The Hidden Hand against Sustainability: Evidence from Separately Managed Accounts

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Abstract

Unlike mutual funds, separately managed accounts (SMAs) allow investors to customize portfolios with greater flexibility and without disclosure requirements. Using previously unexplored SMA holdings data covering $6 trillion in assets under management, we find that this flexibility leads SMAs to tilt more willingly toward brown stocks compared to mutual funds. In particular, the mutual funds' green-to-brown tilt escalates after the Paris Agreement, consistent with the heightened reputational concerns for mutual fund clients. The fact that SMA twins of co-managed funds, whose holdings are effectively disclosed through their mutual-fund counterparts, tilt green after the Paris Agreement further reinforces the channel. Finally, we document the heterogeneity in sustainability tilts across SMA characteristics, showing consistent dispersion between green and brown preferences.

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JEL Classification: G1, G2

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Introduction

Understanding investor sustainability preferences is important, as they can affect firms' cost of capital and potentially generate real effects. While the literature has documented a shift toward green investing—primarily within the traditional asset management sector, such as mutual funds (e.g., Starks, 2023)—this visible trend may not capture the full picture. Mutual funds are subject to disclosure requirements and may be sensitive to reputational concerns when deviating from prevailing social norms. As a result, existing research may be overlooking a large segment of investors who are not constrained in these ways. Would these unconstrained investors also tilt green, or would they behave differently? Importantly, the extent to which the rise in green investing affects firms' cost of capital depends on whether there remain investors willing to invest in brown firms—and how significant their role is[1]. In this paper, we examine the sustainability-related portfolio choices of a previously overlooked group of investors—who nonetheless comprise a substantial share of the asset management industry—using novel portfolio holdings data on separately managed accounts (SMAs).

Unlike mutual funds, SMAs offer investors the flexibility to customize portfolios without public disclosure requirements. SMA clients—typically high-net-worth individuals or institutional investors—can tailor their portfolios to reflect specific preferences, such as screening assets based on sustainability scores or aligning investments with religious beliefs. Mutual fund families often provide these customized services through their SMA platforms[2]. SMAs represent a substantial share of the market, with total assets under management for U.S. domestic equity portfolios amounting to approximately $6 trillion as of 2023. Importantly, SMA portfolios remain private, making them well-suited for studying underlying sustainability preferences. The absence of disclosure likely allows clients to express their views on sustainability-related characteristics with greater discretion.

In this paper, we ask two related questions. First, do investors with greater flexibility and without public disclosure requirements differ in their willingness to tilt their portfolios toward brown stocks compared to those with less flexibility and mandatory disclosure? And among these flexible and undisclosed investors, what types are more likely to tilt green versus brown? Second, if differences in investment behavior exists, what role—if any–do reputational concerns play in driving these differences?

[1] According to the model of Pástor et al. (2021), the expected "greenium" is a function of the relative wealth of ESG investors.

[2] For example, see https://www.fidelity.com/learning-center/trading-investing/separately-managed-accounts.

Our findings show that SMAs exhibit substantially greater dispersion in sustainability investing—some heavily favor green stocks, while others lean brown—whereas mutual funds display less variation and predominantly tilt green. Using the Paris Agreement in 2015 as a shock that heightened attention to sustainable investing, we find that mutual funds have increasingly tilted toward green stocks with high sustainability ratings, while SMAs continue to display wide dispersion in their sustainability preferences. We interpret this as evidence that mutual funds have become increasingly constrained by social norms, likely due to the public disclosure of their portfolios. Supporting this disclosure channel, we find that SMAs with co-managed twin mutual funds—sharing nearly identical portfolios—have behaved similarly to standalone mutual funds since the Paris Agreement. SMA managers appear to tilt more actively to green stocks when those holdings are subject to public disclosure through their mutual fund counterparts.

To begin, we collect detailed portfolio holdings data on U.S. domestic equity SMAs from the Morningstar Direct platform. To the best of our knowledge, we are the first to assemble comprehensive holdings data on SMAs[3]. Although SMAs report their holdings to Morningstar on a voluntary basis, we observe data for up to approximately 90% of the SMA universe identified in Morningstar Direct—perhaps due to Morningstar's influential role in the industry (e.g., Ben-David et al. (2022)). The total equity value covered by our data amounts to $6 trillion as of 2023, representing approximately 14% of the U.S. stock market. For comparison, U.S. domestic equity mutual funds held about 24% of the U.S. stock market in 2023.

To study investor sustainability preferences, we examine their sustainability-related portfolio decisions using the methodology proposed by Pastor et al. (2023). They develop an empirical approach that attributes portfolio weights to sustainability preferences while controlling for other key stock characteristics, such as size and book-to-market ratios. They emphasize that sustainability-related characteristics are often correlated with other firm attributes. For example, growth firms tend to receive higher environmental scores from sustainability rating agencies. As a result, if an investor tilts toward growth stocks, failing to control for this correlation may lead researchers to mistakenly infer that the investor prefers firms with high environmental scores.

Following their approach, we merge MSCI ESG ratings with our SMA holdings data to estimate the extent to which SMAs and mutual funds tilt their portfolios based on sustainability criteria (hereafter

[3]Evans et al. (2023) also exploit SMA holdings data from Morningstar for a subsample of actively managed U.S. domestic equity SMAs.

referred to as sustainability tilts). A portfolio exhibits stronger sustainability tilts when MSCI ESG ratings have greater explanatory power for its portfolio weights. Importantly, sustainability tilts can be large when a portfolio holds a disproportionately large share of either green (high-sustainability score) or brown (low-sustainability score) stocks. In other words, even if an SMA investor tilts toward brown stocks, the sustainability tilt can still be high, as the portfolio decisions are actively driven by sustainability-related characteristics. Capturing such tilts is important in our setting, as a strong tilt toward brown stocks reflects an investor's willingness to allocate capital to brown firms.

Since Pastor et al. (2023) show that sustainability tilts can mechanically appear greater for funds with high active share (Cremers and Petajisto, 2009), our main measures are sustainability tilts scaled by active share, following their methodology. This adjustment addresses the concern that SMAs may mechanically exhibit higher tilts than mutual funds simply because, as we show later, they tend to have higher active shares—likely reflecting their greater portfolio flexibility.

We first present evidence that SMAs exhibit greater flexibility in portfolio construction compared to mutual funds. Specifically, we find that SMAs have consistently higher active shares than mutual funds throughout our sample period from 2009 to 2023. For example, in 2023, the average active share for SMAs is 54%, compared to 36% for mutual funds. These findings suggest that SMA investors have greater discretion to construct portfolios that deviate from standard benchmarks such as the S&P 500 or the Russell 1000 Growth.

We also show that SMAs are significantly more performance-driven than mutual funds. Specifically, flow-performance sensitivity is twice as high for SMAs, suggesting that SMA investors are primarily motivated by pecuniary interests and operate under fewer non-financial constraints. In other words, mutual funds may be subject to more non-financial considerations than SMAs.

Building on these differences that SMAs construct more flexible portfolios and are more performance-driven than mutual funds, we next examine how these differences translate into sustainability tilts across SMAs and mutual funds. Our analysis reveals several novel findings. First, we find that SMAs exhibit not weaker but stronger sustainability tilts than mutual funds—an unexpected result given their stronger performance orientation—with sustainability-related holdings, whether green or brown, accounting for 40% of SMAs' active share, compared to 36% for mutual funds. Second, we find that SMAs display greater dispersion in the direction of their tilts—some heavily favor green stocks while others lean brown—whereas mutual funds show less variation and tilt predominantly green. Among SMAs, 42% of active share is

attributable to green tilts, while 37% reflects brown tilts. In contrast, for mutual funds, 42% of active share is also attributable to green tilts, but only 28% is driven by brown tilts. These differences are economically meaningful—accounting for up to 10% of the variation in tilts—and statistically significant. Since the Paris Agreement, mutual funds have increasingly converged toward green tilts, while SMA tilts have remained more polarized over time.

Next, we formally compare SMAs and mutual funds in a regression framework and consistently find that SMAs tilt more actively toward brown stocks. These results remain robust even after controlling for market-wide sustainability trends, time-varying styles, or manager-by-time fixed effects, suggesting that the differences reflect the preferences of flexible clients rather than managerial styles.

After establishing that unconstrained investors—proxied by SMA portfolios—more willingly tilt toward brown stocks, we next explore what limits mutual funds from doing the same.

We hypothesize that a key channel driving this difference is the interaction between disclosure requirements and evolving social norms around green investing. Because mutual fund holdings are publicly disclosed, mutual fund managers are more likely to face reputational pressure to align with sustainability norms, thereby creating incentives to tilt green. This reputational concern is likely amplified when serving institutional clients such as public pension funds, which are known to be more influenced by social norms than other types of investors (Hong and Kacperczyk, 2009). In contrast, SMA clients face less public scrutiny and therefore have greater freedom to invest according to their financial goals or personal views, even when these goals or views diverge from prevailing norms.

To test this mechanism, we exploit the Paris Agreement as a reputational shock that marked a turning point in the salience of sustainable investing as a social norm. We document a differential response to this shock between SMAs and mutual funds. Specifically, following the Paris Agreement, SMAs increased their brown tilt by 4.7% more and their green tilt by 7.6% less than mutual funds.

The difference-in-differences event studies show no evidence of pre-trends, supporting the interpretation that the reputational shock associated with the Paris Agreement played a central role in driving the divergence between SMAs and mutual funds.

To address the concern that our results may reflect differential shifts in investor preferences across vehicle types—for example, if mutual funds independently became more inclined toward green assets as sustainability gained prominence—we compare difference-in-differences estimates between twin and non-twin SMAs. Twin funds are nearly identical portfolios offered through different channels—one

through a mutual fund, the other through an SMA—but managed by the same manager using nearly the same strategy and holdings (Huang et al., 2023). As a result, SMAs with twins are indirectly subject to mutual fund disclosure requirements. By construction, twin SMAs are subject to public disclosure through their mutual fund counterparts, whereas non-twin SMAs remain fully private. Thus, the key distinction between the two lies in their exposure to portfolio disclosure requirements.

We estimate a triple interaction model and find that, relative to non-twin SMAs, twin SMAs tilt 14.7% more green following the Paris Agreement. This differential response supports the interpretation that disclosure exposure—rather than differential shifts in investor preferences—is a key driver of sustainability tilts. Importantly, we again find no evidence of pre-trends in the triple difference-in-differences event studies, reinforcing the conclusion that the reputational shock surrounding the Paris Agreement is the primary force behind twin SMAs' increased green tilts.

Further supporting this mechanism, we find that mutual funds with institutional clients, such as public pension funds, exhibit especially strong green tilts after the Paris Agreement—consistent with heightened reputational sensitivity. For example, CalPERS explicitly screens out brown firms as part of its sustainable investment mandate.[4] The presence of such norm-constrained clients likely creates pressure for mutual fund managers to align with sustainability norms and avoid brown stocks.

This reputational channel is further evidenced by a sharp decline in mutual funds' green tilts in late 2023, when at least 165 anti-ESG bills were introduced across 37 U.S. states (S&P Global Market Intelligence, 2023). In response, many public funds appear to have reduced their green exposures, likely to comply with emerging regulations and avoid political scrutiny. Together, these findings suggest that mutual funds' tilting behavior is tightly linked to the reputational and political environments their clients face—constraints from which SMA clients remain largely insulated.

In the final part of our paper, we examine how sustainability tilts affect fund flows, comparing SMAs and mutual funds. Our hypothesis is twofold. First, disclosure requirements make tilting brown costly for norm-constrained mutual funds by negatively affecting fund flows. At the same time, portfolio disclosure allows these funds to signal green tilts—potentially attracting capital from investors who care about social norms. Second, we conjecture that such investors are willing to accept lower financial performance in exchange for holding green funds, consistent with non-pecuniary motivations.

Consistent with this view, we find that mutual fund managers receive greater inflows when they tilt

[4]For example, see https://www.calpers.ca.gov/investments/sustainable-investments-program.

more heavily toward green stocks—either directly through their mutual funds or indirectly via their mutual fund twin counterparts. Notably, green tilts continue to positively influence flows even after controlling for performance, suggesting that underlying investors value sustainability on its own. Moreover, these investors—such as institutional clients—exhibit weaker sensitivity to performance when allocating flows, further supporting the presence of non-pecuniary motivations.

In contrast, SMA investors do not respond to sustainability tilts. As shown in earlier sections, their flows are far more sensitive to performance. Consequently, SMAs neither benefit from tilting green nor experience outflows as a result of tilting brown. This contrast reinforces our interpretation that mutual funds operate under reputational or norm-based constraints, which create incentives to tilt green and discourage tilting brown, whereas SMAs—shielded from public disclosure—face fewer such pressures.

However, while tilting brown does not appear to affect flows for SMAs on average—likely because their portfolio holdings remain private—we find that when SMA portfolios are revealed through their mutual fund twin counterparts, brown tilts become costly, leading to lower flows. Overall, the evidence suggests that the interaction between disclosure requirements and evolving social norms around sustainable investing is the key mechanism through which tilting brown becomes costly.

Related literature Our paper contributes to two main strands of literature. First, we add to research on investors' demand for sustainability. Prior studies—such as Bollen (2007), Benson and Humphrey (2008), Renneboog et al. (2011), Białkowski and Starks (2016), Hartzmark and Sussman (2019), and Pastor et al. (2023)—have primarily examined sustainable investing demand through mutual fund flows.[5] While this approach helps reveal the sustainability preferences of mutual fund investors, it can hardly identify the potential causes or motivations behind these preferences. Furthermore, it only paints a partial picture of the sustainability preferences of institutional and retail investors, as the amount of their assets managed by SMAs is sizable. For example, 13F filings reflect only aggregate portfolio holdings at the institution level (e.g., Fidelity's combined portfolio), masking substantial within-institution variation. As a result, important investor segments—such as SMA clients—are obscured in the aggregation. In another example, Pastor et al. (2023) infer retail behavior by using non-13F investors as a proxy, concluding that retail portfolios tend to be brown. Examining SMA holdings vis-à-vis mutual fund holdings offers not only an avenue to understand *why* sustainability matters but also a way to directly and comprehensively observe institutional and retail

[5] See also, Humphrey and Li (2021), Gibson Brandon et al. (2022), Kim and Yoon (2023), Ceccarelli et al. (2024), Edmans et al. (2024), and Emiris et al. (2024).

portfolios to understand *for whom* it matters.

Second, our paper contributes to the literature on separately managed accounts (SMAs) by examining the sustainable investing behavior of SMA holders. Existing research on SMAs—such as Busse et al. (2010), Elton et al. (2014), Gerakos et al. (2021), Rohleder et al. (2025), and Evans et al. (2023)—has largely focused on performance comparisons with mutual funds, benchmarks, or across investor types. In contrast, we study SMA investors' preferences for sustainability-related characteristics, leveraging the customized nature of SMAs as a unique opportunity to observe investor demand more directly. This shift from "how SMAs perform" to "what SMA investors want" provides new insights into the drivers of sustainability adoption across investor types.

1 Primer on SMAs

An SMA is a customized portfolio of securities overseen by a professional portfolio manager for an individual client. Unlike mutual funds and exchange-traded funds (ETFs)—which pool capital from multiple investors who collectively own shares in a standardized portfolio—SMAs offer tailored, investor-specific management. This customization enables clients to choose individual securities, allowing them to build portfolios that align closely with their personal investment objectives and preferences. For example, an investor guided by environmental considerations may selectively exclude particular stocks, industries, or regions while still employing mainstream investment strategies.[6]

Another advantage of separately managed accounts is their superior tax efficiency compared to pooled investment vehicles. Direct ownership of the underlying securities by clients enables portfolio managers to opportunistically harvest losses to offset gains, defer capital-gain realization by retaining appreciated positions, and tailor trades to each client's specific tax circumstances. In contrast, mutual funds distribute portfolio-level capital gains to all shareholders, imposing tax liabilities arising from other investors' redemptions or managerial trading decisions. Additionally, SMAs provide extensive transparency: clients can monitor trades in real time, review current holdings, balances, cost basis, and fees, and access detailed performance reports, thereby facilitating continuous portfolio assessment and effective tax planning[7].

Although SMA clients receive individualized transparency, very little information about SMAs enters the public domain. As individually owned portfolios regulated solely under the adviser's fiduciary

[6] See, for instance, the brochure with ESG-based customization options for Dimensional SMAs.
[7] See, for instance, JPMorgan marketing brochure for SMAs.

obligations set by the Investment Advisers Act of 1940—rather than the Investment Company Act of 1940—SMAs are exempt from the public prospectus and portfolio-holding disclosures required of mutual funds.[8]

To attract new clients, asset management firms report SMA's characteristics to financial advisors and data vendors, such as Morningstar and eVestment. In compliance with the Global Investment Performance Standards (GIPS),[9] individual SMA portfolios following the same strategy and managed by the same management team are aggregated into composite indices available to prospective investors. Although data on individual portfolios are not publicly accessible, Morningstar collects and reports aggregated composition data, including the number and size distribution of constituent accounts within an SMA composite.

SMAs cater to a distinctly different clientele compared to mutual funds. With a median minimum investment of $1 million, SMAs predominantly target institutional and high-net-worth investors. By contrast, mutual funds feature significantly lower entry thresholds, with median minimum investments for retail share classes set at $1,000.[10] According to the 2024 Investment Company Institute (ICI) Fact Book, retail investors dominate U.S. mutual fund holdings, accounting for 88% of total mutual fund assets in 2023.

2 Data on SMAs and Empirical Methodology

2.1 Data

We collect a survivorship-bias-free dataset on separately managed accounts from Morningstar Direct. The platform reports various characteristics, including gross and net monthly returns, assets under management, net inflows, and fees. Morningstar does not disclose individual SMAs; instead, it aggregates accounts with the same strategy and management team into SMA composites. Although the underlying accounts are unobservable, Morningstar reports key compositional variables, such as the number and size distribution of constituent accounts within an SMA composite.[11] This survivorship-bias-free SMA dataset has been used in a growing body of academic work (see, e.g., Evans and Fahlenbrach (2012), Elton et al. (2014), Evans

[8] Large investment advisers with at least $100 million under management that exercises discretionary control over the SMAs must include the account's securities in the adviser's own Form 13F filing.

[9] CFA Institute.

[10] Both medians are calculated on the universe of equity SMAs and mutual funds from Morningstar Direct.

[11] We exploit the dynamic variables titled *"Number of Strategy Accounts"* and *"Strategy Market Value of Accounts"*.

et al. (2023), Huang et al. (2023)).

Although SMAs are not required to report their holdings to regulators, they voluntarily disclose them to data providers such as Morningstar for business and marketing purposes. In doing so, SMA managers seek to attract more clients by increasing their visibility among financial advisors and institutional investors while building credibility with these audiences. As with other characteristics, Morningstar aggregates SMA portfolio holdings by strategy and management team. Thus, the holdings of individual SMAs remain hidden. We collect security-level portfolio holdings of all SMAs from Morningstar Direct, which are available at a quarterly frequency. Although disclosure is voluntary, we observe the portfolio holdings of 71% of SMA composites, with the coverage improving over time and reaching 89 % of SMA composites and 94 % of assets under management at the end of the sample period.

We obtain mutual fund data from Morningstar Direct and aggregate all share-class variables to the fund level. To ensure consistency in the source of holdings when comparing mutual funds with SMAs, we also collect mutual-fund holdings from Morningstar. To define SMA-MF twins, we exploit the variable *"StrategyId"*, which allows us to match mutual funds and SMAs that follow the same investment strategy.

Our sample period spans from 2009Q1 to 2023Q4, beginning in 2009 to align with Pástor et al. (2021). The sample is restricted to U.S. domestic-equity SMAs and mutual funds drawn from nine Morningstar equity categories[12]. To minimize incubation bias (Evans (2010)), we restrict our sample to mutual funds and separately managed accounts with at least $15 mln under management. When constructing portfolio-based measures, we further require portfolios to invest at least 50% of assets in U.S. stocks and to hold at least 30 stocks. The final sample includes 3,897 SMA composites and 2,703 mutual funds, representing 3,709 and 2,000 unique strategies, respectively. Summary statistics are presented in Table 1.

2.2 How SMAs Differ from Mutual Funds

We begin by documenting that SMAs represent a large and economically significant segment of the asset management industry. Figure 1 shows that, throughout the sample period, SMAs managed a comparable dollar amount of assets to mutual funds. By the end of 2023, SMAs managed over $6 trillion in assets, while mutual funds managed approximately $10 trillion. These figures highlight the substantial size of SMAs, despite their lower visibility relative to mutual funds, and motivate our focus on their portfolio choices.

[12]Defined by the variables "*US Category Group*" and "*Morningstar Category*". The *Morningstar Category* variable for both SMAs and mutual funds is restricted to the following types: Large Blend, Large Growth, Large Value, Mid-Cap Blend, Mid-Cap Growth, Mid-Cap Value, Small Blend, Small Growth, and Small Value.

Panel A of Table 1 presents summary statistics comparing SMAs and mutual funds. While SMAs exhibit returns similar to those of mutual funds, a key distinguishing feature is their investor composition. On average, 88% of SMA funds have institutional investors, compared to 56% among mutual funds. Additionally, 61% of SMA funds have more than half of their shares held by large investors with assets exceeding $25 million.

Given these contrasts, we turn to two key dimensions that further distinguish SMAs from mutual funds: portfolio flexibility and financial motivations. We find that SMAs maintain significantly more flexible portfolios than mutual funds, as proxied by their higher active shares. We also find that SMA investors are approximately twice as sensitive to returns as mutual fund investors, indicating a stronger emphasis on financial performance. Overall, the evidence suggests that SMAs combine high-powered financial incentives with greater portfolio discretion, making them an ideal vehicle for flexible, unconstrained investors—particularly those who can freely express their sustainability-related preferences without being bound by prevailing social norms.

First, we examine whether SMAs exhibit greater flexibility in constructing portfolios than mutual funds by studying their active shares (Cremers and Petajisto, 2009). Active share measures the extent to which a portfolio's holdings deviate from its benchmark index, capturing how "active" the portfolio is. Pavlova and Sikorskaya (2023) argue that fund managers prefer to hold stocks included in their benchmark indexes, and Kim (2025) show that fund mandates often require managers to hold a fraction of benchmark constituents. Accordingly, we view active share not only as a measure of activeness but also as an indicator of portfolio flexibility—that is, how freely a manager can deviate from the benchmark.

Figure 2 compares the average active shares of SMAs and mutual funds from 2009 to 2023. As shown in the figure, SMAs have consistently exhibited higher active shares than mutual funds. Table 1, Panel A shows that the average active share for SMAs is 60%, compared to 45% for mutual funds. SMAs' active shares show no distinct trend over time, although they decline slightly in late 2023. In contrast, mutual funds' active shares have steadily decreased from 50% in 2009 to 36% in 2023. This pattern is consistent with prior findings (e.g., Koijen et al., 2024), which document a general decline in activeness across the asset management industry. However, SMAs appear to be an exception to this trend, maintaining consistently higher deviations from their benchmarks. We interpret these findings as evidence that SMAs indeed have greater discretion over portfolio construction, consistent with how they are marketed. Given their large market presence, this evidence further suggests that there are hidden portfolios that have remained very

active and flexible despite the popularity of passive investing.

Next, we examine how sensitive SMA investors are to performance. A strong sensitivity of flows to returns reflects financially motivated behavior—whether driven by rational expectations or behavioral biases (Berk and Green, 2004). We hypothesize that financially motivated investors are less constrained by non-financial considerations, such as maintaining higher sustainability ratings in their portfolios.

To test this hypothesis, we estimate the classic flow-performance relationship using monthly flows and net returns for both SMAs and mutual funds. Fund flows are calculated using the standard definition:

$$flow_{i,t} = \frac{TNA_{i,t} - TNA_{i,t-1} \cdot (1 + ret_{i,t})}{TNA_{i,t-1}}, \tag{1}$$

where TNA is total net assets and ret denotes monthly net returns.

In Table 2, we regress next month's flows on current month returns, including an interaction term between returns and an SMA indicator variable (equal to one if the fund is an SMA). The results show that SMA investors are approximately twice as sensitive to performance as mutual fund investors. This pattern remains robust across multiple specifications: Column (1) includes fund fixed effects; Column (2) includes time fixed effects; Column (3) includes both fund and time fixed effects; and Column (4) adds style-by-time fixed effects to account for differences across investment styles over time. Overall, the results highlight that SMA investors exhibit a high degree of performance sensitivity, suggesting that they are substantially more pecuniarily motivated than mutual fund investors.

Taken together, the evidence suggests that SMAs maintain more flexible portfolios with greater managerial discretion and place stronger emphasis on financial performance. This, in turn, implies that SMAs are a natural vehicle for flexible and unconstrained investors who can freely express their sustainability-related preferences, compared to investors who are potentially constrained by social norms.

2.3 Empirical Methodology

After investigating the key differences between SMAs and mutual funds, we compare their sustainability-related portfolio choices. To do this, we follow the methodology proposed by Pastor et al. (2023), which estimates portfolio weights stemming from tilting toward or away from sustainability-related characteristics. Following their approach, we use MSCI ESG ratings as a proxy for sustainability-related characteristics. A key aspect of their methodology is controlling for other important stock characteristics, such as size, book-

to-market ratios, and profitability, when estimating sustainability-related stock choices. This is important because many popular asset characteristics are correlated with ESG scores. For example, growth stocks, such as technology firms, tend to receive high environmental scores. Therefore, failing to control for such characteristics could lead to the incorrect conclusion that a technology fund heavily uses sustainability criteria in its portfolio construction, when its stock choices are simply driven by industry exposures.

While we refer readers to Pastor et al. (2023) for a detailed explanation of the methodology, we summarize the key ideas here. Let w_{in} denote investor i's portfolio weight on stock n. We estimate:

$$\mathbb{E}[w_{in}|\mathcal{G}, C], \tag{2}$$

and

$$\mathbb{E}[w_{in}|\mathcal{G}_0, C], \tag{3}$$

where $\mathbb{E}$ denotes the conditional expectation of portfolio weights, C is the set of control variables (such as size, book-to-market ratio, and profitability), $\mathcal{G}$ represents sustainability-related characteristics (e.g., E, S, and G scores), and $\mathcal{G}_0$ is a counterfactual set where sustainability characteristics are replaced by their corresponding market portfolio values.

For example, if a stock has E, S, and G scores of 8, 9, and 10, and the market portfolio has E, S, and G scores of 4, 5, and 6, then $\mathcal{G}_0$ replaces the stock's values with those of the market (e.g., E score changes from 8 to 4). In words, Equation 2 estimates expected portfolio weights given actual sustainability and control characteristics, whereas Equation 3 estimates expected portfolio weights if stocks had market-average sustainability characteristics while maintaining their original controls.

Using these counterfactual portfolio weights, we estimate sustainability-related portfolio tilts as:

$$\Delta_{in} = \mathbb{E}[w_{in}|\mathcal{G}, C] - \mathbb{E}[w_{in}|\mathcal{G}_0, C], \tag{4}$$

which captures the fraction of w_{in} explained by sustainability-related characteristics. Fund-level sustainability tilts are then computed as:

$$T_i = \frac{1}{2}\sum_{n=1}^{N} |\Delta_{in}|. \tag{5}$$

Note that for a passive fund holding the market portfolio, $T_i = 0$, since $\mathcal{G} = \mathcal{G}_0$ would hold. Thus, T_i

measures the active sustainability tilt relative to the market.

The aggregate sustainability tilt is defined as:

$$T = \frac{\sum_i A_i T_i}{\sum_i A_i}, \tag{6}$$

where A_i denotes fund i's total assets under management (AUM).

Importantly, T_i captures the magnitude of sustainability tilts but not their direction. We are also interested in decomposing tilts into green and brown components. Green tilts are defined as overweighting green stocks or underweighting brown stocks, while brown tilts are defined as overweighting brown stocks or underweighting green stocks. Let T_i^G and T_i^B denote green and brown tilts, respectively. By construction,

$$T_i = T_i^G + T_i^B.$$

We define the fund-level net green tilt (green-minus-brown) as:

$$T_i^{GMB} = T_i^G - T_i^B, \tag{7}$$

and the aggregate net green tilt as:

$$T^{GMB} = \frac{\sum_i A_i T_i^{GMB}}{\sum_i A_i}. \tag{8}$$

For simplicity and to facilitate interpretation, we primarily use composite ESG scores as our sustainability-related characteristic. However, we find qualitatively similar results when we estimate tilts separately using E, S, and G scores. For the control set C, we follow Pastor et al. (2023) and include size, book-to-market ratios, profitability, asset growth, dividend yield, and market beta.

3 Sustainability Tilts in SMAs

Building on the idea that SMAs offer greater flexibility—as evidenced by their higher active shares relative to mutual funds—and that their investors are often strongly financially motivated, we now examine how sustainability tilts in SMAs compare to those in mutual funds. We hypothesize that social norms may constrain investors from tilting toward brown stocks (e.g., stocks with low environmental scores), as doing so could expose norm-constrained investors to reputational risk.

3.1 Time Series Evidence

In Figure 3, we calculate the aggregate sustainability tilts of SMAs and mutual funds using total net assets as weights, following Equation 6. Panel A shows that both SMAs and mutual funds have significantly increased their overall sustainability tilts over time. By the end of the sample period, approximately 48% of their deviations from the benchmark portfolio are attributable to sustainability-related considerations, up from about 30% in 2010. This trend suggests that sustainability-related characteristics have become an increasingly important driver of portfolio decisions for both SMAs and mutual funds.

What is also noticeable in Panel A is that sustainability tilts have been consistently higher among SMAs than mutual funds throughout the sample period, with one exception during Q4 of 2022 and Q1 of 2023. Apart from this episode, sustainability criteria have generally played a more prominent role in the portfolio decisions of SMA clients than those of mutual fund investors. Given that the tilt measure controls fosr other stock characteristics, such as size, value, and momentum, this finding suggests that SMA investors are actively incorporating sustainability considerations into their portfolio decisions—beyond what can be explained by traditional factor exposures. This pattern is particularly interesting because, once the disclosure and other constraints of mutual funds are lifted, end-investors appear to tilt even more strongly toward sustainabiliy.

As we explained in Section 2.3, overall sustainability tilts do not reveal the direction of the tilt—that is, whether a portfolio leans toward green or brown stocks. Sustainability tilts can be high regardless of whether a fund tilts green or brown. Importantly, tilting toward brown stocks is also a meaningful dimension of portfolio choice, as it reflects the active incorporation of sustainability-related characteristics into investment decisions. However, the tilts shown in Figure 3, Panel A do not, by themselves, indicate whether high tilt values are driven by green or brown exposures. To uncover the nature of these preferences, we analyze the direction of sustainability tilts by examining net green exposure.

In Panel B of Figure 3, we examine whether SMAs, on average, tilt more green or brown by analyzing net green tilts (green minus brown), constructed following Equation 8. The results show that mutual funds, on average, tilt more strongly toward green stocks than SMAs. Before 2015, both SMAs and mutual funds exhibited net green tilts close to zero, indicating that their portfolios were broadly sustainability-neutral with respect to the direction of tilts—neither strictly favoring green nor brown stocks. However, following the Paris Agreement, their trajectories diverged sharply: mutual funds became significantly more green-tilted,

consistent with prior findings (e.g., Noh et al., 2023), while SMAs maintained a relatively stable stance, with net green tilts hovering around zero. As we later show and interpret, we view the Paris Agreement as an event that substantially heightened the role of social norms in portfolio management.

Another noteworthy pattern is that mutual funds' net green tilts began to substantially decline in early 2023, while SMAs' net green tilts continued to fluctuate within their usual range. The magnitude of the decline for mutual funds is striking, falling from about 30% to 6% over a short period. As we show later, we interpret this sharp drop as consistent with the political backlash against sustainable investing during 2023. In particular, we find that this anti-ESG movement disproportionately affected mutual funds serving previously norm-constrained clients, prompting them to revert back to sustainability-neutral portfolios—likely as an effort to avoid political scrutiny.

Panels C and D decompose net green tilts into separate green and brown tilts for mutual funds and SMAs. Panel C shows that in the early part of the sample period, mutual funds' tilts were similarly distributed between green and brown stocks: some funds tilted toward green stocks, while others tilted toward brown stocks. However, beginning in 2015, mutual funds substantially increased their allocation to green stocks, while their allocation to brown stocks remained relatively stable—widening the gap between the two. During this period, mutual funds generally exhibited little interest in investing in brown firms relative to green firms.

This pattern, however, changed fundamentally in 2023. Specifically, mutual funds' brown tilts increased sharply from 30% to 40% within a single year, while their green tilts decreased from 60% to 45% over the same period. As we later argue, this reversal is consistent with the intensification of the anti-ESG political environment in 2023. We interpret these shifts as evidence of portfolio rebalancing by previously norm-constrained mutual funds seeking to reduce their exposure to political scrutiny.

In Panel D, we find that SMAs have maintained relatively similar exposures to both green and brown stocks, with green tilts only slightly exceeding brown tilts. This evidence supports the interpretation that SMA investors are split in their views on sustainable investing, with roughly as many tilting green as tilting brown. When aggregated, these opposing preferences result in a group-level tilt that appears nearly neutral. However, this aggregation masks the fact that many SMA investors actively tilt toward brown stocks.

Overall, these results underscore the importance of accounting for heterogeneity in sustainability preferences. The detailed SMA holdings data reveal divergent views on sustainability that are often obscured in aggregate analysis. This point is particularly important because SMA investors are part of the broader population of 13F and non-13F investors, whose portfolios are often studied only in aggregate

(e.g., the aggregate portfolio of Fidelity or the aggregate retail sector).

Another noteworthy pattern is that, unlike mutual funds, SMAs did not disproportionately increase their green tilts relative to brown tilts following the Paris Agreement. In fact, over the sample period, SMAs have steadily increased their tilts toward both green and brown stocks. These results suggest that sustainability-related characteristics have become increasingly important inputs into SMA portfolio construction, but that SMA investors have consistently disagreed on the direction of these tilts. Moreover, SMAs do not appear to react to salient events such as the Paris Agreement in 2015 or the ESG political backlash in 2023. As we argue later, this muted reaction likely reflects the fact that SMA investors' views continue to be reflected in their portfolios, given that SMAs are not required to publicly disclose their holdings or the sustainability profiles of their investments.

Comparing Panels C and D also reveals an interesting pattern: SMA investors tended to tilt more green than mutual funds before 2018, but after 2018—as mutual funds increasingly tilted green—mutual funds became greener than SMAs. For brown tilts, however, SMA investors consistently tilted more toward brown stocks than mutual funds throughout the sample period. As we show formally in a regression analysis later, SMA investors, on average, tilt more toward brown stocks than mutual funds.

Overall, we interpret these results as reflecting the relatively low cost of expressing divergent views on sustainability within SMA portfolios. Due to fewer disclosure requirements, SMA investors may find it easier to tilt brown without facing public scrutiny or backlash—costs that may have increased substantially since the Paris Agreement. These findings suggest that SMAs serve as a vehicle through which investors actively express their individual views on sustainability-related characteristics, whether tilting green or brown.

3.2 Fund-Level Evidence

After examining trends in sustainable investing, we turn to fund-level panel data to further investigate differences in sustainability tilts between SMAs and mutual funds in a regression framework. In these settings, we are able to control for a variety of fixed effects, addressing potential systematic drivers affecting sustainability tilts. The results are presented in Table 3.

Column (1) of Panel A shows that SMAs exhibit higher overall sustainability tilts than mutual funds, consistent with Figure 3. The average difference is about 0.02 and is statistically significant at the 5% level. This magnitude means that SMAs' sustainability tilts explain two percentage points more variation in

their active shares than those of mutual funds. This difference is economically meaningful, accounting for approximately 5% of the mean and standard deviation of overall tilts (see Table 1).

In Column (2), we replace time fixed effects with style-by-time fixed effects to account for time-varying style-specific influences on sustainability tilts. While we control for other key stock characteristics when estimating sustainability tilts, this set of fixed effects addresses the concern that differences simply originate from the differential style distribution of funds between the two types of vehicles. The results remain virtually unchanged, indicating robustness to this alternative specification. If anything, the results become even more economically and statistically significant.

Columns (3) and (4) show that SMAs have lower green-minus-brown tilts than mutual funds, again consistent with Figure 3. The average difference (-0.03) represents about 6% of the standard deviation of green-minus-brown tilts. These results suggest that SMAs are more willing to tilt toward brown stocks compared to green stocks, and again, this difference is not driven by aggregate variations in tilts or time-varying style effects.

In the remaining columns, we decompose green-minus-brown tilts into green and brown tilts to understand the origin of the lower green-minus-brown tilts for SMAs. In Columns (5) and (6), we find no statistically significant difference in green tilts between SMAs and mutual funds. These results suggest that green preferences are similar between the two types of vehicles. If anything, mutual funds are slightly more tilted toward green stocks. In contrast, Columns (7) and (8) reveal that brown tilts are significantly higher for SMAs, with the magnitude of the difference representing nearly 10% of the mean. These results suggest that the higher net brown tilts among SMAs are driven by their greater willingness to invest in brown stocks compared to mutual funds. This pattern is consistent with the idea that large SMA clients face fewer institutional or reputational constraints than mutual fund investors. When expressing brown preferences, large SMA investors may prefer SMAs over mutual funds because SMAs offer greater flexibility and less public scrutiny, allowing them to pursue sustainability strategies that diverge from the mainstream.

3.3 Manager or Client Preferences: Who Drives Sustainability Tilts?

Next, we dig deeper into the mechanism behind sustainability tilts in SMAs. Specifically, we ask: What really drives these tilts? Our previous results suggest that sustainability tilts reflect clients' divergent views of sustainability-related characteristics, given that SMA investors typically have more discretion and flexibility in constructing their portfolios. However, one might wonder whether these tilts instead largely reflect the

preferences of the managers who oversee the portfolios. After all, despite their flexibility, SMAs are still a form of delegated asset management. It is therefore plausible that sustainability tilts are shaped more by managerial views than by investor demand.

To explore this possibility, we exploit within-manager variation across portfolios at a given point in time, using historical data on fund managers from Morningstar Direct. The key idea is to examine managers who simultaneously operate both SMAs and mutual funds. If tilts are similar across all portfolios managed by the same individual, it would suggest that sustainability preferences stem from the manager. By contrast, meaningful variation in tilts across portfolios managed by the same person—especially between SMAs and mutual funds—would imply that client preferences are playing a more prominent role.

One limitation of this approach is that it requires us to exclude managers who run only a single portfolio. However, a major advantage is the ability to isolate variation in sustainability tilts across portfolios with identical management, thus holding manager-specific preferences constant. To capture this, we include manager-by-time fixed effects in our panel regressions.

Panel B of Table 3 presents the results. First, Column (1) shows that sustainability tilts are stronger in SMAs than in mutual funds, even when managed by the same individual. This pattern holds across multiple measures, including overall tilts, green-minus-brown tilts, and green and brown tilts separately. On average, SMAs exhibit an overall tilt that is 0.04 higher than mutual funds run by the same manager—an economically meaningful difference that represents nearly 10% of the standard deviation of overall tilts.

Consistent with earlier results, SMAs appear more net brown-tilted than mutual funds (see Column (2)). Interestingly, we also find that SMA portfolios exhibit higher tilts toward both green and brown stocks (see Columns (3) and (4)). That is, SMA clients are not simply more green or more brown—they are more opinionated in both directions, although the average portfolio still tilts net green. This greater dispersion is consistent with the idea that SMA investors use their portfolios to actively express views on sustainability, regardless of direction. While SMAs are free to tilt in either direction, the results suggest that mutual funds are constrained in a way that discourages tilts toward brown firms.

These findings suggest that SMA clients have substantial discretion in shaping their portfolios, and that sustainability tilts in SMAs primarily reflect client preferences rather than managers' opinions. This is perhaps not surprising, given that SMA investors can communicate directly with their managers and monitor their portfolios in real time—features that give them greater control compared to traditional mutual fund investors.

3.4 Which SMAs Tilt Green and Which Tilt Brown?

We then examine which investor-level characteristics account for the differences in sustainability tilts between SMAs and mutual funds. Morningstar Direct provides limited but informative client-level data for SMAs, including whether the clients are institutional or retail, and the distribution of account sizes (e.g., the proportion of assets contributed by accounts exceeding $100 million).

First, in Columns (1), (4), (7), and (10), we find that SMAs serving institutional clients are the main drivers of sustainability tilts. Specifically, only these institutional accounts exhibit significantly stronger overall tilts—both green and brown—relative to mutual funds. Interestingly, while the average SMA investor appears sustainability-neutral, institutional SMA clients show a modest but clear preference for green stocks over brown ones. This pattern is consistent with the growing emphasis on sustainability by institutional asset owners, particularly sustainability-oriented pension funds and endowments. These clients may face greater external scrutiny and have longer investment horizons, motivating them to incorporate sustainability factors more systematically. Still, it is important to note that not all institutional investors behave similarly, as some institutional clients continue to tilt willingly toward brown firms (see Column (10)).

Second, Columns (2), (5), (8), and (11) show that SMAs with a large share of assets coming from very wealthy clients (defined as those with more than 50% of contributions from accounts over $100 million) generally do not emphasize sustainability criteria in their portfolio decisions. One possible interpretation is that these seasoned investors, having been active in public markets for decades, may rely more heavily on traditional financial metrics and return-based signals. Their long-standing investment philosophies may be less influenced by newer signals such as sustainability scores, especially if they perceive these scores as lacking predictive power or alignment with their performance goals.

Finally, Columns (3), (6), (9), and (12) reveal that SMAs with lower portfolio turnover—indicative of longer holding periods—tend to rely more heavily on sustainability criteria. This finding is consistent with Starks et al. (2023), who document that long-term investors are more likely to integrate sustainability signals into their decision-making. These investors may view sustainability factors as relevant to long-term risk and return, and thus more suitable for buy-and-hold strategies.

Together, these results highlight meaningful heterogeneity in how SMA investors incorporate sustainability considerations, shaped by client type, wealth level, and investment horizon. They underscore that sustainable investing takes different forms depending on investor characteristics: while some

sophisticated investors use sustainability to express values or manage long-term risks, others continue to rely on more traditional investment approaches.

4 What Prevents Mutual Funds from Tilting Brown?

While the preceding analysis highlights clear differences between SMAs and mutual funds, understanding why these differences emerge requires a closer look at the underlying mechanisms. We now turn to investigating the mechanism driving this divergence. A key channel we examine is the interaction between disclosure requirements and evolving social norms around sustainability. Mutual funds are required to publicly disclose their holdings and are thus more exposed to reputational pressures from investors, media, and regulators. As sustainability norms become increasingly salient, mutual funds have stronger incentives to align their portfolios with expectations on sustainability. By contrast, SMAs operate with greater discretion and face less public scrutiny, allowing them to reflect client-specific preferences with fewer reputational concerns.

4.1 Difference-in-Differences Analysis

To identify the effect of reputational pressure more cleanly, we exploit the Paris Agreement in December 2015 as a shock that heightened the salience of sustainability as a global social norm. The Paris Agreement increased expectations for climate-conscious investing, particularly among institutions sensitive to public opinion. If reputational pressure drives the observed differences between SMAs and mutual funds, we would expect mutual funds to shift their portfolios strongly towards sustainability following the Agreement, while SMAs remain comparatively stable. To test this, we conduct a difference-in-differences analysis comparing changes in sustainability tilts between SMAs and mutual funds before and after the Paris Agreement.

$$Y_{i,t} = \beta_1 \mathbb{1}(\text{SMA})_{\text{i,t}} + \beta_2 \mathbb{1}(\text{Post Paris Agreement})_{\text{t}} + \beta_3 \mathbb{1}(\text{SMA})_{\text{i,t}} \times \mathbb{1}(\text{Post Paris Agreement})_{\text{t}} + \varepsilon_{i,t}. \quad (9)$$

In Equation 9, the independent variable of interest is relative to mutual funds. $\mathbb{1}(\text{SMA})_{\text{i,t}}$ is one if a fund is an SMA. Similarly, $\mathbb{1}(\text{Post Paris Agreement})_{\text{t}}$ is one after the Paris Agreement. $\mathbb{1}(\text{SMA})_{\text{i,t}} \times \mathbb{1}(\text{Post Paris Agreement})_{\text{t}}$ captures the difference-in-differences estimate.

Table 5 presents the difference-in-differences regression results following 9. The first row in Column

(1) shows that SMAs exhibited higher overall sustainability tilts relative to mutual funds prior to the Paris Agreement, with a coefficient of 0.03. Following the Paris Agreement, mutual funds substantially increased their overall sustainability tilts by 0.12 (second row in Column (1)), while the interaction term suggests no differential shift in overall sustainability tilts for SMAs relative to mutual funds.

Column (2) examines green-minus-brown (i.e., net green) tilts. Before Paris, SMAs tilted 0.01 more green than mutual funds. After Paris, mutual funds increased their net greenness by 0.03 (second row in Column (2)). Importantly, the interaction term indicates that SMAs did not increase their net greenness compared to mutual funds; in fact, they tilted more toward brown. This difference-in-differences estimate suggests that, as sustainable investing gained prominence with evolving social norms during that period, mutual funds—who are presumably more norm-constrained than SMAs due to their public reporting requirements—responded by tilting more toward green firms. In contrast, the more flexible SMA vehicles did not.

Recalling the results on overall tilts in Column (1), the evidence shows that the Paris Agreement raised attention to sustainable investing among both SMAs and mutual funds, as indicated by increases in their overall tilts. Notably, while both groups exhibited greater interest in sustainability-related characteristics, they differed markedly in the direction of their tilts. Mutual funds began to show greater consensus on green investing, whereas SMA investors displayed increasing disagreement on the direction of sustainability-related tilts.

We also use fully saturated difference-in-differences event study models to assess dynamics. The event studies tell us whether the SMAs had any pre-trend effects that we see post-Paris. The equation for SMA is as follows:

$$Y_{i,t} = \sum_{s \neq 0} \beta_s \text{SMA Year Around Paris Agreement}_{\text{i,s}} + \varepsilon_{i,t}. \tag{10}$$

The model includes coefficients for each year around the Paris Agreement year, which is 2015. If we observe no pretrends in the plotted coefficients, we interpret the results as representing a degree of casual impact on the treated.

Figure 4, we present coefficient plots around the Paris Agreement and find no evidence of a pre-existing trend in green-minus-brown tilts prior to the event. The absence of a pre-trend strengthens the interpretation that the Paris Agreement served as a catalyst for the emergence of green investing as a salient social norm.

In its aftermath, mutual funds—more sensitive to prevailing social expectations due in part to their public disclosure obligations—responded sharply by significantly increasing their green tilts. By contrast, SMAs, which face fewer external pressures and operate with greater flexibility, exhibited no comparable shift toward green investing. This divergence underscores how differences in institutional constraints shape investors' responses to evolving social norms.

In Columns (3) and (4) of Table 5, we decompose the green-minus-brown tilts into separate green and brown tilt measures. The first rows of Columns (3) and (4) show that, prior to the Paris Agreement, SMAs tilted more heavily toward both green and brown firms relative to mutual funds. These findings are consistent with our earlier results on overall tilts, suggesting that SMAs made greater use of sustainability-related characteristics—both green and brown—in their portfolio construction before the agreement.

The second rows show that, following the Paris Agreement, mutual funds increased their tilts in both directions. However, the interaction terms reveal that SMAs tilted significantly less toward green stocks relative to mutual funds, and more toward brown stocks. These results suggest that mutual funds' stronger green tilts may be partly driven by social norms, as unconstrained SMA vehicles do not exhibit similarly high green tilts. They also suggest that mutual funds face greater constraints against tilting toward brown stocks, as evidenced by the larger brown tilts observed among more flexible SMA portfolios.

4.2 Triple Difference-in-Differences Analysis

Our previous difference-in-differences results around the Paris Agreement support the notion that the interaction between the heightened role of green investing as a social norm and public disclosure requirements among mutual funds is the channel through which mutual funds increasingly tilted toward green firms compared to SMAs. Our event study analysis, showing the absence of a pre-trend, addresses the concern that any pre-existing factors could explain the differential shifts in tilts between them. However, one may conjecture an alternative mechanism driving these results. Specifically, it is possible that the Paris Agreement differentially shifted investor preferences between SMAs and mutual funds. For example, suppose that SMAs and mutual funds serve entirely segmented clienteles and that the Paris Agreement disproportionately raised green preferences among mutual fund clients while leaving SMA clients unaffected. In that case, even without differences in norm constraints or disclosure requirements, we would observe similar results to those documented in the previous section.

To address this concern, we exploit a unique institutional setting: some managers operate both SMAs

and mutual funds using nearly identical investment strategies, effectively scaling up their ideas across platforms (Huang et al., 2023). Specifically, a manager running SMAs may choose to offer the same strategy to public investors via the mutual fund distribution channel. Once launched, these twin strategies result in nearly identical portfolios offered to distinct client groups—high-net-worth individuals or institutional clients through SMAs, and public investors through mutual funds. Crucially, managers of twin mutual funds become subject to public disclosure requirements due to their mutual fund offerings. Therefore, within SMAs, variation in disclosure requirements arises: SMAs without mutual fund twins remain exempt from disclosure, while SMAs with twins face disclosure obligations through their mutual fund counterparts. We estimate triple-difference (difference-in-difference-in-differences) specifications exploiting this feature. Our identification assumption is that the decision to operate twin funds versus SMA-only strategies is unrelated to factors contemporaneous with the Paris Agreement.

$$
\begin{aligned}
Y_{i,t} = {} & \beta_1 \, \mathbb{1}(\text{SMA})_{i,t} + \beta_2 \, \mathbb{1}(\text{Post Paris Agreement})_t + \beta_3 \, \mathbb{1}(\text{Twin Fund})_{i,t} \\
& + \beta_4 \, \mathbb{1}(\text{SMA})_{i,t} \times \mathbb{1}(\text{Post Paris Agreement})_t \\
& + \beta_5 \, \mathbb{1}(\text{SMA})_{i,t} \times \mathbb{1}(\text{Twin Fund})_{i,t} \\
& + \beta_6 \, \mathbb{1}(\text{Twin Fund})_{i,t} \times \mathbb{1}(\text{Post Paris Agreement})_t \\
& + \beta_7 \, \mathbb{1}(\text{SMA})_{i,t} \times \mathbb{1}(\text{Twin Fund})_{i,t} \times \mathbb{1}(\text{Post Paris Agreement})_t \\
& + \varepsilon_{i,t}.
\end{aligned}
\tag{11}
$$

In this specification, $Y_{i,t}$ denotes the sustainability related tilts for fund i at time t. The variable $\mathbb{1}(\text{SMA})_{i,t}$ is an indicator equal to one if the fund is an SMA, and $\mathbb{1}(\text{Post Paris Agreement})_t$ is a time dummy that equals one for periods after the Paris Agreement. $\mathbb{1}(\text{Twin Fund})_{i,t}$ is a dummy equal to one if the SMA is co-managed with a mutual fund (i.e., a twin fund). The coefficient β_4 captures a difference-in-differences effect, estimating how SMAs differ from mutual funds in response to the Paris Agreement. The triple interaction term associated with β_7 is the coefficient of interest, which captures how SMA managers adjust their portfolios post-Paris when their holdings are indirectly disclosed through a co-managed mutual fund. A significant β_7 supports the role of reputational pressure arising from disclosure as a channel driving ESG-related tilts.

In Table 6, we report triple-difference estimates across overall tilts, green-minus-brown tilts, green tilts, and brown tilts.

We first find no differential change in overall tilts between SMAs with and without twins (Column (1)). However, SMAs with twin mutual funds behaved similarly to standalone mutual funds around the Paris Agreement. Specifically, their green-minus-brown tilts shifted similarly to those of mutual funds, indicating a movement toward consensus on green investing (Column (2)). Columns (3) and (4) show that the changes in green-minus-brown tilts are driven by both sides: SMAs with twins tilted more toward green firms and less toward brown firms compared to SMAs without twins.

One might still wonder whether pre-existing trends between SMAs with and without twins could explain the triple-difference estimates. To address this, we follow Olden and Møen (2022) and conduct event study analyses, plotting the triple-difference estimates around the Paris Agreement.

$$\begin{aligned} Y_{i,t} = & \sum_{s \neq -1} \beta_s \, \mathbb{1}(\text{Twin SMA Fund Event Year } s)_{i,t} \\ & + \sum_{u} \gamma_u \, \mathbb{1}(\text{Twin Fund Event Year } u)_{i,t} \\ & + \sum_{v} \delta_v \, \mathbb{1}(\text{SMA Event Year } v)_{i,t} + \varepsilon_{i,t}. \end{aligned} \tag{12}$$

In Equation (12), $Y_{i,t}$ denotes the sustainability related tilt for fund i at time t. The specification includes three sets of event-time indicators. The first term sums over event years $s \neq -1$ for Twin SMA funds, with coefficients β_s capturing how Twin SMA funds' outcomes evolve relative to the Paris Agreement. These β_s coefficients are the focus of our dynamic analysis and are plotted in Figure 5. The goal is to test for parallel pre-trends in the triple-difference setting by examining whether the pre-Paris β_s coefficients (i.e., for $s < 0$) are statistically indistinguishable from zero. The second and third terms control for dynamic effects in Twin Funds (coefficients γ_u) and SMAs (δ_v), respectively. The omitted event year ($s = -1$) serves as the baseline period. This specification allows us to isolate the time path of the triple interaction group and assess the plausibility of the identifying assumption.

As Olden and Møen (2022) emphasize, for valid triple-difference identification, it is not necessary to show parallel trends across all subgroups. Rather, a parallel trend assumption on the triple difference is sufficient. The intuition is that the estimator remains unbiased as long as any biases across subgroups operate in the same direction.

Consistent with this condition, we find no evidence of a pre-trend between SMAs with and without twins before the Paris Agreement. After the agreement, however, SMAs with twins disproportionately increased

their net green tilts relative to SMAs without twins. Given that the primary difference between the two groups is exposure to public disclosure requirements—and that the decision to offer a twin mutual fund is unlikely to be correlated with the Paris Agreement itself—these results strongly support the conclusion that public disclosure requirements became particularly costly when green investing emerged as a salient social norm, thereby discouraging managers from tilting toward brown firms.

We provide additional evidence supporting our conclusion. Specifically, we compare the sustainability tilts of mutual funds with institutional clients to those with only retail clients. We hypothesize that mutual funds with institutional clients are particularly constrained by prevailing social norms, as these clients—such as public pension funds—are known to explicitly incorporate sustainability considerations. For example, CalPERS explicitly screens out brown firms as part of its sustainable investment mandate. The presence of such norm-sensitive clients likely creates pressure for mutual fund managers to align with sustainability norms and avoid brown stocks.

Panel A of Figure 6 shows that mutual funds with institutional share classes consistently place greater weight on sustainability-related characteristics than mutual funds serving only retail clients throughout the sample period. Their overall tilts are similar to those of SMAs. Panel B shows that the sharp increase in green-minus-brown tilts around the Paris Agreement is driven primarily by mutual funds with institutional clients. Mutual funds with only retail clients exhibited only a modest increase in their net green tilts following the agreement. These results support the idea that mutual funds serving institutional clients—who more explicitly care about prevailing social norms—were particularly responsive to the increased salience of green investing.

Moreover, we observe that the sudden decline in net green tilts in 2023 is more pronounced among mutual funds with institutional clients. These funds, which had previously maintained strongly green-tilted portfolios, became nearly sustainability-neutral by 2023. This pattern again supports the notion that mutual funds with institutional clients were most affected by the political backlash against sustainable investing during that period. It is likely that institutional clients, such as public pension funds, began responding to political pressures by scaling back their green tilts.

Panels C and D separately compare green and brown tilts. They show that the increase in net green tilts among mutual funds with institutional clients was driven primarily by an increase in green tilts. Brown tilts remained consistently low, both before and after the Paris Agreement. These results suggest that the emerging consensus toward green investing among mutual funds with institutional clients underlies the

overall pattern.

However, by 2023, mutual funds with institutional clients substantially decreased their green tilts and simultaneously increased their brown tilts. In contrast, retail-oriented mutual funds exhibited little change in their tilts during the same period. The only exception is the most recent period from 2019 to 2023, during which retail-focused mutual funds modestly increased their green tilts. Overall, the pronounced reversal among mutual funds with institutional clients suggests that these funds may have either responded to growing political pressure or experienced a relaxation of prior constraints that had discouraged brown tilts.

4.3 Are Mutual Funds Penalized for Brown Tilts?

In the final part of our paper, we investigate whether mutual funds benefit from tilting green and whether tilting brown is costly in terms of client responses through fund flows. Specifically, we are interested in whether some clients prefer holding portfolios with green tilts—or avoiding portfolios with brown tilts—beyond pure performance considerations. If sustainability-related preferences are partly driven by non-pecuniary motives, these clients may be willing to sacrifice some financial performance to meet their green preferences. Although it is difficult to precisely quantify how much performance clients are willing to forgo, we approach this question by studying whether fund flows respond more strongly to green versus brown tilts, and at the same time exhibit weaker sensitivity to performance.

A positive association between flows and green tilts, combined with weaker flow-performance sensitivity, would indicate that investors are motivated by non-pecuniary preferences. In turn, mutual funds could tilt green to cater to these clients and benefit from inflows. Conversely, tilting brown could be costly if it triggers client outflows.

In Table 7, we regress fund flows on fund performance and green-minus-brown tilts, interacting them with SMA, twin, and institutional share indicators. Column (1) pools SMAs and mutual funds together and shows that flows respond positively both to performance and to green-minus-brown tilts. Importantly, the positive relation between flows and green-minus-brown tilts holds even after controlling for performance, suggesting that investors value portfolio greenness on its own. Conversely, tilting brown appears costly on average, as it leads to outflows even when performance is controlled for.

In Column (2), we interact performance and green-minus-brown tilts with the SMA indicator. Consistent with our earlier findings, SMAs exhibit approximately twice the flow-performance sensitivity compared to

mutual funds, implying that SMA clients are more pecuniary-driven. Additionally, SMA investors respond much less to green-minus-brown tilts themselves, indicating that tilting green does not attract significant inflows for SMAs. Nor is tilting brown especially costly for them. This pattern likely reflects the broader spectrum of sustainability preferences among SMA clients, including clients with brown preferences who are less concerned about social norms and more comfortable expressing their views through their portfolio choices.

Column (3) provides further evidence that disclosure requirements through twin mutual funds impose real costs. We find that twin mutual funds exhibit much weaker flow-performance sensitivity but much stronger responsiveness to green tilts. This suggests that SMA managers with twin funds face stronger incentives to tilt green because public disclosure exposes their brown tilts to greater scrutiny, leading to outflows. Investors in twin funds appear to value greenness intrinsically and to be less financially driven, as reflected in their lower sensitivity to fund performance.

In Column (4), we examine mutual funds with institutional share classes. We find that institutional investors exhibit significantly weaker flow-performance sensitivity, consistent with a greater emphasis on non-pecuniary motives. Although we do not find a statistically significant difference in their response to green tilts, the point estimates suggest that institutional clients may be somewhat more responsive to net greenness. These results are consistent with the idea that institutional clients—such as public pension funds—care about sustainability characteristics independently of financial returns.

Overall, our findings show that tilting green is rewarded, while tilting brown is costly—especially among investors subject to public disclosure requirements. These results are consistent with observed behavior: the substantial increase in net green tilts among mutual funds following the Paris Agreement supports the idea that, under heightened social norms favoring sustainability, tilting green is beneficial and tilting brown is penalized.

5 Conclusion

In this paper, we examine sustainability-related portfolio choices in a large but underexplored segment of the asset management industry: separately managed accounts (SMAs). Unlike mutual funds, SMAs allow for investor-level customization in portfolio construction and do not require public disclosure of holdings, making them an ideal candidate for studying sustainability-related portfolio choices of unconstrained

investors. In contrast, mutual funds may be pressured to abide by prevailing social norms since their portfolios are publicly disclosed.

We find that the flexibility of SMAs leads investors to tilt more willingly toward brown firms, especially around the time of the Paris Agreement, when green investing became increasingly salient as a social norm. Exploiting a unique institutional feature—where some SMA managers offer nearly identical "twin" mutual fund counterparts that are subject to disclosure—we show that disclosure, when combined with rising social pressure, is the key channel that constrains mutual funds from freely tilting toward brown firms.

Moreover, we find that mutual funds benefit from tilting green and face costs from tilting brown: norm-sensitive clients allocate more capital to green-tilted funds and withdraw from brown-tilted ones, while simultaneously exhibiting weaker sensitivity to financial performance. These findings suggest that reputational and social norm considerations—not just pecuniary motives—play a significant role in shaping mutual funds' portfolio choices.

Overall, our findings delineate the sustainability-related portfolio decisions of a large but previously hidden class of investors: flexible, performance-driven SMA investors. These unconstrained investors exhibit much greater dispersion in sustainability tilts compared to mutual funds, highlighting a broader diversity of views on sustainability when public disclosure pressures are absent. Our evidence underscores the important but often overlooked role of unconstrained capital in sustainable investing—willingly allocating to brown firms even as social norms around green investing intensify.

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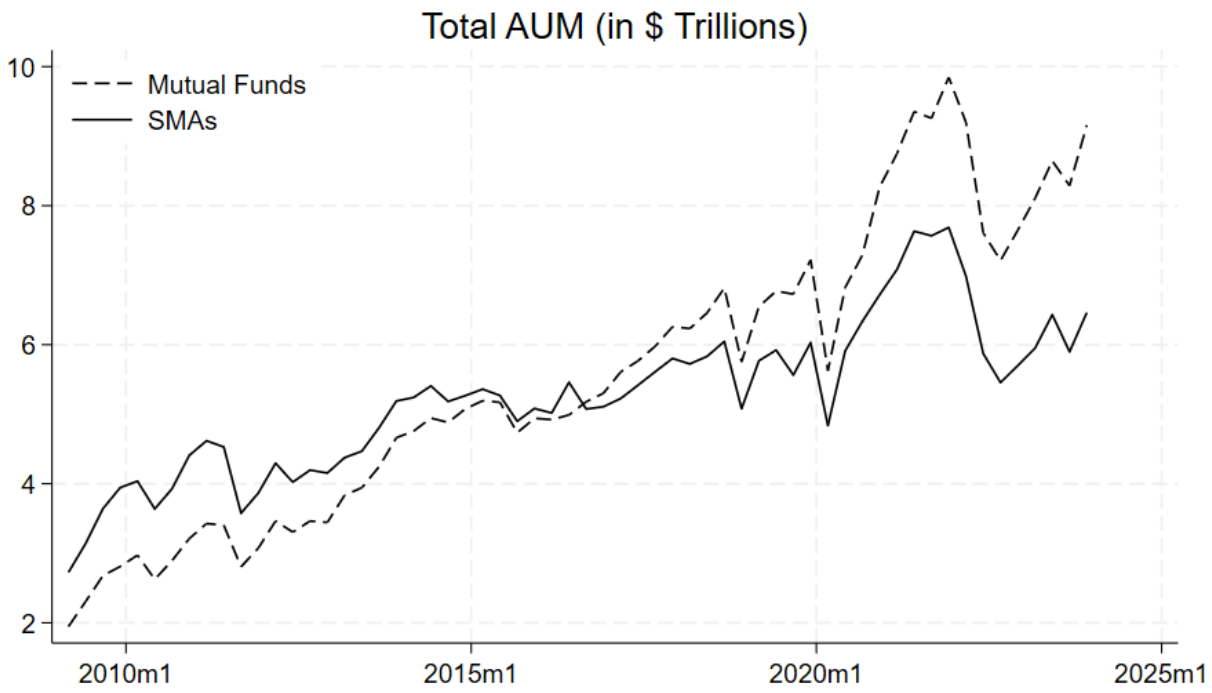


Figure 1: Comparison of Assets Under Management: SMAs vs. Mutual Funds

This figure compares total assets under management between SMAs and mutual funds. Each line represents the sum of assets under management for SMAs and for mutual funds, respectively.

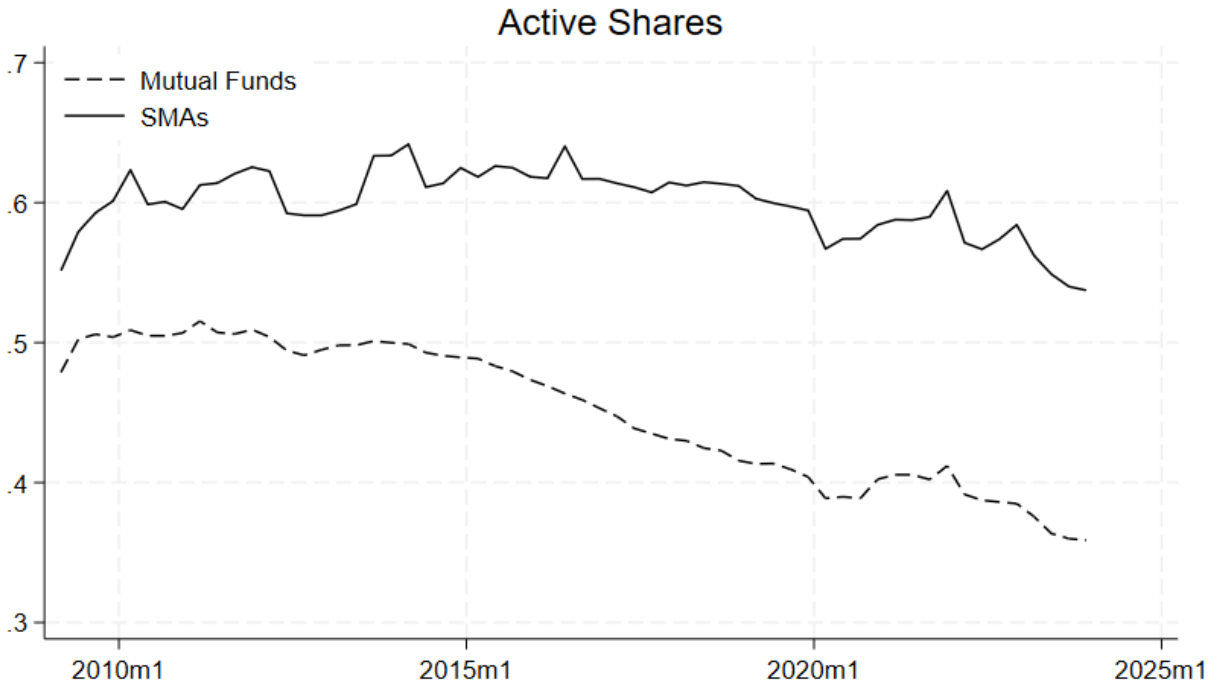
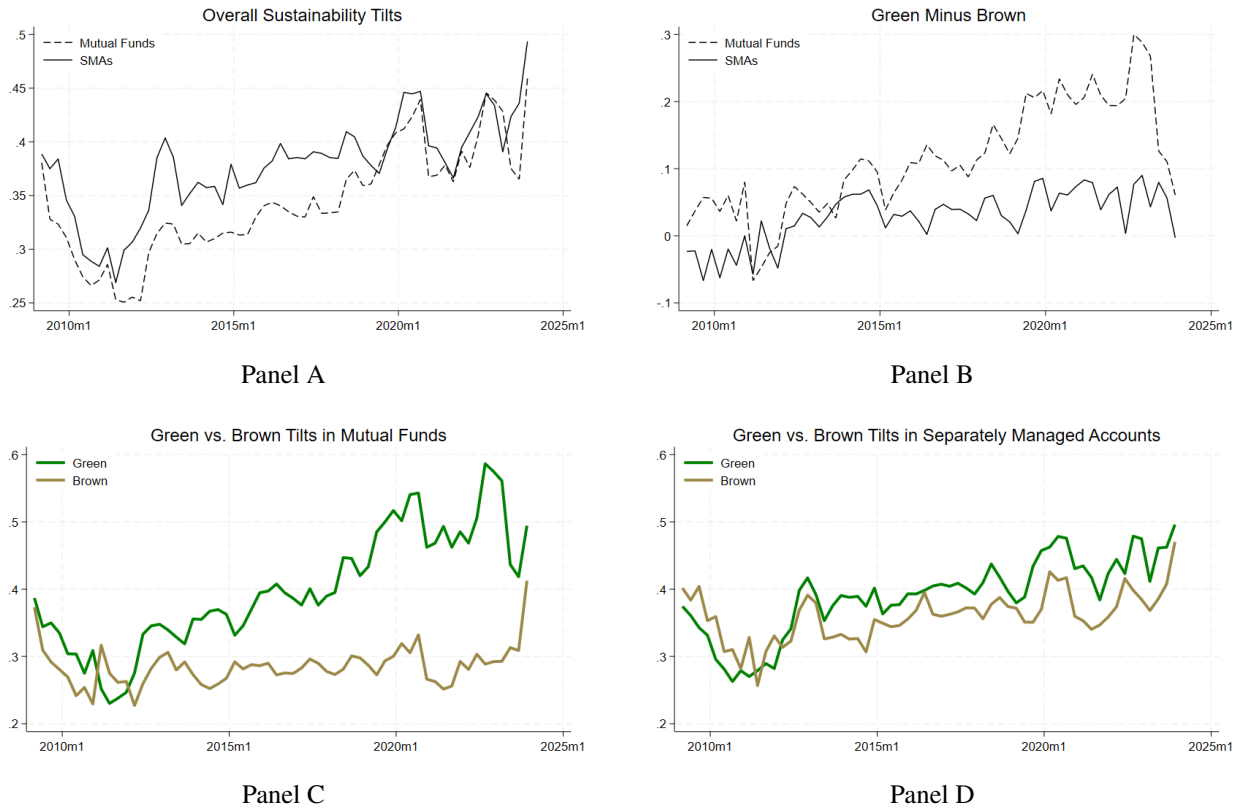


Figure 2: Comparison of Active Shares: SMAs vs. Mutual Funds

This figure compares active shares across SMAs and mutual funds. Each line shows the AUM-weighted average of active shares. Active shares are calculated following Cremers and Petajisto (2009).



Panel A Panel B

Panel C Panel D

Figure 3: Comparison of Sustainability Metrics: SMAs vs. Mutual Funds

This figure compares sustainability-related tilts across SMAs and mutual funds. Each line shows the AUM-weighted average of the relevant sustainability tilt, scaled by active share within each fund. Panel A shows Overall Tilt. Panel B presents Green vs. Brown Tilt. Panels C and D show Green Tilt and Brown Tilt separately for mutual funds (Panel C) and SMAs (Panel D). Overall Tilt is estimated following Equation 5. Green Tilt is the fraction of Overall Tilt resulting from overweighting green stocks or underweighting brown stocks. Brown Tilt is the fraction of Overall Tilt resulting from overweighting brown stocks or underweighting green stocks. Green vs. Brown Tilt is Green Tilt minus Brown Tilt, following Equation 7.

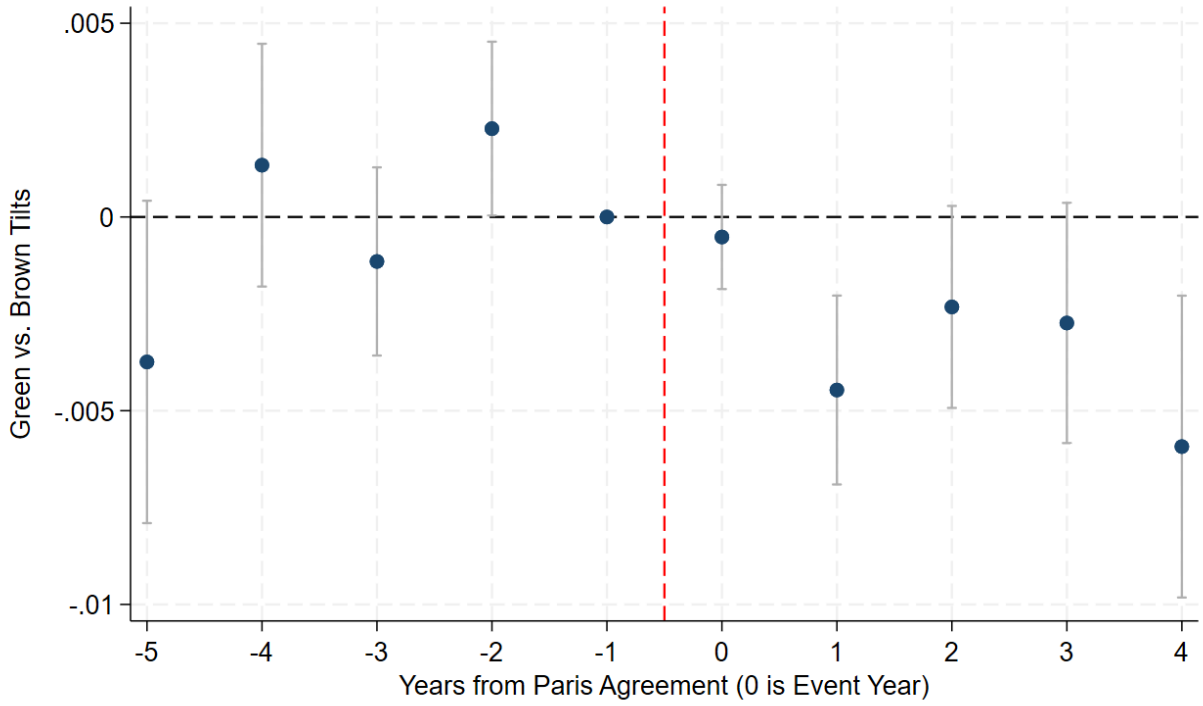


Figure 4: Dynamic Effects of the Paris Agreement on SMA Tilts: Event Study Estimates

This figure presents event study estimates of tilts around the Paris Agreement. The treatment group consists of SMAs, while the control group consists of mutual funds.

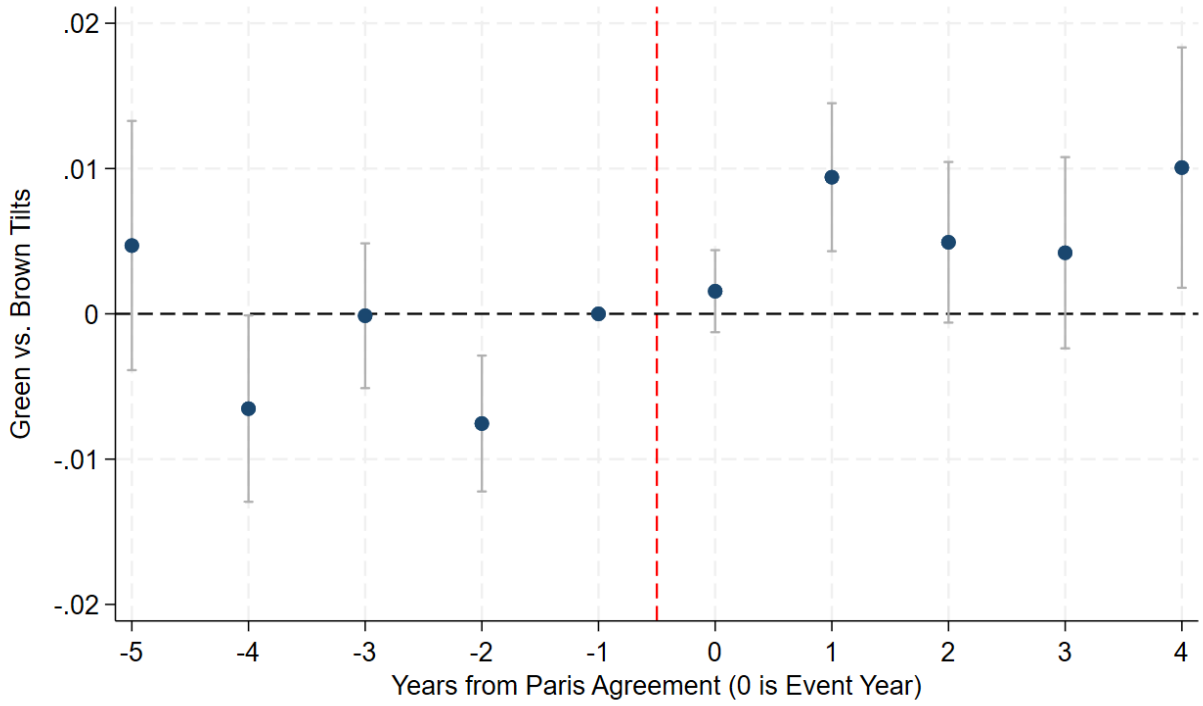
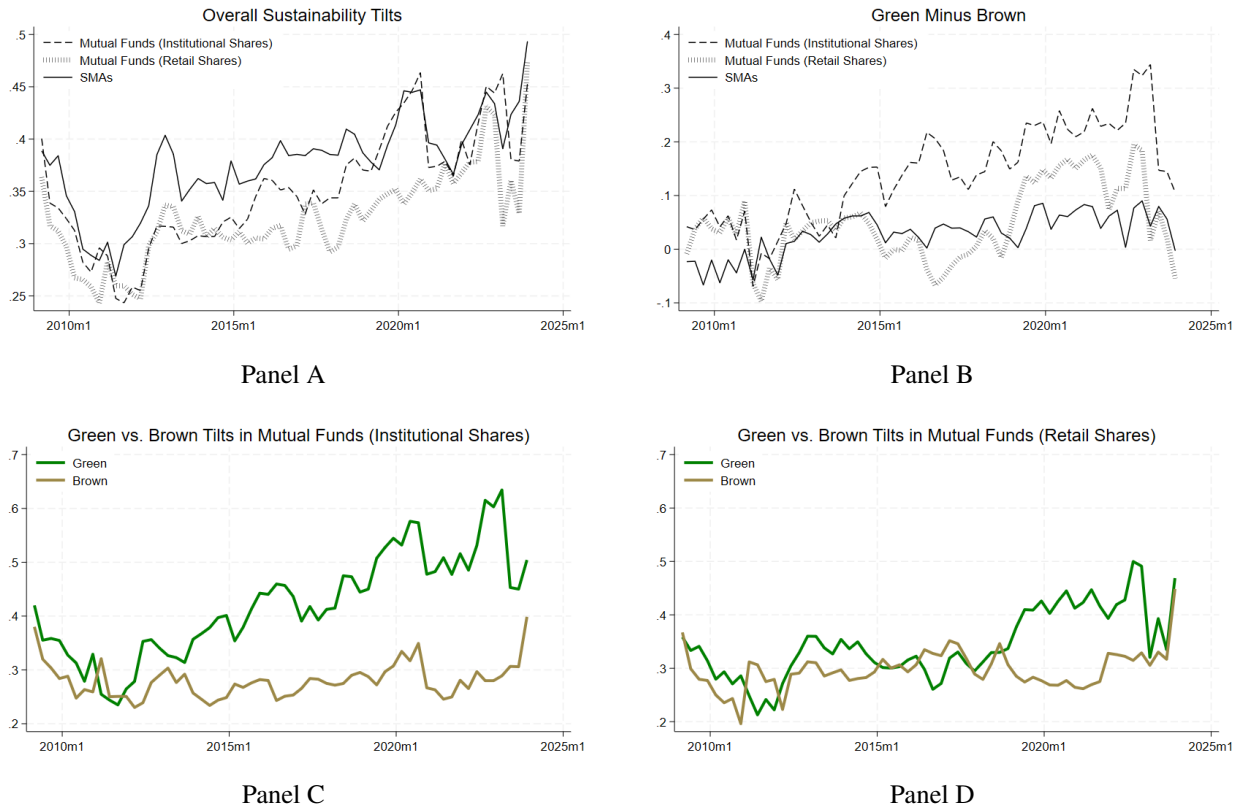


Figure 5: Dynamic Triple-Difference Estimates of Tilts in SMA Twin Funds: Event Study Estimates

This figure presents event study triple-difference estimates of tilts around the Paris Agreement. The treatment group consists of SMAs with twin mutual funds, while the control group consists of SMAs without twins.



Panel A Panel B

Panel C Panel D

Figure 6: Comparison of Sustainability Metrics Between Mutual Funds with Institutional and Retail Shares

This figure compares sustainability-related tilts across SMAs and mutual funds. We split mutual funds into a group with institutional shares and a group with retail shares only. Each line shows the AUM-weighted average of the relevant sustainability tilt, scaled by active share within each fund. Panel A shows Overall Tilt. Panel B presents Green vs. Brown Tilt. Panels C and D show Green Tilt and Brown Tilt separately for mutual funds (Panel C) and SMAs (Panel D). Overall Tilt is estimated following Equation 5. Green Tilt is the fraction of Overall Tilt resulting from overweighting green stocks or underweighting brown stocks. Brown Tilt is the fraction of Overall Tilt resulting from overweighting brown stocks or underweighting green stocks. Green vs. Brown Tilt is Green Tilt minus Brown Tilt, following Equation 7.

Table 1: Summary Statistics

This table reports the summary statistics of the fund-level data from 2009 Q1 to 2023 Q4. Panel A compares SMAs and mutual funds, and Panel B compares SMAs with and without twin mutual funds. Active Shares are calculated following Cremers and Petajisto (2009). 𝟙(Inst. Class) is a dummy equal to 1 if a fund is offered to institutional investors. For SMAs, it is equal to 1 if the "Product Focus" variable in Morningstar Direct is "Institutional" or "Both". For mutual funds, it is equal to 1 if the fund has an institutional share class. 𝟙(Retail Class) is a dummy equal to 1 if a fund is offered only to retail investors. 𝟙(Large Investors) is a dummy equal to 1 if a fund is classified as having large investors, defined as more than half of its assets coming from investors contributing more than $25 million. Turnover is defined as total purchases or sales divided by total assets. Fund Return is the monthly net return. Fund Flow is the monthly fund flow, defined following Equation 1. Overall Tilt is estimated following Equation 5. Green Tilt is the fraction of Overall Tilt resulting from overweighting green stocks or underweighting brown stocks. Brown Tilt is the fraction of Overall Tilt resulting from overweighting brown stocks or underweighting green stocks. Green vs. Brown Tilt is Green Tilt minus Brown Tilt, following Equation 7.

Panel A. SMAs vs. Mutual Funds

	SMAs						Mutual Funds					
Variable	N	Mean	SD	p25	p50	p75	N	Mean	SD	p25	p50	p75
Active Shares (%)	324270	0.601	0.230	0.629	0.749	0.844	295540	0.446	0.273	0.561	0.701	0.815
𝟙(Inst. Class)	459970	0.881	0.323	1.000	1.000	1.000	356112	0.563	0.496	0.000	1.000	1.000
𝟙(Retail Class)	459970	0.119	0.323	0.000	0.000	0.000	356112	0.437	0.496	0.000	0.000	1.000
𝟙(Twin Fund)	454658	0.612	0.487	0.000	0.000	1.000	330238	0.423	0.494	0.000	1.000	1.000
𝟙(Large Investors)	459970	0.608	0.488	0.000	0.000	1.000	356112	0.000	0.000	0.000	0.000	0.000
Turnover (%)	346634	40.835	66.290	21.520	38.770	68.740	354939	32.251	38.349	23.000	44.860	79.000
Net Monthly Return of Fund	449911	0.011	0.048	-0.017	0.014	0.040	354125	0.012	0.048	-0.017	0.014	0.041
Net Monthly Fund Flow	447266	-0.017	0.205	-0.024	-0.003	0.012	352881	-0.003	0.033	-0.014	-0.005	0.005
Overall Tilt	290905	0.386	0.366	0.249	0.368	0.570	258606	0.368	0.452	0.226	0.338	0.525
Fund's Green Tilt	290905	0.405	0.454	0.202	0.351	0.597	258606	0.434	0.524	0.187	0.331	0.563
Fund's Brown Tilt	290905	0.364	0.388	0.189	0.338	0.593	258606	0.295	0.417	0.162	0.302	0.543
Green vs. Brown Tilt	290905	0.041	0.453	-0.239	0.010	0.254	258606	0.135	0.473	-0.210	0.028	0.264

Panel B. SMAs without Twin Funds vs. SMAs with Twin Funds

	SMAs without Twin Funds						SMAs with Twin Funds					
Variable	N	Mean	SD	p25	p50	p75	N	Mean	SD	p25	p50	p75
Active Shares (%)	190659	0.558	0.272	0.609	0.732	0.840	132873	0.621	0.205	0.660	0.770	0.849
𝟙(Inst. Class)	283400	0.802	0.398	1.000	1.000	1.000	171258	0.929	0.257	1.000	1.000	1.000
𝟙(Retail Class)	283400	0.198	0.398	0.000	0.000	0.000	171258	0.071	0.257	0.000	0.000	0.000
𝟙(Large Investors)	283400	0.487	0.500	0.000	0.000	1.000	171258	0.698	0.459	0.000	1.000	1.000
Turnover (%)	200483	46.276	94.174	20.060	38.280	71.100	144732	38.543	49.991	23.340	39.100	64.650
Fund Return	276037	0.011	0.047	-0.017	0.014	0.040	168910	0.011	0.048	-0.017	0.014	0.041
Fund Flow	273907	-0.019	0.232	-0.026	-0.002	0.013	168460	-0.015	0.182	-0.021	-0.005	0.009
Overall Tilt	167641	0.460	0.493	0.248	0.373	0.592	122694	0.352	0.283	0.249	0.361	0.545
Green Tilt	167641	0.501	0.612	0.203	0.355	0.613	122694	0.362	0.350	0.201	0.346	0.577
Brown Tilt	167641	0.411	0.475	0.190	0.345	0.620	122694	0.342	0.338	0.188	0.330	0.562
Green vs. Brown Tilt	167641	0.088	0.547	-0.242	0.008	0.253	122694	0.020	0.401	-0.235	0.013	0.256

Table 2: Flow-Performance Sensitivity: SMAs vs. Mutual Funds

This table presents flow–performance sensitivity comparing SMAs and mutual funds. Fund Return is the monthly net return. Fund Flow is the monthly fund flow, defined following Equation 1. $\mathbb{1}$(SMA) is a dummy equal to 1 if a fund is structured as an SMA. Robust t-statistics are clustered by fund and date.

Dependent Variable:	Fund Flow (t+1)			
	(1)	(2)	(3)	(4)
Fund Return (t, %)	0.03***	0.08***	0.06**	0.08***
	(0.01)	(0.02)	(0.02)	(0.01)
Fund Return (t, %) × $\mathbb{1}$(SMA)	0.11**	0.10**	0.11**	0.10**
	(0.05)	(0.05)	(0.05)	(0.04)
Observations	799527	799573	799527	799573
Fund FE	Yes	No	Yes	No
Time FE	No	Yes	Yes	No
Style-Time FE	No	No	No	Yes
R^2	0.03	0.01	0.03	0.01

Table 3: SMA vs. Mutual Fund Tilts: Panel Regression Evidence

This table presents panel regression results using fund-quarter data from 2009 Q1 to 2023 Q4. The dependent variables are four types of sustainability-related tilts: Overall Tilt, Green vs. Brown Tilt, Green Tilt, and Brown Tilt. Overall Tilt is estimated following Equation 5. Green Tilt is the fraction of Overall Tilt resulting from overweighting green stocks or underweighting brown stocks. Brown Tilt is the fraction of Overall Tilt resulting from overweighting brown stocks or underweighting green stocks. Green vs. Brown Tilt is Green Tilt minus Brown Tilt, following Equation 7. Panel A includes quarter and style-by-quarter fixed effects. Columns 1 and 2 use Overall Tilt as the dependent variable; columns 3 and 4 use Green vs. Brown Tilt; columns 5 and 6 use Green Tilt; and columns 7 and 8 use Brown Tilt. Odd-numbered columns include quarter fixed effects only, while even-numbered columns include style-by-quarter fixed effects. Panel B reports regressions at the fund-manager-quarter level, controlling for manager-by-quarter fixed effects. Column 1 uses Overall Tilt as the dependent variable; column 2 uses Green vs. Brown Tilt; column 3 uses Green Tilt; and column 4 uses Brown Tilt. The key independent variable in both panels is $\mathbb{1}$(SMA), a dummy equal to 1 if a fund is structured as an SMA. Mutual funds serve as the reference group in all regressions. Robust t-statistics are clustered by fund and date.

Panel A. Time and Style-by-Time Fixed Effects

Dependent Variable:	Overall Tilts		Green vs. Brown Tilts		Green Tilts		Brown Tilts	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\mathbb{1}$(SMA)	0.02**	0.03***	-0.03***	-0.03***	0.01	0.02	0.04***	0.05***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Observations	189361	189361	189361	189361	189361	189361	189361	189361
Time FE	Yes	No	Yes	No	Yes	No	Yes	No
Style-Time FE	No	Yes	No	Yes	No	Yes	No	Yes
Controls	No	No	No	No	No	No	No	No
R^2	0.04	0.08	0.01	0.03	0.03	0.07	0.03	0.06
Y-Mean	0.49	0.49	0.01	0.01	0.49	0.49	0.48	0.48

Panel B. Manager-Time Fixed Effects

Dependent Variable:	Overall Tilts	Green vs. Brown Tilts	Green Tilts	Brown Tilts
	(1)	(2)	(3)	(4)
$\mathbb{1}$(SMA)	0.04***	-0.02***	0.03***	0.05***
	(0.01)	(0.01)	(0.01)	(0.01)
Observations	498468	498468	498468	498468
Manager-Time FE	Yes	Yes	Yes	Yes
Controls	No	No	No	No
R^2	0.53	0.50	0.53	0.53
Y-Mean	0.48	0.02	0.49	0.47

Table 4: Heterogeneity in Tilts in SMA

This table presents panel regression results using fund-quarter data from 2009 Q1 to 2023 Q4. The dependent variables are four types of sustainability-related tilts: Overall Tilt, Green vs. Brown Tilt, Green Tilt, and Brown Tilt. Overall Tilt is estimated following Equation 5. Green Tilt is the fraction of Overall Tilt resulting from overweighting green stocks or underweighting brown stocks. Brown Tilt is the fraction of Overall Tilt resulting from overweighting brown stocks or underweighting green stocks. Green vs. Brown Tilt is Green Tilt minus Brown Tilt, following Equation 7. Columns 1–3 use Overall Tilt as the dependent variable; columns 4–6 use Green vs. Brown Tilt; columns 7–9 use Green tilt; and columns 10–12 use Brown Tilt. The key independent variables are: (i) $\mathbb{1}$(SMA), a dummy equal to 1 if a fund is an SMA; (ii) $\mathbb{1}$(SMA) $\times$ $\mathbb{1}$(Inst. Class), where a fund is classified as having institutional investors if the "Product Focus" variable in Morningstar Direct is "Institutional" or "Both"; (iii) $\mathbb{1}$(SMA) $\times$ $\mathbb{1}$(Large Investors), where a fund is classified as having large investors if more than half of its assets come from investors contributing more than $25 million; and (iv) $\mathbb{1}$(SMA) $\times$ log(Turnover), where turnover is defined as total purchases or sales divided by total assets. Mutual funds serve as the reference group in all regressions. All regressions include quarter fixed effects, and robust t-statistics are clustered by fund and date.

Dependent Variable:	Overall Tilts			Green vs. Brown Tilts			Green Tilts			Brown Tilts		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
$\mathbb{1}$(SMA)	-0.05***	0.07***	0.12***	-0.06***	-0.04***	0.02	-0.08***	0.05***	0.13***	-0.02	0.09***	0.10***
	(0.02)	(0.01)	(0.03)	(0.01)	(0.01)	(0.03)	(0.02)	(0.01)	(0.04)	(0.02)	(0.01)	(0.03)
$\mathbb{1}$(SMA) $\times$ $\mathbb{1}$(Inst. Class)	0.08***			0.04**			0.10***			0.06***		
	(0.02)			(0.01)			(0.02)			(0.02)		
$\mathbb{1}$(SMA) $\times$ $\mathbb{1}$(Large Investors)		-0.11***			0.02**			-0.10***			-0.12***	
		(0.01)			(0.01)			(0.01)			(0.01)	
$\mathbb{1}$(SMA) $\times$ Log(Turnover)			-0.03***			-0.01**			-0.04***			-0.02**
			(0.01)			(0.01)			(0.01)			(0.01)
Observations	189361	189361	174055	189361	189361	174055	189361	189361	174055	189361	189361	174055
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	No	No	No	No	No	No	No	No	No	No	No
R^2	0.04	0.04	0.04	0.01	0.01	0.01	0.03	0.04	0.03	0.03	0.03	0.03
Y-Mean	0.25	0.49	0.49	0.01	0.01	0.01	0.49	0.49	0.49	0.48	0.48	0.48

Table 5: Difference-in-Differences Estimates of Tilts in SMAs Following the Paris Agreement

This table reports difference-in-differences regression results using fund-quarter panel data from 2009 Q1 to 2023 Q4, examining how SMA funds adjusted their sustainability-related tilts following the Paris Agreement in December 2015. The dependent variables are: Overall Tilt (column 1), Green vs. Brown Tilt (column 2), Green Tilt (column 3), and Brown Tilt (column 4). Key independent variables include: (i) $\mathbb{1}$(SMA), a dummy equal to 1 if a fund is an SMA; (ii) $\mathbb{1}$(Post-Paris), a dummy equal to 1 for periods after the Paris Agreement; and (iii) their interaction, $\mathbb{1}$(Post-Paris) $\times$ $\mathbb{1}$(SMA), which captures the difference-in-differences estimate—i.e., the change in SMA behavior relative to mutual funds. Mutual funds serve as the reference group in all regressions. Robust t-statistics are clustered at the fund level.

Dependent Variable:	Overall Tilts	Green vs. Brown Tilts	Green Tilts	Brown Tilts
	(1)	(2)	(3)	(4)
$\mathbb{1}$(SMA)	0.03***	0.01*	0.04***	0.03***
	(0.01)	(0.01)	(0.01)	(0.01)
$\mathbb{1}$(Post-Paris)	0.12***	0.03***	0.14***	0.11***
	(0.01)	(0.01)	(0.01)	(0.01)
$\mathbb{1}$(SMA) $\times$ $\mathbb{1}$(Post-Paris)	-0.00	-0.06***	-0.03***	0.02*
	(0.01)	(0.01)	(0.01)	(0.01)
Observations	189361	189361	189361	189361
Controls	No	No	No	No
R^2	0.02	0.00	0.01	0.02
Y-Mean	0.48	0.01	0.48	0.48

Table 6: Triple Differences in Tilts: SMA Twin Funds After the Paris Agreement

This table presents triple-difference (DDD) regression results using fund-quarter panel data from 2009 Q1 to 2023 Q4. The analysis examines whether SMA twin funds adjusted their sustainability-related tilts differently than other funds following the Paris Agreement in December 2015. The dependent variables are: Overall Tilt (column 1), Green vs. Brown Tilt (column 2), Green Tilt (column 3), and Brown Tilt (column 4). The main coefficient of interest is the three-way interaction term $\mathbb{1}$(SMA) $\times$ $\mathbb{1}$(Twin Fund) $\times$ $\mathbb{1}$(Post-Paris), which captures the differential change in ESG tilts for SMA twin funds relative to non-twin SMAs, twin mutual funds, and non-twin mutual funds after the Paris Agreement. All regressions include robust t-statistics clustered at the fund level.

Dependent Variable:	Overall Tilts	Green vs. Brown Tilts	Green Tilts	Brown Tilts
	(1)	(2)	(3)	(4)
$\mathbb{1}$(Post-Paris)	0.13***	0.09***	0.17***	0.09***
	(0.01)	(0.01)	(0.01)	(0.01)
$\mathbb{1}$(SMA)	0.02	0.02**	0.03**	0.01
	(0.02)	(0.01)	(0.01)	(0.02)
$\mathbb{1}$(Twin Fund)	-0.05***	0.02**	-0.03**	-0.06***
	(0.02)	(0.01)	(0.01)	(0.02)
$\mathbb{1}$(SMA) $\times$ $\mathbb{1}$(Post-Paris)	0.01	-0.12***	-0.05***	0.06***
	(0.02)	(0.02)	(0.02)	(0.02)
$\mathbb{1}$(Twin Fund) $\times$ $\mathbb{1}$(Post-Paris)	-0.02	-0.10***	-0.07***	0.03
	(0.01)	(0.02)	(0.02)	(0.02)
$\mathbb{1}$(SMA) $\times$ $\mathbb{1}$(Twin Fund)	0.01	-0.02	-0.00	0.02
	(0.02)	(0.01)	(0.02)	(0.02)
$\mathbb{1}$(SMA) $\times$ $\mathbb{1}$(Twin Fund) $\times$ $\mathbb{1}$(Post-Paris)	-0.02	0.11***	0.04*	-0.06***
	(0.02)	(0.02)	(0.02)	(0.02)
Observations	184185	184185	184185	184185
Controls	No	No	No	No
R^2	0.02	0.00	0.02	0.02
Y-Mean	0.48	0.01	0.48	0.48

Table 7: Performance vs. Tilts in Explaining Fund Flows

This table compares performance and sustainability-related tilts in explaining future fund flows. Fund Return is the monthly net return. Fund Flow is the monthly fund flow, defined following Equation 1. Green vs. Brown Tilt is Green Tilt minus Brown Tilt, following Equation 7. $\mathbb{1}$(SMA) is a dummy equal to 1 if a fund is an SMA, $\mathbb{1}$(Twin) is a dummy equal to 1 if a mutual fund has a twin SMA, and $\mathbb{1}$(Inst. Class) is a dummy equal to 1 if a mutual fund is offered to institutional investors. Robust t-statistics are clustered by fund and date.

Dependent Variable:	Fund Flow (t+1)			
	(1)	(2)	(3)	(4)
Fund Return (t, %)	0.12***	0.07***	0.13***	0.14***
	(0.02)	(0.02)	(0.02)	(0.02)
Fund Return (t, %) × $\mathbb{1}$(SMA)		0.09**		
		(0.03)		
Fund Return (t, %) × $\mathbb{1}$(Twin)			-0.05**	
			(0.02)	
Fund Return (t, %) × $\mathbb{1}$(Inst. Class)				-0.07***
				(0.03)
Green vs. Brown Tilt (t-3)	0.06***	0.10***	0.06***	0.06**
	(0.02)	(0.02)	(0.02)	(0.02)
Green vs. Brown Tilt (t-3) × $\mathbb{1}$(SMA)		-0.06*		
		(0.03)		
Green vs. Brown Tilt (t-3) × $\mathbb{1}$(Twin)			0.13**	
			(0.06)	
Green vs. Brown Tilt (t-3) × $\mathbb{1}$(Inst. Class)				0.02
				(0.03)
Observations	529874	529874	515197	529874
Time FE	Yes	Yes	Yes	Yes
R^2	0.00	0.00	0.00	0.00