Asset Reclassification and Mutual Fund Flows*

Nicolas P. B. Bollen
Vanderbilt University

Veronika K. Pool
Vanderbilt University

Alexey Vasilenko
Vanderbilt University

September 14, 2025

ABSTRACT

This paper documents substantial asset 'reclassification' in the mutual fund industry, exceeding $450 billion in 2021. These reclassification events do not involve investor flows; instead, mutual fund assets are simply converted into twin investment vehicles, such as separate accounts or collective investment trusts. Analyzing the implications of asset reclassification for the mutual fund literature, we find that these events distort inferred mutual fund flows without reflecting actual asset movements at the investment product level. Failing to account for asset reclassification in flow-based regression analyses can lead to biased estimates, as it resembles a non-classical measurement error. We first analyze scenarios in which mutual fund flows serve as a dependent variable, focusing on flow-performance sensitivity. A regression utilizing reclassification-adjusted quarterly flows demonstrates a 40-100% greater flow-performance sensitivity for mutual funds with twin vehicles than one employing unadjusted flows. We then examine cases when flows serve as an independent variable, as in 'smart money' tests, where measurement error artificially inflates true estimates.

JEL Classification: G23
Keywords: mutual funds, twin investment vehicles, asset reclassification, fund flows

*Nicolas P. B. Bollen is at the Owen Graduate School of Management, Vanderbilt University; Email: nick.bollen@vanderbilt.edu. Veronika K. Pool is at the Owen Graduate School of Management, Vanderbilt University; Email: veronika.pool@vanderbilt.edu. Alexey Vasilenko is at the Owen Graduate School of Management, Vanderbilt University; Email: alexey.vasilenko@vanderbilt.edu.

1 Introduction

Over the past two decades, institutional-focused investment vehicles such as collective trusts and separate accounts have seen remarkable growth. Their combined net assets surged from $13.2 trillion to over $28.2 trillion between 2009 and 2021.[1] This growth partially stems from the creation of twin investment vehicles for existing mutual funds. In 2023, one-third of assets in institutional-focused vehicles were held in vehicles with mutual fund twins.[2] While twin accounts employ the same strategies, the institutional-focused vehicles operate under less stringent regulation, leading to reduced operational costs.

The factors driving the growing popularity of twin vehicles and their impact on the mutual fund industry are not fully understood. Asset managers may create these accounts to attract new clients from competitors. Alternatively, they may simply shift existing mutual fund assets into these vehicles to renegotiate contracts with existing clients. This latter 'asset reclassification' represents a simple change of structure where money shifts to twin vehicles without actual changes in assets under management at the investment product level.

In this paper, we study asset reclassifications. Our focus is motivated by emerging anecdotal evidence from the retirement industry suggesting that such events often involve very large pools of funds. One specific example is Delta Airlines' 2014 decision to transfer approximately $1 billion from the Fidelity Contrafund into a CIT managed by the same portfolio team.[3] For the roughly $100 billion Contrafund, this reallocation registers as a large 'outflow,' an order of magnitude larger than typical monthly flows in prior years. More generally, following the launch of the Contrafund CIT in 2014, monthly outflows from the mutual fund often exceed 2%. These abnormally large outflow months coincide with

[1] These figures are obtained by aggregating information from the Morningstar Direct database and Form 5500 filings.

[2] Source: the Morningstar Direct database.

[3] https://www.reuters.com/article/business/us-mutual-funds-cut-expenses-by-shifting-billions-to-trusts-idUSL1N0W51V8/

abnormally large inflow months for the CIT.[4] Importantly, these episodes appear puzzling when examining the mutual fund data in isolation as these 'fire sales' frequently occur after strong fund performance.

While news reports and industry publications point to significant asset moves that are becoming increasingly common in the retirement setting, there is no systematic assessment of these asset reclassification events and whether they benefit investors. Additionally, as the example above suggests, an important concern is whether these shifts affect inference concerning central research concepts in the mutual fund literature, such as flow-performance sensitivity. More generally, measuring fund flows accurately has far reaching importance as they enter nearly all analyses in the literature.

To examine asset reclassifications, we combine several data sources and utilize two alternative approaches. First, motivated by industry anecdotes, we employ data on retirement plan menus, which tend to disclose not only the name of the each investment option but also their type. We obtain information on the investment menus of defined contribution plans from the BrightScope database, which we also merge with Form 5500 filings from the Department of Labor (DOL). Our combined sample of plans that contain at least one mutual fund and an institution-focused vehicle comprises 4,764,156 menu options (including mutual funds, collective investment trusts, and pooled separate accounts) across 103,571 401(k) and 403(b) plans over the period from 2011 to 2021.

To capture reclassifications, we use information provided by Brightscope as well as the Schedule D of each plan's Form 5500 filing, which provides information on plan positions in vehicles such as common investment trusts or separate accounts (generally referred to as Direct Filing Entities (DFE's) in Form 5500). These DFE's often file their own Form 5500, enabling us to classify investment options in DC plan menus by vehicle type.

[4]Information about monthly flows and performance of the Contrafund and its CIT twin are from the Morningstar Direct database.

We document a substantial reclassification of assets between mutual funds and their twin vehicles using these data. We also find that the intensity of these events is higher in more recent years. Reclassification from mutual funds to twin vehicles in DC plans averaged 1.12% of total assets in mutual fund options during 2017-2021. Our analysis reveals systematic patterns in which investment options undergo reclassification in DC plans, with distinct profiles for different destination vehicles. Mutual fund options that transition to collective investment trusts are substantially larger, more cost-efficient, exhibit superior performance characteristics, and are overwhelmingly concentrated in target-date strategies. These CIT-bound options also originate from large retirement plans. In contrast, mutual fund options transitioning to pooled separate accounts are much smaller, more expensive, more equity-focused, and originate from smaller retirement plans.

While using retirement data allows us to directly identify asset shifts across twin vehicles, it has important limitations. First these data only capture a subset of the assets in both the retirement industry and those held in the mutual fund industry and their institution-focused twin accounts. This suggests that we are only able to identify a subset of the actual asset shifts. Second, information on retirement plan holdings is only available at the annual frequency. The latter significantly limits our ability to assess the impact of reclassifications on inference in the mutual fund literature.

Therefore, we also utilize an alternative data source. Specifically, we use the Morningstar Direct database to obtain data on mutual funds and institutional-focused vehicles. For mutual funds, Morningstar provides monthly data on total net assets, returns, sales, and redemptions, as well as detailed fund characteristics. Data on institutional-focused vehicles from Morningstar include monthly fund-level total net assets and returns, with linkages to mutual funds via investment product ID. Morningstar also provides quarterly investment product-level information for the consolidated institutional-focused vehicle segment, such as assets, total accounts, the number of accounts opened and closed, and assets in opened and

closed accounts. It is important to note that institutional-focused vehicles are not regulated by the Securities and Exchange Commission (SEC), therefore, unlike in the case of their mutual fund twins, data on these accounts are not systematically available. Morningstar sources information on these vehicles from self-reported surveys. Our sample includes 16,456 mutual funds and 24,754 institutional-focused vehicles (comprising 4,877 common/collective investment trusts and 19,877 separately managed accounts), covering the period from Q1:2000 to Q4:2022.

Although the retirement data obtained from Brightscope and Form 5500 and the asset management data obtained from Morningstar capture common assets, the aggregate industry statistics reveal significant differences. For example, it appears that separately managed accounts, which represent the largest asset pool in Morningstar, are not common in retirement plans. These differences suggest that while asset reclassification cases can be directly identified in DC retirement plans, they likely represent only a fraction of total asset reclassification at the mutual fund level.

To infer (unobservable) reclassifications using Morningstar, we develop a procedure based on two facts. First, asset reclassification should not affect total assets under management at the investment product level (i.e., the combined assets of mutual funds and their twin vehicles), as asset reclassification does not represent actual asset flows. Second, for institution-focused twins, Morningstar reports assets in opened and closed accounts, respectively. Asset reclassification is reflected in these figures: we can think about these figures as asset reclassifications plus the 'remainder,' where only the latter contributes to a change in total assets at the investment product level.

Based on these facts, we employ the following procedure. We begin by estimating the shares of assets in opened and closed twin vehicle accounts that contribute to investment product flows. To do so, we regress product level flows on flows reflected in assets reported in newly opened and closed accounts. Since the estimated coefficients from these regressions

represent the proportion of the money flows attributed to the 'remainder,' we then calculate the share of flows related to asset reclassification as one minus the estimated coefficients. The dollar amount of reclassified assets from mutual funds to twin vehicles, as well as from twin vehicles back to mutual funds, are calculated by multiplying the respective shares related to asset reclassification by the corresponding dollar assets, respectively.

Our analysis reveals that asset reclassification distorts fund flow measurement differentially across fund characteristics, with fixed income and allocation strategies showing the largest strategy-based effects and smaller funds exhibiting the most pronounced size-based impact. Importantly, funds with higher institutional share class assets demonstrate amplified reclassification effects across all dimensions, highlighting the role of institutional demand in driving flow measurement distortions. We also estimate that the annual aggregate reclassified assets for U.S. mutual funds with twin vehicles exceeded $450 billion in 2021. This figure substantially surpasses the annual TNAs of fund mergers which correspond to approximately $95 billion in 2021.

After quantifying asset reclassification at both fund and aggregate levels, we demonstrate that adjusting for asset reclassification has important methodological implications for regression analyses using fund flows. Asset reclassification negatively correlates with actual fund flows, resembling a non-classical measurement error. We investigate potential biases in regressions using unadjusted fund flows, in which asset reclassification acts as a measurement error. When flows serve as an explanatory variable, the measurement error negatively correlated with standard fund flows inflates true estimates (Pischke, 2007), as we demonstrate for the relation between flows and future performance (Gruber, 1996; Zheng, 1999; Keswani and Stolin, 2008). We then analyze scenarios in which mutual fund flows serve as a dependent variable, focusing on flow-performance sensitivity. A regression utilizing reclassification-adjusted quarterly flows demonstrates a 40-100% greater flow-performance sensitivity for mutual funds with twin vehicles than one employing unadjusted flows.

Our study contributes to several strands of the literature. First, it adds to the literature on institutional investment products. Numerous studies investigate performance (e.g., Busse et al., 2010; Peterson et al., 2011; Elton et al., 2013; Gerakos et al., 2021), flow determinants (Fedyk, 2024), and investment consultants' recommendations within the realm of institutional investment products (Jenkinson et al., 2016). Tian and Shi (2024) documents a shift from mutual funds to collective investment trusts in 401(k) plans. Additionally, several studies in this literature examine twin investment vehicles. Huang et al. (2023) show that including twin vehicle assets reduces fund-level diminishing returns to scale in mutual funds up to 90%. Jones et al. (2023) find structural differences explain outperformance of separately managed accounts over corresponding mutual funds. Rohleder et al. (2023) demonstrate joint underperformance of "fraternal twin" vehicles and their corresponding mutual funds (have the same fund family, manager, and investment objective, but different portfolios) compared to "identical twin" vehicles and their corresponding mutual funds (have identical portfolios in addition to the fund family, manager, and investment objective).

We contribute to this literature by documenting asset reclassifications between mutual funds and twin investment vehicles and demonstrate the methodological importance of adjusting for asset reclassification in regression analyses using fund flows. Additionally, the extant literature on institutional twins often compares flow-performance sensitivities across the different vehicles to make inferences about differences in clientele behavior, for example. Our paper cautions against such comparisons as flows derived from the assets of individual vehicles may often capture simple asset shifts across the twins.

Second, our paper contributes to the literature investigating the determinants of menu design in DC retirement plans.[5] Several studies demonstrate that plan providers' incentives affect plan menus (e.g., Cohen and Schmidt, 2009; Pool et al., 2016, 2022). Bhattacharya and Illanes (2022) demonstrate that imperfect market competition for recordkeeping can result in

[5]Reuter (2024) reviews the broad literature on DC retirement plan design and participant behavior.

low plan quality. A few papers also examine the role of employer-related factors in the plan menu design, such as transaction costs when selecting and switching plan providers (Yang, 2023), employers' willingness to pay for plan quality (Bhattacharya and Illanes, 2022), and litigation risk (Gropper, 2023). This paper investigates how asset reclassification shapes DC retirement plan menus and demonstrates that mutual fund options are frequently replaced with their twin investment vehicles. Our analysis reveals that the distribution of benefits from asset reclassification varies depending on investment option structure. Options invested directly in mutual funds and their twin vehicles experience substantial fee reductions. Conversely, when reclassification occurs through feeder funds, participants see no fee reductions.

Third, our paper adds to the literature highlighting problems in mutual fund databases. Multiple studies demonstrate survivorship bias in commonly employed mutual fund datasets (e.g., Grinblatt and Titman, 1989; Brown et al., 1992; Elton et al., 1996). Elton et al. (2001) identify omission return bias and inaccurate merger months in the CRSP Survivor Bias Free U.S. Mutual Fund Database. Evans (2010) documents incubation bias in reported mutual fund returns using CRSP data. Schwarz and Potter (2016) reveal discrepancies between CRSP and Thomson databases and SEC filings. Specifically, they find that CRSP and Thomson databases include many voluntarily reported portfolios absent from SEC filings while missing numerous SEC-filed portfolios. Our study extends this literature by demonstrating that reported mutual fund sales, redemptions, and asset changes may not always accurately reflect actual asset movements, emphasizing the importance of improving mutual fund data reporting standards.

Finally, our paper contributes to the extensive literature on mutual fund flows. Christoffersen et al. (2014) provide a comprehensive review of this literature. We contribute to this literature by demonstrating that adjusting for asset reclassification has important methodological implications for regression analyses using fund flows.

The rest of the paper is structured as follows. Section 2 discusses the institutional

background of institutional-focused vehicles. Section 3 explains our data. In Section **??**, we analyze asset reclassification in DC retirement plans from the client's perspective and examine how it appears in mutual fund and twin vehicle variables. Section 5 describes how we infer the magnitude of asset reclassification at the mutual fund and aggregate levels. Section 6 discusses the methodological implications of adjusting for asset reclassification in regression analyses using fund flows. Section 7 offers concluding remarks.

2 Institutional Background: Collective Trusts and Separate Accounts

The terms "collective trusts" and "separate accounts" are umbrella designations encompassing several distinct institutional-focused investment vehicles. "Collective trusts" may refer to collective investment trusts or common trust funds, while "separate accounts" can denote separately managed accounts or pooled separate accounts. We provide institutional background for each vehicle and clarify their structural, operational, and regulatory differences.

2.1 Collective Investment Trusts

"Collective investment trusts" (CITs) are tax-exempt, pooled investment vehicles established by banks or trust companies. Often managed by the same asset managers as mutual funds, CITs are available only to qualified retirement plans, including defined benefit, 401(k), and 457(b) plans, with potential expansion to 403(b) plans pending legislation.

CITs originated in the 1920s when regulators allowed banks to manage deceased customers' assets.[6] Their use for pension savings expanded post-WWII with the rise of employer-sponsored retirement plans. In 2000, the National Securities Clearing Corporation's inclusion of CITs in its trading platform improved tracking for qualified investors.

[6]Shnitser (2023) provides a comprehensive overview of CIT history and regulation.

CITs offer lower fees than mutual funds, making them an appealing option for retirement plans aiming to minimize expenses and reduce litigation risks related to these expenses. Consequently, CITs have grown significantly in the retirement space, reaching $9 trillion in 2021.[7] The fee difference primarily stems from reduced operational expenses due to lighter regulation and reporting standards.

Unlike mutual funds, CITs operate outside SEC regulation and are subject to fragmented oversight by various regulatory authorities. The Office of the Comptroller of the Currency regulates CITs established by national banks or trust companies, while state regulators oversee CITs created by state-chartered institutions. Additionally, the Department of Labor regulates CITs holding assets of retirement plans covered by the Employee Retirement Income Security Act of 1974. This regulatory framework results in significantly lower oversight and reporting requirements, including no public performance disclosure.

Overall, CITs offer lower fees and less transparency than mutual funds, with lighter regulation, while remaining similar to institutional share classes of mutual funds.

2.2 Common Trust Funds

Common trust funds function similarly to collective investment trusts in operational and regulatory aspects, but with one key distinction: they accept investments from a broader range of investors, including foundations, corporations, endowments, asset aggregators, and high net worth individuals.[8]

2.3 Separately Managed Accounts

"Separately managed accounts" (SMAs) are investment portfolios managed by professional asset managers in accounts designated solely for a single investor. SA investors directly own

[7] Based on data from Form 5500.

[8] Source: white paper of the Coalition of Collective Investment Trusts https://www.seic.com/sites/default/files/2022-05/SEI-STC-CCIT-WhitePaper.pdf

underlying securities, contrasting with mutual funds' pooled ownership structure. Originating in the 1970s for high-net-worth individuals, SMAs offer lower fees than mutual funds due to reduced operational expenses from lighter regulation and reporting standards.

Like CITs, SMAs are not registered with the SEC and lack public performance disclosures. Nonetheless, the SEC recently modified Form ADV Part 1 to collect information on SMAs. Since 2017, an investment adviser is required to report the value of assets in SMAs held at a single custodian if this value represents at least 10% of total assets in SMAs managed by the investment adviser. In addition, the Department of Labor also regulates SMAs holding ERISA-covered retirement plan assets.

An important distinction between CITs and SMAs is the investor base that these vehicles cater to. While CITs serve specific qualified retirement plans, SMAs cater to a broader range of investors, including CIT-qualified retirement plans, 403(b) plans, other institutional investors, and large retail clients.

2.4 Pooled Separate Accounts

"Pooled separate accounts" (PSAs) are investment vehicles created by life insurance companies where assets from multiple clients are combined in accounts segregated from the insurer's general assets.[9]

PSAs originated in the mid-20th century through state statutes initially designed for variable annuities. The modern PSA evolved in the late 1950s/early 1960s when insurance companies created these vehicles to offer pension clients higher-return portfolios with greater equity exposure than state insurance regulations typically permitted in general accounts. By segregating plan assets, insurers circumvented conservative state investment limitations while providing market-based returns without guaranteeing principal or fixed rates.

[9]An overview of the history and regulation of pooled separate accounts can be found in and Wiedenbeck et al. (2013)

PSAs function at the nexus of insurance regulation and ERISA law. State insurance commissioners exercise oversight of these vehicles to protect consumers from potential fraud and other risks. When retirement plan assets are placed within a PSA, ERISA regulations classify these investments as "plan assets," thereby subjecting them to ERISA's fiduciary obligations.

PSAs are only available to qualified pension, profit-sharing, annuity, and certain government plans. These vehicles, like other institutional investment vehicles, typically offer reduced fee structures due to their lighter regulatory oversight and less demanding reporting requirements. Information regarding their performance is also inaccessible to the general public.

2.5 Master and Feeder Funds

Institutional-focused investment vehicles can be categorized into two distinct categories. The first category encompasses vehicles that make direct investments in securities such as stocks, bonds, or other financial instruments ("master" funds). This category also includes target-date and asset allocation investment products that function as fund-of-funds structures, investing in other underlying investment vehicles. These institutional vehicles from the first category may serve as the twin vehicles of mutual funds.

The second category of institutional-focused vehicles comprises feeder funds that allocate assets to underlying funds. These funds can function as asset aggregators, pooling capital from smaller investors to access institutional pricing and preferential fee arrangements unavailable to individual participants. Alternatively, financial advisors may establish feeder funds, charging supplementary fees for their advisory services while directing assets into underlying funds.

3 Data

This section describes the data used in our empirical analysis. First, we employ DC retirement plan data compiled from Form 5500 filings and the BrightScope Beacon dataset. Second, we obtain mutual fund and institutional-focused investment vehicle data from the Morningstar Direct database.

3.1 Data on DC Retirement Plans

3.1.1 Form 5500 Filings

Form 5500 is a mandatory filing requirement for private-sector employee benefit plans regulated under the Employee Retirement Income Security Act of 1974 (ERISA). Access to these filings is available through the DOL's website, which also compiles information from these filings in its 'Form 5500 Datasets.' The datasets separate the Form 5500 information into the main form and the individual schedules. Each filing is identified by an 'ack_id.' This is the main ID that connects the main form and the schedules.

The filing requirement is not universal. For example, public 403(b) plans and governmental defined benefit plans do not file Form 5500. Additionally, 401(k) plans with fewer than 100 participants are only required to provide basic plan information and therefore do not disclose details on their investment menus or file Schedule H. Since menu and Schedule H information are essential for our analyses, we focus on reporting plans with at least 100 participants.

Despite these limitations, Form 5500 filings that contain a Schedule H attachment capture $11.8 trillion in pension assets in 2021. This is roughly 30% of the total pension assets in the US, as reported by the Investment Company Institute (ICI) Factbook. The most comprehensive coverage comes from 401(k) plans. The corresponding figure is $6.1 trillion for this group, which represents 76% of the 401(k) assets reported by ICI.

Schedule H provides detailed financial information across plan assets, liabilities, income,

and expenses. It reports asset values by type (including U.S. Government securities, corporate debt instruments, and various equity holdings) and aggregate asset values for investments in common/collective trusts, pooled separate accounts, and registered investment companies such as mutual funds. Notably, assets held in separately managed accounts are typically reported as direct plan assets rather than being classified as investment vehicles.[10] Therefore, the label 'separately managed account' does not appear as a vehicle type in Form 5500 data.

Additionally, if a retirement plan invests in institutional investment vehicles, it must disclose these holdings in Schedule D of Form 5500.[11] This Schedule reports the plan's end-of-year dollar value invested in each institutional vehicle along with the detailed information about the vehicle, including the vehicle's code (PN), name, sponsor company code (EIN), and sponsor company name.

Panel A of Figure 1 reports total retirement assets invested in CITs and (Pooled) Separate Accounts for the 2009-2022 period, based on the universe of Schedule D filings by retirement plans. Using Schedule H filings reveals a similar picture. The panel also shows plan assets invested in 'master trusts,' which are investment vehicles that pool assets from multiple plans by the same employer or multiple employers, for example. These are often investment 'bundles' resembling funds of funds that may contain mutual funds, CITs, Separate Accounts, and other investment options, such as Guaranteed Investment Contracts or individual assets. However, this information cannot be unpacked from the retirement plans' filings.

In Panel A, we use Schedule D information submitted by *retirement plans*. However, institutional-focused vehicles can also file *their own* Form 5500 forms to reduce reporting burdens for participating plans. These institutional-focused vehicles are collectively referred to as direct filing entities (DFE's) in the DOL filings. Their Form 5500 filings contain three

[10]According to Form 5500 filing instructions, SMAs may be reported either as individual Master Trust Investment Accounts or as direct plan assets. We perform a textual analysis of Master Trust Investment Account names and determine that the majority of these accounts are not SMAs.

[11]Institutional-focused vehicles are classified as "Direct Filing Entities" (DFEs) in Form 5500 filings.

forms: the main form, Schedule D, and Schedule H. Therefore, an alternative way to utilize Form 5500 information to gain insights on retirement asset allocations by vehicle type is to use information filed by the DFE's.

There are over 125 thousand DFE filings in the DOL datasets in the 2009 to 2022 period. The main form in these filings identifies the DFE type. We then obtain the total assets for each filing DFE from their Schedule H. Panel B of Figure 1 shows the total assets reported by each investment vehicle type by year. Compared to Panel A, it is clear that relying on DFE filings paints a more comprehensive picture, though not all DFE's file. This is because the total assets of the DFE's also include retirement assets from plans that are not reporting to the DOL or only file basic plan information. It is important to note however, that DFE's are often funds of funds. Therefore, some assets are double counted in Panel B.

To mitigate this problem, we use information from Schedule D of the DFE filings. Generally, Schedule D contains two parts. Part I is only filled out by DFE's that are funds of funds that invest in institutional vehicles such as CITs and Separate Accounts (this is analogous to the use of Part I by retirement plans, described above). When the DFE's Schedule D filing contains Part I information, we use this information to identify its underlying funds. We then check whether these underlying funds also file Form 5500 with the DOL. If they do, we subtract the total assets they report on Schedule H of their filing from the total assets reported by the DFE. Although we stop at this first step, an iterative correction may be required to completely eliminate double counting. This is because, in some cases, there are many 'layers' in these institutional arrangements. That is, a DFE may be a fund of fund that holds other underlying funds, where the underlying funds may also be funds of funds that hold underlying funds, some of which are funds of funds.

The adjusted asset values are tabulated in Panel C of Figure 1. Panel C shows that double-counting is potentially an important concern when aggregating DFE assets. For example, the total assets invested in CITs decline significantly after the adjustment, but

remain significantly higher than the asset values reported in Panel A, which are based on disclosures by retirement plans.

3.1.2 Retirement Menu Data

Up to this point, our industry snapshots are obtained from the DOL's Form 5500 datasets. As mentioned above, these datasets collect information from the main from and the individual schedules, but do not contain information from the supplementary materials that often accompany the Form 5500 filings. For example, for plans filing Schedule H, the detailed list of investment options offered on the menu is typically attached as an appendix to Form 5500. However, extracting this information presents significant technical challenges.

To address this limitation, we supplement our Form 5500 data with detailed investment menu information from the BrightScope Beacon database, which collects retirement plan menu data from audited Form 5500 filings. We obtain data from the Brightscope database for the 2009-2022 period. Brightscope provides a good coverage of Form 5500 filers and, by the post-2015 period, it captures the near universe of retirement plans with at least 100 participants. In Panel D of Figure 1 we calculate the total assets invested by investment type using detailed menu information from Brightscope. Brightscope also reports allocations to common stock. We include this in the figure as common stock holdings may occur through investments in separately managed accounts, as mentioned above. The figure reveals that common stock holdings are relatively small, indicating that separately managed accounts are not likely to be a popular investment vehicle in retirement plans.

More generally, the four panels of the figure highlight large differences in the total assets that researchers can capture using different data sources related to retirement plans. While it is important to document these differences, we now turn to reclassifications. To identify asset reclassifications, we follow two approaches. Our first approach focuses on options that maintain identical names but change vehicle types. Qualifying cases must demonstrate two

consecutive periods in the original vehicle type, whether mutual fund, collective investment trust, or pooled separate account, followed by two consecutive periods in the new vehicle type while retaining the same investment name throughout the transition.

Our second approach addresses options with slight name modifications due to reclassification by matching closed options with newly opened options. This process requires confirming that the same asset management company manages both options and verifying that one option's name components form a subset of the other's components. For example, when "Vanguard Extended Market Index" as a mutual fund transitions to "Vanguard Institutional Extended Market Index" as a collective investment trust, the original name components ('Vanguard', 'Extended', 'Market', and 'Index') are fully contained within the new name ('Vanguard', 'Institutional', 'Extended', 'Market', and 'Index'), satisfying our subset criteria. This approach prioritizes accuracy over comprehensiveness, ensuring high confidence in identified reclassification events while potentially missing rare cases with significant name changes that do not meet our subset criteria.

Table 2 reports summary statistics for the data on menu options in DC retirement plans obtained from the BrightScope Beacon database. Continuous variables are winsorized at the 1st and 99th percentiles. The analysis is restricted to plans for which asset reclassification data can be identified. Since asset reclassification identification requires information for at least two preceding periods and one following period, this requirement reduces the initial sample period from 2009-2022 to 2011-2021. We further restrict the sample to investment options that are mutual funds, collective investment trusts, or pooled separate accounts, as only these investment vehicles can be subject to asset reclassification. The final sample comprises 4,764,156 plan-menu option pairs (including mutual funds, collective investment trusts, and pooled separate accounts) across 103,571 401(k) and 403(b) plans over the period from 2011 to 2021.

The average option balance is $1.54 million, with a median of $0.18 million, indicating a

right-skewed distribution where most options hold relatively small amounts while a few options manage substantial assets. The average expense ratio is 0.63% (median 0.65%), suggesting a fairly symmetric distribution of fees across options. The typical plan in our sample has total assets of $37.18 million, though the median of $8.12 million reveals considerable skewness in plan size. Plans offer an average of 28.5 investment options (median 27.14), with considerable variation as indicated by the standard deviation of 11.81 options. The number of options ranges from a minimum of 3 to a maximum of 81.

INSERT TABLE 2 HERE

3.2 Data on Investment Vehicles

3.2.1 Mutual Fund Data

Mutual fund data is sourced from the Morningstar Direct database, encompassing active and inactive U.S. mutual funds from Q1:2000 through Q4:2022. The dataset provides share-class level historical data on quarterly gross and net returns, quarterly total net assets, and annual expense ratios, along with share-class characteristics such as inception dates. At the fund level, the Morningstar database supplies historical data tracking quarterly total net assets, sales, redemptions, alongside fund characteristics including detailed investment strategy classifications.

We calculate fund-level gross and net returns by averaging share class-level returns weighted by share class TNA. Fund age is calculated as the time elapsed since the inception date of the fund's oldest share class. We employ the Global Broad Category Group classification to define the primary asset class for each fund and the more detailed Morningstar Category classification to identify and group funds pursuing comparable investment strategies.

For our analysis, we calculate quarterly mutual fund flows using the standard formula:

$$F_{i,t} = \frac{TNA_{i,t} - (1 + r_{i,t})TNA_{i,t-1} - MGN_{i,t}}{(1 + r_{i,t})TNA_{i,t-1}} \tag{1}$$

where $TNA_{i,t}$ represents the total net assets of fund i at time t. $r_{i,t}$ denotes the net return of fund i at time t. $MGN_{i,t}$ is the inflow from fund mergers of fund i at time t.

Panel A in Table 1 reports summary statistics for the Morningstar mutual fund data. Continuous variables are winsorized at the 1st and 99th percentiles to remove outliers. Our sample includes 654,960 observations across distinct mutual funds. The average quarterly gross and net returns are 1.68% and 1.41%, respectively. The average mutual fund has total net assets (TNA) of $1,189.52 million, though the median of $196.75 million suggests a right-skewed distribution. Monthly sales and redemptions average $94.46 million and $89.26 million respectively. The sample is predominantly comprised of equity funds (54%), followed by fixed income (27%), allocation (15%), and other strategies (4%). The average fund age is 12.53 years.

INSERT TABLE 1 HERE

3.2.2 Institutional-Focused Vehicle Data

In addition to mutual fund data, the Morningstar Direct provides comprehensive data on institutional-focused investment vehicles. The Morningstar universe covers CITs and SMAs, but not PSAs.

At the vehicle level, the Morningstar database supplies historical data including quarterly gross and net returns, quarterly total net assets, and vehicle characteristics such as investment strategy classifications. The database also provides inception dates at the share class level, which we use to calculate vehicle age as the time elapsed since the inception date of the vehicle's oldest share class.

At the strategy level, the Morningstar database supplies the following quarterly historical information on the non-mutual fund part of an investment strategy: total number of strategy accounts, taxable and tax-exempt accounts, newly opened and closed accounts, and assets categorized by account type, including assets in opened and closed accounts.

For our analysis, we calculate quarterly investment product-level flows as follows:

$$F_{s,t} = \frac{\sum_{j\in\{mf,cit,sma\}} TNA_{j,s,t} - \sum_{j\in\{mf,cit,sma\}} (1+r_{j,s,t})TNA_{j,s,t-1} - \sum_{j\in\{mf,cit,sma\}} MGN_{j,s,t}}{\sum_{j\in\{mf,cit,sma\}} (1+r_{j,s,t})TNA_{j,s,t-1}} \quad (2)$$

where $TNA_{j,s,t}$ represents the total net assets of strategy s in quarter t for investment vehicle type j, which can be mutual fund ($j = mf$), CIT ($j = cit$), or SMA ($j = sma$). $r_{j,s,t}$ denotes the net return of strategy s in quarter t for investment vehicle type j. $MGN_{j,s,t}$ is the inflow from vehicle mergers of strategy s in quarter t for investment vehicle type j. Unlike individual vehicle and mutual fund flows, strategy-level flow is not affected by reclassifications.

We also calculate flows due to opened and closed twin vehicle accounts as follows:

$$F_{\text{Opened},s,t} = \frac{\text{Assets in Opened Accounts}_{s,t}}{\sum_{j\in\{mf,cit,sma\}} (1+r_{j,s,t})TNA_{j,s,t-1}} \quad (3)$$

$$F_{\text{Closed},s,t} = \frac{\text{Assets in Closed Accounts}_{s,t}}{\sum_{j\in\{mf,cit,sma\}} (1+r_{j,s,t})TNA_{j,s,t-1}} \quad (4)$$

where $\text{Assets in Opened Accounts}_{s,t}$ and $\text{Assets in Closed Accounts}_{s,t}$ represent assets in opened and closed twin vehicle accounts, respectively, of strategy s in quarter t.

Panel B in Table 1 reports summary statistics for the Morningstar institutional-focused vehicle data. Continuous variables are winsorized at the 1st and 99th percentiles to remove outliers. Our sample includes 997,004 observations across distinct institutional-focused vehicles, including 121,470 CITs and 876,534 SMAs. CITs' average size ($824.77 million) is

smaller than mutual funds (in Panel A), with a different strategic composition: 42% equity, 39% allocation, 16% fixed income, and 4% other strategies. CITs are generally younger, with an average age of 8.31 years. SMAs have a larger average size than mutual funds and CITs, amounting to $1,092.41 million. Their strategic distribution resembles mutual funds, with 56% equity, 23% fixed income, 20% allocation, and 2% other strategies. SMAs' average age is 10.23 years. On average, each investment product serves 175.19 institutional-focused vehicle accounts, with 102.64 taxable and 59.34 tax-exempt accounts. Monthly account turnover averages 5.85 accounts lost and 6.03 gained. Average assets in institutional-focused vehicle accounts total $1,925.64 million, with fairly even distribution between taxable accounts ($1,473.88 million) and tax-exempt accounts ($1,396.18 million). The average asset outflow from institutional-focused vehicle lost accounts is $19.41 million, while assets gained average $23.92 million.

Table B.1 in the Appendix presents additional summary statistics for two specialized subsamples: mutual funds with twin investment vehicles and the corresponding institutional-focused vehicles that are twins for these mutual funds. This combined subsample encompasses 3,168 mutual funds alongside their twin vehicles, consisting of 600 CITs and 2,915 SMAs. The data reveals that mutual funds with twin institutional vehicles tend to be larger, more equity-focused, and more established than the broader universe of mutual funds.

3.2.3 Growth of Institutional-Focused Investment Vehicles

In subsection 3.1 we inferred the growth of institutional-focused investment vehicles using data on retirement plans. We now combine Morningstar Direct data on SMAs with data on CITs, PSAs, and other institutional-focused investment vehicles from Form 5500 filings collected by the Department of Labor.[12]

Figure 2 illustrates the growth of total net assets across four institutional-focused invest-

[12]Although CIT data is also available in Morningstar Direct, Form 5500 filings provide more comprehensive coverage of these investment vehicles.

ment vehicle categories from 2009 to 2022: SMAs, CITs, PSAs, and other direct vehicles. Over the analyzed period, institutional-focused investment vehicles exhibit a consistent growth in combined assets, with SMAs holding the largest share among the four categories, followed by CITs. PSAs maintain the smallest assets. SMAs' dominant position can be attributed to their broader investor accessibility compared to the more restricted eligibility criteria of CITs and PSAs. Notably, CITs have been the primary driver of recent growth in institutional-focused vehicles, reflecting their increasing adoption by Defined Contribution (DC) retirement plans in recent years.

INSERT FIGURE 2 HERE

Figure 3 illustrates the changing distribution of assets in DC retirement plans allocated across individual assets and five investment vehicle categories from 2009 to 2022: mutual funds, CITs, PSAs, other direct vehicles, and fiduciary vehicles. This figure does not display SMAs, which do not appear in Form 5500 filings because their assets are typically reported as direct plan assets rather than being classified as an investment vehicle. The results reveal that the percentage of assets allocated to CITs has consistently increased throughout the sample period, primarily because CITs have been displacing mutual funds and individual assets in recent years. Figure A.4 in the Appendix demonstrates similar trends for the sample of DC retirement plans with continuous annual Form 5500 filings throughout the 2009-2022 period.

INSERT FIGURE 3 HERE

4 Asset Reclassification in DC Retirement Plans

This section examines asset reclassification from the investor perspective, focusing specifically on defined contribution (DC) retirement plans. We begin by analyzing a case study to

illustrate the reclassification phenomenon and then investigate which investment options undergo reclassification within our sample of DC retirement plans.

4.1 Asset Reclassification: Case Study

To illustrate the potential magnitude and importance of asset reclassification for mutual fund flow measurement, we present a detailed case study of the Vanguard Extended Market Index Fund in Figure 4. Vanguard established a twin collective investment trust (CIT) for this fund at the end of 2016.

Figure 4 presents three distinct flow measurement approaches over the period 2013-2018. We compare standard annual flows with two alternative measures that adjust for asset reclassification: flows adjusted using observable asset reclassification cases from the BrightScope database, and flows adjusted under the assumption that all assets in the established twin CIT originated from reclassification. These approaches provide bounds on the true magnitude of asset reclassification. The BrightScope-adjusted flows likely underestimate total reclassification effects, as the database does not capture all asset reclassification cases. Conversely, the CIT assets-adjusted flows likely overestimate total reclassification effects, as not all assets in the twin CIT necessarily originate from reclassification of existing mutual fund assets.

The empirical results reveal substantial divergences among the three measurement approaches following twin CIT establishment. Unadjusted flows indicate relatively modest annual flow rates of 3.71% in 2017 and 2.16% in 2018. In stark contrast, flows adjusted for observable asset reclassification using BrightScope data reveal substantially larger flow rates of 10.78% and 4.76%, respectively. Most dramatically, flows adjusted using total CIT assets indicate annual flow rates of 20.04% in 2017 and 8.16% in 2018. Unadjusted flows exhibit a declining trend over time, whereas adjusted flows show no such pattern.

INSERT FIGURE 4 HERE

This case study demonstrates that asset reclassification can severely distort mutual fund flow measurement for funds with twin vehicles.

4.2 DC Plan Options Undergoing Reclassification

Figure 5 depicts the evolution of asset reclassification magnitude in DC retirement plans from 2011 to 2021. The black bars show reclassification from mutual funds to twin vehicles (collective investment trusts and pooled separate accounts). This reclassification exhibits substantial growth over the observation period, beginning at approximately 0.06% of mutual fund assets in 2011 and reaching a peak of 2.23% in 2017. This peak was primarily driven by Vanguard's establishment of a series of collective investment trusts for its mutual funds at the end of 2016, which led to widespread adoption of these lower-cost alternatives across DC retirement plans. After 2017, reclassification activity moderates but remains elevated, ending at 0.73% in 2021. Asset reclassification from mutual funds to twin vehicles averaged 1.12% of total mutual fund assets during the 2017-2021 period.

In contrast, reclassification from twin vehicles back to mutual funds, shown by gray bars, demonstrates considerably smaller magnitudes. This reverse reclassification ranges between 0.08% and 0.18% of mutual fund assets, with slight fluctuations but no clear directional trend.

INSERT FIGURE 5 HERE

Having established the magnitude of asset reclassification in DC retirement plans, we next examine the characteristics of investment options that undergo such transitions. Table 3 compares characteristics of mutual fund options that undergo asset reclassification and those that remain unchanged in DC plan menus. The analysis distinguishes between two types

of reclassification destinations: collective investment trusts (column 1) and pooled separate accounts (column 2).

Mutual fund options that transition to CITs exhibit markedly different characteristics from non-reclassified options. Most notably, these options are substantially larger, with average assets of $22.36 million compared to $2.43 million for non-reclassified options. These reclassified options demonstrate superior cost efficiency, with expense ratios averaging 0.52% versus 0.59% for non-reclassified options. Performance metrics further distinguish CIT-bound options, which exhibit significantly higher prior three-year performance percentiles (71.32 versus 57.28) and lower return volatility (2.95% versus 3.47% standard deviation).

The strategic composition of CIT reclassifications reveals a concentration in allocation strategies, comprising 87.49% of reclassified options compared to 34.68% of non-reclassified options. These options also demonstrate lower portfolio turnover (26.24% versus 48.73%) and originate from younger funds (14.54 versus 17.67 years). Notably, while the underlying mutual funds are smaller in terms of total assets under management ($20.85 billion versus $42.44 billion), they are offered within significantly larger retirement plans ($489.41 million versus $107.85 million in plan assets).

In contrast, mutual fund options transitioning to PSAs present a different profile. These options are substantially smaller than both CIT reclassifications and non-reclassified options, averaging only $0.66 million in assets. They exhibit higher expense ratios (0.66% versus 0.59% for non-reclassified options) and originate from larger underlying mutual funds ($39.73 billion in assets under management). PSA reclassifications show a greater concentration in equity strategies (54.43% versus 51.37% for non-reclassified options) and are offered within smaller retirement plans than their CIT counterparts.

INSERT TABLE 3 HERE

5 Asset Reclassification Magnitude

5.1 Inferring Asset Reclassification for Mutual Funds with Twin Vehicles

Asset reclassification cases in DC retirement plans represent only a fraction of total asset reclassification at the mutual fund level. To infer the unobservable total reclassified assets at this level, we develop a procedure based on two facts. First, asset reclassification should not affect total investment product assets (the combined assets of mutual funds and their twin vehicles), as asset reclassification does not represent actual asset flows. Second, as shown in the previous results, asset reclassification is reflected in twin vehicle accounts. It means that a portion of assets in opened and closed accounts represent asset reclassification and do not reflect a change in investment product assets, whereas the remainder contributes to a change in investment product assets. Assets in open twin vehicle accounts (excluding those related to asset reclassification) increase investment product assets, while assets in closed accounts (excluding those related to asset reclassification) decrease investment product assets. Based on these facts, we employ the following procedure to infer the unobservable total reclassified assets at the mutual fund level. We begin by estimating the shares of assets in opened and closed twin vehicle accounts contributing to investment product flows as follows:

$$F_{s,t} = \sum_{\nu \in \{\text{strategy classes}\}} \beta_{1,v} F_{\text{Opened},s,t} \mathbb{1}_{s,t}(v) + \sum_{\nu \in \{\text{strategy classes}\}} \beta_{2,v} F_{\text{Closed},s,t} \mathbb{1}_{s,t}(v) + \gamma X_{s,t} + \alpha_s + \alpha_t + \epsilon_{s,t} \quad (5)$$

where $F_{s,t}$ represents the flow of investment product s in quarter t calculated according to equation (2). $F_{\text{Opened},s,t}$ and $F_{\text{Closed},s,t}$ denote investment product flows attributable to opened and closed accounts, calculated according to equations (3) and (4), respectively. $\mathbb{1}_{s,t}(v)$ is an indicator variable for one of the four strategy classes: equity, fixed income, allocation, and other. $\beta_{1,v}$ and $\beta_{2,v}$ are the parameters of interest that quantify the shares of assets in opened and closed twin vehicle accounts, respectively, that contribute to investment product flows.

$\gamma X_{s,t}$ represents the vector of the following control variables: the log of lagged investment product size and the log of lagged investment product age in years. α_s denotes investment product fixed effects that control for time-invariant heterogeneity at the investment product level. α_t indicates time fixed effects that control for common time-varying factors. double clustered at the Global category and time levels and are reported in parentheses.

Table 4 reports coefficient estimates from the OLS regression (5), which quantifies the proportion of investment product flows attributable to assets in opened and closed twin vehicle accounts. In the baseline specifications (Columns 1 and 3), we observe that flows due to assets in opened twin vehicle accounts have a positive and statistically significant impact on overall investment product flows, with coefficients of 0.30 and 0.35, respectively. Conversely, flows attributable to closed twin vehicle accounts demonstrate a negative impact of similar magnitude, with coefficients of -0.40 and -0.46. This suggests that twin vehicle account openings and closures account for roughly one-third to one-half of investment product flows, with asset reclassification accounting for the remainder.

When examining the heterogeneity across investment strategies (Columns 2 and 4), we find substantial variation in the relationship between twin vehicle account activity and investment product flows. Fixed income investment products exhibit the lowest proportion of investment product flows attributable to assets in opened twin vehicle accounts, with coefficients of 0.10 and 0.13, suggesting that asset reclassification is a particularly frequent phenomenon for these funds. In contrast, "Other" strategy funds show the highest coefficients (0.59 and 0.62), indicating that twin vehicle account activity explains a larger proportion of flows for these specialized investment products. Equity and allocation strategies demonstrate intermediate levels, with equity funds showing coefficients of 0.38 and 0.44, and allocation funds (including target-date funds) having coefficients of 0.29 and 0.33 for opened accounts.

INSERT TABLE 4 HERE

We then calculate the shares related to asset reclassification as one minus the shares of assets in opened $(1 - \beta_{1,\nu})$ and closed $(1 + \beta_{2,\nu})$ twin vehicle accounts contributing to investment product flows. Figure illustrates the percentage of assets in opened (Panel A) and closed (Panel B) twin vehicle accounts across four investment strategy classes (equity, fixed income, allocation, and other) related to asset reclassification. The results indicate that investment products related to fixed income and allocation strategies, such as target-date funds, have the highest percentage of assets in new twin vehicle accounts explained by asset reclassification.

INSERT FIGURE 6 HERE

The amounts of reclassified assets from mutual funds to twin vehicles, as well as from twin vehicles back to mutual funds, are calculated by multiplying the respective shares related to asset reclassification by the respective opened or closed account assets:

$$\textit{Reclassified Assets Out}_{s,t} = (1 - \beta_{1,\nu})\textit{Assets in Opened Accounts}_{s,t} \tag{6}$$

$$\textit{Reclassified Assets In}_{s,t} = (1 + \beta_{2,\nu})\textit{Assets in Closed Accounts}_{s,t} \tag{7}$$

where $\textit{Reclassified Assets Out}_{s,t}$ quantifies the estimated assets transferred from a mutual fund to twin vehicles related to investment product s in quarter t. $\textit{Reclassified Assets In}_{s,t}$ measures the estimated assets transferred from twin vehicles to a mutual fund related to investment product s in quarter t .

Finally, we calculate the flow attributable to asset reclassification $F_{\text{Reclassification},i,t}$ of mutual fund i at time t as follows:

$$F_{\text{Reclassification},i,t} = \frac{\textit{Reclassified Assets Out}_{i,t} - \textit{Reclassified Assets In}_{i,t}}{(1 + r_{i,t})TNA_{i,t-1}} \tag{8}$$

where $TNA_{i,t}$ represents the total net assets of fund i at time t, while $r_{i,t}$ denotes the

fund's net return for the same period.

We calculate mutual fund flows adjusted for asset reclassification as follows:

$$\overline{F_{i,t}} = F_{i,t} + F_{\text{Reclassification},i,t} \tag{9}$$

where $F_{i,m}$ represents the standard flow of fund i at time t and $F_{\text{Reclassification},i,t}$ represents the asset reclassification flow for the same fund-time, calculated according to equation (8).

Table 5 examines the differential impact of asset reclassification on flow measurement across fund characteristics by comparing standard and adjusted flows. The results reveal that measurement distortions vary significantly across both investment strategies (Panel A) and fund size (Panel B). Fixed income and allocation funds show the largest strategy-based effects, while the smallest funds (Q1) exhibit the most pronounced size-based impacts. Across both dimensions, funds with higher asset in institutional share classes consistently demonstrate amplified reclassification effects.

INSERT TABLE 5 HERE

5.2 Aggregate Asset Reclassification

Data regarding twin vehicle accounts is not available for all twin vehicles, complicating the estimation of the aggregate asset reclassification. To address this data limitation, we employ a two-step estimation approach. First, we calculate the annual aggregate value of asset reclassification within the subsample of twin vehicles with available account information. Second, we adjust the annual aggregate value of asset reclassification from the subsample by multiplying it by the ratio of total assets across all twin investment vehicles to total assets within the subsample with available account information for the corresponding year.

Figure 7 presents the annual aggregate value of asset reclassification between mutual funds and their twin investment vehicles from 2010 to 2021, compared with the annual total

value of mutual fund mergers. The average annual reclassified assets for U.S. mutual funds with twin vehicles exceeded $375 billion over the period 2010-2021. This number significantly surpasses the average annual TNAs of fund mergers, approximately 60 billion, during the same period.

INSERT FIGURE 7 HERE

We also analyze how accounting for asset reclassification affects the measurement of total net inflows to U.S. mutual funds. We adjust the total net inflows to U.S. mutual funds for asset reclassification by adding annual aggregate asset reclassification from mutual funds to their twin investment vehicles and subtracting annual aggregate asset reclassification from twin vehicles to mutual funds. Figure 8 compares total net inflows to U.S. mutual funds from 2010 to 2021 with and without adjusting for asset reclassification.

INSERT FIGURE 8 HERE

6 Asset Reclassification and Flow-Based Regressions

After quantifying asset reclassification at both fund and aggregate levels, we examine its methodological implications for regression analyses involving fund flows. Asset reclassification introduces non-classical measurement error in standard flow measures, potentially biasing empirical results. We investigate this bias by comparing coefficient estimates from OLS regressions using standard fund flows versus reclassification-adjusted flows.

6.1 Bias When Flows Serve as a Dependent Variable

We first analyze scenarios in which mutual fund flows serve as a dependent variable, focusing on the flow-performance sensitivity regressions.

$$F_{i,t} = \beta Y_{i,t-1} + \gamma X_{s,t} + \alpha_i + \alpha_t + \epsilon_{s,t} \tag{10}$$

where $Y_{i,t}$ represents the performance of mutual fund i in month t. β is the parameter of interest quantifying the flow-performance sensitivity. $X_{s,t}$ denotes the vector of the following control variables: the log of fund size (lagged one period) and the log of fund age in years (lagged one period). α_i are the fund fixed effects that control for time-invariant heterogeneity at the mutual fund level. α_t indicate time fixed effects that control for common time-varying factors. Standard errors are clustered at the fund level.

Table 6 reports coefficient estimates from the OLS regression (10) examining the flow to past performance sensitivity. The sample comprises mutual funds with twin investment vehicles, for which data on opened and closed twin vehicle accounts is available. The sample period spans from Q1:2000 through Q2:2022. Columns 1-4 report results for the entire sample, while columns 5-8 present estimates for mutual funds where institutional share classes comprise more than 50% of assets. Columns 1-2 and 5-6 report results using standard quarterly mutual fund flows as the dependent variable. Columns 3-4 and 7-8 employ an adjusted flow measure that accounts for asset reclassification, calculated according to equation (8).

In Columns (1) and (2), using standard quarterly flows as the dependent variable for all mutual funds, the coefficients on lagged quarterly gross returns are positive and highly significant (0.241 and 0.270, respectively). This indicates that a 1 percentage point increase in quarterly gross returns is associated with a subsequent increase in quarterly flows of approximately 0.241 to 0.270 percentage points. When accounting for asset reclassification

in Columns (3) and (4), the flow-performance relationship becomes substantially stronger. The coefficients on lagged quarterly gross returns increase to 0.341 and 0.401, suggesting that standard flow measures significantly underestimate investors' responsiveness to past performance. The effect is even more pronounced for funds with high institutional ownership (columns 5-8), where the coefficients range from 0.211 to 0.504. Overall, the results indicate that regressions utilizing reclassification-adjusted flows demonstrate 42-49% greater flow-performance sensitivity for all funds, and 84-97% greater sensitivity for mutual funds with high institutional ownership, compared to specifications employing unadjusted flows.

INSERT TABLE 6 HERE

To ensure that the regression results in Table 6 are not obtained by chance, we additionally employ Monte Carlo simulations. Table 7 presents the parameters used in our Monte Carlo simulations to investigate the bias in flow-based regressions when asset reclassification between mutual funds and twin vehicles is not properly accounted for. Panel A details the simulation setup for flow-performance sensitivity regressions. The simulations are calibrated using empirical moments from our sample of mutual funds with complete twin vehicle account information. We conduct 10,000 Monte Carlo simulations, each with 10,000 observations, to ensure robust statistical inference. The key insight from the simulation design is that we set the true flow-performance sensitivity coefficient ($\beta_{\text{sensitivity}}$) to 0.30, but estimate regressions using standard flows that include measurement error from asset reclassification.

INSERT TABLE 7 HERE

Figure 9 displays the distribution of coefficient estimates from 10,000 Monte Carlo simulations of flow-performance sensitivity regressions. The histogram shows that when we use standard flow measures, the estimated coefficients cluster tightly around 0.14-0.15, substantially below the true coefficient value of 0.30 (indicated by the vertical dashed line).

This exercise confirms that measurement error from unaccounted asset reclassification creates severe downward bias in flow-performance sensitivity estimates.

INSERT FIGURE 9 HERE

6.2 Bias When Flows Serve as an Explanatory Variable

When flows serve as an explanatory variable, the measurement error negatively correlated with observed fund flows can inflate true estimates (Pischke, 2007). We test it for the relation between flows and future performance (Gruber, 1996; Zheng, 1999; Keswani and Stolin, 2008).

We first confirm this statement by employing Monte Carlo simulations based on the parameters detailed in Panel B of Table 7. The simulation design tests whether investors can identify superior fund managers before their outperformance becomes evident. We set the true relationship between actual flows and future performance at $\beta_{\text{smart}} = 0.10$, meaning that a one percentage point increase in actual flows leads to a 0.10 percentage point increase in subsequent performance. Figure 10 presents the distribution of coefficient estimates from 10,000 Monte Carlo simulations of smart money regressions. The results demonstrate a systematic upward bias when using standard flow measures as explanatory variables. While the true coefficient is 0.10 (indicated by the vertical dashed line), the estimated coefficients cluster around 0.13-0.14, representing approximately a 30-40% overestimate of the true smart money effect.

INSERT FIGURE 10 HERE

Having established the bias through simulations, we now examine whether investors can identify superior fund managers before their outperformance becomes evident using our empirical data. We estimate the following regression specification:

$$Y_{i,t} = \beta F_{i,t-1} + \gamma X_{s,t} + \alpha_i + \alpha_t + \epsilon_{s,t} \tag{11}$$

where $Y_{i,t}$ represents the performance measure of mutual fund i in month t. We employ three performance measures: monthly gross returns, monthly alpha estimated from the CAPM model over 12 future months, and monthly alpha estimated from the Carhart four-factor model over 12 future months. β is the parameter of interest capturing the relation between between flows and future performance. $X_{s,t}$ denotes the vector of the following control variables: the log of fund size (lagged one period) and the log of fund age in years (lagged one period). α_i are the fund fixed effects that control for time-invariant heterogeneity at the mutual fund level. α_t indicates time fixed effects that control for common time-varying factors. Standard errors are clustered at the fund level.

Table 8 reports coefficient estimates from the OLS regression (11) examining the relationship between fund flows and subsequent performance for active equity mutual funds. The sample comprises active equity mutual funds with twin investment vehicles, for which data on opened and closed twin vehicle accounts is available. The sample period spans from Q1:2010 through Q4:2020. The dependent variables are quarterly gross returns (Columns 1-2), forward-looking CAPM alpha estimated over the subsequent 12 months (Columns 3-4), and forward-looking Carhart four-factor alpha estimated over the subsequent 12 months (Columns 5-6). Odd-numbered columns use standard quarterly fund flows as the explanatory variable, while even-numbered columns employ quarterly fund flows adjusted for asset reclassification (calculated according to equation (8)).

The results provide compelling evidence against the existence of a smart money effect in our sample. Our Monte Carlo simulation results demonstrate that if a true smart money effect existed, regressions using unadjusted flows would systematically overestimate the relationship due to measurement error bias. Given that the coefficients in specifications with unadjusted flows are close to zero and statistically insignificant, we conclude there is no smart money effect in our sample.

INSERT TABLE 8 HERE

7 Conclusion

This paper documents substantial asset 'reclassification' in the mutual fund industry, exceeding $450 billion in 2021. These reclassification events do not involve investor flows; instead, mutual fund assets are simply converted into twin investment vehicles, such as separate accounts or common investment trusts.

Utilizing data on DC retirement plans, we find that reclassification from mutual funds to twin vehicles in DC plans averaged 1.12% of total assets in mutual fund options during 2017-2021. Our analysis reveals systematic patterns in which investment options undergo reclassification in DC plans, with distinct profiles for different destination vehicles. Mutual fund options that transition to collective investment trusts are substantially larger, more cost-efficient, exhibit superior performance characteristics, and are overwhelmingly concentrated in target-date strategies. These CIT-bound options also originate from large retirement plans. In contrast, mutual fund options transitioning to pooled separate accounts are much smaller, more expensive, more equity-focused, and originate from smaller retirement plans.

We also demonstrate that adjusting for asset reclassification has important methodological implications for regression analyses using fund flows. Asset reclassification negatively correlates with actual fund flows, resembling a non-classical measurement error. We investigate potential biases in regressions using unadjusted fund flows, in which asset reclassification acts as a measurement error. When flows serve as an explanatory variable, the measurement error negatively correlated with standard fund flows inflates true estimates. We then analyze scenarios in which mutual fund flows serve as a dependent variable, focusing on flow-performance sensitivity. A regression utilizing reclassification-adjusted quarterly flows demonstrates a 40-100% greater flow-performance sensitivity for mutual funds with twin vehicles than one employing unadjusted flows.

References

Bhattacharya, V. and G. Illanes (2022, April). The design of defined contribution plans. Working Paper 29981, National Bureau of Economic Research.

Brown, S. J., W. Goetzmann, R. G. Ibbotson, and S. A. Ross (1992, 05). Survivorship bias in performance studies. *The Review of Financial Studies 5*(4), 553–580.

Busse, J. A., A. Goyal, and S. Wahal (2010). Performance and persistence in institutional investment management. *The Journal of Finance 65*(2), 765–790.

Christoffersen, S. E., D. K. Musto, and R. Wermers (2014). Investor flows to asset managers: Causes and consequences. *Annual Review of Financial Economics 6*(Volume 6, 2014), 289–310.

Cohen, L. and B. Schmidt (2009). Attracting flows by attracting big clients. *The Journal of Finance 64*(5), 2125–2151.

Elton, E. J., M. J. Gruber, and C. R. Blake (1996, 06). Survivor bias and mutual fund performance. *The Review of Financial Studies 9*(4), 1097–1120.

Elton, E. J., M. J. Gruber, and C. R. Blake (2001). A First Look at the Accuracy of the CRSP Mutual Fund Database and a Comparison of the CRSP and Morningstar Mutual Fund Databases. *The Journal of Finance 56*(6), 2415–2430.

Elton, E. J., M. J. Gruber, and C. R. Blake (2013, 09). The Performance of Separate Accounts and Collective Investment Trusts. *Review of Finance 18*(5), 1717–1742.

Evans, R. B. (2010). Mutual fund incubation. *The Journal of Finance 65*(4), 1581–1611.

Fedyk, V. (2024). Heterogeneous asset pricing model preferences by investor type: Evidence from separate accounts.

Gerakos, J., J. T. Linnainmaa, and A. Morse (2021). Asset managers: Institutional performance and factor exposures. *The Journal of Finance 76*(4), 2035–2075.

Grinblatt, M. and S. Titman (1989). Mutual fund performance: An analysis of quarterly portfolio holdings. *The Journal of Business 62*(3), 393–416.

Gropper, M. (2023). Lawyers setting the menu: The effects of litigation risk on employer-sponsored retirement plans. *Available at SSRN 4393420*.

Gruber, M. J. (1996). Another puzzle: The growth in actively managed mutual funds. *The Journal of Finance 51*(3), 783–810.

Huang, S., X. Lu, Y. Song, and H. Xiang (2023). Remeasuring scale in active management.

Jenkinson, T., H. Jones, and J. V. Martinez (2016). Picking winners? investment consultants' recommendations of fund managers. *The Journal of Finance 71*(5), 2333–2370.

Jones, H., J. V. Martinez, and A. Montag (2023). Separate account vs mutual fund investors: Manager selection and performance.

Keswani, A. and D. Stolin (2008). Which money is smart? mutual fund buys and sells of individual and institutional investors. *The Journal of Finance 63*(1), 85–118.

Peterson, J. D., M. J. Iachini, and W. Lam (2011). Identifying characteristics to predict separately managed account performance. *Financial Analysts Journal 67*(4), 30–40.

Pischke, S. (2007). Lecture notes on measurement error. *London School of Economics, London*.

Pool, V. K., C. Sialm, and I. Stefanescu (2016). It pays to set the menu: Mutual fund investment options in 401(k) plans. *The Journal of Finance 71*(4), 1779–1812.

Pool, V. K., C. Sialm, and I. Stefanescu (2022). Mutual fund revenue sharing in 401 (k) plans. Technical report, National Bureau of Economic Research.

Reuter, J. (2024). Plan design and participant behavior in defined contribution retirement plans: past, present, and future. Technical report, National Bureau of Economic Research.

Rohleder, M., H. Tentesch, R. Weh, and M. Wilkens (2023). Fraternal twins—should investors be careful? *Review of Financial Economics 41*(1), 23–42.

Schwarz, C. G. and M. E. Potter (2016, 09). Revisiting Mutual Fund Portfolio Disclosure. *The Review of Financial Studies 29*(12), 3519–3544.

Shnitser, N. (2023). Overtaking mutual funds: The hidden rise and risk of collective investment trusts.

Tian, J. and J. Shi (2024). Why mutual funds decline in 401 (k) s.

Wiedenbeck, P. J., R. K. Hinkle, and A. D. Martin (2013). Invisible pension investments. *Virginia Tax Review 32*(4), 591–626.

Yang, H. (2023). What determines 401 (k) plan fees? a dynamic model of transaction costs and markups.

Zheng, L. (1999). Is money smart? a study of mutual fund investors' fund selection ability. *The Journal of Finance 54*(3), 901–933.

Figures

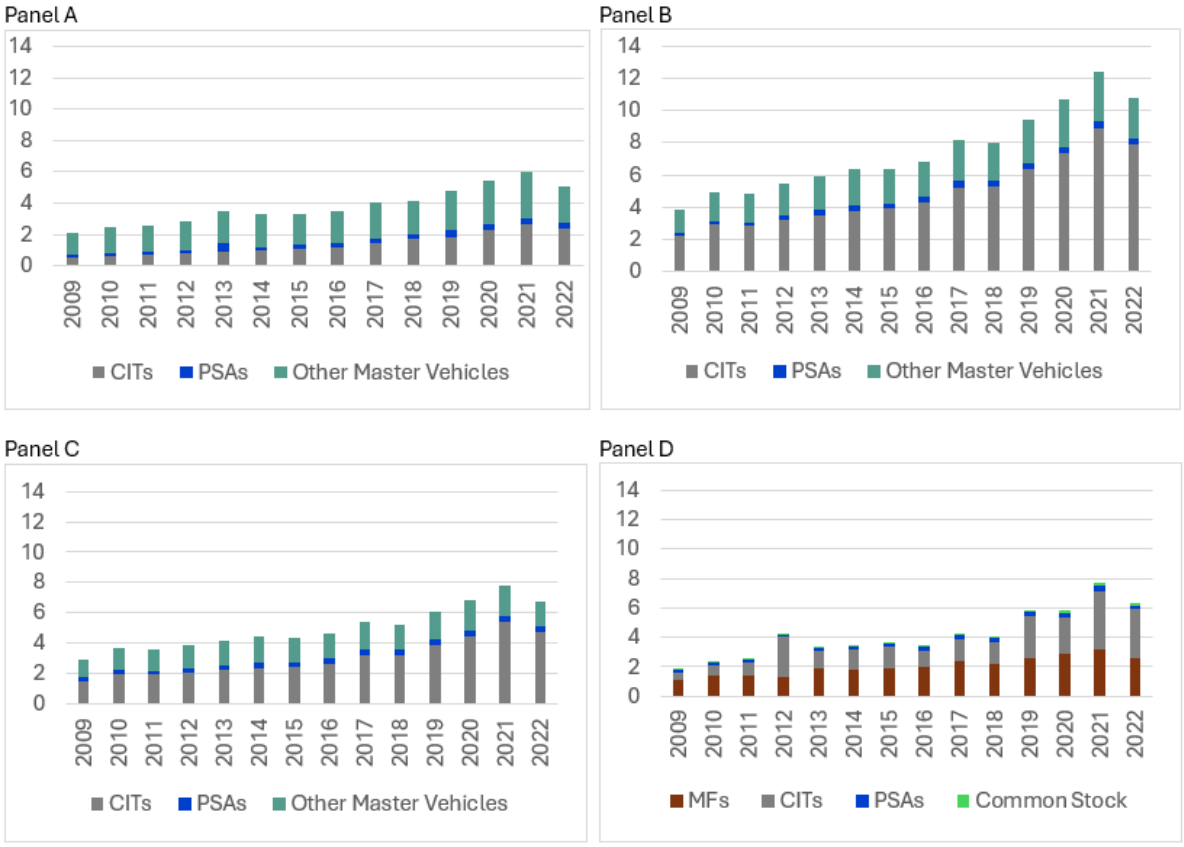

Figure 1: Retirement Asset Allocations to Institutional-Focused Investment Vehicles

The figure provides information on aggregate asset allocations to vehicle categories from 2009 to 2022: common and collective investment trusts (CITs), pooled separate accounts (PSAs), and other master vehicles, using different sources of data. Panel A aggregates retirement assets by institutional-focused vehicle type based on the universe of Schedule D filings by retirement plans. In Panel B, the aggregate numbers are from the universe of Schedule D filings by direct filing entities (DFE's). In Panel C, we adjust the aggregate figures in Panel B for possible double-counting. Panel D shows aggregate plan investments in institutional-focused vehicles based on the Brightscope database. Additionally, it also shows allocation to common stocks (which potentially captures allocations to separately managed accounts (SMAs))

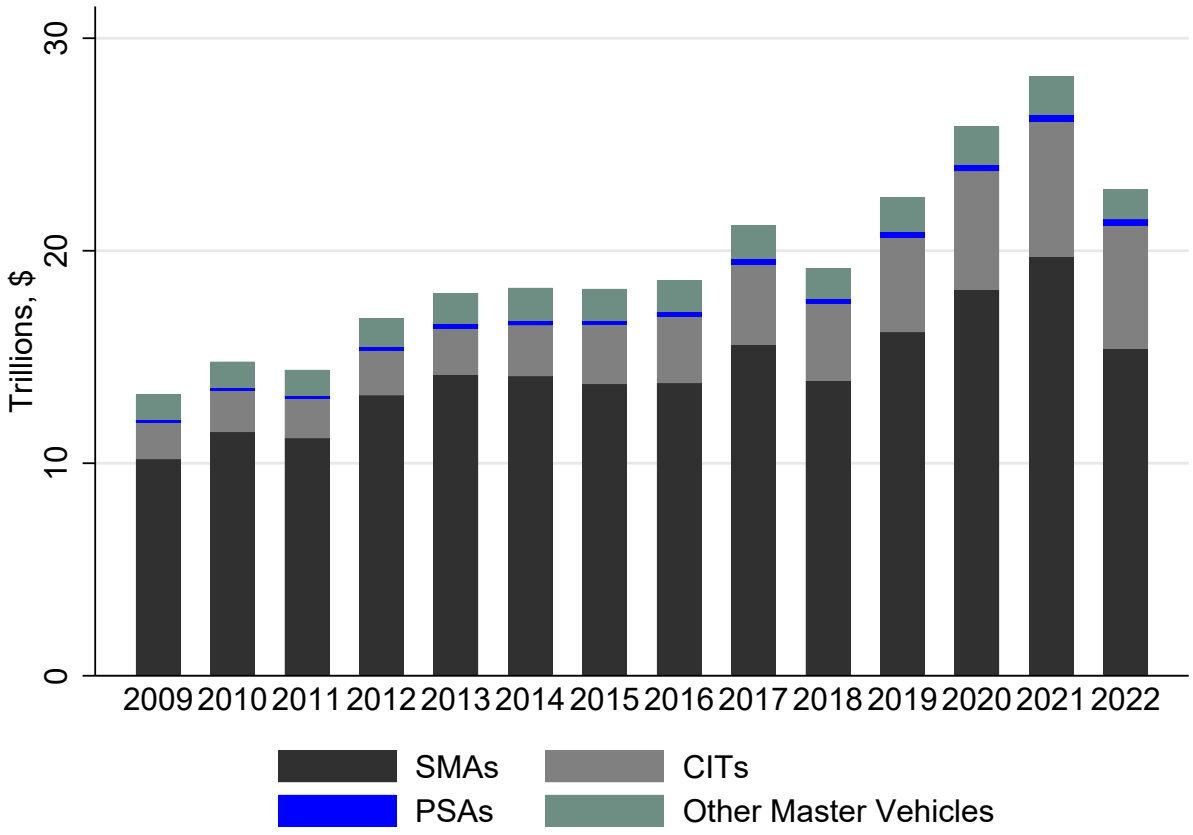

Figure 2: Growth of Assets in Institutional-Focused Investment Vehicles

This figure illustrates the growth of total net assets across four institutional-focused investment vehicle categories from 2009 to 2022: separately managed accounts (SMAs), common and collective investment trusts (CITs), pooled separate accounts (PSAs), and other master vehicles. Information regarding the total net assets of SMAs is sourced from the Morningstar Direct. Total net assets for all remaining investment vehicle categories are derived from Form 5500 filings submitted by employee benefit plans and Direct Filing Entities.

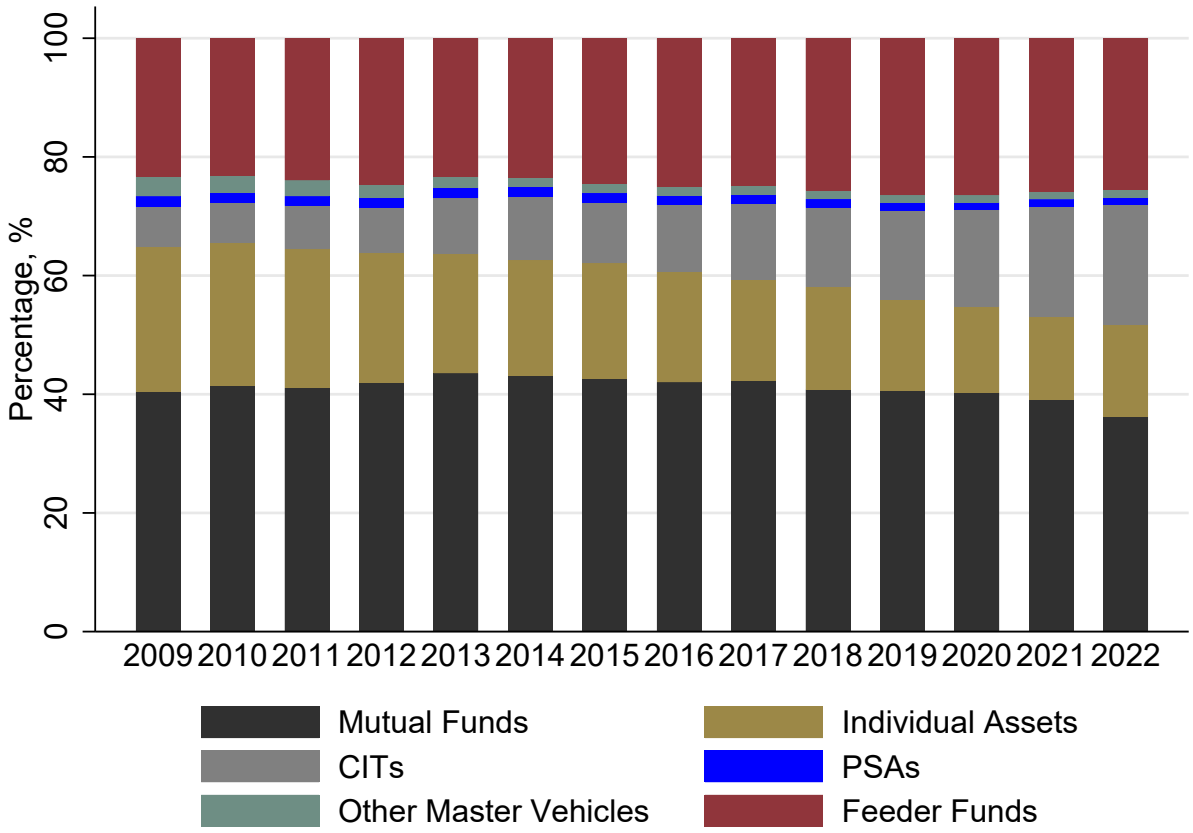

Figure 3: Asset Allocation across Investment Vehicles in DC Retirement Plans

This figure illustrates the changing distribution of assets in defined contribution (DC) retirement plans allocated across individual assets and five investment vehicle categories from 2009 to 2022: mutual funds, common and collective investment trusts (CITs), pooled separate accounts (PSAs), other master vehicles, and feeder funds. The data are sourced from Schedule H Form 5500 filings submitted by defined contribution (DC) retirement plans with at least 100 participants. To identify feeder fund structures, we utilize Schedule H Form 5500 filings submitted by Direct Filing Entities in conjunction with information from Schedule D Form 5500 filings submitted by DC retirement plans. This figure does not include separately managed accounts (SMAs), which do not appear in Form 5500 filings because their assets are typically reported as direct plan assets rather than being classified as an investment vehicle.

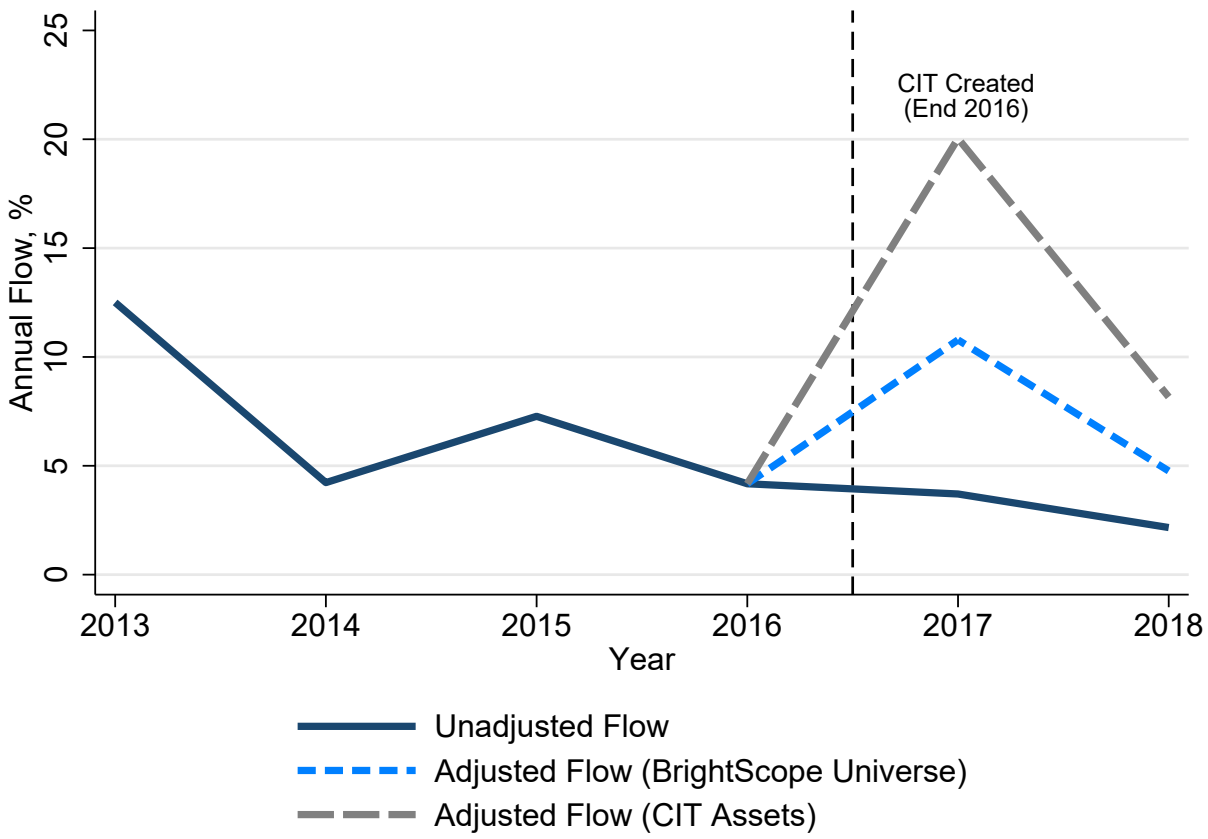

Figure 4: The Impact of Asset Reclassification on Mutual Fund Flow Measurement: Evidence from the Vanguard Extended Market Index Fund

This figure demonstrates the impact of asset reclassification on mutual fund flow measurement, using the Vanguard Extended Market Index Fund as a case study. The vertical dashed line marks the establishment of a twin collective investment trust (CIT) for this mutual fund in late 2016. Three flow measurement approaches are presented: (1) Unadjusted Flow represents standard annual flow without accounting for asset reclassification; (2) Adjusted Flow (BrightScope Universe) incorporates corrections for observable asset reclassification within defined contribution retirement plans, utilizing data from the BrightScope database; and (3) Adjusted Flow (CIT Assets) reflects flow adjustments based on asset reclassification inferred from total assets held in the corresponding twin CIT.

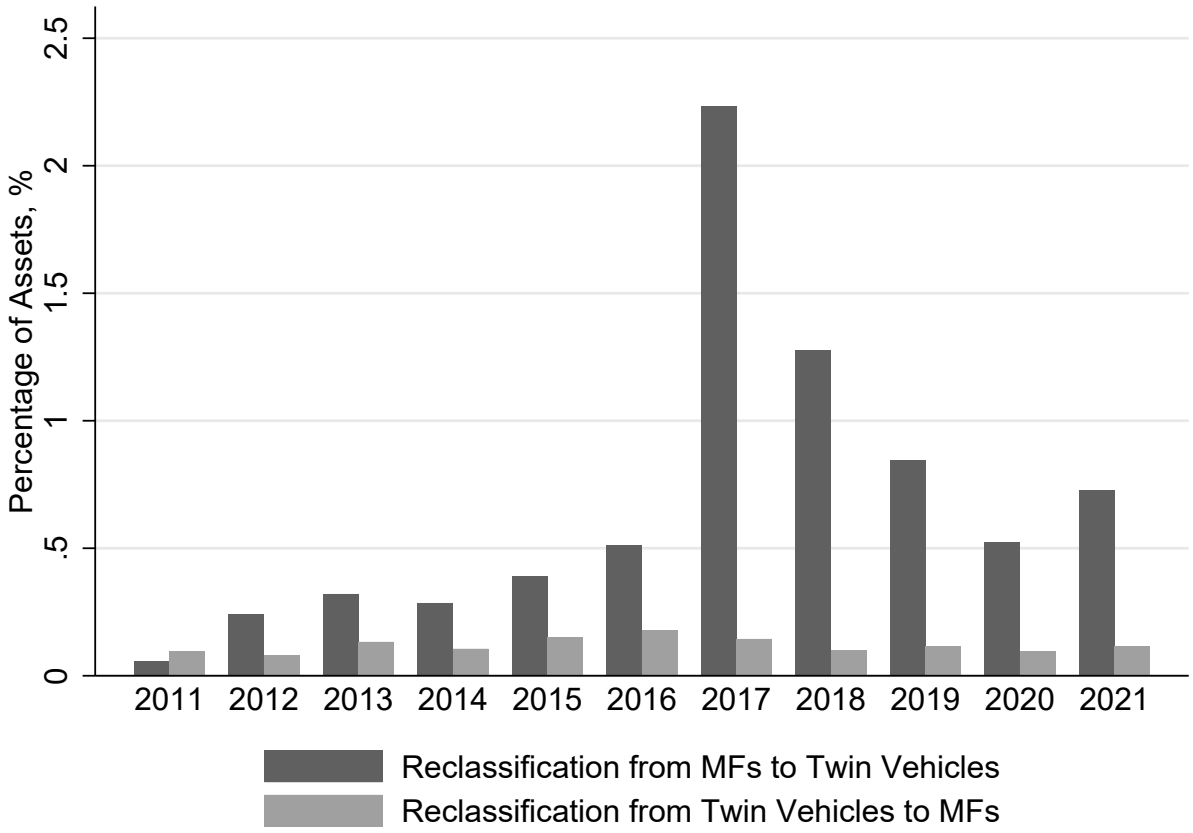

Figure 5: Asset Reclassification Magnitude in DC Retirement Plans

This figure illustrates the magnitude of asset reclassification in defined contribution (DC) retirement plans with at least 100 participants from 2011 to 2021. The sample includes plans with complete investment option information available in the BrightScope Beacon dataset. We measure asset reclassification magnitude as follows: (1) Mutual fund to twin vehicle reclassification is the ratio of total balances at the end of the previous year in mutual fund options replaced by their twin vehicles to total balances at the end of the previous year of all mutual fund investment options; (2) Twin vehicle to mutual fund reclassification is the ratio of total balances at the end of the previous year in twin vehicle options replaced by their corresponding mutual funds to total balances at the end of the previous year of all mutual fund investment options.

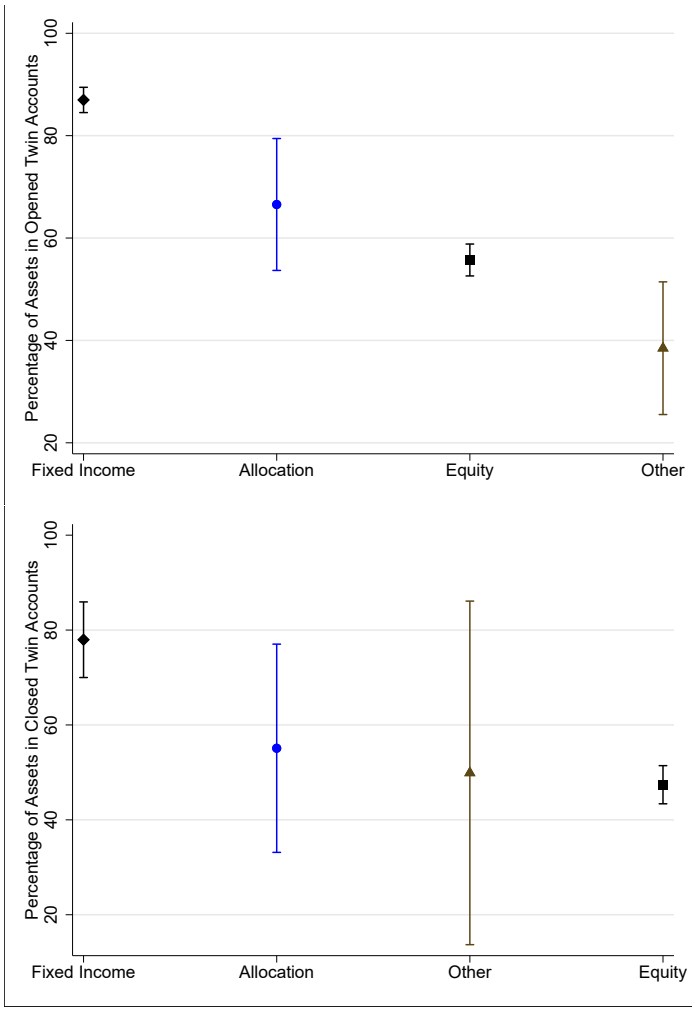

Figure 6: Assets in Twin Vehicle Opened and Closed Accounts Related to Asset Reclassification

This figure illustrates the percentage of assets in opened (Panel A) and closed (Panel B) twin vehicle accounts across four investment strategy classes (equity, fixed income, allocation, and other) related to asset reclassification. The percentages are sorted by magnitude within each panel and are calculated as $100 - 100\beta_{1,v}$ for opened accounts and $100 + 100\beta_{2,v}$ for closed accounts, where $\beta_{1,v}$ and $\beta_{2,v}$ represent coefficient estimates from the OLS regression model (5). These coefficients quantify the proportion of assets in opened and closed accounts that contribute to investment product flows for each strategy class v. The remaining portion of assets in opened and closed accounts that does not contribute to investment product flows is therefore associated with asset reclassification. The vertical bars represent 95% confidence intervals based on standard errors two-way clustered at the Morningstar Global category and time levels.

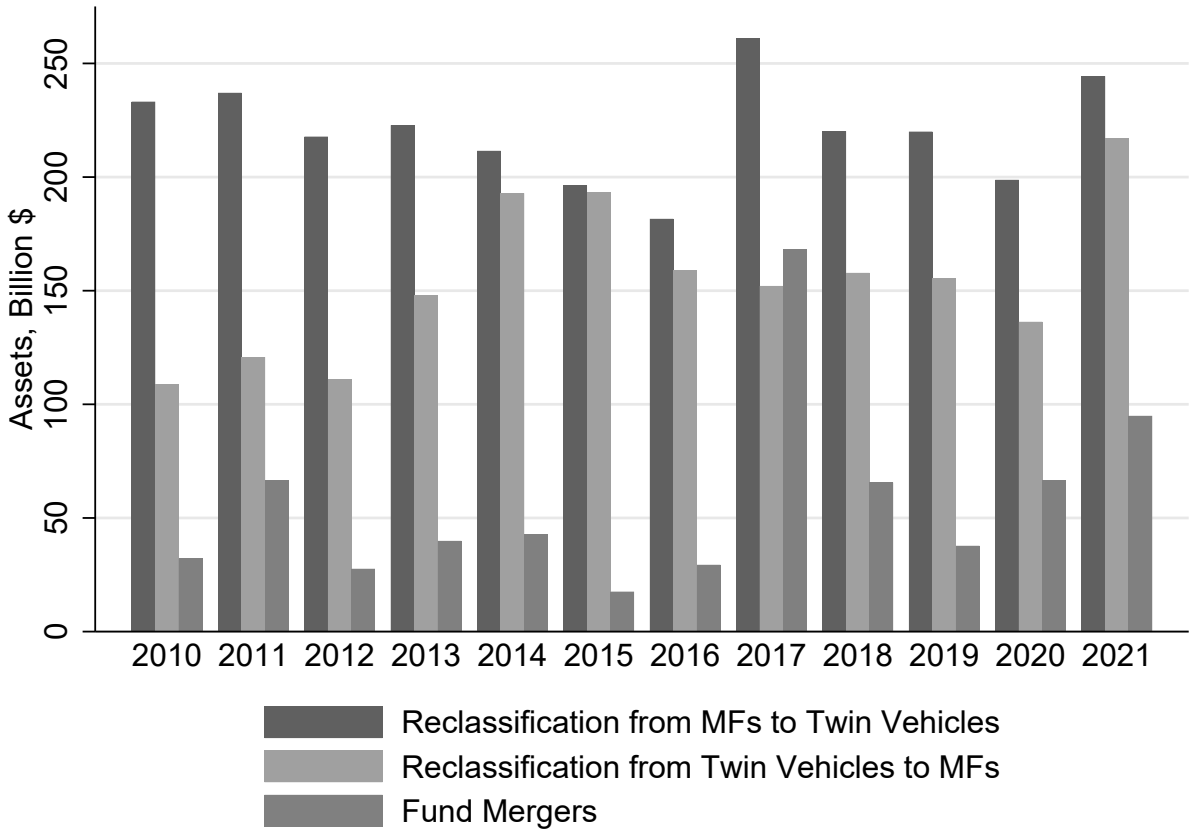

Figure 7: Annual Aggregate Asset Reclassification and Mutual Fund Mergers

This figure presents the annual aggregate value of asset reclassification between mutual funds and their twin investment vehicles from 2010 to 2021, compared with the annual total value of mutual fund mergers. Our methodology for quantifying the annual aggregate value of asset reclassification follows three steps: (1) We estimate the annual value of asset reclassification at the investment product level using a subsample with available data on opened and closed accounts in twin investment vehicles; (2) We calculate the annual aggregate value of asset reclassification within this subsample; and (3) We adjust the annual aggregate value of asset reclassification from the subsample by multiplying it by the ratio of total assets across all twin investment vehicles to total assets within the subsample for the corresponding year. The data on fund mergers is sourced from the Morningstar Direct database.

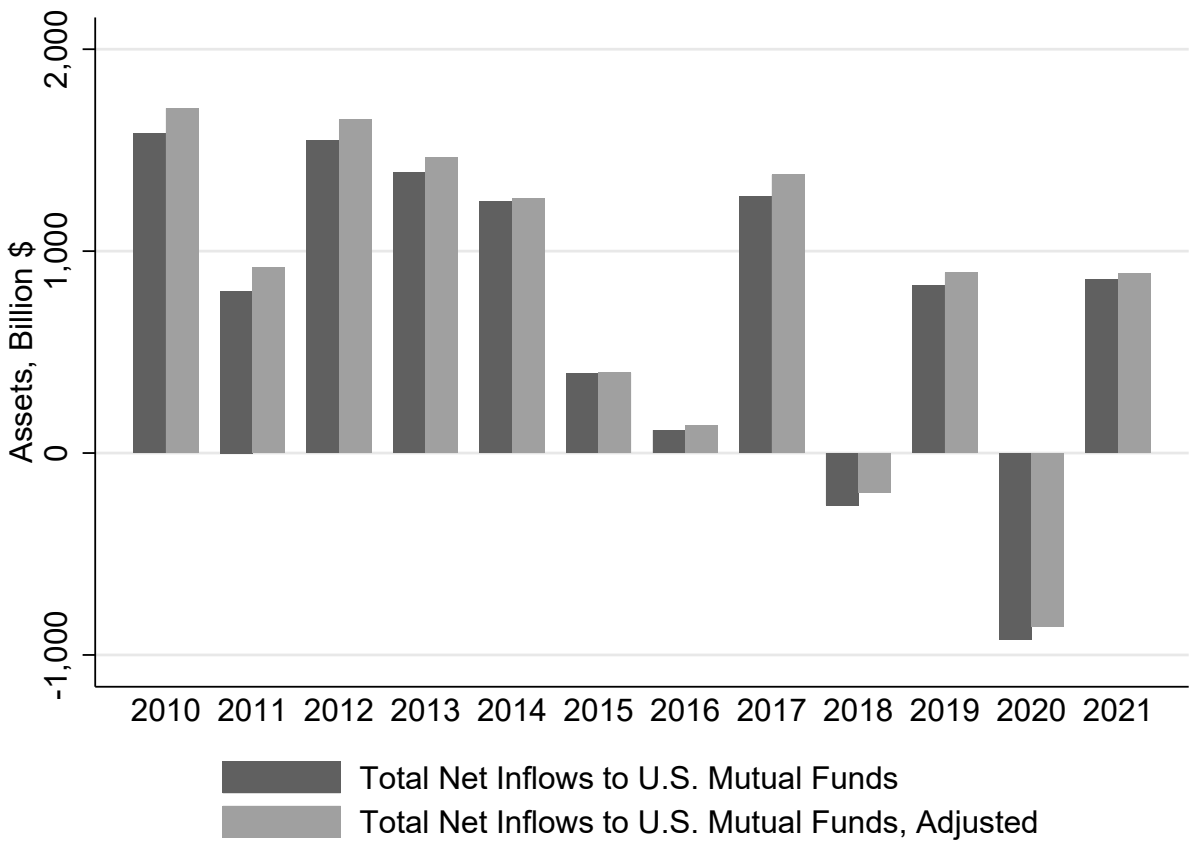

Figure 8: Total Net Inflows to U.S. Mutual Funds: Adjusted vs. Unadjusted for Asset Reclassification

This figure compares total net inflows to U.S. mutual funds from 2010 to 2021 with and without adjusting for asset reclassification. Total net inflows to U.S. mutual funds represent the annual sum of quarterly values from the Federal Reserve's "Total Financial Assets, Transactions" time series [BOGZ1FA654090000Q], sourced from the Financial Accounts of the United States, Board of Governors of the Federal Reserve System (US), and retrieved via the Federal Reserve Bank of St. Louis FRED system. The total net inflows to U.S. mutual funds are adjusted for asset reclassification by adding annual aggregate asset reclassification from mutual funds to their twin investment vehicles and subtracting annual aggregate asset reclassification from twin vehicles to mutual funds.

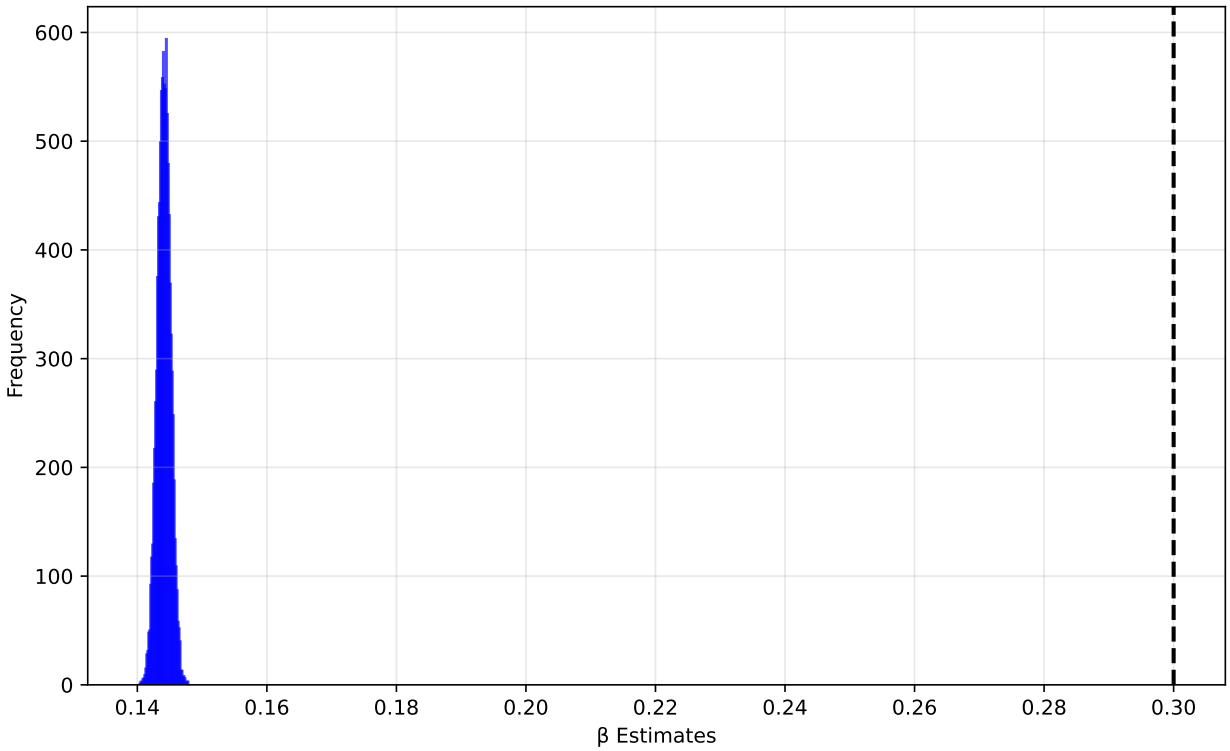

Figure 9: How Asset Reclassification Biases Flow-Performance Sensitivity Estimates: Simulation Evidence

This figure shows the distribution of estimated coefficients from 10,000 Monte Carlo simulations of flow-performance sensitivity regressions, where standard flows not adjusted for reclassification are regressed on past performance. Each simulation includes 10,000 observations. We first generate the random joint distribution of actual and reclassification flows using parameters matched to empirical moments from the sample of mutual funds with available information on twin vehicle gained and lost accounts. Next, we calculate standard flows as Standard $\text{Flow}_{i,t}$ = Actual $\text{Flow}_{i,t}$ + Reclassification $\text{Flow}_{i,t}$ and performance measures as $\text{Performance}_{i,t-1} = \frac{\text{Actual Flow}_{i,t}}{\beta_{\text{sensitivity}}} - \varepsilon_{i,t}$. Finally, we estimate the following regression specifications: Standard $\text{Flow}_{i,t} = \beta \times \text{Performance}_{i,t-1} + \varepsilon_{i,t}$. The vertical dashed line indicates the true coefficient value ($\beta_{\text{sensitivity}} = 0.30$).

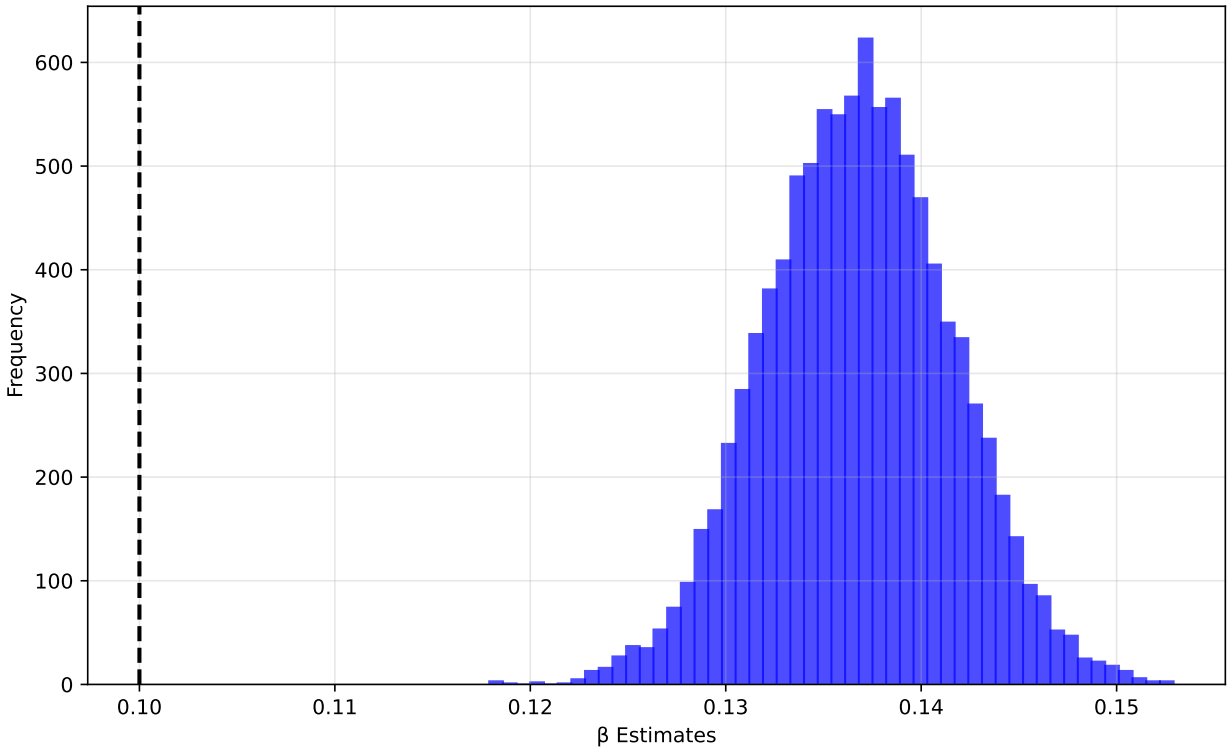

Figure 10: How Asset Reclassification Biases Smart Money Tests' Estimates: Simulation Evidence

This figure shows the distribution of estimated coefficients from 10,000 Monte Carlo simulations of smart money tests, where future performance is regressed on standard flows not adjusted for asset reclassification. Each simulation includes 10,000 observations. We first generate the random joint distribution of actual and reclassification flows using parameters matched to empirical moments from the sample of mutual funds with available information on twin vehicle gained and lost accounts. Next, we calculate standard flows as $\text{Standard Flow}_{i,t} = \text{Actual Flow}_{i,t} + \text{Reclassification Flow}_{i,t}$ and performance measures as $\text{Performance}_{i,t+1} = \beta_{\text{smart}} \times \text{Actual Flow}_{i,t} + \varepsilon_{i,t}$. Finally, we estimate the following regression specifications: $\text{Performance}_{i,t+1} = \beta \times \text{Standard Flows}_{i,t} + \varepsilon_{i,t}$. The vertical dashed line indicates the true coefficient value ($\beta_{\text{smart}} = 0.10$).

Tables

Table 1: Summary Statistics on Mutual Funds, Common/Collective Investment Trusts, and Separately Managed Accounts

This table presents summary statistics for mutual funds, common/collective investment trusts (CITs), and separately managed accounts (SMAs) using data from Morningstar Direct. The sample comprises 16,456 mutual funds, 4,877 CITs, and 19,877 SMAs over the period Q1:2000 to Q4:2022. All variables are reported quarterly and continuous variables are winsorized at the 1st and 99th percentiles.

	Mean	Median	SD	Min	Max	# Obs.
Panel A - Mutual Fund Data						
Gross Return, %	1.68	1.82	7.91	-24	23	619,267
Net Return, %	1.41	1.59	7.93	-24	23	626,276
Fund TNA, Million	1,189.52	196.75	3,234.88	1	24,344	654,645
Sales, Million	94.46	14.00	251.83	0	1,801	502,076
Redemptions, Million	89.26	15.43	230.47	0	1,652	497,435
Equity Strategy	0.54	1.00	0.50	0	1	654,960
Allocation Strategy	0.15	0.00	0.36	0	1	654,960
Fixed Income Strategy	0.27	0.00	0.44	0	1	654,960
Other Strategy	0.04	0.00	0.19	0	1	654,960
Age, Years	12.53	9.83	11.18	0	98	654,177
Panel B - Institutional-Focused Vehicle Data						
Common/Collective Investment Trusts						
Gross Return, %	1.72	1.90	7.44	-22	21	49,997
Net Return, %	1.64	1.96	7.31	-21	20	98,642
Fund TNA, Million	824.77	101.41	2,507.80	0	19,482	121,470
Equity Strategy	0.42	0.00	0.49	0	1	121,470
Allocation Strategy	0.39	0.00	0.49	0	1	121,470
Fixed Income Strategy	0.16	0.00	0.36	0	1	121,470
Other Strategy	0.04	0.00	0.20	0	1	121,470
Age, Years	8.31	5.83	8.04	0	62	121,301
Separately Managed Accounts						
Gross Return, %	1.89	1.92	7.56	-22	22	854,198
Net Return, %	1.71	1.76	7.56	-23	22	834,730
Fund TNA, Million	1,092.41	116.77	2,970.01	0	21,039	752,226
Equity Strategy	0.56	1.00	0.50	0	1	876,534
Allocation Strategy	0.20	0.00	0.40	0	1	876,534
Fixed Income Strategy	0.23	0.00	0.42	0	1	876,534
Other Strategy	0.02	0.00	0.14	0	1	876,534
Age, Years	10.23	8.42	8.13	0	89	873,409
Investment Product-Level Data for CITs and SMAs						
Total Inst. Vehicle Accounts	175.19	11.00	1,211.81	0	117,451	597,747
Inst. Vehicle Taxed Accounts	102.64	3.00	845.40	0	77,755	326,177
Inst. Vehicle Tax-Exempt Accounts	59.34	5.00	457.05	0	38,014	319,973
Inst. Vehicle Accounts Lost	5.85	0.00	224.46	0	103,751	342,580
Inst. Vehicle Accounts Gained	6.03	0.00	90.69	0	35,044	353,736
Assets in Inst. Vehicle Accounts, Million	1,925.64	186.00	5,477.06	0	39,724	689,954
Assets in Inst. Vehicle Taxed Accounts, Million	1,473.88	103.58	4,444.60	0	32,326	354,488
Assets in Inst. Vehicle Tax-Exempt Accounts, Million	1,396.18	157.00	3,632.26	0	24,866	352,279
Assets in Inst. Vehicle Accounts Lost, Million	19.41	0.00	77.02	0	569	320,691
Assets in Inst. Vehicle Accounts Gained, Million	23.92	0.00	93.00	0	684	325,386

Table 2: Summary Statistics for Investment Menu Options in DC Retirement Plans

This table presents summary statistics for investment menu options in defined contribution (DC) retirement plans from BrightScope Beacon covering 2011 to 2021, which we use to analyze asset reclassification in DC plans. The unit of observation is plan-menu option-year. The sample includes only investment options that are mutual funds, collective investment trusts (CITs), and pooled separate accounts (PSAs), comprising 4,764,156 plan-menu option pairs across 103,571 401(k) and 403(b) plans. Continuous variables are winsorized at the 1st and 99th percentiles.

	Mean	**Median**	**SD**	**Min**	**Max**	**# Obs.**
Investment Option-Year Level						
Option Balance (in M)	1.54	0.18	4.99	0	38	15,557,939
Expense Ratio	0.63	0.65	0.38	0	2	14,627,254
Mutual Fund Option	0.69	1.00	0.46	0	1	15,557,939
Common/Collective Investment Trust Option	0.04	0.00	0.21	0	1	15,557,939
Pooled Separate Account Option	0.26	0.00	0.44	0	1	15,557,939
Plan Level						
Plan Balance (in M)	37.18	8.12	111.67	0	860	103,565
Number of Plan Menu Options	28.52	27.17	11.81	3	81	103,571

Table 3: Characteristics of Mutual Fund Options Undergoing Asset Reclassification in DC Plan Menus

This table compares descriptive statistics for mutual fund options in defined contribution (DC) plan menus that experience asset reclassification versus those that do not. Option Size is the option's dollar value of assets (in millions). Relative Option Size is the ratio of assets invested in an option to plan assets. Mutual fund-level variables include fund age, fund size (in billions) as measured by total assets under management, the volatility of monthly fund returns, turnover, the expense ratio, indicator variables for an investment strategy class (Equity, Fixed Income, Allocation, or Other), and mean performance percentiles. Performance percentiles are calculated over the previous three years based on mutual funds of the same Morningstar category in the Morningstar fund universe. The remaining variables are plan-level variables: the number of menu options and the dollar value of plan assets (in millions). Significance levels for tests of the difference in means are denoted by *, **, and ***, which correspond to the 10%, 5%, and 1% levels, respectively.

Variable	(1) Reclassified Options to CITs	(2) Reclassified Options to PSAs	(3) Non-Reclassified Options	(4) Diff. (1)-(3)	(5) Diff. (2)-(3)
Option Size (in M)	22.36	0.66	2.43	19.93***	-1.79***
	(93.19)	(5.82)	(17.42)	(0.25)	(0.12)
Relative Option Size (in %)	4.15	3.00	3.38	0.77	-0.38
	(4.48)	(4.61)	(37.17)	(0.52)	(0.24)
Expense Ratio (in %)	0.52	0.66	0.59	-0.07***	0.07***
	(0.29)	(0.38)	(0.40)	(0.01)	(0.00)
Turnover (in %)	26.24	47.13	48.73	-22.48***	-1.59**
	(32.36)	(80.16)	(91.42)	(1.42)	(0.64)
Age (in years)	14.54	18.42	17.67	-3.13***	0.76***
	(5.48)	(12.05)	(11.45)	(0.18)	(0.08)
Fund Size (in B)	20.85	39.73	42.44	-21.58***	-2.69***
	(55.35)	(105.46)	(102.06)	(1.64)	(0.84)
Return Std.Dev. (in %)	2.95	3.45	3.47	-0.53***	-0.03**
	(1.13)	(1.54)	(1.67)	(0.03)	(0.01)
Prior 3-Yr. Perf. (Percentile)	71.32	57.25	57.28	14.03***	-0.04
	(22.66)	(23.38)	(25.13)	(0.39)	(0.18)
Equity Strategy (in %)	10.38	54.43	51.37	-40.99***	3.09***
	(30.51)	(49.80)	(49.98)	(0.78)	(0.35)
Fixed Income Strategy (in %)	2.13	12.01	13.61	-11.48***	-1.59***
	(14.42)	(32.51)	(34.29)	(0.53)	(0.24)
Allocation Strategy (in %)	87.49	33.35	34.68	52.81***	-1.37***
	(33.09)	(47.15)	(47.60)	(0.74)	(0.33)
Other Strategy (in %)	0.00	0.21	0.34	-0.34***	-0.13***
	(0.00)	(4.62)	(5.81)	(0.09)	(0.04)
Number of Plan Menu Options	28.60	42.23	36.02	-7.45***	6.21***
	(7.19)	(26.54)	(26.12)	(0.37)	(0.17)
Plan Balance (in M)	489.41	48.14	107.85	381.75***	-59.99***
	(1,160.53)	(275.40)	(567.31)	(7.97)	(3.74)
Observations	5,064	23,114	6,990,350	7,018,528	7,018,528

Table 4: Investment Product Flows Explained by Assets in Opened and Closed Accounts

This table presents coefficient estimates from the OLS regression (5), which quantifies the proportion of investment product-level flows attributable to assets in newly opened and recently closed accounts. The sample period spans from Q1:2000 through Q2:2022. The unit of observation is at the investment product-quarter level. The dependent variable in each specification is investment product flows calculated according to equation (2). The explanatory variables in Columns 1 and 3 are investment product flows attributable to opened and closed accounts, calculated according to equations (3) and (4), respectively. The explanatory variables in Columns 2 and 4 incorporate the interaction between investment product-level flows attributable to opened and closed accounts and indicator variables for four strategy classes: equity, fixed income, allocation, and other. All regression specifications include the following control variables: the log of lagged investment product size and the log of lagged investment product age in years. Fixed effects used in each specification are detailed in the table. Standard errors are double clustered at the Global category and time levels and are reported in parentheses. Significance levels are denoted by *, **, and ***, which correspond to the 10%, 5%, and 1% levels, respectively.

	Investment Product Flows$_{i,t}$			
	(1)	(2)	(3)	(4)
Flow Due to Assets in Opened Accounts$_{i,t}$	0.30***		0.35***	
	(0.05)		(0.06)	
Flow Due to Assets in Closed Accounts$_{i,t}$	-0.40***		-0.46***	
	(0.04)		(0.04)	
Flow Due to Assets in Opened Accounts$_{i,t}$ * Equity$_i$		0.38***		0.44***
		(0.02)		(0.02)
Flow Due to Assets in Closed Accounts$_{i,t}$ * Equity$_i$		-0.47***		-0.53***
		(0.03)		(0.02)
Flow Due to Assets in Opened Account$_{i,t}$ * Fixed Income$_i$		0.10***		0.13***
		(0.01)		(0.01)
Flow Due to Assets in Closed Accounts$_{i,t}$ * Fixed Income$_i$		-0.20***		-0.22***
		(0.03)		(0.04)
Flow Due to Assets in Opened Accounts$_{i,t}$ * Allocation$_i$		0.29***		0.33***
		(0.07)		(0.06)
Flow Due to Assets in Closed Accounts$_{i,t}$ * Allocation$_i$		-0.37***		-0.45***
		(0.09)		(0.11)
Flow Due to Assets in Opened Accounts$_{i,t}$ * Other$_i$		0.59***		0.62***
		(0.04)		(0.06)
Flow Due to Assets in Closed Accounts$_{i,t}$ * Other$_i$		-0.51***		-0.50***
		(0.17)		(0.18)
Controls	Yes	Yes	Yes	Yes
Investment Product FE	Yes	Yes	-	-
Global Category FE	-	-	Yes	Yes
Date FE	Yes	Yes	Yes	Yes
Observations	77,370	77,370	77,412	77,412
R^2	0.24	0.25	0.15	0.16

Table 5: Average Quarterly Standard and Adjusted Flows

This table reports average quarterly flows for mutual funds with twin vehicles, spanning Q1:2000 to Q2:2022, using a double-sort methodology by institutional asset percentage and fund characteristics. The sample includes only mutual funds with complete information on twin vehicle opened and closed accounts, enabling estimation of asset reclassification. Panel A sorts funds by percentage of assets in institutional share classes ($< 50\%$ vs. $\geq 50\%$) and global broad category group (Allocation, Equity, Fixed Income, Other). Panel B employs the same institutional asset threshold but sorts by fund size quartile (Q1=smallest, Q4=largest). Both standard and adjusted flows are reported, with all measures winsorized at the 2nd and 98th percentiles. Values are in percentage points.

	Percentage of Institutional Assets				**Total**	
	<50%		>=50%			
	Flows	Adj. Flows	Flows	Adj. Flows	Flows	Adj. Flows
Panel A: Global Broad Category Group						
Allocation	1.14	4.16	2.64	8.96	1.43	5.10
Equity	1.18	3.69	2.55	7.81	1.43	4.43
Fixed Income	1.93	6.99	2.48	8.85	2.04	7.35
Other	0.91	1.53	2.47	4.24	1.37	2.33
Total	1.34	4.39	2.54	8.00	1.56	5.06
Panel B: Fund Size Quartile						
Q1	4.82	13.68	6.11	18.87	5.11	14.83
Q2	0.94	3.50	2.05	6.41	1.12	3.97
Q3	0.32	1.32	0.72	2.90	0.39	1.59
Q4	-0.47	-0.30	0.43	1.36	-0.30	0.01
Total	1.34	4.39	2.54	8.00	1.56	5.06

Table 6: Impact of Asset Reclassification Adjustment on Flows to Past Performance Sensitivity Estimates

This table reports coefficient estimates from the OLS regression (10) examining the flow to performance sensitivity. The sample comprises mutual funds with twin investment vehicles, for which data on opened and closed twin vehicle accounts is available. The sample period spans from Q1:2000 through Q2:2022. Columns 1-4 report coefficient estimates for the entire sample, while columns 5-8 present estimates for mutual funds where institutional share classes comprise more than 50% of assets. Columns 1-2 and Columns 5-6 report results for regression specifications with standard quarterly mutual fund flows as the dependent variable. Regression specifications in Columns 3-4 and 7-8 employ an adjusted flow measure that accounts for asset reclassification, calculated according to equation (8). The explanatory variable is the one-quarter lagged gross return. All regression specifications include the following control variables: the log of lagged fund size and the log of lagged fund age in years. Fixed effects used in each specification are detailed in the table. Standard errors are double clustered at the Global category and time levels and are reported in parentheses. Significance levels are denoted by *, **, and ***, which correspond to the 10%, 5%, and 1% levels, respectively.

	All Mutual Funds				**MFs with Institutional Assets>50%**			
	$\text{Flow}_{i,t}$ (1)	$\text{Flow}_{i,t}$ (2)	Adj. $\text{Flow}_{i,t}$ (3)	Adj. $\text{Flow}_{i,t}$ (4)	$\text{Flow}_{i,t}$ (5)	$\text{Flow}_{i,t}$ (6)	Adj. $\text{Flow}_{i,t}$ (7)	Adj. $\text{Flow}_{i,t}$ (8)
Gross $\text{Return}_{i,t-1}$	0.241***	0.270***	0.341***	0.401***	0.211***	0.256***	0.388***	0.504***
	(0.046)	(0.055)	(0.050)	(0.069)	(0.053)	(0.068)	(0.070)	(0.098)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund FE	Yes	-	Yes	-	Yes	-	Yes	-
Global Category FE	-	Yes	-	Yes	-	Yes	-	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	72,569	72,617	72,569	72,617	13,523	13,545	13,523	13,545
R^2	0.25	0.12	0.23	0.08	0.30	0.13	0.28	0.09

Table 7: Monte Carlo Simulation Parameters

This table presents the parameters used in Monte Carlo simulations investigating bias in flow-based regressions when asset reclassification between mutual funds and twin vehicles is not accounted for. Panels A and B report simulation parameters for flow-performance sensitivity regressions and smart money tests, respectively. We first generate the random joint distribution of actual and reclassification flows using parameters matched to empirical moments from the sample of mutual funds with complete information on twin vehicle gained and lost accounts, which enables estimation of asset reclassification. Next, we calculate standard flow and performance measures using the equations indicated in the table. Finally, we estimate the regression specifications shown in the table to compare the resulting estimates with the true coefficients.

Parameter	**Value**
Panel A: Simulation Parameters for Flow-Performance Sensitivity Regressions	
# of observations per simulation	10,000
# of Monte Carlo simulations	10,000
True coefficient ($\beta_{\text{sensitivity}}$)	0.30
Performance equation	$\text{Performance}_{i,t-1} = \frac{\text{Actual Flow}_{i,t}}{\beta_{\text{sensitivity}}} - \varepsilon_{i,t}$
Standard flow equation	$\text{Standard Flow}_{i,t} = \text{True Flow}_{i,t} + \text{Reclassification Flow}_{i,t}$
Regression specification	$\text{Standard Flow}_{i,t} = \alpha + \beta \times \text{Performance}_{i,t-1} + u_{i,t}$
Actual flow mean (μ(Actual Flow))	5.028
Actual flow variance (σ^2(Actual Flow))	1096.5
Reclassification flow mean (μ(Reclassification Flow))	-2.28
Reclassification flow variance (σ^2(Reclassification Flow))	423.87
Correlation with true flows (ρ(Actual Flow, Reclassification Flow))	-0.8305
Performance innovation variance ($\sigma^2(\varepsilon)$)	81.9
Panel B: Simulation Parameters for Smart Money Tests	
# of observations per simulation	10,000
# of Monte Carlo simulations	10,000
True coefficient (βsmart)	0.10
Performance equation	$\text{Performance}_{i,t+1} = \beta_{\text{smart}} \times \text{Actual Flow}_{i,t} + \varepsilon_{i,t}$
Standard flow equation	$\text{Standard Flow}_{i,t} = \text{Actual Flow}_{i,t} + \text{Reclassification Flow}_{i,t}$
Regression specification	$\text{Performance}_{i,t+1} = \alpha + \beta \times \text{Standard Flow}_{i,t} + u_{i,t}$
Actual flow mean (μ(Actual Flow))	5.028
Actual flow variance (σ^2(Actual Flow))	1096.5
Reclassification flow mean (μ(Reclassification Flow))	-2.28
Reclassification flow variance (σ^2(Reclassification Flow))	423.87
Correlation with true flows (ρ(Actual Flow, Reclassification Flow))	-0.8305
Performance innovation variance ($\sigma^2(\varepsilon)$)	81.9

Table 8: Impact of Asset Reclassification Adjustment on Smart Money Test Estimates

This table reports coefficient estimates from the OLS regression (11) examining the relation between performance and past flows for active equity mutual funds. The sample comprises active equity mutual funds with twin investment vehicles, for which data on opened and closed twin vehicle accounts is available. The sample period spans from Q1:2010 through Q4:2021. The unit of observation is at the fund-quarter level. The dependent variables are quarterly gross returns in Columns 1-2, monthly alpha estimated using the CAPM model over a 3-year forward period in Columns 3-4, and monthly alpha estimated using the Carhart four-factor model over a 3-year forward period in Columns 5-6. In Columns 1, 3, and 5, the explanatory variable is lagged standard fund flows. In Columns 2, 4, and 6, the explanatory variable is lagged fund flows adjusted for asset reclassification (calculated according to equation (8)). All regression specifications include the following control variables: the log of lagged fund size and the log of lagged fund age in years. Additionally, each specification incorporates both time and Global category fixed effects. Standard errors are double clustered at the Global category and time levels and are reported in parentheses. Significance levels are denoted by *, **, and ***, which correspond to the 10%, 5%, and 1% levels, respectively

	Gross Return$_{i,t}$		**Forward CAPM Alpha**$_{i,t}$		**Forward Carhart FF4 Alpha**$_{i,t}$	
	(1)	(2)	(3)	(4)	(5)	(6)
Standard Flow$_{i,t-1}$	-0.0020		0.0004		-0.0017	
	(0.0042)		(0.0016)		(0.0015)	
Adjusted Flow$_{i,t-1}$		-0.0003		0.0001		-0.0001
		(0.0012)		(0.0006)		(0.0005)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Global Category FE	Yes	Yes	Yes	Yes	Yes	Yes
Date FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	43,809	43,809	24,159	24,159	24,159	24,159
R^2	0.82	0.82	0.25	0.25	0.12	0.12

Appendix

A Figures

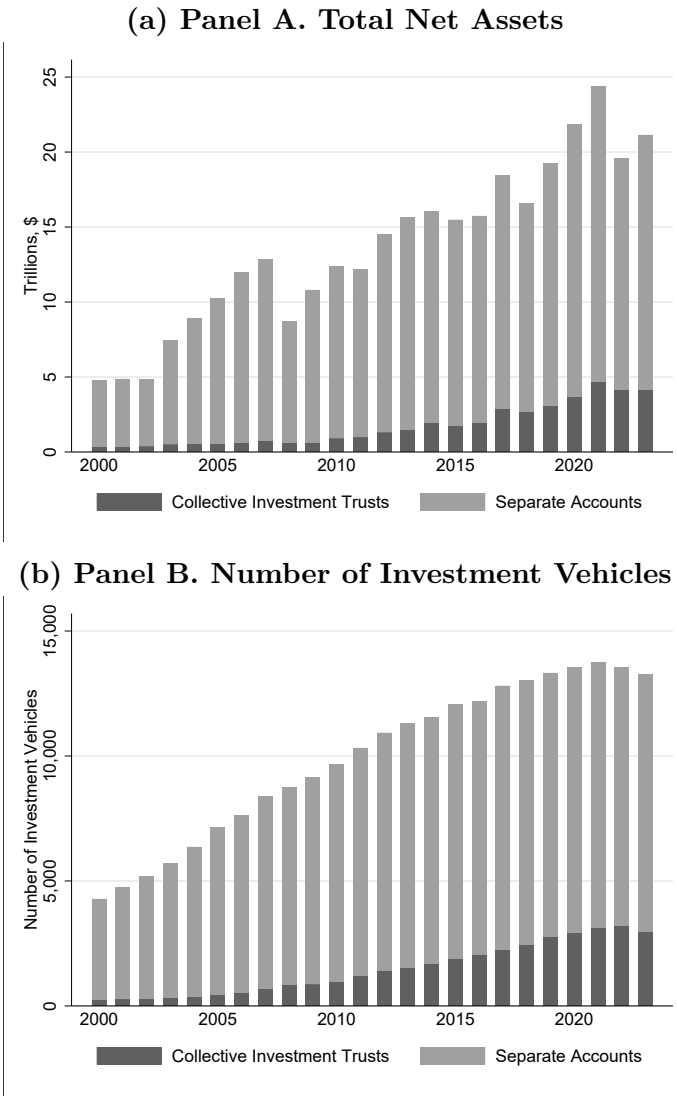

Figure A.1: Collective Investment Trusts and Separately Managed Accounts: Morningstar Coverage

This figure illustrates Morningstar's coverage of collective investment trusts and separately managed accounts from 2000 to 2023. Panel A presents the total net assets, while Panel B displays the total number of investment vehicles. The total number of investment vehicles is defined as the number of unique Fund IDs.

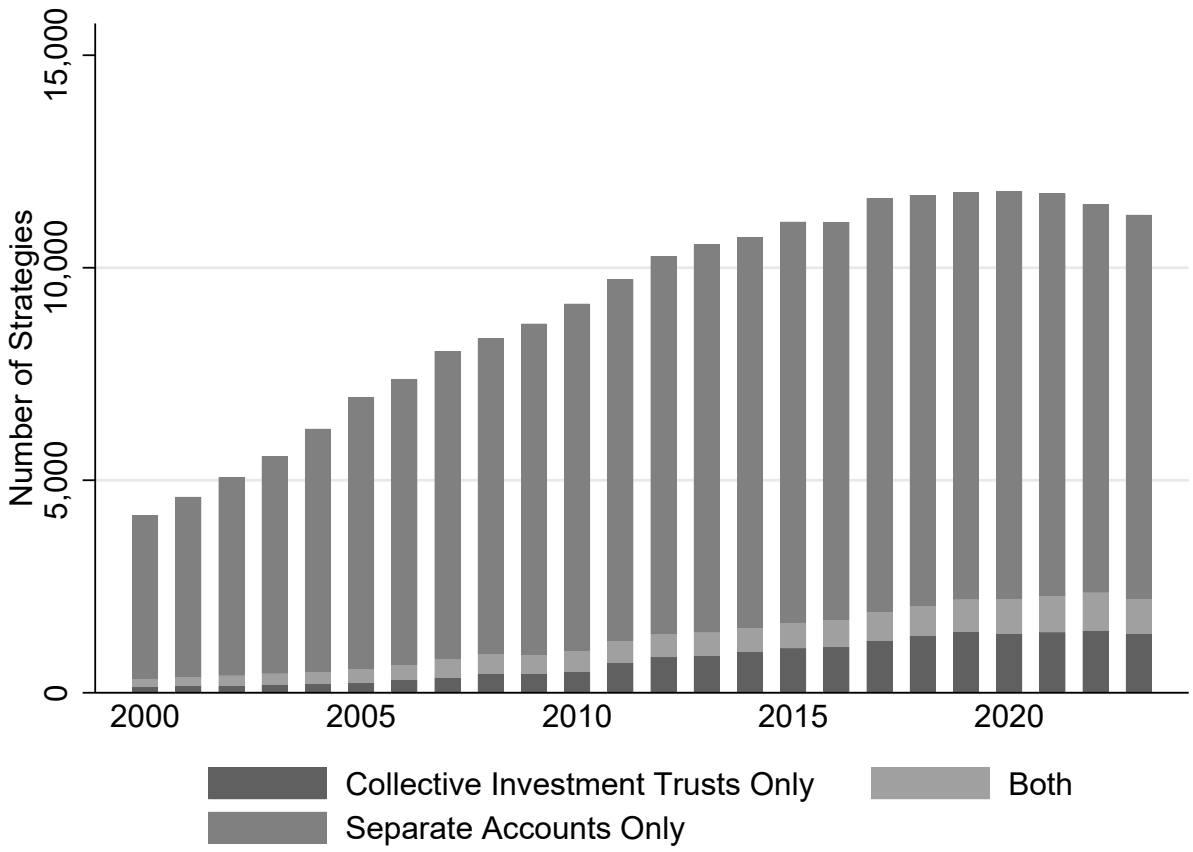

Figure A.2: Investment Products in Collective Investment Trusts and Separately Managed Accounts: Morningstar Coverage

This figure illustrates Morningstar's coverage of investment products in collective investment trusts and separately managed accounts from 2000 to 2023. The number of investment products is defined as the number of unique Strategy IDs.

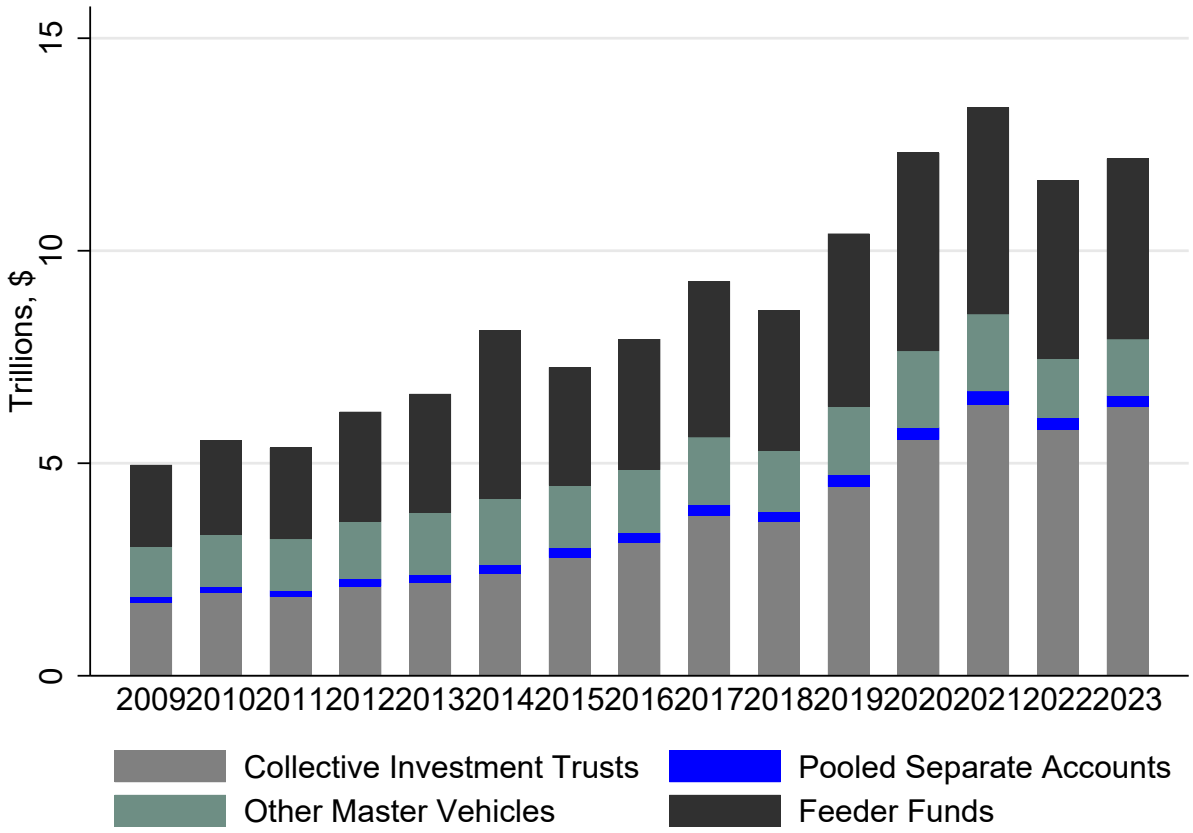

Figure A.3: Assets in Institutional-Focused Investment Vehicles Observed Through Form 5500 Fillings

This figure illustrates the growth of assets in employee benefit plans and Direct Filling Entities reporting Form 5500 filings across four investment vehicle categories from 2009 to 2022: common and collective investment trusts (CITs), pooled separate accounts (PSAs), other direct vehicles, and fiduciary vehicles.

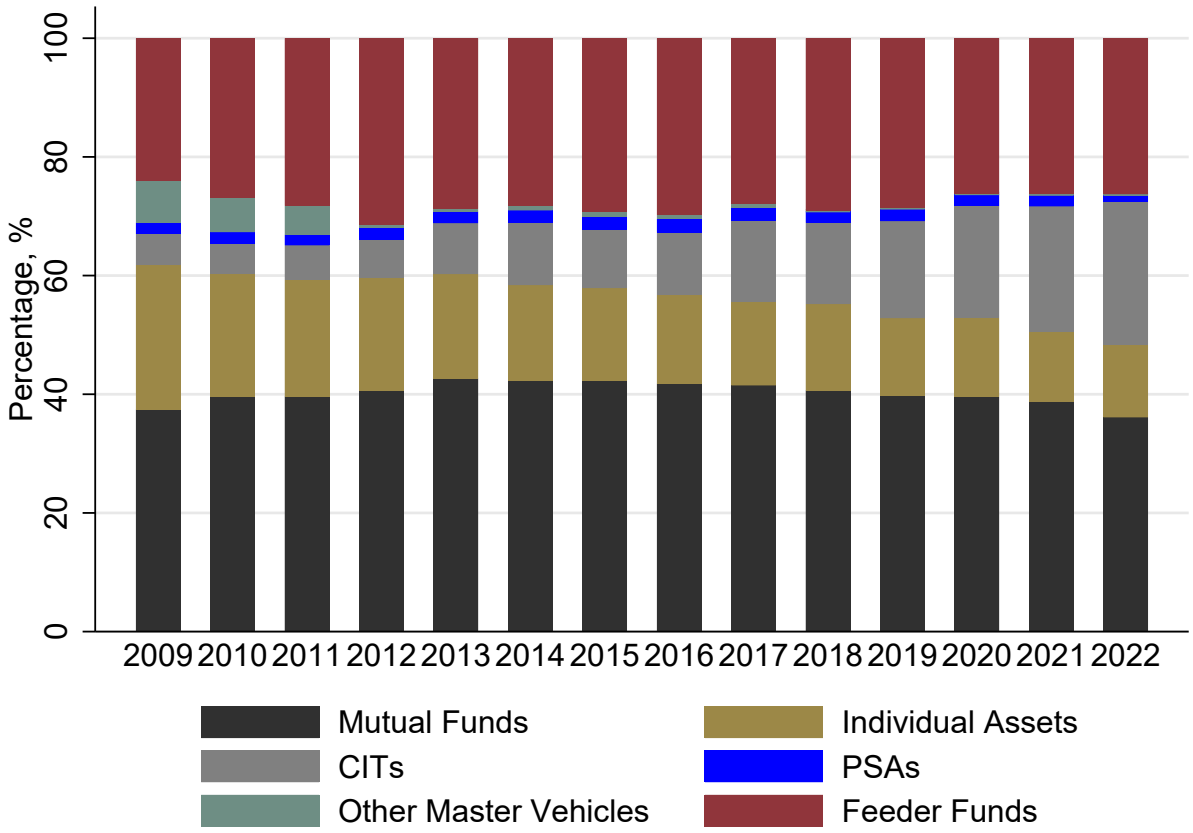

Figure A.4: Assets in Institutional-Focused Investment Vehicle within Large DC Retirement Plans: the Constant Sample of Plans

This figure illustrates the changing distribution of assets in DC retirement plans allocated across individual assets and five investment vehicle categories from 2009 to 2022: mutual funds, common and collective investment trusts (CITs), pooled separate accounts (PSAs), other master vehicles, and feeder funds. The data are sourced from Schedule H Form 5500 filings submitted by large DC retirement plans. The sample is limited to DC retirement plans with continuous annual filings throughout the 2009-2022 period. This figure does not include separately managed accounts (SMAs), which do not appear in Form 5500 filings because their assets are typically reported as direct plan assets rather than being classified as an investment vehicle.

B Tables

Table B.1: Summary Statistics on Mutual Funds and Their Twin Investment Vehicles

This table presents summary statistics for mutual funds, common/collective investment trusts (CITs), and separately managed accounts (SMAs) using data from Morningstar Direct. The sample comprises 3,168 mutual funds, 600 CITs, and 2,915 SMAs over the period Q1:2000 to Q4:2022. All variables are reported quarterly and continuous variables are winsorized at the 1st and 99th percentiles.

	Mean	Median	SD	Min	Max	# Obs.
Mutual Funds with Twin Vehicles						
Gross Return, %	2.15	2.34	8.38	-24	23	157,708
Net Return, %	1.88	2.10	8.36	-24	23	158,235
Fund TNA, Million	1,733.19	368.20	3,919.18	1	24,344	160,839
Sales, Million	135.04	25.34	303.74	0	1,801	121,470
Redemptions, Million	130.81	27.38	284.47	0	1,652	120,365
Equity Strategy	0.72	1.00	0.45	0	1	160,891
Allocation Strategy	0.04	0.00	0.19	0	1	160,891
Fixed Income Strategy	0.22	0.00	0.42	0	1	160,891
Other Strategy	0.02	0.00	0.12	0	1	160,891
Age, Years	14.54	12.08	12.23	0	98	160,760
Twin Common/Collective Investment Trusts						
Gross Return, %	1.92	2.23	8.27	-22	21	8,524
Net Return, %	1.84	2.22	8.24	-21	20	13,605
Fund TNA, Million	1,301.69	207.48	3,499.17	0	19,482	15,738
Equity Strategy	0.74	1.00	0.44	0	1	15,738
Allocation Strategy	0.05	0.00	0.23	0	1	15,738
Fixed Income Strategy	0.20	0.00	0.40	0	1	15,738
Other Strategy	0.01	0.00	0.09	0	1	15,738
Age, Years	8.60	6.25	7.83	0	47	15,666
Twin Separately Managed Accounts						
Gross Return, %	2.21	2.39	8.30	-22	22	148,063
Net Return, %	2.03	2.22	8.30	-23	22	146,808
Fund TNA, Million	2,614.16	759.99	4,552.79	0	21,039	147,636
Equity Strategy	0.74	1.00	0.44	0	1	150,472
Allocation Strategy	0.03	0.00	0.18	0	1	150,472
Fixed Income Strategy	0.21	0.00	0.41	0	1	150,472
Other Strategy	0.02	0.00	0.12	0	1	150,472
Age, Years	13.75	12.42	9.09	0	89	149,203
Investment Product-Level Data for Twin CITs and SMAs						
Total Inst. Vehicle Accounts	149.00	11.00	1,317.81	0	71,614	115,705
Inst. Vehicle Taxed Accounts	74.43	4.00	741.33	0	34,218	92,622
Inst. Vehicle Tax-Exempt Accounts	49.58	5.00	513.78	0	38,014	89,986
Inst. Vehicle Accounts Lost	5.89	0.00	417.20	0	103,751	86,893
Inst. Vehicle Accounts Gained	4.82	0.00	141.70	0	35,044	88,910
Assets in Inst. Vehicle Accounts, Million	4,343.35	1,301.98	7,861.01	0	39,724	125,052
Assets in Inst. Vehicle Taxed Accounts, Million	2,848.72	640.97	5,821.97	0	32,326	101,970
Assets in Inst. Vehicle Tax-Exempt Accounts, Million	1,983.20	402.08	4,282.30	0	24,866	99,286
Assets in Inst. Vehicle Accounts Lost, Million	25.51	0.00	89.96	0	569	83,551
Assets in Inst. Vehicle Accounts Gained, Million	31.57	0.00	108.78	0	684	84,033