q3 and 2022Q4. The Securities and Exchange Commission (SEC) recently mandated registered investment companies to

[2] See https://www.blackrock.com/corporate/literature/publication/securities-lending-viewed-through-the-sustainability-lens.pdf.

file quarterly portfolio holdings using Form N-PORT. Crucially, N-PORT filings indicate whether each individual fund's position is on loan, enabling direct analysis of lending behavior. I develop an empirical methodology to measure each individual passive fund's pro-environment lending style. Specifically, using a rolling-window, high-dimensional fixed effects regression framework, I estimate the sensitivity of each fund's propensity to lend a stock position to the stock's environmental profile within the fund's portfolio, while holding shorting demand constant through the inclusion of stock-by-time fixed effects. Intuitively, the pro-environment lending style captures how a fund's willingness to lend varies with the "brownness" of position within its portfolio. By definition, funds scoring high on the pro-environment lending style persistently prefer to supply browner portfolio positions for lending. I classify funds as pro-environment lenders if their estimated pro-environment lending style falls within the top tercile of the cross-sectional distribution.

I analyze the determinants and incentives that drive some passive funds to become pro-environmental lenders in the cross-section. Conventional financial incentives, such as fund returns and flows, are not significant determinants of PEL status. In contrast, the political orientation of the portfolio managers emerges as the most robust determinant of the fund's lending style. Passive funds managed by Democrat-leaning (Republican-leaning) portfolio managers are 25.5 percentage points (pp) more likely (11.4 pp less likely) to be identified as PELs. Funds domiciled in Democratic-leaning areas are also more likely to be identified as PELs, pointing to the role of the local political environment in influencing portfolio managers' pro-environment securities lending decisions. Additionally, funds managing larger asset pools and those that engage more actively in securities lending are also more likely to be identified as PELs, indicating that fund resources and lending expertise play a role. Collectively, these findings suggest that passive funds' pro-environment lending styles are primarily driven by non-pecuniary preferences.

At the granular portfolio position level, PELs reveal persistent preferences for lending brown portfolio positions. My headline estimate shows that PELs are 5.4 pp more likely to have brown stock holdings on loan (a substantial 61% increase relative to the unconditional probability of a portfolio position being on loan), after controlling for shorting demand and fund family-level lending policies. The documented PEL effect (which refers to PELs' greater willingness to supply brown stocks) remains robust in various cross-sectional and time-series subsamples sorted by factors that may affect funds' securities lending incentives. Specifically, the PEL effect is evident in both subsamples

of funds that use in-house versus external lending agents. It holds after excluding funds from the "Big 3" fund families and omitting the COVID crisis period. It also remains robust after excluding equity loans around dividend record dates that are likely to be motivated by tax arbitrage (Thornock, 2013; Dixon, Fox, and Kelley, 2021).

One empirical caveat for drawing inferences from the estimated pro-environment securities lending styles is the potential confounding effect of borrower demand. For instance, short sellers may systematically prefer to borrow brown stocks from certain fund families for reasons unrelated the lending supply policies of these families. This would mechanically lead to more PELs being identified for fund families or lending agents that are systematically favored by short sellers of brown stocks. To address such concerns, I develop a novel identification strategy based on an institutional insight. In practice, stock borrowers initiate loan transactions by contacting the lending agent (or the fund family if it operates a large in-house lending desk). Importantly, stock borrowers do not have visibility into which specific funds *within* the lending agent or the fund family ultimately supply the securities. Instead, the agent or fund family allocates the demand to member funds that are ex-ante willing to supply the requested security. I exploit this institutional feature by examining cases where new borrowing demand for a given stock arises at the agent/family level and analyzing how this demand is allocated across individual funds within the same agent/family. This setting allows me to isolate PELs' lending preferences by comparing how new loan demand is distributed across funds within the family, thereby fully controlling for borrowing demand at the borrower-agent/family pair level. In these restrictive cases, I find that new agent/family-level loan demand for brown stocks is more likely to be allocated to PELs within the agent/family, reinforcing that PELs' preference for lending brown stocks is unlikely to be mechanically driven by borrower demand.

In addition, I examine the role of ESG attention shocks in shaping PELs' lending behavior. I find that PELs are 2 pp more likely to supply brown stocks when the stock faces a significant jump in media exposure to ESG issues, following the methodology of Schmidt, Filali, and Von Beschwitz (2024). This represents an economically significant 37% increase relative to the baseline PEL effect (5.4 pp) and suggests that PELs' lending preferences are shaped by their awareness of ESG issues associated with brown stocks. More interestingly, I find that ESG attention shocks to other positions within the same fund increase PEL's propensity to supply the focal brown stock for loan, pointing to a spillover effect of ESG attention shocks across portfolio positions. These results indicate that

attention to ESG issues serves as an important stimulator of PELs' brown-tilted lending decisions.

Do PELs view securities lending ("exit") and proxy voting ("voice") as complementary tools for incorporating their preferences, or do they view them as substitutes? When shares are on loan over voting record dates, lenders forfeit their voting rights, potentially limiting their ability to monitor and engage with loaned firms. I address this question by examining PEL share recall decisions prior to voting record dates. The decision to recall shares reflects a trade-off between the potential revenue from continued lending and the voting rights retained through recalls. Empirically, I find that while PELs' recall propensity before record dates is statistically indistinguishable from those of other passive funds in general, PELs are significantly more likely to recall brown stocks when shareholder meetings feature E&S proposals. Moreover, PELs do vote more favorably on E&S proposals, reinforcing their pro-environment stance. This finding suggests that PELs do not forgo engagement opportunities for the brown stocks that they persistently supply for lending. Instead, they actively recall shares when they perceive their votes to be influential in shaping brown firms' ES policies. Furthermore, I find that brown firms' E&S proposals receive greater voter support when PELs are present, consistent with PELs' voting preferences influencing aggregate proposal outcomes. Overall, PELs' "exit" strategies in the securities lending market do not undermine their "voice" efforts; rather, they view these mechanisms as complementary tools for promoting pro-environment incentives.

Having documented a robust lending preference for brown stocks among PELs, I explore the asset pricing implications of pro-environment securities lending styles. Ownership by PELs may have an economically meaningful impact for the short-selling environment of brown stocks. This, in turn, has important implications for the informational efficiency in brown firms. At the stock level, I find that brown stocks with higher PEL ownership exhibit lower short-sale constraints: they have higher lendable supply, higher short interest, lower loan fees, and greater short-selling stability (Engelberg, Reed, and Ringgenberg, 2018), all of which indicate an outward shift in the supply curve (Cohen, Diether, and Malloy, 2007). Furthermore, these high-PEL-ownership brown stocks display improved informational efficiency, a pattern that holds in the broad sample and during salient informational events, such as earnings releases and environmental incidents. More speculatively, I provide suggestive evidence on PELs' implications for brown firms' cost of capital. Despite the limitation of a short time-series of data, I find that PEL ownership positively predicts changes in

brown firms' cost of capital, though the statistical power and the economic magnitude remain small. Nonetheless, this finding aligns with the notion that relaxing short-sale constraints for brown stocks enables short sellers to voice their negative environmental outlook on brown firms, potentially raising these firms' cost of capital over the long run.

Lastly, I employ a range of identification strategies to provide more robust evidence on the role of PEL ownership in shaping the short-selling environment of brown firms. I exploit plausibly exogenous variation in PEL ownership driven by position exits and entries by PEL funds. Since PELs are passively managed, any position exit or entry is likely a result of reconstitutions of the fund's underlying benchmark index. Using an event-study approach, I show that significant position exits (entries) by existing (new) PELs lead to a decrease (increase) in lendable supply and loan fees, and an increase (decrease) in short interest. Additionally, I use residualized fund flows[3] to existing PELs as an instrument for PEL ownership and obtain results that are qualitatively consistent with the main findings. Overall, results from these identification strategies provide further support for the notion that ownership by pro-environment lenders has economically significant implications for brown stocks' short-sale constraints and limits to arbitrage.

Related literature My main contributions to the literature are twofold. First, I contribute to the literature on asset manager behavior concerning ESG issues. The existing literature provide mixed evidence on how ESG-conscious investors may influence firms through active portfolio selection (Gantchev, Giannetti, and Li, 2022; Heath, Macciocchi, Michaely, and Ringgenberg, 2023; Pastor, Stambaugh, and Taylor, 2024), shareholder voting (Dikolli, Frank, Guo, and Lynch, 2022; Li, Naaraayanan, and Sachdeva, 2023), and direct engagement (Aggarwal, Litov, and Rajgopal, 2023; Hoepner, Oikonomou, Sautner, Starks, and Zhou, 2024). I contribute to the literature by documenting that, while passive investors cannot make discretionary portfolio choices, some actively integrate pro-environment preferences into their securities lending activities. PELs exhibit persistent preferences for supplying brown stocks, which helps relax short-sale constraints and ultimately enhances the informational efficiency of brown firms. Importantly, PELs do not forgo engagement opportunities for the brown stocks they lend. Instead, they actively recall shares to exercise their voting power when they anticipate their votes to be influential. These findings suggest that some passive funds

[3]Residualized fund flows refer to the residuals from regressing quarterly fund flows on contemporaneous fund size, fund return, expense ratio, tracking error, and an ETF indicator, along with fund-style-by-quarter fixed effects. This approach aims to isolate the component of fund flows that is not driven by salient fund characteristics.

are active securities lenders and play a critical role in advancing sustainable investing through the securities lending channel.

Second, my findings speak to the growing literature on the incentives of securities lenders. Prior studies suggest that securities lenders' supply decisions may be influenced by information acquisition motives (Honkanen, 2024; Greppmair, Jank, Saffi, and Sturgess, 2024), agency conflicts (Chu, Lin, Saffi, and Sturgess, 2024; Gogar, Haushalter, and Pisciotta, 2024), and voting rights (Aggarwal, Saffi, and Sturgess, 2015; Li and Zhu, 2024). My findings contribute to this literature by showing that some environmentally conscious securities lenders actively incorporate such non-pecuniary preferences into their lending supply decisions. Such preferences carry important asset pricing implications for brown stocks. In addition, I join a few recent studies that leverage position-level mutual fund equity lending data from N-PORT filings to provide granular insights into the functioning of the securities lending market (Dong and Zhu, 2024; Li and Zhu, 2024; Sikorskaya, 2024). I document the presence of securities lending habitats whereby a small subset of pro-environment lenders persistently supply the bulk of the observed lending supply for brown stocks.

The rest of the paper is organized as follows. Section 2 gives a brief overview of the securities lending market, and develops the main hypothesis for subsequent empirical analysis. Section 3 describes the data sources used in the study. In Section 4, I develop a methodology to estimate the fund-level pro-environment securities lending styles and explore their determinants. Section 5 provides granular position-level insights into pro-environment lenders' securities lending, recall, and voting behavior at the position-level. I investigate the asset pricing implications of the presence of pro-environment securities lenders in Section 6. Section 7 concludes the paper.

2 Institutional background and hypothesis formation

2.1 Institutional background on securities lending

Securities lending transactions occur in over-the-counter (OTC) markets, where securities borrowers and lenders connect through intermediaries. Investors borrow stocks for various reasons, the most common being to facilitate short sales. Less frequently, stocks are borrowed for tax arbitrage strategies (Dixon, Fox, and Kelley, 2021) or to exercise voting rights in shareholder meetings (Ag-

garwal, Saffi, and Sturgess, 2015). Hedge funds are often the end borrowers in the securities lending market, obtaining shares through prime brokers as intermediaries.

Securities lenders — typically long-term institutional investors such as endowment funds, pension funds, passive mutual funds, and exchange-traded funds (ETFs) - loan a portion of their portfolio holdings to borrowers in exchange for a lending fee. Many asset owners rely on lending agents to manage their securities lending programs. Large asset owners with abundant resources may establish their in-house lending desks to manage the lending program directly.

Stock loans are collateralized transactions, where the borrower provides cash collateral to the lender.[4] The lender reinvests the cash collateral in money market instruments and returns a portion of the interest to the borrower, known as the rebate rate. The lending fee (also called the loan fee or shorting fee) is usually calculated as the spread between the reinvestment rate of the cash collateral and the rebate rate. Most securities loans are open-ended and rolled over daily, allowing both the borrower and lender to terminate the transaction at any time.

Securities lending is particularly attractive for passive funds. The primary objective of passive funds is to track their benchmark index, meaning that they do not engage in active portfolio selection and have substantially lower portfolio turnover than their active counterparts. As a result, passive funds maintain a stable inventory of portfolio holdings, making them well-positioned to participate in securities lending. Furthermore, because passive funds tracking the same benchmark index hold nearly identical portfolios, they primarily compete on minimizing fund fees. Revenue generated from securities lending fees can offset a meaningful portion of fund expenses, giving lending funds a competitive advantage over non-lending peers in attracting investor flows. Empirically, prior studies document that passive funds are significantly more likely to engage in securities lending than active funds and that they lend out a substantially higher proportion of their portfolio holdings (Evans, Ferreira, and Porras Prado, 2017; Gogar, Haushalter, and Pisciotta, 2024; Honkanen, 2024; von Beschwitz, Honkanen, and Schmidt, 2025).

Importantly, rather than simply responding to borrower demand, securities lenders exercise discretion in selecting which portfolio positions to make available for lending. In private discussions with a securities lending trader at a large agent lending desk, I find that asset managers typically

[4] In the U.S., securities loans are commonly collateralized with cash, whereas in some other regions (such as Europe), non-cash collateral is more prevalent.

designate only a portion of their holdings as lendable inventory. They actively monitor their securities lending programs and construct a "lending list" of portfolio positions they wish to make available, which may be updated as frequently as daily or even intradaily to reflect time-varying lending preferences. In some cases, asset owners mark most holdings as lendable inventory; however, they may impose stringent lending fee and/or collateral requirements, effectively restricting their available lending supply to a subset of positions with realistic lending terms. As a result, there is a tendency for commercial data vendors to overestimate the effective lendable supply, as not every share of lendable inventory is equally accessible.

2.2 Hypothesis development: pro-environment securities lending

Particularly relevant to this paper, the discussions with the securities lending trader reveal that some asset owners actively integrate ESG considerations into their lending supply decisions and may restrict their lendable supply based on ESG criteria. It follows naturally that some passive fund investors may incorporate pro-environment preferences into their lending decisions. In particular, pro-environment lenders may selectively supply shares of portfolio firms with inferior environmental outlooks (i.e., brown firms) to short sellers, who short these firms to express negative environment-related assessments. In addition, an expansion in lendable supply of brown stocks can itself serve as a disciplining mechanism, independent of shorting demand. Increased availability of lendable shares facilitates short selling threats against brown firms, discouraging corporate managers from engaging in activities disfavored by (environmentally conscious) capital market investors. The discplining role of lending supply has been examined in studies such as Massa, Zhang, and Zhang (2015) and Chang, Lin, and Ma (2019).[5] For instance, BlackRock explicitly states that it manages and balances ESG risk within its securities lending programs.[6] Consistent with this, most passive funds affiliated with BlackRock in my sample rank in the top tercile of the pro-environment lending style distribution, suggesting that BlackRock funds exhibit stronger pro-environment lending preferences – they are

[5]One possible concern is that pro-environment investors may avoid holding brown stocks altogether, leaving them with only green stocks to lend. However, by focusing exclusively on passive funds, I eliminate the potentially endogenous portfolio selection channel. The passive funds in my sample track mainstream benchmark indexes, which include stocks with varying degrees of brownness. This within-portfolio variation in brownness, combined with the novel position-level securities lending data introduced in this paper, allows me to identify heterogeneity in passive fund lenders' pro-environment lending styles —- the extent to which lenders prefer supplying brown stocks over green stocks.

[6]See https://www.blackrock.com/corporate/literature/publication/securities-lending-viewed-through-the-sustainability-lens.pdf.

more willing to supply brown stocks for lending within their portfolios.

The above hypothesis builds on the assumptions that short sellers view environmental issues of brown firms as (financially) material. While the shorting side is not the primary focus of this paper, anecdotal evidence also suggests that some short sellers indeed employ negative ESG information as a signal for shorting stocks. Cliff Asness, Chief Investment Officer at AQR Capital Management, stated that "... shorting matters for the ultimate goal of responsible investing: to effect change ... if a manager expects a security to do poorly, simply not holding it is a less significant expression of that view than shorting. This is, of course, not particular to ESG."[7] Similarly, the United Nations Principles for Responsible Investment (UNPRI) has advocated that "... taking a short position in a company or issuer can convey a view regarding an ESG-related risk or practice. This can have implications for a company's cost of capital and valuation, thereby creating an incentive for management to engage on the issues identified."[8]

Motivated by the anecdotal evidence presented and the hypothesis outlined above, this paper systematically estimates pro-environment securities lending styles across a broad sample of U.S. passive funds and provides granular insights into the implications of the proposed securities lending channel of sustainable investing.

3 Data

3.1 Passive fund sample

The primary data source for this study is open-end funds' position-level quarterly holdings reported in N-PORT filings as recently mandated by the SEC. U.S. registered investment companies are required to file N-PORT filings beginning in the third calendar quarter of 2019. The N-PORT reports provide fund-level quarterly balance sheet information, including fund assets, inflows and outflows, and portfolio holdings.[9] Importantly, item C.12.c in the portfolio holdings section of the N-PORT filing (Part C: Schedule of Portfolio Investments) indicates whether the position is on

[7] https://www.aqr.com/Insights/Perspectives/Shorting-Your-Way-to-a-Greener-Tomorrow

[8] https://www.unpri.org/hedge-funds/shorting-and-responsible-investment-a-review/8388.article.

[9] For a complete list of items available in the N-PORT filings, see https://www.sec.gov/files/formn-port.pdf.

loan (and if it is on loan, the loan value) for each individual position in the fund's portfolio. Such granular information allows me to observe investment funds' securities lending activities at the fund-position-quarter level.

I download the full history of N-PORT filings available for all registered investment funds from the SEC's Electronic Data Gathering, Analysis, and Retrieval (EDGAR) system. If there are amended filings for the same fund and the same report date (i.e., form NPORT-P/A), I use the latest filing available to reflect the most up-to-date fund holdings information. For each N-PORT filing, I extract information on each portfolio position, including the CUSIP identifier, the number of shares held, the dollar value of the position, and most importantly, whether the position is on loan (and if on loan, the total loaned value for the position). I collect additional fund information from their annual N-CEN filings, including the identities of the lending agents employed by each fund and whether the agent is an in-house affiliated entity. I limit my sample to passively managed equity funds, to alleviate the concern that stock lending decisions are confounded by fund managers' active portfolio choices. In addition, Figure 1 shows that participation in securities lending is much more prevalent in the passive fund segment of the mutual fund sector. Because these funds cannot actively trade stocks, they have strong incentives to participate in securities lending to generate additional portfolio income.

I collect generic fund characteristics from Morningstar Direct, such as fund size, fund flow, fund return, expense ratio, fund manager history, and fund family name. My sample covers US-domiciled equity mutual funds and ETFs that follow a passive strategy (as identified from the index fund flag in Morningstar). I use a combination of fund ticker and fund legal entity identifier (LEI) to link funds in the Morningstar Direct database to their N-PORT filings.

3.2 Other data sources

I identify the political orientation of fund managers by matching the fund manager names to their individual political contributions from the OpenSecrets database. Appendix A provides details on how I identify Democrat-leaning and Republican-leaning funds. Data on state-level returns for elections to the U.S. presidency come from the MIT Election Data and Science Lab, which I use to construct measures of state-level political leaning.

I collect other firm-related information from standard data sources. The main measure of the

environmental profile of a firm is the LSEG (formerly Refinitiv/Asset 4) environmental pillar score. LSEG has one of the most comprehensive firm coverage for its ESG data and has been a popular ESG data source in the sustainable investing literature (e.g., Cao, McLean, Zhan, and Zhang, 2024; Cao, Titman, Zhan, and Zhang, 2023).[10] I obtain stock market data from CRSP and quarterly firm balance sheet data from Compustat. Aggregated stock-level securities lending data (e.g., lendable supply, short interest, loan fees) comes from S&P Global Securities Finance Buyside Analytics (previously IHS Markit), which is the standard database used in the short selling and securities lending literature. Analyst forecast data, which I use to construct measures of earnings surprises and implied cost of capital, is from I/B/E/S. For the purpose of analyzing securities lenders' share recall and voting decisions around proxy voting dates, I additionally collect information on firms' shareholder meetings and funds' proxy votes from ISS Voting Analytics, which provides voting-related information such as the share record date, proposal descriptions, the voting outcome, and fund-proposal-level voting collected from N-PX filings.

3.3 Summary statistics

My final sample covers 501 distinct passive US equity funds and 3205 unique US firms for which I have non-missing data, spanning a sample period of 2019Q3 – 2022 Q4. I winsorize all continuous variables at the 1^{st} and 99^{th} percentiles of the cross-sectional distribution in each quarter. Table 1 reports the summary statistics of the data used in the paper. All variable definitions are described in Table A1. Panel A reports the distributional statistics for the position-level variables. The unconditional probability of a position being on loan is 8.9%, and the unconditional average fraction of holding on loan is 4.9%. Untabulated statistics show that, conditional on the position being on loan (i.e., $1[\text{On loan}] = 1$), the fraction of holding on loan is on average 55.7%. The fund holds on average 0.22% portfolio weight for a given stock holding, which translates into 0.20% ownership weight relative to the stock's total market capitalization.

Panel B reports the sample distributions of the fund-level variables. The average passive fund in my sample has $0.65 billion total net assets, experiences a 2.2% quarterly fund returns, and has an expense ratio of 33 bps. 72% of the fund-quarter observations are from ETFs, 15% are managed by Democrat-leaning portfolio managers, and 7.1% are managed by Republican-leaning managers.

[10] My empirical findings remain robust when I employ an alternative environmental rating score from S&P.

7.9% of the funds track ESG-oriented indexes, and 2.4% of the total net assets are on loan for an average sample fund.

Panel C reports the distributional statistics of the stock-level variables. The average stock in my sample has 6.4% equity ownership by pro-environment lender funds, 7.8% by other passive funds, and 12% by active mutual funds. The average lendable supply is 32% of the stock's total shares outstanding, with an average short interest of 3.4% and an average loan fee of 53 bps.

4 Estimation and determinants of pro-environment securities lenders

I begin my empirical analysis in this section by developing a methodology to identify pro-environment securities lenders within a sample of passive equity funds and exploring the determinants of pro-environment securities lending behavior across funds in the cross-section.

Before proceeding, it is important to validate an implicit assumption underlying the identification of pro-environment lenders: securities lenders exercise discretion over stock lending decisions. If lenders merely respond to short-seller demand without actively exercising discretion, they cannot incorporate preferences into their lending behavior. I employ a variance decomposition approach to separately assess the relative explanatory power of borrowers and lenders on securities lending outcomes. Specifically, I use a quarterly position-level panel of stock lending data and progressively incorporate fixed effects to explain variation in observed stock lending activities. By comparing the adjusted R^2 across specifications, I infer the influence of stock borrowers (i.e., short sellers) and lenders (i.e., passive funds in the sample) in the stock lending process.

Table A2 reports the incremental explanatory power of different sets of fixed effects in explaining variation in lending outcomes. The results indicate that time-varying stock-specific factors—which potentially capture overall shorting demand and/or lending supply—as reflected in stock-by-quarter fixed effects, explain 28.8% of the variation in position-level lending outcomes. Adding lending-agent-by-quarter fixed effects (or fund-family-by-quarter fixed effects) increases the adjusted R^2 by an additional 5.6% (6.5%), respectively. Notably, introducing fund-by-quarter fixed effects, which capture lender-specific factors, explains an additional 13.3% of the variation in lending outcomes beyond the specification with stock-by-quarter fixed effects alone. This suggests that lenders exercise

considerable discretion in determining which portfolio positions to make available for lending. In other words, passive fund securities lenders exhibit heterogeneous lending preferences even for the same portfolio stock, a pattern not solely explained by general shorting demand.

4.1 Measuring pro-environment securities lending styles

In this subsection, I develop an empirical methodology to measure each individual passive fund's pro-environment securities lending style and, consequently, identify pro-environment lender funds.

I motivate my analysis by first presenting high-level distributional statistics on the securities lending environment of brown stocks in my sample. Table 2 shows that, for the average brown stock, only 9.6 out of 56.2 mutual fund holders actively lend shares, indicating that lending is concentrated among a limited subset of funds. Moreover, 69% of these 9.6 lenders are passive funds, and for more than 25% of the brown stock observations, the entirety of the mutual fund lending supply comes from passive funds. This concentration, coupled with the significant presence of passive funds in the lending market, underscores the need to examine pro-environment securities lending styles in the passive funds sector.

I define pro-environment lending style as the extent to which a lender's willingness to supply shares for lending varies with the brownness of the stock. For example, a passive fund lender may systematically prefer to supply browner stocks over greener stocks within its portfolio. Such a lender would exhibit a pro-environment lending style, as increasing the loan supply for brown stocks helps alleviate short-sale constraints, enabling short sellers to more effectively voice their negative environment-related views on brown firms. Additionally, expanding the lending supply alone may exert a disciplinary effect on brown firms' operations (Massa, Zhang, and Zhang, 2015; Chang, Lin, and Ma, 2019). Conversely, some other lenders may derive less non-pecuniary utility from supplying brown firms for lending within their portfolios.

I quantify each passive fund lender's pro-environment lending style by estimating the sensitivity of position lending propensity to the stock's portfolio-adjusted brownness within each lender's portfolio. I use the LSEG's environmental score to proxy for the brownness of a stock. Specifically, in each quarter t, I slice the position-level panel to only include periods from $t-3$ to t,[11] and run

[11] This is effectively estimating pro-environment lending styles in a rolling-window fashion, with the window being four quarters. The results are robust to using only the data from quarter t (i.e., cross-sectional estimates) or using all

the following regression:

$$1[\text{On loan}]_{f,i,t} = \lambda_{f,t}(\text{Fund-adjusted brownness}_{f,i,t-1} \times \gamma_{f,t}) + \beta' X_{f,i,t-1} + \theta_{i,t} + \gamma_{f,t} + \varepsilon_{f,i,t}, \quad (1)$$

where $\theta_{i,t}$ denotes stock-by-quarter fixed effects, $\gamma_{f,t}$ denotes fund-by-quarter fixed effects, $X_{f,i,t-1}$ denotes the vector of position-level characteristics, including the fund's portfolio weight on the stock, the fund's ownership weight on the stock (value of stock held relative to the total market capitalization of the stock), and an indicator of whether the fund had the stock on loan in the previous period. Fund-adjusted $\text{brownness}_{f,i,t-1}$ is within-fund standardized brownness of stock i's within fund f's portfolio, calculated as the stock's LSEG environmental score scaled by the within-portfolio standard deviation of the stock environmental score, multiplied by -1 so that higher values indicate browner stocks. The main benefit of standardizing the brownness score within each fund's portfolio is that I can identify individual funds' lending styles from the variation in lending propensity for positions with different levels of brownness *within* the same fund portfolio.[12]

The parameter of interest is $\lambda_{f,t}$, the coefficient of the interaction term between the fund-adjusted stock brownness score and the fund-by-quarter fixed effects (i.e., a series of binary variables indicating each fund-quarter). $\lambda_{f,t}$ captures how the propensity of stock lending varies with the relative brownness of the stock within the lender's portfolio, keeping time-varying stock-level shocks (e.g., general shorting demand) constant through $\theta_{i,t}$. I obtain the coefficient estimates of $\lambda_{f,t}$ for each fund f in each quarter t as my measure of pro-environment lending style. A higher value of $\widehat{\lambda_{f,t}}$ indicates that the fund is more willing to supply browner stocks in the portfolio for lending compared to greener stocks, i.e., the fund exhibits a more pro-environment securities lending style.

Figure 2 plots the distribution of estimated pro-environment lending styles for two cross-sections in the sample, 2021Q2 and 2022Q4. Notably, there is substantial cross-sectional heterogeneity in pro-environment lending styles. In the next subsection, I examine the potential determinants of this heterogeneity across passive funds to gain insights into the incentives that drive some funds to act as pro-environment lenders.

available data from the start of the period to quarter t (i.e., cumulative-window estimates).

[12] One concern could be that the fund-adjusted stock brownness may overstate the true differences in stock brownness if there is not much variation in the raw stock brownness scores within a fund's portfolio. However, I note that the within-portfolio standard deviation of stock brownness for the average passive fund is 0.24, which is similar to the unconditional standard deviation of raw stock brownness in the position-level sample (0.30). Therefore, there remains substantial heterogeneity in stock brownness within a portfolio.

4.2 Determinants of pro-environment lenders

Having estimated the pro-environment securities lending styles ($\widehat{\lambda_{f,t}}$) for my sample funds, I analyze their potential determinants. As $\widehat{\lambda_{f,t}}$ can be subject to estimation noise, I create an indicator variable to identify pro-environment lenders (PELs): $1[\text{PEL}]$ equals one if $\widehat{\lambda_{f,t}}$ sits in the top tercile of the cross-sectional distribution in quarter t. These high $\widehat{\lambda_{f,t}}$ funds by definition have a much higher propensity to supply browner portfolio stocks for lending relative to other funds in the cross-section. To this end, I estimate the following regression in a fund-quarter-level panel:

$$1[\text{PEL}]_{f,t+1} = \beta' X_{f,t} + \alpha_t + \varepsilon_{f,t}. \tag{2}$$

The outcome variable is whether fund f is identified as a PEL in quarter $t+1$. I construct a list of candidate determinants that proxy for funds' incentives to behave in a pro-environment way in their lending decisions, including fund size, fund return, expense ratio, fund flow, tracking error, fund overall lending intensity, fund political environment[13], whether the fund is an ETF, and whether the fund is marketed as an ESG-indexed fund. I include quarter fixed effects to examine cross-sectional differences in funds' lending style. In more stringent specifications, I include fund style-by-quarter fixed effects to compare passive funds within the same investment style (and thus have near-identical portfolios) or family-by-quarter fixed effects to compare funds within the same family (and thus absorbing the effects of family-wide securities lending policies).

Table 3 presents the regression results.[14] Standard errors are clustered at the fund level. Across all fixed effects specifications, I observe that the political ideology of fund managers is a robust and economically significant determinant of PEL status. Specifically, the coefficient on Democrat-leaning (Republican-leaning) funds is positive (negative) and statistically significant in all (all but one) specifications. This suggests that Democrat-leaning (Republican-leaning) funds possess significantly stronger (weaker) pro-environment securities lending styles. Taking Column (1) as an example, funds managed by Democrat-leaning (Republican-leaning) managers are 25.5% more likely (11.4% less likely) to be identified as pro-environment lenders compared to other politically-unidentified funds. These findings speak to the literature on political ideology and sustainable investing. Prior research

[13] Appendix A details the methodology used to classify funds into a Democrat-leaning or a Republican-leaning fund.

[14] Results are qualitatively similar when I use the S&P environmental score as the proxy for stock brownness to identify PELs.

shows that active funds managed by Democrat-leaning portfolio managers invest less in socially irresponsible firms (Hong and Kostovetsky, 2012) and receive higher portfolio sustainability ratings (Cassidy and Vorsatz, 2024). While existing studies focus exclusively on political partisanship's impact on stock selection in actively managed portfolios, I show that political ideology also shapes passive fund managers' decisions through securities lending.

Funds managing larger asset pools and those more active in securities lending also appear more likely to be PELs. This suggests that funds with greater resources and expertise in securities lending are more pro-environment, possibly because they better understand the potential impact of the securities lending channel in promoting the green transition. Fund managers' pro-environment lending style also appears to be shaped by their local political environment, as evidenced by the positive and statistically significant coefficient on state-level Democrat vote share, which proxies for the political orientation of the fund manager's local residence.[15] Interestingly, ESG index funds exhibit weaker pro-environment lending styles than other funds. This may be because many of these funds follow exclusionary mandates, limiting their exposure to brown stocks and thereby reducing their ability to supply these stocks in the lending market.

Other fund characteristics, particularly those related to fund performance, do not significantly explain pro-environment lending styles. This finding suggests that financial incentives do not weigh heavily in a fund's decision to lend pro-environmentally. Combined with the previous evidence that the political orientation of fund managers and clientele plays a significant role in shaping PEL status, I conclude that pro-environment lending styles are primarily driven by non-pecuniary motives.

5 Pro-environment lenders: granular position-level evidence

Having identified PELs and explored their determinants, in this section, I exploit the rich heterogeneity provided by the N-PORT equity lending data to dive deeper into PELs' securities lending behavior at the position-level.

[15]The effect becomes insignificant with family-by-quarter fixed effects, potentially because operations in the asset management industry are often concentrated near headquarters, leaving little within-family variation in individual fund locations.

5.1 The PEL effect: headline estimates

As a starting point, I show at the invidiual position-level that PELs systematically prefer to make brown stocks available for lending in their portfolios. My position-level regressions generally follow the specification below:

$$1[\text{On loan}]_{f,i,t+1} = 1[\text{PEL}]_{f,t} \times 1[\text{Brown}]_{i,t} + \beta' X_{f,i,t} + \theta_{i,t} + \gamma_{f,t} + \varepsilon_{f,i,t+1}, \tag{3}$$

where $1[\text{On loan}]_{f,i,t+1}$ is an indicator for whether the position is loan in quarter $t+1$, $1[\text{PEL}]_{f,t}$ indicates PEL fund, and $1[\text{Brown}]_{i,t}$ indicates brown stocks, whose environmental scores are below the bottom tercile in the cross-sectional distribution. Fund's portfolio weight and ownership weight as well as an indicator for whether the same position was on loan in the previous quarter are included as controls, along with stock-by-quarter fixed effects and fund-by-quarter fixed effects to control for the stock-level shorting demand and fund-level lending policies.

I present in Table 4 the baseline regression results for Equation 3. Column (1) shows that compared to non-PEL funds and non-brown portfolio stocks, PELs are 5.4% more likely to have brown portfolio stocks on loan, a substantial 61% increase relative to the sample mean. I note that PELs' lending incentives might be different when the lending agent is affiliated with the fund family, since in-house agents retain a large fraction of the lending income (Johnson and Weitzner, 2025). In this case, affiliated lending agents' monetary incentives may override individual funds' lending preferences. Columns (2) and (3) split the whole sample into funds with in-house lending agents and third-party lending agents, respectively. Results indicate that the PEL effect is present in both in-house and third-party lending agent subsamples, with a slightly larger effect for funds with in-house agents. This suggests that affiliated lending agents' monetary incentives do not significantly distort PELs' lending preferences for brown stocks.

I show in Table A3 that the headline result is also present on the intensive margin, where I use the fraction of position on loan as the outcome variable. Column (1) shows that the PEL effect remains highly significant for the loan fraction in the full sample. However, this result may still be driven by the extensive margin, as the full sample includes both loaned and unloaned positions. In Column (2), where I restrict the sample to loaned positions only, the PEL effect remains significant but is both statistically and economically weaker. In common industry practice, fund-level restrictions

on individual stock lending typically operate on the extensive margin (i.e., whether to include a stock in the lending supply list). Once a stock is on loan, the fraction of shares loaned for a given position (i.e., the intensive margin) is generally governed by fund family-level policies.[16] Sikorskaya (2024) and Honkanen (2024) both show that, conditional on lending, the fund-level allocation of loaned shares is proportional to the number of shares the fund holds within its family. Therefore, the findings in Table A3 are consistent with the notion that the PEL effect is primarily driven by the extensive margin of securities lending. Fund managers appear to have less discretion over the intensive margin, making it less sensitive to individual funds' lending preferences.

5.2 Identification: within-family loan allocation upon new borrowing demand

While pro-environment lending styles are estimated controlling for time-varying demand-side factors through stock-by-quarter fixed effects, one may still be concerned that the documented PEL effect could be influenced by short-seller demand. For instance, short sellers of brown stocks may systematically prefer to borrow from certain fund families or lending agents for reasons unrelated to these entities' securities lending policies. This could mechanically result in more PELs being identified from fund families or lending agents favored by short sellers of brown stocks, even if the lending entities themselves do not actively incorporate pro-environment preferences into their securities lending programs.

To address this "demand-driven effect" concern, I develop a novel identification strategy that perfectly controls for demand factors, which is based on an institutional feature of the securities lending market. In practice, stock borrowers (i.e., prime brokers borrowing for themselves or on behalf of hedge fund clients) initiate stock loan transactions by contacting lending agents. In some cases, prime brokers may contact fund families directly if the family operates an in-house securities lending desk. The fund family or lending agent then decides how to allocate the loan request across its member funds. Crucially, stock borrowers do not have visibility into which specific funds within the lending agent or fund family ultimately supply the securities. As a result, when a prime broker demands a stock, the agent or fund family allocates the loan request to member funds that have internally designated the stock as available for lending.

[16] My conversations with agent lending traders confirm that asset owners hardly imposes stock-specific limits on the proportion of a position that can be loaned out.

Based on the above institutional insight, I construct a sample of new borrowing demand arriving at the fund family or lending agent level. Specifically, I search for scenarios where all funds in a lending agent or fund family do not have a given stock on loan in the current quarter t but there is a loan record from any fund within the agent/family for the same stock in the next quarter $t+1$. In these cases, the agent/family receives new shorting demand for the stock of interest and decides which member fund to allocate the stock loans to. The stock loans will be allocated to funds who are ex-ante willing to supply lending for the demanded stock. I explore how the new within-family (or within-agent) loan demand for brown stocks is allocated across funds in regards to the funds' PEL status. To this end, I run the following regression:

$$1[\text{On loan}]_{f,i,t+1} = \phi(1[\text{PEL}]_{f,t} \times 1[\text{Brown}]_{i,t}) + \beta' X_{f,i,t} + \alpha_{a,i,t} + \gamma_{f,t} + \varepsilon_{f,i,t+1} \quad (4)$$

The coefficient ϕ captures how the probability of within-family (or within-agent) new loan allocation for PELs varies with the brownness status of the demanded stocks.

Table 5 presents the results. Columns (1) and (2) use the sample of new loans arriving at the fund family level, while Columns (3) and (4) include all new loans at the lending agent level. In Column (2) ((4)), I replace stock-by-quarter fixed effects with stock-by-family-by-quarter (stock-by-agent-by-quarter) fixed effects to enable direct comparison among different funds within the same family (lending agent) for the same stock subject to new loan demand. The interaction term is positive and statistically significant at the 1% level, indicating that ex-ante identified PELs within the same fund family or lending agent are more likely to receive loan allocations for brown stocks when new borrowing demand arises. This finding provides direct evidence that PELs prefer supplying brown stocks for lending, while perfectly controlling for granular agent- or family-level borrowing demand.

5.3 The role of attention shock spillover

Schmidt, Filali, and Von Beschwitz (2024) show that mutual funds' attention to ESG influences their pro-ESG trading and voting decisions, highlighting the role of fund learning in shaping ESG-motivated portfolio choices. Building on this idea, I propose that ESG attention shocks may mediate PELs' decisions to supply brown stocks for lending. To test this possibility, I follow Schmidt, Filali, and Von Beschwitz (2024) and construct a stock-level ESG attention shock using the RepRisk index

data. A stock is defined as having experienced an attention shock if the quarter-over-quarter jump in its RepRisk index is above the 90^{th} percentile in the cross-sectional distribution. Such cases indicate an abnormal increase in the stock's media exposure to ESG incidents, constituting a valid attention shock for the stock's shareholders. I then interact this ESG attention shock indicator with the original PEL and brown stock interaction term to examine the incremental effect of ESG attention shocks on PELs' propensity to supply brown stocks for lending.

Table 6 Column (1) shows that the PEL is 2 percentage points more likely to have brown stocks on loan upon receiving an ESG attention shock on the same stock, which points to the salient role of ESG awareness in influencing PELs' lending choices. Given that ESG incident news coverage constitutes a shock to the fund managers, I expect such an attention effect to be more prevalent when the fund did not the position on loan previously. In Column (2), I limit my sample to positions that were not on loan in the previous quarter, and find that PELs are 2.8 percentage points more likely to establish new stock loans upon observing the ESG attention shock.

Furthermore, at the portfolio level, if a greater share of a fund's portfolio positions experiences ESG attention shocks, the pro-environment fund manager may become more attuned to ESG issues and, as a result, may be more inclined to lend brown portfolio stocks—even if the specific brown stock of interest has not experienced an attention shock itself. In other words, portfolio-level ESG attention shocks may spill over to non-shocked brown stocks within PELs' portfolios, motivating PELs to increase their lending propensity for brown stocks. To test this conjecture, I construct a position-specific ESG attention spillover measure by computing a holding-value-weighted average of ESG attention shocks across all stocks in a fund's portfolio, excluding the focal stock of interest. In other words, I calculate a leave-one-out, fund-level weighted average ESG attention shock measure for each position in the portfolio. Columns (3) and (4) of Table 6 show that when PELs are more exposed to ESG attention shocks at the portfolio level, they are significantly more likely to have brown positions on loan. The presence of this spillover effect also helps alleviate concerns that the ESG attention effect may be confounded by demand factors. Since, in these cases, the focal brown stock itself has not been subject to media exposure, it is instead the ESG incident exposure of other stocks within the same fund portfolio that influences PELs' lending decisions for the focal brown stock.

5.4 Robustness checks

In this subsection, I conduct a series of robustness checks to confirm the robustness of the PEL effect to alternative specifications and sample compositions. First, I run a series of cross-sectional and time-series subsample analyses to explore whether the documented PEL effect is present in subsamples sorted by various factors that may affect fund lending outcomes. Table A4 shows that the results remain robust to excluding the "Big 3" asset management firms (Blackrock, Vanguard, and State Street) and excluding the COVID crisis period (i.e., 2020 Q1 and 2020 Q2). To the extent that securities lending transactions may be motivated by tax arbitrage reasons around dividend record dates (Thornock, 2013; Dixon, Fox, and Kelley, 2021), I exclude observations for which the dividend record date is less than 10 calendar days from the quarter end. Regression results from Column (3) confirms that the PEL effect is not confounded by securities lending transactions for tax arbitrage purposes.

I also explore how the PEL effect interacts with the fund's general lending strategies. There are two predominant lending strategies: value lending and volume lending (Chen, Tran, and Wang, 2024). Value lenders target a small subset of portfolio stocks with high lending fees and they charge higher lending fees for these in-demand positions, while volume lenders lend a much broader group of portfolio stocks at lower fees. I construct two subsamples of value lenders and volume lenders based on the fund's percentage of positions on loan in a given quarter. Value lenders are defined as those with less than 1% of the positions on loan, whereas volume lenders are defined as those with at least 30% of the positions on loan. Results in Columns (4) and (5) indicate that the PEL effect is present in both value and volume lender subsamples, though it is considerably stronger for volume lenders. This result is intuitive, as volume lenders select a much larger pool of stock positions for lending, providing them with greater flexibility to incorporate environment-related preferences into their lending supply screening process.

I further confirm in Table A5 that the PEL effect is robust to employing alternative measures of stock brownness, including the raw environmental (E) scores, E scores from S&P, as well as residualized E scores that are orthogonal to firm fundamentals. Residualized E scores are computed by taking the residuals from a stock-quarter-level panel regression in which the raw E score is regressed on an array of firm characteristics, including firm size, market-to-book, capital expenditure, return on assets, dividend payouts, tangibility, stock return, stock return volatility, Amihud illiquidity,

and industry-by-quarter fixed effects (so that the residualized E scores are also "industry-neutral"). Table A6 shows that the PEL effect remains statistically and economically strong in the presence of various combinations of high-dimensional fixed effects.

5.5 Pro-environment lenders' share recall and voting decisions on brown firms

When a position is on loan over the voting record date, the lender forfeits the voting rights associated with that position for shareholder meeting proposals. However, the lender can choose to recall shares prior to the record date to regain voting rights. This decision involves a trade-off between the potential lending revenue from continued lending and the ability to influence brown firms' policies through proxy voting.

Do PELs view securities lending and proxy voting as substitutes or complements in advancing pro-environment incentives? In this subsection, I examine PELs' share recall and voting decisions. On one hand, funds may actively recall shares before the record date to exercise their voting rights and influence company policies through proxy voting. Using aggregate lendable supply data at the stock level, Aggarwal, Saffi, and Sturgess (2015) find that lenders with monitoring incentives actively recall shares to vote on shareholder proposals. More recently, Li and Zhu (2024) use the same N-PORT data as this study and provide granular evidence that mutual funds tend to recall loaned shares before voting record dates to exercise their voting rights. On the other hand, securities lenders may prioritize lending revenue over voting rights and opt not to recall shares. Exploiting a 2019 SEC guidance change that relaxed legal constraints on funds' fiduciary duties regarding proxy voting, Hu, Mitts, and Sylvester (2021) document an increase in stock lendable supply leading up to proxy meetings, particularly for stocks heavily owned by index funds. This suggests that securities lenders may have a financial incentive to keep shares on loan rather than recalling them for voting purposes.

I investigate PELs' recall decisions on brown stocks by constructing a sample where the position was on loan in the previous quarter $t-1$ and run the following regression:

$$1[\text{Recall}]_{f,i,t} = \phi(1[\text{PEL}]_{f,t} \times 1[\text{Proxy meeting}]_{i,t}) + \beta' X_{f,i,t} + \alpha_{i,t} + \gamma_{f,t} + \varepsilon_{f,i,t+1}, \quad (5)$$

where $1[\text{Recall}]_{f,i,t}$ is an indicator variable that equals one if fund f recalls the outstanding loans of brown stock i in quarter t, and $1[\text{Proxy meeting}]_{i,t}$ indicates whether the record date for brown stock i falls between quarters $t-1$ and t. The coefficient ϕ captures how the voting-recall sensitivity differs between PELs and other passive funds.

Table 7 presents the results. Column (1) shows that PELs and other funds exhibit no statistically significant differences in their share recall decisions for brown stocks prior to voting record dates. In other words, unconditionally, PELs are no more likely than other funds to recall brown stocks to exercise their voting rights. However, the above specification masks substantial heterogeneity in the types of proposals featured in proxy meetings. If PELs have pro-environment preferences, they may be more inclined to recall brown stocks and participate in proxy voting when E&S proposals appear on the meeting agenda. To test this, I replace the general proxy meeting indicator with an indicator equal to one when the meeting includes E&S proposals.[17] Column (2) reveals a striking contrast: while PELs do not recall brown stsocks for voting unconditionally, they are 66.1% more likely to recall when the brown firm's proxy meeting features E&S proposals. This finding suggests that PELs actively recall shares and engage with brown firms when E&S proposals are on the agenda.[18]

Given that PELs view voting on E&S proposals as a crucial channel for engaging with brown firms, it is natural to examine how PELs actually vote on these proposals at brown firms' proxy meetings. To investigate this, I collect fund voting records from ISS Voting Analytics, which sources data from SEC N-PX filings. I match ISS fund voting records to my sample funds using EDGAR's internal fund identifier. I then estimate the following fund-proposal-level regression:

$$1[\text{Voted for}]_{f,p} = \phi(1[\text{PEL}]_{f,t} \times 1[\text{E\&S proposal}]_p) + \lambda 1[\text{E\&S proposal}]_p + \beta' X_{f,i,t} + \alpha_{f,t} + \gamma_p + \varepsilon_p, \tag{6}$$

where $1[\text{Voted for}]_{f,p}$ equals one if the fund votes in favor of the proposal. In some stringent specifications, I include proposal fixed effects γ_p to directly compare how PELs vote differently compared to other shareholders on the same proposal at the same proxy meeting, thus completely

[17] I use proposal descriptions from the ISS database to categorize proposals into different types, including E&S proposals, close-vote proposals (outcomes within 10% of the passing threshold), M&A proposals, shareholder proposals, compensation proposals, and director elections.

[18] Table A7 further examines how PELs' recall activities vary with different proposal types featured in brown firms' shareholder meetings. The results show that PELs are also more likely to recall brown stocks when the meeting includes close-vote proposals and compensation proposals, suggesting that PELs recall brown stocks when they expect their votes to be of economic value.

controlling for unobserved heterogeneity from the firm side. Table 8 Panel A presents the regression results. Column (1) shows that, while unconditionally brown firms' E&S proposals are much less likely to receive favorable voting by funds than other proposal types, PELs are 19.2 percentage points more likely to vote for E&S proposals than other funds, and the magnitude of this effect is quantitatively similar when proposal fixed effects are included in Column (2). This indicates that while PELs persistently tilt lending toward brown stocks, they actively recall and vote in line with their pro-environment preferences in proxy meetings where E&S proposals are on the agenda.

A potential implication of PELs' support for brown firms' E&S proposals is that, at the aggregate proposal level, brown firms with higher PEL ownership may receive greater support for their E&S proposals, as PELs are supportive voters on such proposals. To test this hypothesis, I compute PEL ownership for each stock by aggregating the shares held by PELs as a percentage of the stock's total shares outstanding. I then estimate the following proposal-level regression:

$$\text{Voting outcome}_p = \phi(1[\text{PEL ownership}]_{i,t} \times 1[\text{E\&S proposal}]_p) + \lambda 1[\text{E\&S proposal}]_p + \gamma_m + \varepsilon_p, \tag{7}$$

where Voting outcome$_p$ is either the fraction of "For" votes received for proposal p or an indicator of whether proposal p is passed. Meeting fixed effects γ_m are included to strictly control for firm fundamentals, as the analysis compares voting outcomes across different proposals within the same proxy meeting. Table 8 Panel B shows that PEL ownership has a statistically and economically significant positive effect on E&S proposal voting outcomes for brown firms, both in terms of fraction of For votres and the overall likelihood of proposal passage. This finding highlights the crucial role PELs play in advancing pro-environment objectives, as they vote more favorably on E&S proposals at brown firms' shareholder meetings, reinforcing their commitment to sustainable investing through proxy voting.

Overall, the evidence in this subsection suggests that PELs view securities lending and proxy voting as complements rather than substitutes. They continue to supply brown stocks for lending when shareholder meetings do not feature key E&S proposals, but they are highly inclined to recall shares for voting when E&S proposals are on the agenda and vote favorably on these proposals. As a result, brown firms' E&S proposals receive stronger voting support in meetings where PELs have a higher presence. By supplying brown stocks for lending, PELs do not forgo monitoring or

engagement efforts —- they recall shares and exercise their voting power precisely when their votes are economically significant and influential in shaping brown firms' environmental policies going forward.

6 Asset pricing implications of pro-environment lender ownership

In this section, I examine the asset pricing implications of pro-environment securities lending styles. Given the inelastic supply in the securities lending market, where only a small subset of lenders is willing to supply shares for lending (Dong and Zhu, 2024), ownership by PELs may have an economically significant impact on the short-selling environment at the stock level. These limits to arbitrage could, in turn, influence a firm's information efficiency and (more speculatively) its cost of capital. Crucially, since PELs exhibit a stronger preference for lending brown stocks, I expect the asset pricing effects to differ systematically between brown and other non-brown stocks. To facilitate the stock-level analysis, I first construct the key explanatory variable, PEL ownership, as follows:

$$\text{PEL ownership}_{i,t} = \sum_{f} (\text{Shares}_{f,i,t} \times \mathbf{1}[\text{PEL}]_{f,t}) / \text{Shares outstanding}_{i,t}. \tag{8}$$

Intuitively, PEL ownership is the fraction of the stocks' oustanding shares held by pro-environment lenders. I use this variable to explore how PEL ownership affects the stock-level outcomes and how the effects vary across brown and other stocks.

6.1 Securities lending outcomes

I first investigate the impact of PEL ownership on securities lending outcomes. Building on the argument of inelastic lending supply (Dong and Zhu, 2024), PEL funds may be important share suppliers in the securities lending market for brown stocks as these funds persistently prefer to supply brown stocks. As a result, the presence of PELs is expected to increase the effective lendable supply, which in turn may reduce the cost of shorting shares and increase the short interest, especially for

brown firms. To test this hypothesis, I run the following regression model on a stock-quarter-level panel:

$$\text{Outcome}_{i,t+1} = \phi(\text{PEL ownership}_{i,t} \times 1[\text{Brown}]_{i,t}) + \beta' X_{i,t} + \alpha_t + \epsilon_{i,t+1}, \tag{9}$$

where $\text{Outcome}_{i,t+1}$ is a securities lending outcome of stock i at time $t+1$, and $X_{i,t}$ is a vector of stock-level control variables along with the individual variables from the interaction term. Stock-level controls include non-PEL passive fund ownership, active fund ownership, firm size, leverage, market-to-book ratio, return on assets, quarterly stock return, stock return volatility, turnover, and utilization. I consider three core securities lending outcomes at the aggregate stock-level, including lendable supply, short interest, and loan fee. Standard errors are clustered at the stock level.

Table 9 presents the results. PEL ownership induces an outward supply shift in the securities lending market, as evidenced by its positive effects on lendable supply and short interest, alongside a negative effect on loan fees. More importantly, the interaction term between PEL ownership and the brown stock indicator shows that the positive supply effect is significantly stronger for brown stocks. Specifically, a one pp increase in PEL ownership leads to 0.26 pp more lendable supply, 0.069 pp higher short interest, and 0.05 pp lower loan fees for brown stocks relative to other stocks. These findings indicate that PELs are marginal share suppliers in the securities lending market for brown stocks, and that their pro-environment lending preferences meaningfully affect aggregate short-sale conditions for these stocks.

If lending supply facilitated through PEL ownership is indeed inelastic, we should observe less frictions and more stability for shorting brown stocks when PEL ownership is high. To this end, I replace the outcome variable in Equation 9 with several proxies for shorting stability, including short-selling risk (proxied by the volatility of daily loan fees, following Engelberg, Reed, and Ringgenberg (2018)), loan tenure, lender concentration, and proportion of shorts borrowed from stable supply (according to Markit's proprietary algorithm). Regression estimates from Table 10 indicate that brown stocks with higher PEL ownership exhibit lower loan fee volatility, longer securities loan tenure, as well as more diversified and more stable securities lender base.

Taken together, the findings in Tables 9 and 10 suggest that PEL ownership has economically significant implications for securities lending outcomes. The results support the argument that PELs

are key share suppliers in the securities lending market for brown stocks, and that an increased presence of PELs leads to an outward shift in the supply curve and greater supply stability for brown stocks.

6.2 Informational efficiency

I next examine the impact of PEL ownership on the informational efficiency of brown stocks. Building on the previous findings that PEL ownership alleviates short-sale constraints and reduces short-selling risk—particularly for brown stocks—I expect that the presence of PELs will enhance the informational efficiency of brown stocks. To test this conjecture, I employ the price delay measure of Hou and Moskowitz (2005) as a broad proxy for price efficiency and use it as the outcome variable in Equation 9. Table 11 Column (1) shows that PEL ownership significantly reduces price delay for brown stocks, consistent with the notion that PEL ownership facilitates the timely incorporation of information into brown stock prices.

Next, I zoom into a specific setting where the incorporation of new information into stock prices can be directly tested: earnings announcements. Specifically, I examine how PEL funds alleviate frictions in the securities lending market around earnings releases and analyze the broader impact of short selling on stock price responses to earnings news. Pontiff (2006) argues that arbitrage risk is the primary cost faced by arbitrageurs, potentially hindering the efficient incorporation of new earnings information into stock prices. Empirically, for each stock, I compute the average lendable supply, short interest, and loan fee over the three-day window surrounding the earnings announcement date. Columns (2) to (4) in Table 11 show that PEL ownership alleviates short-sale constraints—leading to higher lendable supply, greater shorting activity, and lower loan fees—particularly for brown stocks around earnings releases, a key informational event.

I next examine the price efficiency implications of a less constrained short-selling environment around earnings releases. Short selling should play a more significant role in cases of bad earnings news compared to good news, as the incorporation of negative information into prices relies on an unconstrained short-selling environment (Porras Prado, Saffi, and Sturgess, 2016). To test this, I follow the literature and compute standardized unexpected earnings (SUE) as the difference between actual earnings per share and the median I/B/E/S analyst forecast made within 90 days before the announcement, scaled by the share price on the announcement day. Following Porras Prado, Saffi,

and Sturgess (2016), I create a binary variable, 1[Bad earnings surprise], which equals one when the SUE for a stock falls into the bottom tercile of the cross-sectional distribution. I measure the stock price reaction to earnings as the cumulative abnormal return (CAR) over the three-day window around the earnings announcement date. Regressing earnings CAR on the interaction between various measures of short selling around earnings and the indicator for bad news, Columns (5) to (7) show that less constrained short selling around earnings releases indeed facilitates a more timely incorporation of bad earnings news into stock prices. Overall, the results in Table 11 suggest that PEL ownership has economically significant implications for the informational efficiency of brown stocks. The findings support the argument that PEL funds alleviate short-sale constraints and arbitrage risk, enabling short sellers to enhance price efficiency, particularly for brown stocks.

These findings may also extend to settings involving environmental incidents at brown firms. Similar to PELs' effects on price efficiency around earnings announcements, I conjecture that PELs facilitate the timely incorporation of negative environmental news into brown stock prices. To test this, I construct a sample of ESG incidents from Reprisk and examine the impact of PEL ownership on stock price reactions. I analyze Reprisk incidents separately across the three ESG dimensions—environmental, social, and governance—using the three-day CAR around the incident date as the outcome variable. Unlike earnings announcements, which occur predictably each quarter, ESG incidents are infrequent, limiting the statistical power of my tests. Despite this, Table 12 Column (1) shows that PEL ownership is negatively associated with stock price reactions to environmental incidents (statistically significant at the 10% level), suggesting that PELs facilitate the timely incorporation of negative environmental news. The results for social and governance incidents are less conclusive, as evidenced by the insignificant coefficients in Columns (2) and (3). Given this paper's focus on pro-environment motives, it is within expectation that the effect is more pronounced for environmental incidents.

6.3 Cost of capital

In this subsection, I examine whether PEL ownership, by alleviating short-sale constraints, enables short sellers to better inject negative environment-related expectations into brown stock prices, potentially leading to a higher cost of capital for brown firms. As changes in cost of capital is more likely to materialize over longer horizons, I use as the outcome variable the change in firms'

implied cost of capital between future quarters and the current quarter t. I obtain data on firms' implied cost of capital from Eskildsen, Ibert, Jensen, and Pedersen (2024), which are calculated based on a mechanical earnings-forecast model.

Table 13 Column (1) provides a validation check that the average brown firm has 50 basis points (bp) higher implied cost of capital than other firms, after other fundamental characteristics are controlled for. In Columns (2) to (4), I regress changes in implied cost of capital over different future horizons on the interaction between PEL ownership and brown stock status. The results are generally consistent with the argument that ownership by PEL funds gradually lead to an increase in the cost of capital for brown firms, although the statistical significance is rather weak and the economic magnitude is small: one pp increase in PEL ownership leads to only 2 bp incremental increase in cost of capital for brown firms, when the change is measured over two quarters ($t = 1.94$).

The finding of a small economic effect on firms' cost of capital aligns with the notion that such changes are more likely to materialize over longer horizons. Given the short sample period in this study, the impact of relaxing short-sale constraints on firms' cost of capital appears to be limited in magnitude. However, the presence of suggestive evidence that PEL ownership may influence brown firms' cost of capital through the securities lending channel is noteworthy. This finding contributes to the ongoing industry debate on whether "green shorting" can effectively influence the cost of capital and the behavior of brown firms.[19] My results suggest that in the context of green shorting, it is equally important to consider frictions arising from the lending supply side — lenders with stronger pro-environment preferences may play a crucial role in facilitating green shorting strategies.

6.4 Identification: entry, exit, and flows

Although the stock-level securities lending outcomes presented thus far are largely correlational, I develop several identification strategies to provide more robust evidence on the role of PEL ownership in this subsection. Specifically, I exploit variation in PEL ownership driven by new entry and exit positions of PEL funds. Additionally, I examine stock-level securities lending outcomes when PEL ownership is instrumented with flows into PEL funds.

[19] See, for example, the blog posts by Cliff Asness, founder and Chief Investment Officer at AQR Capital Management: https://www.aqr.com/Insights/Perspectives/Shorting-Your-Way-to-a-Greener-Tomorrow and https://www.aqr.com/Insights/Perspectives/Shorting-Counts.

Given that PELs in my sample are all passively managed funds, it is reasonable to assume that their entry and exit decisions are primarily driven by reconstitutions of their underlying benchmark indices, which are plausibly exogenous to the fundamentals of individual stocks. To test this, I construct the indicator variable $1[\text{PEL Exit}]_{i,t} > 5\%$ ($1[\text{PEL Entry}]_{i,t} > 5\%$) that equal one when the aggregate exit (entry) positions of PEL funds in stock i and quarter t exceeds 5% of the existing ownership by PEL funds. I focus on a 5% threshold to ensure that the exit (entry) positions are economically significant relative to the existing shareholder base of PEL funds, in a similar spirit to the analysis in Dong and Zhu (2024). I then estimate an event-study model, regressing changes in stock-level securities lending outcomes on the exit (or entry) indicator. To isolate the plausibly exogenous variation in PEL ownership, I control for existing PEL ownership and other stock-level characteristics.

Table 14 Panel A presents the regression results for the PEL exit event study. I observe results that are consistent with the main findings in the previous subsections. When a significant number of PELs exit their positions in a brown stock (plausibly due to index deletions), the stock experiences a contraction in lending supply (0.5 pp), a decrease in short interest (0.2 pp), and an increase in loan fees (30 bp). The findings point to an inward shift in the lending supply curve and a more constrained short-selling environment for brown stocks. Results from the PEL entry event study in Panel B mirror the findings from the exit event study. When new-entry PELs acquire significant stakes into a brown stock (plausibly due to index additions), the stock experiences an expansion in lending supply (1.5 pp), an increase in short interest (0.6 pp), and a decrease in loan fees (10 bp).

Finally, I instrument PEL ownership with flows into (or out of) PEL funds. The identifying assumption is that flows to passive PEL funds impact the securities lending environment for a stock only through the PEL ownership channel. Prior literature shows that active mutual funds tend to scale their portfolios proportionally in response to large inflows or outflows (Coval and Stafford, 2007; Edmans, Goldstein, and Jiang, 2012; Lou, 2012). This effect should be even stronger for passive funds, as they do not make active portfolio choices and are required to track benchmark portfolio weights as closely as possible. Motivated by this line of work, I define a continuous variable PEL residual $\text{flow}_{i,t}$ that equals holding-weighted percentage residualized flow of existing PEL shareholders in stock i and quarter t. I compute residualized fund flows as the residuals from regressing quarterly fund flows on contemporaneous fund size, fund return, expense ratio, tracking

error, and an ETF indicator, along with fund-style-by-quarter fixed effects. This approach isolates the component of fund flows unlikely to be driven by salient fund characteristics, making it a better candidate for plausibly exogenous shocks to PEL ownership. I use PEL residual $\text{flow}_{i,t}$ as an instrumental variable for PEL ownership and re-run the regressions in Table 9 in a 2SLS framework.

Table 14 Panel C reports the results. The first-stage regression in Column (1) shows that the PEL residual flow instrument is strongly positively correlated with PEL ownership with a first-stage F-statistic of 13.3 (untabulated), satisfying the relevance condition. The second-stage results, presented in Columns (2) to (4), suggest that flow-instrumented PEL ownership has significant predictive power for lendable supply and loan fees, with effects in the expected directions. However, its impact on short interest becomes statistically insignificant. Nonetheless, the joint occurrence of an expansion in lendable supply and a decline in loan fees suggests an outward shift in the supply curve (Cohen, Diether, and Malloy, 2007), leading to a less constrained short-selling environment for brown stocks. This finding is consistent with the main results.

Overall, the results from using PEL fund position exits, position entries, and residualized flows as plausibly exogenous shocks to stock-level PEL ownership provide consistent and robust evidence that ownership by pro-environment lenders has economically significant supply-side effects on brown stocks' aggregate short-sale conditions and limits to arbitrage.

7 Conclusion

Sustainable investing has emerged as a major trend in the asset management industry. Existing literature primarily examines sustainable investing through portfolio selection, shareholder voting, and direct engagement. This paper introduces a novel perspective on how passive funds can contribute to sustainability objectives by leveraging securities lending. Environmentally conscious passive funds integrate their pro-environment preferences into securities lending decisions by making shares of brown portfolio stocks available for lending. By increasing the lending supply for brown stocks, these funds help relax short-sale constraints, thereby allowing short sellers to more swiftly and effectively express their negative assessment of brown firms through shorting, thereby exerting pressure on these firms. Moreover, the increased availability of lendable shares can by itself serve as a disciplining mechanism, as it facilitates short-selling threats against brown firms, discouraging

corporate managers from engaging in activities disfavored by (environmentally conscious) investors.

Using novel position-level securities lending data, I estimate the fund-level pro-environment securities lending styles and document substantial heterogeneity among passive funds. Funds managed by politically liberal portfolio managers and those domiciled in Democratic-leaning areas exhibit significantly stronger pro-environment lending styles. Funds with abundant resources and expertise in securities lending are also more likely to adopt pro-environment lending practices. Pro-environment lenders persistently favor supplying brown stocks for lending, yet they actively recall shares of these stocks prior to voting record dates to exercise their voting rights when they perceive their votes to be economically valuable – particularly when E&S proposals are on the agenda at brown firms' shareholder meetings. In other words, pro-environment lenders view securities lending and proxy voting as complementary tools for promoting sustainability: they facilitate short selling of brown stocks through supplying shares in the lending market, while also actively participating in proxy voting when their influence is likely to shape brown firms' long-term E&S policies. At the aggregate stock-level, ownership by pro-environment lenders has important implications for brown firms' short-sale constraints and informational efficiency, with some suggestive evidence of an impact on brown firms' long-horizon cost of capital.

Overall, my results provide novel insights into the securities lending channel of sustainable investing. In light of the ongoing industry debate on the role of short selling in advancing ESG objectives, my findings underscore the importance of accounting for frictions on the lending supply side. Lenders with strong pro-environment preferences can significantly enhance the effectiveness of green shorting strategies. Future research could explore the regulatory implications of integrating sustainability and other non-pecuniary considerations into securities lending practices within the asset management sector.

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Figures

Figure 1: **Aggregate lending activities: active vs passive funds**
This figure plots the aggregate lending share (defined as the total value of stocks on loan reported by N-PORT filings divided by the total value of stock loans reported by Markit) and the fraction of lending funds (defined as equity funds that have reported securities on loan divided by the total number of equity funds in N-PORT filings). The two metrics are plotted for each quarter-end from 2019 Q3 to 2022 Q4, and separately for the active fund type and the passive fund type.

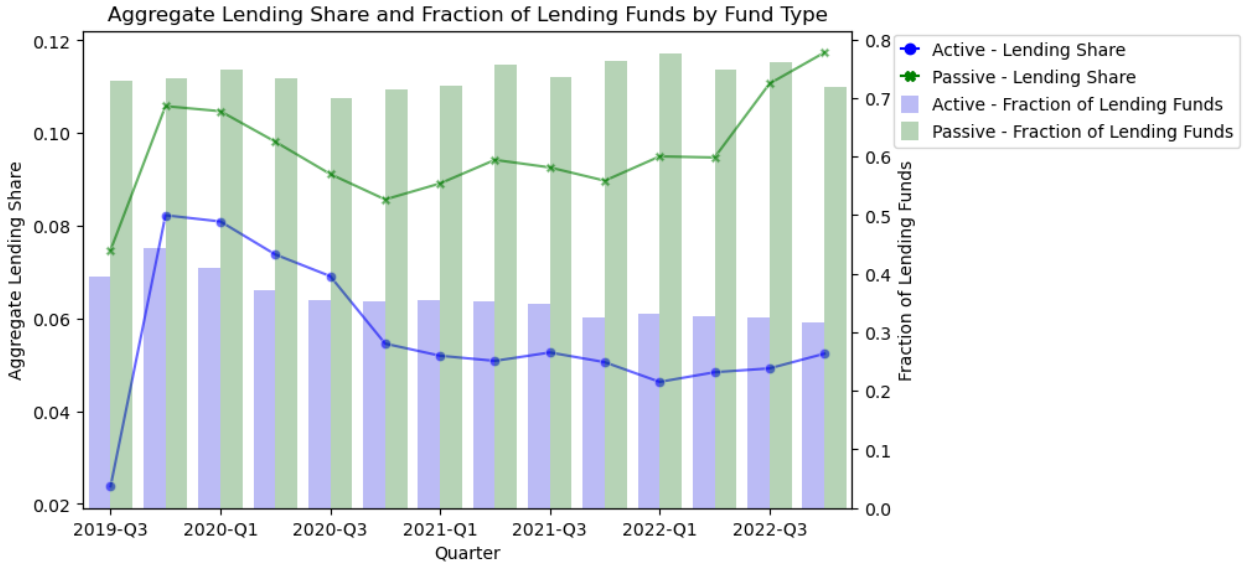
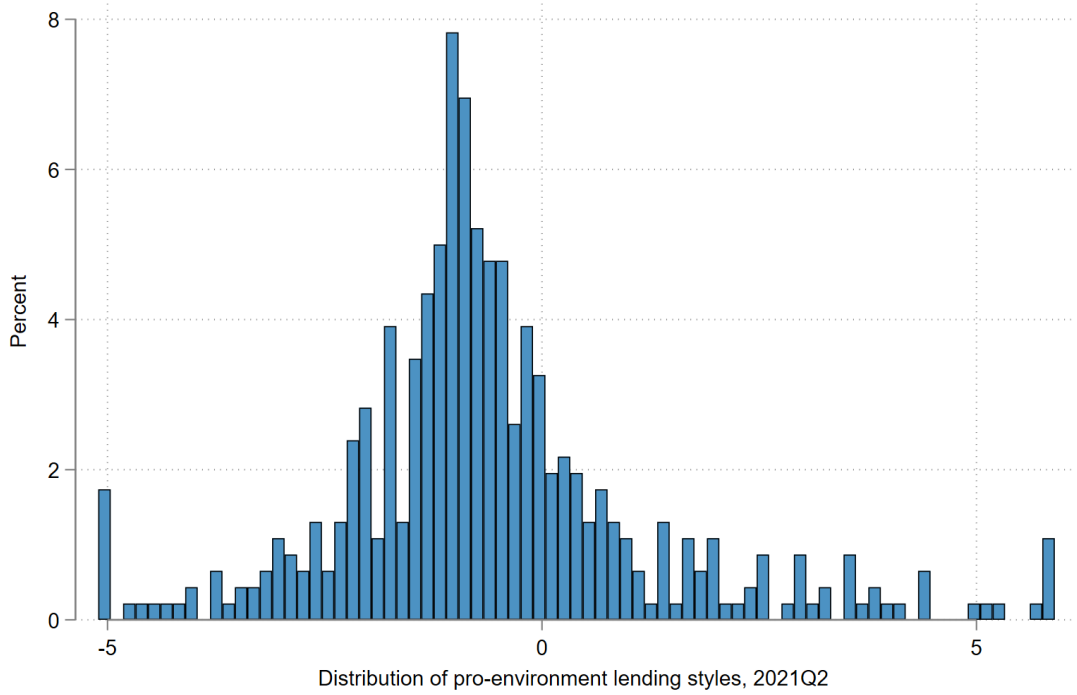
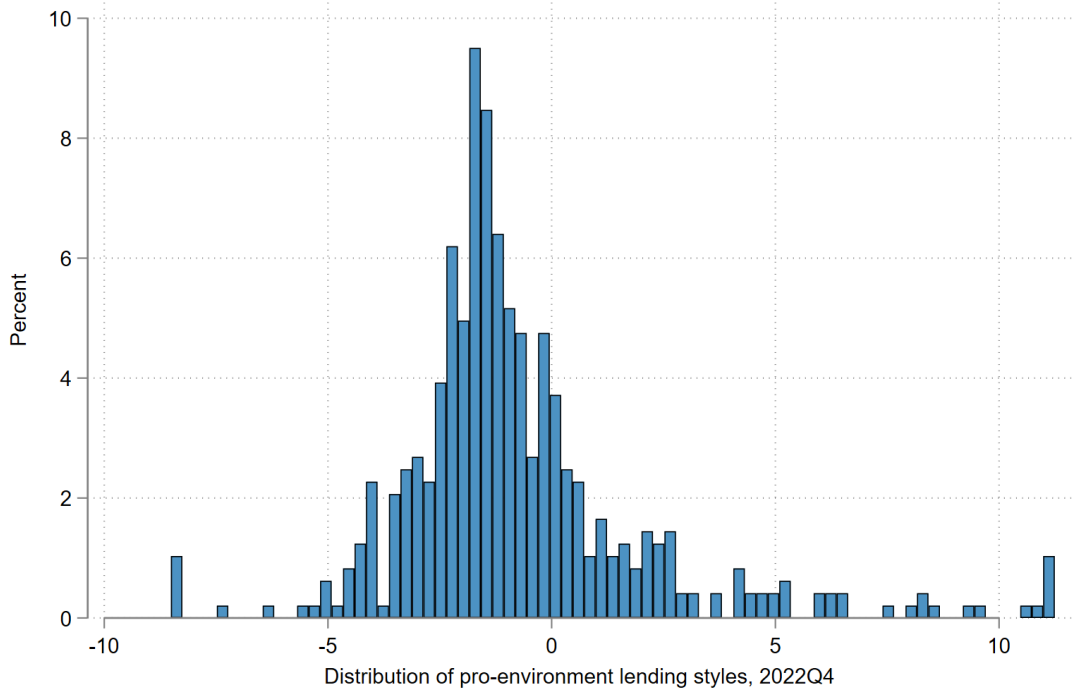


Figure 2: **Distribution of pro-environment securities lending style**
This figure plots the distribution of estimated pro-environment securities lending styles for two separate cross-sections: 2021Q2 and 2022Q4.

Panel A: 2021Q2



Panel B: 2022Q4



Tables

Table 1: Summary statistics
This table reports the summary statistics of the key variables in the paper. Panel A reports the distributional statistics for the position-level variables. Panel B reports the distributional statistics for the fund-level variables. Panel C reports the distributional statistics for the stock-level variables. Summary statistics are computed from observations with non-missing values for all the variables reported.

Panel A: Position-level variables

Variable	N	Mean	Std	P25	Median	P75
1[On loan]	2389295	0.089	0.28	0	0	0
Fraction on loan	2389295	0.049	0.20	0	0	0
1[Recall]	2389295	0.027	0.16	0	0	0
Portfolio weight	2389295	0.0022	0.0044	0.00022	0.00080	0.0022
Ownership weight	2389295	0.0020	0.0050	0.000045	0.00024	0.0010

Panel B: Fund-level variables

Variable	N	Mean	Std	P25	Median	P75
1[PEL]	5547	0.34	0.47	0	0	1
Pro-environment lending style	5547	-0.57	2.23	-1.71	-0.91	0.050
ln(TNA)	5547	20.3	2.41	18.7	20.4	22.0
Fund return	5547	0.022	0.13	-0.049	0.040	0.097
Expense ratio	5547	0.0033	0.0033	0.0011	0.0026	0.0044
Fund flow	5547	0.91	2.80	-0.032	0.028	0.16
Tracking error	5547	0.026	0.045	0.0057	0.012	0.024
1[ETF]	5547	0.72	0.45	0	1	1
Proportion of TNA on loan	5547	0.024	0.041	0.00039	0.0064	0.026
1[Democrat fund]	5547	0.15	0.36	0	0	0
1[Republican fund]	5547	0.071	0.26	0	0	0
Democrat vote share of fund state	5547	0.56	0.077	0.48	0.58	0.63

Panel C: Stock-level variables

Variable	N	Mean	Std	P25	Median	P75
PEL ownership	27549	0.064	0.034	0.038	0.061	0.083
1[Brown]	27549	0.32	0.47	0	0	1
Lendable supply	27549	0.32	0.13	0.22	0.34	0.43
Short interest	27549	0.034	0.044	0.0056	0.016	0.044
Loan fee	27549	0.0053	0.0099	0.0028	0.0029	0.0031
Loan fee volatility	27549	0.0013	0.0036	0.00020	0.00032	0.00058
Loan tenure	27549	68.7	47.5	35.6	55.8	87.6
Lender HHI	27549	0.31	0.12	0.23	0.29	0.37
Proportion of stable shorts	27549	0.63	0.15	0.53	0.63	0.73
Price delay	27549	0.11	0.13	0.031	0.066	0.14
Lending supply around earnings	23496	0.33	0.13	0.23	0.35	0.43
Short interest around earnings	23496	0.033	0.044	0.0048	0.015	0.043
Loan fee around earnings	23495	0.0042	0.0051	0.0028	0.0029	0.0032
Earnings CAR	23499	0.0010	0.084	-0.042	0.00055	0.042
ICC	23135	0.079	0.036	0.055	0.077	0.098
1[PEL exit >5%]	27549	0.062	0.24	0	0	0
1[PEL entry >5%]	27549	0.069	0.25	0	0	0
PEL residual flow	27549	0.0089	0.072	-0.017	0.0090	0.034
Non-PEL passive ownership	27549	0.078	0.048	0.039	0.075	0.10
Active ownership	27549	0.12	0.081	0.055	0.11	0.17
Size	27549	7.82	1.82	6.56	7.73	8.95
Leverage	27549	0.27	0.20	0.081	0.25	0.41
Market-to-book	27549	2.30	2.15	1.06	1.49	2.59
ROA	27549	0.014	0.039	0.0047	0.019	0.034
Stock return	27549	0.030	0.27	-0.12	0.011	0.15
Return volatility	27549	0.032	0.017	0.019	0.027	0.040
Turnover	27549	0.60	0.58	0.28	0.44	0.70
Utilization	27549	0.099	0.14	0.014	0.043	0.13

Table 2: Distribution of lender funds for brown stocks

This table presents the stock-quarter level distribution of lender funds for sample brown stocks from the N-PORT data. Brown stocks are defined as those with LSEG Environmental pillar score below the cross-sectional tercile. Number of funds is the total number of funds holding the stock. Number of lenders is the total number of funds having the stock position on loan. Proportion of lending funds is the ratio of the number of lender funds to the total number of fund holders. Proportion of passive fund lenders is the ratio of the number of passive lender funds to the total number of lender funds.

Variable	N	Mean	Std	P25	Median	P75
Number of funds	12407	56.17	44.21	24.00	44.00	77.00
Number of lenders	12407	9.64	10.10	3.00	6.00	12.00
Proportion of lending funds	12407	0.26	0.24	0.07	0.17	0.38
Proportion of passive fund lenders	12407	0.69	0.30	0.50	0.75	1.00

Table 3: Determinants of pro-environment securities lenders
This table presents the regression estimates of determinants of pro-environment securities lenders. t-statistics are reported in parentheses and standard errors are clustered at the fund level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1) 1[PEL] (t+1)	(2) 1[PEL] (t+1)	(3) 1[PEL] (t+1)
ln(TNA)	0.025***	0.024***	0.044***
	(3.64)	(3.51)	(5.87)
Fund return	0.065	-0.033	-0.033
	(0.49)	(-0.14)	(-0.25)
Expense ratio	3.136	2.548	2.530
	(0.67)	(0.54)	(0.25)
Fund flow	-0.004	-0.003	-0.007
	(-0.92)	(-0.69)	(-1.50)
Tracking error	-0.206	-0.192	0.186
	(-0.91)	(-0.83)	(0.77)
1[ETF]	0.010	-0.005	0.017
	(0.27)	(-0.13)	(0.34)
Proportion of TNA on loan	3.151***	3.450***	1.506***
	(10.14)	(9.58)	(4.33)
1[Democrat fund]	0.251***	0.261***	0.185**
	(5.26)	(5.57)	(2.41)
1[Republican fund]	-0.108**	-0.105**	-0.026
	(-2.14)	(-2.05)	(-0.31)
Democrat vote share of fund state	0.395**	0.367*	-0.085
	(2.02)	(1.86)	(-0.07)
Quarter FE	Yes	No	No
Style $\times$ quarter FE	No	Yes	No
Family $\times$ quarter FE	No	No	Yes
Adjusted R^2	0.159	0.162	0.297
N	5547	5547	5390

Table 4: Position-level evidence: baseline estimates
This table presents the position-level baseline regression estimates of the securities lending relation between PEL and brown stocks. Results from sample splits based on lending agent affiliation are also reported. t-statistics are reported in parentheses and standard errors are clustered at the fund and stock levels. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
	1[On loan] (t+1)	1[On loan] (t+1)	1[On loan] (t+1)
1[PEL] $\times$ 1[Brown]	0.054***	0.059***	0.034***
	(11.23)	(9.28)	(8.25)
Portfolio weight	0.152	0.366	-0.020
	(1.10)	(1.26)	(-0.18)
Ownership weight	0.410	0.825	2.272***
	(0.50)	(0.91)	(2.91)
1[On loan]	0.376***	0.364***	0.339***
	(29.97)	(21.48)	(23.12)
Sample	All	In-house agent	Third-party agent
Stock-quarter FE	Yes	Yes	Yes
Fund-quarter FE	Yes	Yes	Yes
Adjusted R^2	0.487	0.497	0.444
N	2388414	1261826	1090120

Table 5: Position-level evidence: within-family/agent allocation of new loans
This table presents the position-level regression estimates of the securities lending relation between PEL and brown stocks in subsamples of new securities loan demand arriving at the fund family or lending agent level. t-statistics are reported in parentheses and standard errors are clustered at the fund and stock levels. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
	1[On loan] (t+1)	1[On loan] (t+1)	1[On loan] (t+1)	1[On loan] (t+1)
1[PEL] $\times$ 1[Brown]	0.049***	0.047***	0.057***	0.044***
	(5.82)	(6.41)	(7.88)	(5.98)
Portfolio weight	-0.846	-0.462	-0.658	-0.483
	(-1.28)	(-0.79)	(-1.58)	(-1.31)
Ownership weight	2.905**	2.500	3.546**	3.170*
	(2.03)	(1.62)	(2.22)	(1.86)
Sample	New family loan	New family loan	New agent loan	New agent loan
Stock-quarter FE	Yes	No	Yes	No
Stock-family-quarter FE	No	Yes	No	No
Stock-agent-quarter FE	No	No	No	Yes
Fund-quarter FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.436	0.450	0.399	0.414
N	116154	113466	173738	172069

Table 6: Position-level evidence: the role of ESG attention shock
This table presents the position-level regression estimates of the securities lending relation between PEL and brown stocks in the presence of ESG attention shocks. t-statistics are reported in parentheses and standard errors are clustered at the fund and stock levels. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
	1[On loan] (t+1)	1[On loan] (t+1)	1[On loan] (t+1)	1[On loan] (t+1)
1[PEL] × 1[Brown] × 1[ESG attention]	0.020**	0.028***		
	(2.12)	(2.99)		
1[PEL] × 1[ESG attention]	-0.004**	-0.003**		
	(-2.21)	(-2.01)		
1[PEL] × 1[Brown] × Fund ESG attention			0.220***	0.232***
			(3.84)	(3.83)
1[PEL] × Fund ESG attention			-0.002	-0.061
			(-0.01)	(-0.49)
Fund ESG attention			-0.044	0.009
			(-0.77)	(0.18)
1[PEL] × 1[Brown]	0.052***	0.039***	0.026***	0.012*
	(8.47)	(7.97)	(3.22)	(1.71)
Portfolio weight	0.065	-0.081	0.060	-0.086
	(0.53)	(-0.80)	(0.49)	(-0.84)
Ownership weight	0.993	0.929*	0.986	0.928*
	(1.36)	(1.65)	(1.35)	(1.65)
1[On loan]	0.370***		0.370***	
	(30.90)		(30.88)	
Sample	All	Loan initiation	All	Loan initiation
Stock-quarter FE	Yes	Yes	Yes	Yes
Fund-quarter FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.458	0.171	0.458	0.171
N	1787948	1664267	1787948	1664267

Table 7: PEL recall analysis

This table presents the position-level regression estimates of the relation between PEL and share recall activities for brown stocks. t-statistics are reported in parentheses and standard errors are clustered at the fund and stock levels. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)
	1[Recall]	1[Recall]
1[PEL] $\times$ 1[Proxy meeting]	0.010	
	(0.83)	
1[PEL] $\times$ 1[ES proposal]		0.661***
		(8.80)
Portfolio weight	-7.925*	-8.010**
	(-1.97)	(-1.99)
Ownership weight	-2.675	-2.677
	(-1.57)	(-1.57)
Sample	Brown	Brown
Stock-quarter FE	Yes	Yes
Fund-quarter FE	Yes	Yes
Adjusted R^2	0.336	0.336
N	74739	74739

Table 8: PEL voting on E&S proposals and proposal outcomes
This table presents the proposal-level regression estimates of the proxy voting preferences of PELs and their impact on voting outcomes of brown stocks. Panel A examines position-level fund voting, and Panel B investigates the implication of the presence of PELs on aggregate proposal voting outcomes. t-statistics are reported in parentheses and standard errors are clustered at the fund and stock levels for Panel A, and at the stock level for Panel B. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: PEL voting on E&S proposals

	(1) 1[Voted for]	(2) 1[Voted for]
1[PEL] × 1[ES proposal]	0.192***	0.203**
	(2.94)	(2.20)
1[ES proposal]	-0.419***	
	(-3.62)	
Portfolio weight	0.668	-0.471
	(0.60)	(-1.55)
Ownership weight	1.621***	-0.021
	(2.75)	(-0.13)
1[On loan]	-0.018***	-0.002
	(-3.12)	(-0.60)
Sample	Brown	Brown
Fund-quarter FE	Yes	Yes
Proposal FE	No	Yes
Adjusted R^2	0.027	0.663
N	192005	191368

Panel B: Proposal voting outcomes

	(1) Fraction of For votes	(2) 1[Proposal passed]
PEL ownership × 1[E&S proposal]	6.826***	15.450***
	(4.84)	(6.33)
1[E&S proposal]	-0.928***	-1.796***
	(-8.67)	(-10.47)
Sample	Brown	Brown
Meeting FE	Yes	Yes
Adjusted R^2	0.648	0.245
N	20272	20335

Table 9: PEL ownership and stock-level securities lending outcomes
This table presents the stock-level regression estimates of the relation between PEL ownership and securities lending outcomes. t-statistics are reported in parentheses and standard errors are clustered at the stock level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1) Lendable supply (t+1)	(2) Short interest (t+1)	(3) Loan fee (t+1)
PEL ownership × 1[Brown]	0.261***	0.069***	-0.050***
	(6.11)	(3.41)	(-5.35)
1[Brown]	-0.029***	-0.002	0.003***
	(-8.90)	(-1.10)	(3.74)
PEL ownership	1.263***	0.159***	-0.025***
	(44.92)	(13.89)	(-6.40)
Non-PEL passive ownership	1.180***	0.081***	-0.008***
	(60.55)	(10.50)	(-3.92)
Active ownership	0.562***	0.080***	-0.016***
	(43.41)	(18.32)	(-12.60)
Size	0.009***	0.000	-0.000***
	(16.07)	(0.64)	(-4.39)
Leverage	0.013***	0.012***	-0.003***
	(2.96)	(7.32)	(-5.03)
Market-to-book	0.004***	-0.000	-0.000***
	(10.57)	(-0.57)	(-4.69)
ROA	-0.040*	-0.005	-0.010**
	(-1.90)	(-0.49)	(-2.24)
Stock return	0.037***	-0.004***	-0.002***
	(22.98)	(-4.30)	(-5.91)
Return volatility	-0.596***	-0.201***	0.016
	(-9.73)	(-8.10)	(1.48)
Turnover	0.017***	0.015***	-0.000
	(9.53)	(16.21)	(-0.56)
Utilization	-0.064***	0.238***	0.030***
	(-10.37)	(45.03)	(14.12)
Quarter FE	Yes	Yes	Yes
Adjusted R^2	0.848	0.719	0.305
N	27549	27549	27549

Table 10: PEL ownership and securities lending stability
This table presents the stock-level regression estimates of the relation between PEL ownership and securities lending stability. t-statistics are reported in parentheses and standard errors are clustered at the stock level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1) Loan fee volatility (t+1)	(2) Loan tenure (t+1)	(3) Lender HHI (t+1)	(4) Proportion of stable shorts (t+1)
PEL ownership × 1[Brown]	-0.015***	113.932***	-0.289***	0.256**
	(-5.25)	(3.20)	(-4.34)	(2.53)
1[Brown]	0.001***	-6.247**	0.035***	-0.024***
	(3.87)	(-2.33)	(6.45)	(-2.90)
PEL ownership	-0.011***	90.204***	-0.041	0.472***
	(-8.13)	(4.11)	(-1.03)	(7.55)
Non-PEL passive ownership	-0.006***	71.866***	-0.277***	0.123***
	(-7.46)	(4.70)	(-10.77)	(3.30)
Active ownership	-0.005***	35.343***	-0.119***	-0.250***
	(-11.84)	(4.42)	(-7.97)	(-10.45)
Size	-0.000***	-1.716***	-0.026***	-0.009***
	(-7.39)	(-4.08)	(-32.38)	(-7.20)
Leverage	-0.001***	7.568**	-0.035***	-0.035***
	(-4.85)	(2.26)	(-5.76)	(-3.77)
Market-to-book	-0.000***	-0.230	-0.015***	-0.011***
	(-8.72)	(-0.71)	(-24.77)	(-12.51)
ROA	0.000	16.069	0.126***	0.018
	(0.34)	(1.01)	(4.30)	(0.39)
Stock return	-0.000***	1.984	0.021***	-0.015***
	(-3.86)	(1.54)	(8.05)	(-3.85)
Return volatility	-0.001	-44.484	0.350***	0.538***
	(-0.28)	(-0.98)	(4.16)	(4.11)
Turnover	0.000***	-23.241***	-0.006***	-0.019***
	(3.37)	(-18.66)	(-2.94)	(-5.50)
Utilization	0.007***	136.708***	-0.336***	0.050***
	(9.60)	(21.84)	(-39.32)	(3.67)
Quarter FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.224	0.141	0.402	0.145
N	27549	27549	27549	27549

Table 11: PEL ownership and information efficiency

This table presents the stock-level regression estimates of the relation between PEL ownership and information efficiency. t-statistics are reported in parentheses and standard errors are clustered at the stock level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1) Price delay (t+1)	(2) Lending supply around earnings	(3) Short interest around earnings	(4) Loan fee around earnings	(5) Earnings CAR	(6) Earnings CAR	(7) Earnings CAR
PEL ownership × 1[Brown]	-0.596***	0.169***	0.061***	-0.030***			
	(-6.08)	(3.76)	(2.68)	(-6.16)			
1[Brown]	0.048***	-0.025***	-0.002	0.002***			
	(5.68)	(-7.09)	(-1.25)	(4.14)			
Lending supply around earnings × 1[Bad earnings surprise]					-0.028***		
					(-3.01)		
Lending supply around earnings					0.043***		
					(4.28)		
Short interest around earnings × 1[Bad earnings surprise]						-0.060**	
						(-2.05)	
Short interest around earnings						0.220***	
						(6.64)	
Loan fee around earnings × 1[Bad earnings surprise]							0.641***
							(2.89)
Loan fee around earnings							-0.178
							(-1.19)
1[Bad earnings surprise]					-0.022***	-0.029***	-0.034***
					(-6.51)	(-20.72)	(-23.32)
PEL ownership	-0.298***	1.244***	0.148***	-0.016***	0.014	0.027	0.060***
	(-4.89)	(40.63)	(13.85)	(-7.27)	(0.62)	(1.39)	(3.09)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.168	0.834	0.800	0.324	0.192	0.193	0.191
N	27551	25489	25489	25488	25497	25497	25496

Table 12: PEL ownership and price formation around ESG incidents
This table presents the incident-level regression estimates of the relation between PEL ownership and price formation around Reprisk ESG incidents. t-statistics are reported in parentheses and standard errors are clustered at the stock level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1) Incident CAR	(2) Incident CAR	(3) Incident CAR
PEL ownership × 1[Brown]	-0.362*	-0.046	-0.077
	(-1.75)	(-0.28)	(-0.43)
1[Brown]	0.027	0.007	0.007
	(1.65)	(0.46)	(0.42)
PEL ownership	-0.004	0.029	0.031
	(-0.06)	(0.58)	(0.42)
Non-PEL passive ownership	-0.009	-0.023	0.131**
	(-0.18)	(-0.60)	(2.01)
Active ownership	-0.017	0.004	-0.021
	(-0.63)	(0.17)	(-0.76)
Size	0.001	0.000	0.002*
	(0.98)	(0.24)	(1.89)
Leverage	-0.001	-0.001	-0.007
	(-0.09)	(-0.15)	(-0.68)
Market-to-book	-0.001	-0.001	0.001
	(-0.63)	(-1.35)	(0.45)
ROA	0.098	0.030	0.023
	(1.12)	(0.51)	(0.26)
Stock return	-0.031***	-0.022***	-0.009
	(-2.71)	(-2.62)	(-0.85)
Return volatility	0.338	-0.013	-0.278
	(1.59)	(-0.07)	(-1.13)
Turnover	-0.005	0.004	0.001
	(-1.12)	(0.91)	(0.13)
Utilization	0.017	0.013	0.042*
	(0.98)	(0.68)	(1.95)
Incident type	Environmental	Social	Governance
Quarter FE	Yes	Yes	Yes
Adjusted R^2	0.052	0.017	0.015
N	808	1465	868

Table 13: PEL ownership and changes in implied cost of capital
This table presents the stock-level regression estimates of the relation between PEL ownership and future changes in implied cost of capital. t-statistics are reported in parentheses and standard errors are clustered at the stock level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1) ICC	(2) Change in ICC (t+1)	(3) Change in ICC (t+2)	(4) Change in ICC (t+3)
PEL ownership × 1[Brown]		0.011	0.020*	0.015
		(1.62)	(1.94)	(1.12)
1[Brown]	0.005***	-0.001	-0.001	-0.000
	(4.53)	(-1.41)	(-0.86)	(-0.22)
PEL ownership	0.008	-0.004	-0.009	-0.014*
	(0.59)	(-1.16)	(-1.58)	(-1.75)
Non-PEL passive ownership	-0.034***	-0.007***	-0.007	-0.007
	(-3.35)	(-2.68)	(-1.56)	(-1.07)
Active ownership	0.010	-0.006***	-0.008***	-0.008**
	(1.42)	(-4.39)	(-3.17)	(-2.31)
Size	0.002***	-0.000***	-0.001***	-0.001***
	(6.22)	(-5.62)	(-5.35)	(-5.47)
Leverage	0.000	0.000	-0.000	-0.002
	(0.13)	(0.25)	(-0.02)	(-1.31)
Market-to-book	-0.008***	0.000	0.000	0.000*
	(-23.84)	(0.86)	(0.70)	(1.92)
ROA	0.347***	-0.006	-0.000	-0.020*
	(20.33)	(-1.07)	(-0.03)	(-1.70)
Stock return	-0.018***	0.011***	0.014***	0.021***
	(-15.23)	(12.79)	(14.70)	(18.17)
Return volatility	0.664***	-0.132***	-0.172***	-0.292***
	(14.16)	(-7.30)	(-7.28)	(-10.07)
Turnover	0.003**	-0.000	0.001	0.002**
	(2.24)	(-0.11)	(1.57)	(2.18)
Utilization	-0.010**	-0.000	-0.005**	-0.007***
	(-2.09)	(-0.04)	(-2.39)	(-2.81)
Quarter FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.326	0.350	0.293	0.306
N	25059	22782	20570	18493

Table 14: Shocks to PEL ownership and stock-level securities lending outcomes
This table presents the stock-level regression estimates of the relation between plausibly exogenous shocks to PEL ownership and stock-level securities lending outcomes. t-statistics are reported in parentheses and standard errors are clustered at the stock level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Position exit by PELs

	(1) Change in lending supply (t+1)	(2) Change in short interest (t+1)	(3) Change in loan fee (t+1)
1[PEL exit >5%] × 1[Brown]	-0.005***	-0.002*	0.003***
	(-3.05)	(-1.93)	(4.66)
1[Brown]	0.002***	0.001**	-0.000
	(5.14)	(2.04)	(-1.27)
1[PEL exit >5%]	-0.012***	-0.002***	0.001***
	(-12.61)	(-3.92)	(4.97)
PEL ownership	-0.008	-0.004	0.001
	(-1.50)	(-0.93)	(1.49)
Non-PEL passive ownership	0.007**	-0.008***	-0.002***
	(2.07)	(-3.03)	(-3.29)
Active ownership	-0.005**	-0.010***	0.000
	(-2.14)	(-5.91)	(0.19)
Size	0.000***	-0.000***	0.000
	(4.97)	(-4.06)	(0.16)
Leverage	-0.002**	0.000	0.000
	(-2.57)	(0.61)	(1.44)
Market-to-book	0.001***	0.000***	-0.000***
	(10.02)	(3.79)	(-4.49)
ROA	0.004	-0.002	-0.003***
	(0.80)	(-0.52)	(-2.94)
Stock return	0.009***	-0.008***	-0.001***
	(11.09)	(-10.82)	(-7.94)
Return volatility	-0.107***	0.031**	0.007
	(-6.38)	(2.40)	(1.63)
Turnover	0.001**	0.003***	0.000
	(2.57)	(6.73)	(0.62)
Utilization	-0.003*	-0.032***	-0.002***
	(-1.95)	(-22.66)	(-4.23)
Quarter FE	Yes	Yes	Yes
Adjusted R^2	0.105	0.073	0.036
N	27549	27549	27549

Panel B: position entry by PELs

	(1) Change in lending supply (t+1)	(2) Change in short interest (t+1)	(3) Change in loan fee (t+1)
1[PEL entry >5%] × 1[Brown]	0.015***	0.006***	-0.001***
	(12.29)	(6.24)	(-3.92)
1[Brown]	0.001	-0.000	0.000**
	(1.64)	(-0.04)	(2.17)
1[PEL exit >5%]	-0.014***	-0.003***	0.001***
	(-17.07)	(-6.10)	(7.95)
PEL ownership	-0.008*	-0.004	0.001
	(-1.69)	(-1.02)	(1.41)
Non-PEL passive ownership	0.007**	-0.008***	-0.002***
	(2.13)	(-3.00)	(-3.17)
Active ownership	-0.004*	-0.009***	-0.000
	(-1.70)	(-5.67)	(-0.20)
Size	0.000***	-0.000***	-0.000
	(5.10)	(-4.04)	(-0.02)
Leverage	-0.002***	0.000	0.000
	(-2.65)	(0.58)	(1.49)
Market-to-book	0.001***	0.000***	-0.000***
	(9.90)	(3.55)	(-4.33)
ROA	0.002	-0.003	-0.003***
	(0.40)	(-0.73)	(-2.82)
Stock return	0.009***	-0.008***	-0.002***
	(11.36)	(-10.82)	(-8.17)
Return volatility	-0.108***	0.031**	0.007*
	(-6.50)	(2.38)	(1.67)
Turnover	0.001**	0.003***	0.000
	(2.14)	(6.58)	(0.72)
Utilization	-0.003**	-0.032***	-0.002***
	(-2.42)	(-22.88)	(-4.03)
Quarter FE	Yes	Yes	Yes
Adjusted R^2	0.115	0.075	0.034
N	27549	27549	27549

Panel C: Instrumenting PEL ownership with PEL residual flow

	(1) PEL ownership	(2) Lendable supply (t+1)	(3) Short interest (t+1)	(4) Loan fee (t+1)
PEL residual flow	0.033***			
	(9.23)			
PEL ownership × 1[Brown]		4.537***	-0.059	-0.351**
		(3.12)	(-0.13)	(-2.20)
1[Brown]		-0.295***	0.006	0.022**
		(-3.25)	(0.23)	(2.18)
PEL ownership		-0.056	0.198	0.068
		(-0.12)	(1.43)	(1.37)
Non-PEL passive ownership	0.310***	1.241***	0.080***	-0.012***
	(38.57)	(36.49)	(7.73)	(-3.79)
Active ownership	0.094***	0.551***	0.080***	-0.015***
	(18.19)	(30.61)	(18.06)	(-9.96)
Size	-0.005***	0.000	0.000	0.000
	(-20.46)	(0.12)	(0.41)	(0.80)
Leverage	-0.009***	0.019***	0.011***	-0.003***
	(-4.94)	(2.71)	(6.74)	(-4.82)
Market-to-book	-0.003***	0.003***	-0.000	-0.000
	(-16.69)	(3.35)	(-0.11)	(-1.51)
ROA	0.027***	-0.112***	-0.003	-0.005
	(3.42)	(-2.87)	(-0.22)	(-0.94)
Stock return	-0.003***	0.043***	-0.004***	-0.002***
	(-4.16)	(12.80)	(-3.54)	(-5.28)
Return volatility	-0.204***	-0.755***	-0.197***	0.028**
	(-7.78)	(-7.61)	(-6.66)	(2.01)
Turnover	0.007***	0.020***	0.015***	-0.000
	(10.52)	(7.63)	(14.97)	(-1.08)
Utilization	-0.007**	-0.052***	0.238***	0.029***
	(-2.42)	(-4.75)	(42.98)	(13.51)
Quarter FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.404	0.619	0.715	0.101
N	27549	27549	27549	27549

Appendix

A Identifying fund political orientation

This section details the methodology used to infer the political orientation of the fund. I obtain individual political contribution data from OpenSecrets (formerly known as Center for Responsive Politics (CRP)), which serves to identify the political leaning of passive fund managers from their campaign contributions. OpenSecret directly collects political campaign contribution records from the Federal Election Commission (FEC) and applies data filters to improve the data quality (e.g., creation of unique contributor identifiers, removal of duplicate records), which makes it more user-friendly than the raw data provided by the FEC. The database provides information on each contributor's full name, location, occupation, employer, donation amounts, donation recipients, and recipients' political party affiliation. I download the full history of individual contribution records from the 2010 election cycle to the 2022 cycle.

I match the list of passive fund manager names obtained from Morningstar Direct to their political contribution records in OpenSecrets. To identify potential matches, I first require the individual in the political contribution database to have the same full name as the portfolio manager. Then, I manually check potential matches to rule out incorrect matches based on information on the individual's employer name and occupation.

The following procedure is used to infer the political identity of each matched portfolio manager. I label each individual donation as Democrat (Republican) if the recipient's party affiliation is Republican (Democrat). If the donation recipient is a Political Action Committee (PAC), I label the donation as Democrat (Republican) if the PAC spends more than 2/3 of the total committee expenditure on Democratic (Republican) candidates in the corresponding election cycle (Vorsatz, 2022; Wang, 2023; Sheng, Sun, and Wang, 2024). Finally, a portfolio manager is classified as Democrat-leaning if the total donation amount to Democrat recipients is higher than that to Republican recipients.

I aggregate manager-level partisanship to the fund level by defining a binary fund-level indicator, 1[Democrat fund] , that equals one if the number of Democrat-leaning portfolio managers is greater

than that of Republican managers.

$$1[\text{Democrat fund}]_{f,t} = 1[\#\ \text{Democrats}_{f,t} > \#\ \text{Republicans}_{f,t}],$$

where # Democrats$_{f,t}$ is the number of Democratic-leaning managers, # Republicans$_{f,t}$ is the number of Republican-leaning managers. An alternative indicator, 1[Republican fund], is defined similarly. For ease of interpretation, the two indicator variables are used in the empirical tests as a proxy for the political orientation at the fund level. In untabulated analysis, I confirm that the results are robust to employing more complex definitions of mutual fund partisanship following the prior literature, such as the net proportion of Democratic-leaning managers in the manager team (Wang, 2023) or the donation-weighted versions of the fund-level partisanship index (Wintoki and Xi, 2020; Khawar, 2022; Kempf, Luo, Schäfer, and Tsoutsoura, 2023).

Additional tables

Table A1: Variable definitions
This table presents the definitions of the main variables used in the paper.

Variable	Definition
1[On loan]	A binary indicator that equals one if the stock position is on loan by the fund.
Fraction on loan	The value of position on loan scaled by the total holding value of the position.
1[Recall]	A binary indicator that equals one when the position was on loan last quarter but is no longer on loan in the current quarter.
Portfolio weight	The holding value of the position divided by the fund's total net assets.
Ownership weight	The holding value of the position divided by the stock's total market capitalization.
1[PEL]	A binary indicator that equals one when the estimated fund-level Pro-environment securities lending style is above the cross-sectional tercile.
pro-environment lending style	Fund-level pro-environment securities lending style, estimated following the methodology described in Section 4.1.
log(TNA)	The natural logarithm of the fund's total net assets.
Fund return	Quarterly fund net return.
Expense ratio	The expense ratio charged by the fund.
Fund flow	Quarterly fund flow, computed as $\mathrm{TNA}_t - \mathrm{TNA}_{t-1} \times (1 + \mathrm{ret}_t)/\mathrm{TNA}_{t-1}$.
Tracking error	The fund's tracking error, defined as the 90-day rolling-window standard deviation of the fund's daily return deviation relative to the Morningstar category benchmark.
1[ETF]	A binary indicator that equals one if the fund is organized as an exchange-traded fund.
Proportion of TNA on loan	Total value of securities on loan divided by the fund's total net assets.

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Variable	Definition
1[Democrat fund]	A binary indicator that equals one when the number of Democrat-leaning portfolio managers is greater than the number of Republican-leaning managers in the fund.
1[Republican fund]	A binary indicator that equals one when the number of Republican-leaning portfolio managers is greater than the number of Democrat-leaning managers in the fund.
Democrat vote share of fund state	The proportion of votes cast for the Democratic candidate in the fund's domiciled state in the most recent presidential election.
PEL ownership	Number of shares owned by pro-environment lenders divided by the stock's total number of shares outstanding.
1[Brown]	A binary indicator that equals one when the stock's LSEG environmental pillar score is below the cross-sectional tercile.
Lendable supply	Quarterly average of daily quantity of stock inventory available to lend, divided by the total number of shares outstanding.
Short interest	Quarterly average of daily number of shares on loan divided by the total number of shares outstanding.
Loan fee	Quarterly average of daily indicative fee.
Loan fee volatility	Standard deviation of daily loan fee within the quarterly.
Loan tenure	Quarterly average of outstanding equity loan tenure in days.
Lender HHI	Herfindahl-Hirschman Index of lender concentration, computed as the sum of the squares of the market shares of all securities lenders.
Proportion of stable shorts	Quarterly average of daily proportion of short interest that is supplied by stable supply, based on Markit's proprietary algorithm.
Price delay	Price delay measure computed according to Hou and Moskowitz (2005).
Lending supply around earnings	Average daily lending supply around the three-day earnings announcement window.
Short interest around earnings	Average daily short interestaround the three-day earnings announcement window.

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Variable	Definition
Loan fee around earnings	Average daily loan feearound the three-day earnings announcement window.
Earnings CAR	Cumulative abnormal return around the three-day earnings announcement window. Abnormal returns are daily raw returns minus the returns predicted by the Fama-French three factor + momentum factor model. I use an estimation window of 250 days, starting 50 days prior to the earnings event date.
Incident CAR	Cumulative abnormal return around the three-day Reprisk ESG incident window. Abnormal returns are daily raw returns minus the returns predicted by the Fama-French three factor + momentum factor model. I use an estimation window of 250 days, starting 50 days prior to the incident event date.
ICC	Implied cost of capital, computed using the mechanical GLS method, as described in Eskildsen et al. (2024).
1[PEL exit > 5%]	A binary indicator that equals one when the aggregate value of exit positions of PEL funds exceeds 5% of the existing ownership by PEL funds.
1[PEL entry > 5%]	A binary indicator that equals one when the aggregate value of new entry positions of PEL funds exceeds 5% of the existing ownership by PEL funds.
PEL residual flow	Holding-weighted percentage residualized flow of existing PEL shareholders. Residualized fund flows as the residuals from regressing quarterly fund flows on contemporaneous fund size, fund return, expense ratio, tracking error, and an ETF indicator, along with fund-style-by-quarter fixed effects.
Non-PEL passive fund ownership	Number of shares owned by passive funds that are not PELs divided by the stock's total number of shares outstanding.
Active fund ownership	Number of shares owned by active funds in the N-PORT data divided by the stock's total number of shares outstanding.
Size	The natural logarithm of the firm's total assets (in millions).
Leverage	Total debt divided by total assets.
Market-to-book	Market value of firm's assets divided by book value of firm's assets.
ROA	Return on assets, defined as operating income before depreciation divided by total assets.

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Variable	Definition
Stock return	Quarterly cumulative stock return.
Return volatility	Standard deviation of daily stock returns over the quarter.
Turnover	Total stock trading volume during the quarter, divided by the number of shares outstanding by the end of the quarter.
Utilization	Quarterly average of daily number of shares on loan divided by the quantity of stock inventory available.

Table A2: Variance decomposition of position-level stock lending
This table presents the regression estimates of position-level stock lending outcome on various sets of fixed effects. t-statistics are reported in parentheses and standard errors are clustered at the fund and stock levels. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
	1[On loan]	1[On loan]	1[On loan]	1[On loan]	1[On loan]
Constant	0.089***	0.089***	0.090***	0.089***	0.089***
	(483.51)	(571.89)	(594.37)	(600.01)	(634.27)
Quarter FE	Yes	No	No	No	No
Stock-quarter FE	No	Yes	Yes	Yes	Yes
Agent-quarter FE	No	No	Yes	No	No
Family-quarter FE	No	No	No	Yes	No
Fund-quarter FE	No	No	No	No	Yes
Adjusted R^2	0.003	0.288	0.344	0.353	0.421
N	2389295	2389284	2353356	2389280	2389280

Table A3: Position-level evidence: fraction of position on loan
This table presents the position-level regression estimates of the securities lending relation between PEL and brown stocks at the intensive margin (i.e., the outcome variable is the fraction of stock holding on loan). Column (1) uses the full sample of position-level observations. Column (2) uses a restricted sample where the position is on loan (i.e., fraction on loan > 0). t-statistics are reported in parentheses and standard errors are clustered at the fund and stock levels. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)
	Fraction on loan (t+1)	Fraction on loan (t+1)
1[PEL] $\times$ 1[Brown]	0.041***	0.012**
	(10.26)	(2.21)
Portfolio weight	-0.152	-6.986***
	(-1.24)	(-7.51)
Ownership weight	0.364	-5.899***
	(0.48)	(-3.20)
1[On loan]	0.196***	0.011**
	(20.60)	(2.21)
Sample	All	On loan
Stock-quarter FE	Yes	Yes
Fund-quarter FE	Yes	Yes
Adjusted R^2	0.440	0.490
N	2388414	197302

Table A4: Position-level robustness check: alternative subsamples
This table presents the position-level regression estimates of the securites lending relation between PEL and brown stocks with alternative sample splits. t-statistics are reported in parentheses and standard errors are clustered at the fund and stock levels. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
	1[On loan] (t+1)	1[On loan] (t+1)	1[On loan] (t+1)	1[On loan] (t+1)	1[On loan] (t+1)
1[PEL] × 1[Brown]	0.049***	0.056***	0.054***	0.030***	0.016***
	(10.04)	(11.46)	(11.24)	(4.56)	(3.01)
Portfolio weight	0.101	0.151	0.154	2.303*	-0.033
	(0.65)	(1.05)	(1.10)	(1.87)	(-1.01)
Ownership weight	0.113	0.522	0.398	2.013**	0.734
	(0.10)	(0.67)	(0.50)	(2.02)	(1.62)
1[On loan]	0.356***	0.381***	0.375***	0.303***	0.310***
	(34.12)	(30.61)	(29.81)	(12.34)	(11.39)
Sample	Non-Big3	Non-COVID	Non-dividend record dates	Volume lenders	Value lenders
Stock-quarter FE	Yes	Yes	Yes	Yes	Yes
Fund-quarter FE	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.493	0.489	0.489	0.495	0.331
N	1502748	2044250	2286568	198373	512906

Table A5: Position-level robustness check: alternative brownness measures
This table presents the position-level regression estimates of the securites lending relation between PEL and brown stocks with alternative brownness measures. t-statistics are reported in parentheses and standard errors are clustered at the fund and stock levels. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1) 1[On loan] (t+1)	(2) 1[On loan] (t+1)	(3) 1[On loan] (t+1)	(4) 1[On loan] (t+1)	(5) 1[On loan] (t+1)
1[PEL] × 1[Brown (S&P)]	0.034***				
	(9.45)				
1[PEL] × E score		-0.028***			
		(-12.93)			
1[PEL] × E score (S&P)			-0.020***		
			(-10.18)		
1[PEL] × Residual E score				-0.008***	
				(-6.10)	
1[PEL] × Residual E score (S&P)					-0.005***
					(-4.63)
Portfolio weight	0.058	0.182	0.088	0.138	0.066
	(0.52)	(1.47)	(0.85)	(1.04)	(0.56)
Ownership weight	1.351	0.379	1.317	0.571	1.360
	(1.61)	(0.47)	(1.61)	(0.65)	(1.58)
1[On loan]	0.374***	0.374***	0.373***	0.381***	0.376***
	(28.93)	(29.76)	(28.82)	(29.24)	(29.04)
Stock-quarter FE	Yes	Yes	Yes	Yes	Yes
Fund-quarter FE	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.420	0.487	0.421	0.467	0.421
N	1823092	2389280	1823092	2002708	1766934

Table A6: Position-level robustness check: alternative fixed effects

This table presents the position-level regression estimates of the securites lending relation between PEL and brown stocks with alternative fixed effects. t-statistics are reported in parentheses and standard errors are clustered at the fund and stock levels. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
	1[On loan] (t+1)	1[On loan] (t+1)	1[On loan] (t+1)	1[On loan] (t+1)	1[On loan] (t+1)
1[PEL] $\times$ 1[Brown]	0.054***	0.054***	0.046***	0.048***	0.044***
	(11.23)	(11.62)	(9.90)	(10.30)	(9.71)
Portfolio weight	0.152	0.180	0.499***	0.103	0.152
	(1.10)	(1.52)	(3.43)	(0.71)	(1.07)
Ownership weight	0.410	0.203	-1.185	0.422	0.594
	(0.50)	(0.28)	(-1.22)	(0.63)	(0.74)
1[On loan]	0.376***	0.381***	0.248***	0.361***	0.376***
	(29.97)	(30.46)	(17.64)	(31.71)	(29.48)
Stock-quarter FE	Yes	No	No	Yes	Yes
Stock-style-quarter FE	No	Yes	No	No	No
Stock-family-quarter FE	No	No	Yes	No	No
Fund-quarter FE	Yes	Yes	Yes	No	No
Fund-SIC2-quarter FE	No	No	No	Yes	No
Fund-state-quarter FE	No	No	No	No	Yes
Adjusted R^2	0.487	0.500	0.590	0.479	0.466
N	2388414	2347827	2224317	1999075	2011310

Table A7: PEL recall analysis: different proposal types
This table presents the position-level regression estimates of the relation between PEL and share recall activities for proxy meetings featuring various proposal types. t-statistics are reported in parentheses and standard errors are clustered at the fund and stock levels. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1) 1[Recall]	(2) 1[Recall]	(3) 1[Recall]	(4) 1[Recall]	(5) 1[Recall]	(6) 1[Recall]
1[PEL] × 1[Close vote]	0.030**					
	(2.14)					
1[PEL] × 1[Proxy contest]		-0.100				
		(-0.99)				
1[PEL] × 1[M&A proposal]			0.017			
			(0.45)			
1[PEL] × 1[Shareholder proposal]				0.031		
				(1.10)		
1[PEL] × 1[Compensation proposal]					0.034***	
					(2.76)	
1[PEL] × 1[Director election]						0.008
						(0.68)
Portfolio weight	-7.935**	-7.934*	-7.932*	-7.930*	-7.884*	-7.925*
	(-1.97)	(-1.97)	(-1.97)	(-1.97)	(-1.95)	(-1.97)
Ownership weight	-2.686	-2.676	-2.675	-2.674	-2.707	-2.677
	(-1.58)	(-1.57)	(-1.57)	(-1.57)	(-1.59)	(-1.57)
Sample	Brown	Brown	Brown	Brown	Brown	Brown
Stock-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Fund-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.336	0.336	0.336	0.336	0.336	0.336
N	74739	74739	74739	74739	74739	74739