Out of Sight No More? The Effect of Fee Disclosures on 401(k) Investment Allocations[*]

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Abstract

Using a hand-collected dataset on investment menus for a large sample of 401(k) plans, we examine the effects of a 2012 regulatory reform of investment option disclosures on participants' allocations across funds. Despite skepticism surrounding the effectiveness of the regulation, we show that participants become significantly more attentive to expense ratios after the reform. The results are stronger for plans with larger account balances and those that are non-unionized. Additionally, they are not driven by secular changes in investor attention or sponsor-initiated changes to the investment menu before the reform. Finally, we find that flows also become more sensitive to short-term performance measures.

1   Introduction

Defined contribution (DC) pension plans, such as 401(k) plans, have become an important investment vehicle for households saving for retirement.[1] In DC plans, individuals have the responsibility to decide how much to save and how to allocate their savings across different investment options. Unfortunately, many individuals may not have easy access to relevant information to make optimal financial decisions. For example, Barber, Odean, and Zheng (2005) show that mutual fund investors often ignore information that is "out of sight" and react to salient attention-grabbing information. In this paper, we examine whether a regulatory reform that required 401(k) plans to disclose additional information on fees and performance had an impact on investment decisions of plan participants.

Understanding how information affects the behavior of households is an influential research area in economics and finance.[2] Information disclosures are particularly important in the retirement setting. Studies on whether employees are accumulating sufficient wealth for retirement paint a rather pessimistic picture.[3] How to improve the savings success of 401(k) participants is therefore an important economic question.

In this paper, we examine whether the 2012 participant-level disclosure reform by the Department of Labor (DOL) affects investment decisions in 401(k) plans. Aiming to increase participants' awareness of the key features of the investment menu, DOL's rule 404(a)(5) requires fiduciaries to provide expense- and investment-related summary statements directly to participants. While the information contained in these disclosures is publicly available before the reform, it is often buried in long fund prospectuses or regulatory filings. Hence, the new rule brings the information more "in sight."

To investigate whether participants become more attentive to fund fees and investment performance that are now disclosed in the new summary statements, we hand-collect information on the menu of options offered in a large sample of 401(k) plans from Form 5500 annually filed by sponsors with the DOL, from 2010 to 2013. We augment these plan-option-year-level data with information on plan- and fund- level characteristics. Due to the timing of the

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[1]By the end of 2017, Americans held $5.3 trillion dollars in 401(k) assets according to the ICI (https://www.ici.org/pdf/ten_facts_401k.pdf).

[2]See, for example, Dranove et al. (2003), Bertrand and Morse (2011), and Figlio and Lucas (2016).

[3]A recent report by the Center on Longevity at Stanford, for example, finds that, based on current savings, the vast majority of employees will experience a significant decline in their standard of living in retirement (http://longevity.stanford.edu/wp-content/uploads/2018/10/Sightlines-Financial-Security-Special-Report-2018.pdf).

regulation, pre-reform observations in our experiment include the years 2010 and 2011, while the post-reform years are 2012 and 2013.

Our data have several advantages. For example, a given fund often contemporaneously appears on several 401(k) menus. Each menu offers a different set of investment options as sponsors and plan providers select different choices for participants across plans. In addition, some mutual funds are never included in 401(k) plans, allowing us to contrast the impact of the new disclosures on funds that appear on 401(k) menus to those that do not. These data features guide our identification strategy.

We begin our analyses by examining whether investors become more attentive to fund fees in their allocation decisions after the disclosure reform. To do so, we ask whether investor flows become more sensitive to fund expense ratios after the DOL regulation. It is reasonable to expect no change in allocations following the new regulation. Participants might already be aware of the fees and the performance of their investment options since this information is publicly available. Alternatively, participants may not open the new disclosures they receive in the mail or they may be overwhelmed by the information content. Plan fiduciaries have an incentive to include as much information as possible in these summary disclosures to fend off legal liability. This, in turn, may undermine the regulatory goal of increased transparency. Additionally, studies show that pension participants are passive and rarely change their investment allocations (Madrian and Shea (2001), Agnew et al. (2003), or Sialm, Starks, and Zhang (2015)).

Remarkably, we find that participants' sensitivity to fees increases significantly after the reform. We show that funds with a one-standard-deviation higher expense ratio (i.e., 0.36 percentage points) experience a reduction in annual flows of approximately 0.20 percentage points (measured as a fraction of the lagged sum of money invested across all options) after the regulatory change. This magnitude is larger than the mean annual flow of 0.117% in our sample.

We then ask whether our findings are driven by participants merely allocating more money to cheaper funds or whether they are also actively withdrawing from those funds that are more expensive. This is important because if our findings are driven by the former, then the change in fee sensitivities may not come from participants' heightened awareness of investment costs. Instead, it is possible that the change is driven by plan providers, who select the menu of investment options for the plan. For example, these providers may designate the cheapest fund on the menu as the new default option around the reform, which could generate our results. We show however that investors actively take flows out of expensive

funds. Economically, a one-standard-deviation increase in the expense ratio is associated with a 7-8% higher probability that the fund will experience negative flows.

We take additional steps to further address the possible concern that higher sensitivities of participant flows to fees could be driven by changes to the plan or the menu of choices, for example, if plans selectively drop expensive funds from the menu around the disclosure reform. First, we exploit plan-fund fixed effects and thus control for the composition of funds in the plan. Second, we show that our results hold when we drop plan-years from our sample that undergo any fund deletions.

An additional concern is that our results may not be unique to the 2012 event. Secular movements over time may increase participants' sensitivity to fees long before the reform. To address this issue, we re-run our experiment using a series of placebo periods but find no evidence to support this alternative.

Having shown that after rule 404(a)(5) takes effect, participants become significantly more sensitive to fund fees in their investment allocations, it is interesting to ask who reacts to fees. In particular, we look at two specific characteristics, account size and plan unionization, that may influence how participants respond to disclosures. Generally, participants with larger account sizes may be more sophisticated or may worry about the economic impact of fees on their savings more. Similarly, unionization is more prevalent among blue-collar professions, which may also proxy for financial sophistication. If the reform provides new information to participants, sophisticated investors may react more strongly. Consistent with these arguments, we find that participant-directed investment allocations in plans with larger average account balances and in those that are non-unionized increase their sensitivities more strongly to fund fees after the reform compared to other plans.

To get more information on how allocation decisions change around the reform, we also investigate changes in participant investments in affiliated funds and in company stock, respectively. We are interested in these two investment choices for different reasons. First, affiliated funds (defined as those that are offered by the financial intermediary that administers the plan) may benefit from additional marketing efforts by the provider. If this is the case, as fee disclosures increase participant awareness and thus level the playing field between affiliated and non-affiliated options, they may prompt participants to reallocate assets towards unaffiliated funds when these are relatively cheaper. Our results provide support for this reallocation hypothesis.

We perform a similar test for allocations to the stock of the employer. Many plans have the option to invest either in diversified mutual funds, or alternatively, allocate money to

the company stock, which has a zero expense ratio. We find that when a plan's mutual fund investment options are particularly expensive compared to other plans, participants shift more assets towards the employer's stock once they acquire better information about these fees through the disclosures. This reallocation toward company stock appears to be an unintended consequence of the fee disclosure.

While the main focus of rule 404(a)(5) is to better inform participants on plan fees and expenses, the disclosures are also mandated to provide participants with comparative information about the historical performance of the plan's investment options. Specifically, the rule requires that they tabulate the 1-, 5-, and 10-year returns for all fund options in the plan, whenever return information at those horizons is available. Therefore, we next investigate whether the regulatory reform changes the sensitivity of participant-directed investment allocations to fund performance.

To the extent that plan investors chase performance, we may expect return-flow sensitivities to increase around the disclosure reform. However, while chasing low fees produces lower fees, chasing high past performance does not produce higher future returns as reliably (Carhart (1997)). Therefore, it is not clear whether investors should react to the new performance information that they receive. Additionally, it is also likely that participants do not pay attention to the same performance horizon uniformly, which may obscure the true sensitivity of their investment allocations to fund performance.

We find that participant-directed flows become more sensitive to one-year returns after the reform, whereas the evidence on changes in flow sensitivity to five- and ten-year performance is more mixed. One possible explanation for these results is that with the disclosure, participants now update their information set on the one-year return at the same time. In contrast, before the reform, the short horizon return estimates of participants vary based on when they access this information. Naturally, longer-horizon return metrics are less sensitive to this 'timing' effect.

In the final section of our paper, we provide additional robustness using fund-year data from the CRSP Survival-Bias Free Mutual Fund database. Our goal is to confirm that changes in investor attentiveness to fees and performance are driven by the disclosure reform rather than some confounding effects. To do so, we take advantage of triple-difference tests in which we study how a fund's fee-sensitivity changes after the disclosure reform, interacted with how exposed the fund is to the reform. We use two different measures of exposure: 1) the natural logarithm of the number of 401(k) plans in our sample that include the fund plus one, and 2) the fraction of fund net assets that can be attributed to 401(k) plans.

The triple-difference analyses show that exposure to 401(k) plans predicts a stronger change in the fee-sensitivity of total fund flows after the disclosure reform, indicating that the regulation also has a measurable effect at the fund-level. These results hold when measuring retirement exposure based on the number of plans as well as when measured as a fraction of fund assets. While these tests provide us with yet another way to address potential endogeneity concerns, it is also important to point out the weakness of these tests. In particular, the measures of exposure that we create from our sample clearly represent a lower bound of the actual exposure of these funds to the retirement industry.

The main contribution of our paper is to provide the first evidence on the effect of the DOL's disclosure reform on plan participants. Despite considerable skepticism surrounding the effectiveness of the reform, our results show that participants become more attentive to fund fees after the regulation. There is also some evidence that investors pay closer attention to past fund performance, but these results are more mixed. The shift in investor attention that we document is important given that small differences in fees or inefficiencies in the selection of investment options can have a significant impact on retirement savings outcomes, especially early in the participants' career.

As such, our paper contributes to the literature on information economics. How information affects the behavior of households is an important and active research area in economics. Papers in this area span a large number of fields and topics. For example, Bertrand and Morse (2011) study whether information affects the behavior of payday borrowers, Figlio and Lucas (2016) examine whether publicly disseminating information on school quality affects the real estate market in the area, Dranove et al. (2003) asks how health outcomes change after the introduction of hospital report cards, and Gao and Huang (2017) shows that individual investors execute more informed trades after the introduction of the EDGAR system.

The paper is also related to several other strands of the literature, covering both pensions and mutual funds. These include studies on the design and characteristics of DC plans,[4] the allocation choices of pension participants, studies that show how nudges can alter participant behavior, and also more generally papers that examine the effectiveness of additional disclosures to individual mutual funds investors.

Several papers show that individual investors make sub-optimal asset allocation decisions (Benartzi and Thaler (2005); Cronqvist and Thaler (2004); Barber, Odean, and Zheng (2005);

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[4]The structure of DC plans is analyzed by, for example, Huberman and Jiang (2006), Elton, Gruber, and Blake (2006, 2007), Brown, Liang, and Weisbenner (2007), Carroll et al. (2009), Tang et al. (2010), Goldreich and Halaburda (2013), and Dvorak (2015).

Choi, Laibson, and Madrian (2010)) while others provide further evidence of irrational investor behavior with respect to mutual fund fees (Elton, Gruber, and Busse (2004), Barber, Odean, and Zheng (2005), Choi, Laibson, and Madrian (2009)). At the same time, research has shown that pension participants are passive and rarely change their allocations (Agnew, Balduzzi, and Sundén (2003), Madrian and Shea (2001) or Sialm, Starks, and Zhang (2015)). Given the potentially large loss of income at retirement resulting from inefficient choices early in the participants' careers, these results open the question of whether policy actions and regulation could improve individual choices through additional disclosures and investor education.

To break the well documented inertia of 401(k) pension participants, a number of studies examine the effectiveness of behavioral nudges (choice architecture techniques) in encouraging retirement savings in DC plans. Early work by Madrian and Shea (2001), Choi, Laibson, Madrian, and Metrick (2004a) and Choi, Laibson, Madrian, and Metrick (2004b) show that default allocations in DC plans have large and lasting effects on the saving behavior of a substantial fraction of newly-hired employees and that opt-out provisions in DC plans dramatically increase 401(k) participation rates.

However, studies that look at the impact of disclosures (which alleviate imperfect information even in the presence of financial literacy) show mixed results. For example, Beshears, Choi, Laibson, and Madrian (2009) use an experiment to estimate the effect of disclosure intervention that provides experimental subjects with an SEC's Summary Prospectus which simplifies mutual fund disclosure. They find that such an intervention yields little change in allocations among actively managed funds compared to when subjects only receive the statutory prospectuses.

The rest of the paper is structured as follows. Section 2 provides information on the legislative timeline of rule 404(a)(5). Section 3 describes our data collection and provides summary statistics of our 401(k) plans as well as the mutual funds offered on the plans' menu. Sections 4 and 5 discuss our results. Section 6 concludes.

2   Institutional Background

Individual plan participants bear the responsibility to make the main retirement savings decisions in DC pension plans. An important question is whether participants have the information, ability, and time to make optimal savings decisions. Accordingly, the Department

of Labor (DOL) has issued a series of regulatory initiatives in recent years under the Employee Retirement Income Security Act of 1974 (ERISA) to ensure that both plan fiduciaries and plan participants receive a clear and comprehensive description of the plan, especially concerning plan costs. In this paper we focus on the participant-level disclosure reform, rule 404(a)(5).

Rule 404(a)(5) requires plan fiduciaries to disclose information on plan fees, expenses, and performance to participants. Although this regulation came into effect in 2012, it has a long legislative timeline. In particular, as a first step in developing the disclosure rule, the Department of Labor published a Request for Information in the Federal Register in 2007. The Request generated over 100 public comment letters concerning the planned fee and performance disclosures to plan participants. The DOL then published a notice of proposed rulemaking in the Federal Register in 2008, with further soliciting public comments on the issue. On October 20, 2010, the Department published the final regulation in the Federal Register, which mostly followed the structure of the original proposed rule. The final regulation set the effective date to December 20, 2010, with an applicability date of November 1, 2011.

In addition to the participant-level disclosure rule, the DOL was simultaneously developing a rule on fiduciary-level plan disclosures, which requires service providers to furnish information to the plan's fiduciaries on the direct and indirect fees these providers collect for the services rendered to the plan. A proposed rule was published in December 2007, and a corresponding interim final rule (408(b)(2)) was issued on July 16, 2010. On June 1, 2011, the effective date of 408(b)(2) was delayed to January 1, 2012.

Though the participant-level disclosure requirements were set to begin before those at the fiduciary level, public commenters argued that it would be preferable that the effective date of the participant-level regulation would be delayed until after 408(b)(2) takes effect as information obtained from service providers would be useful to plan fiduciaries when they issue participant disclosures. In response to these comments, to align the compliance dates of the two rules, the final compliance date for rule 408(b)(2) was later set to April 1, 2012. Additionally, the DOL amended the transition rule in 404(a)(5) to require that participant-level disclosures are made no later than 60 days after the effective date of fiduciary-level disclosure.

While the two rules were simultaneously developed, it is important to point out that any potential effects from these regulations likely differ on the extensive and intensive margins. In particular, plan fiduciaries and providers anticipated the rule changes over a period of approximately five years. Accordingly, it is likely that they made changes to the menu design

by adding and deleting investment options already before the effective date of the reforms. In contrast, the change in the information environment for plan participants occurred at a specific point in time. Thus, rule 404(a)(5) provides a shock at the intensive margin, that is for participant reallocation decisions. For this reason, we focus on the question of whether participants reallocate their 401(k) savings across options after the reforms.

3   Data and Summary Statistics

This section describes the data collection and the properties of our sample.

3.1   Data Collection

To investigate whether 401(k) participants become more attentive to investment fees in their plans after the disclosure reform, we manually collect the investment options offered in a large sample of 401(k) plans for the 2010-2013 period. Because the first disclosures were sent out during 2012, we designate the plan years ending in 2012 and 2013 as the post-reform period, and plan-year ends in 2010 and 2011 as the pre-reform period.[5]

Our sample is comprised of two sets of plans. First, we hand-collect information for the plans studied in Pool, Sialm, and Stefanescu (2016) for the 2010 to 2013 period. Second, we augment these original set of plans with information on the one thousand largest plans in the US. While the original sample in Pool, Sialm, and Stefanescu (2016) was collected from Form 11-K filings filed with the SEC, information on the menu of investment options for the new time period and plans is collected from Form 5500 filed with the DOL. When covered by both sources, Form 11-K and the Form 5500 filings provide the same description of the plans, including the menu of investment options offered to participants at the end of the fiscal year. However, unlike Form 11-K, Form 5500 is filed by all pension benefit plans covered by the Employee Retirement Income Security Act (ERISA).

From Form 5500 filings we collect the tables that describe the 'Schedule of Assets,' which are typically included on the very last pages of the documents. In most cases, the table reports the complete set of investment options offered by the plan, including the employers' own stock, mutual funds, separate accounts, stable value funds, or guaranteed investment contracts. We supplement our menu information with various plan characteristics such as plan

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[5]While most of the plans in our sample follow the calendar year as their fiscal, a small subset does not. For these plans, we designate any fiscal year end month after December 2012 as the *Post* period.

size, number of participants, or whether the plan is collectively bargained. These variables can be downloaded from the various schedules of Form 5500.

To obtain information on the mutual funds included in DC plans, we match these menu data to the CRSP Survivorship Bias-Free U.S. Mutual Fund database by fund name. Since we do not always know the exact share class of the fund offered on the menu, we establish the link between our 401(k) sample and CRSP at the fund level. Accordingly, fund age is calculated as the age of the oldest share class, fund size is the sum of the total net assets (TNA) of all share classes, and fund returns and expense ratios are calculated as the TNA-weighted average returns and expense ratios of the share classes, respectively. For funds of funds in our sample, we calculate expense ratios as the sum of the expense ratio charged by the fund of funds and the value-weighted expense ratios charged by the portfolio funds. We also classify each mutual fund into the following style groups: balanced funds (B), domestic equity funds (ED), foreign equity funds (EF), domestic fixed income (FID), foreign fixed income (FIF), and other (O), by mapping Lipper fund styles into these broader categories. We create separate dummy variables for money market, target date, and index funds. We manually group funds into target date and index fund categories based on fund name.

Studying choices between options in defined contribution plans is arguably an ideal setting to study the effect of fund characteristics on flows: participants' choice set is strictly limited, and we know precisely between which options each fund participant can choose. The number of choices is also typically limited at around 21 options, which makes a comparison of every option at least feasible. In contrast, if we instead study mutual fund investors outside of defined contribution plans, these investors have thousands of possible choices, and we cannot expect them to be able to consider all available options.

While some analyses are at the fund level, we perform several of our tests at the share class level using the subsample of options for which we can identify the correct share class. Share class information comes from several sources. First, for a subsample of plans, share class information is available from the 'Schedule of Assets' table. Second, in some of the cases, the 'Schedule of Assets' contains information on the number of shares held by the plan in addition to the market value of the position. This allows us to calculate the net asset value (NAV) of the position on the report date. When the NAV information is available, we match the menu choice to the CRSP mutual fund files by NAV and date, which allows us to identify the correct share class. Third, in some cases, Part 1/3 of Schedule C specifies the share class of the fund ('payor'), even when the 'Schedule of Assets' table does not. Finally, some funds only have one share class. We can identify the correct share class for over 60% of our funds;

but there is substantial heterogeneity across plans, as we know all share classes for some plans and no share classes for other plans. Whenever we know the share class information for a vast majority of funds offered in a plan-year (above 95%), we use the share class-specific information; if we do not know the share class, we instead use the minimum fee across share classes as the fee.[6] While we acknowledge that this means that we cannot perfectly measure the fees of all the options in our sample, any mismeasurement of fees should attenuate our results.

3.2 Sample description

Panels A and B of Table 1 provide summary statistics for our sample. We restrict our sample to plan years that offer at least three and no more than 100 options on the menu. The final sample covers 5,577 plan years in the period 2010-2013. The average plan size is $784 million. The average plan has 11,682 participants. Participants in our sample have, on average, approximately $73,000 in their 401(k) accounts. Although our sample only contains approximately 1,395 plans per year, it covers $1.3 trillion in retirement assets in 2013 and approximately 18 million participants. This represents roughly 25% of the total 401(k) assets in Form 5500. About 16% of our plans are collectively negotiated (*i.e.*, unionized).

[Insert Table 1 about here]

The average plan offers approximately 21 investment options to participants. Approximately 18 of these options have been on the menu for at least two consecutive years, while 3 are newly added funds. In this paper, we focus on participants' investment decisions; therefore, we exclude newly added funds (as well as fund deletions) in our analyses.

Around 51% of the funds in the average plan in our sample are domestic equity funds, 17% are domestic bond funds, and 19% are balanced funds. Over 80% of balanced funds are target date funds, which represent approximately 8 of the 21 options offered on the menu. We drop target date funds from the sample in most of our analyses.[7] Participants invest approximately $26 million in the average mutual fund on the menu and they pay, on average, around 60 basis points in the form of mutual fund expense ratios.

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[6]Most of the defined contribution plans in our sample are very large and thus may have access to the lowest fee share classes that are available.

[7]Target funds are only included in regressions that explicitly test for flows to target funds, or when testing for differences between target and non-target funds.

4 Results

This section summarizes our results analyzing the impact of the disclosure regulation on portfolio allocation decisions.

4.1 Fee information and fund flows

This section describes our baseline results on the relation between fees and flows around the disclosure reform. We estimate the following baseline model:

$$Flow_{p,f,t} = \beta_1 ExpRatio_{p,f,t-1} + \beta_2 Post_t + \beta_3 ExpRatio_{p,f,t-1} \cdot Post_t + \mathbf{\Gamma'Controls}_{p,f,t-1} + \epsilon_{p,f,t},$$
(1)

where $Flow_{p,f,t}$ is the growth rate of new money of fund f included in plan p in year t ('fund flow'), $ExpRatio_{p,f,t-t}$ is the lagged expense ratio of fund f in plan p, and $Post$ is an indicator that takes the value of one for the two fiscal years that follow the reform and is zero for the two years before the reform. Finally, $\mathbf{Controls}_{p,f,t-1}$ is a vector of relevant control variables.

We include a range of controls and fixed effects. These absorb variation in flows and fees that are unrelated to the reform. The fixed effects include Plan-by-Fund fixed effects, which allow for a *within-investment-option* comparison of fees and flows and further control for possible compositional changes in the menu of funds. We further include Size-by-Year controls since, for example, large options may see systematically different flows from small options. We further allow this relation to be varying by year, which helps to control for the fact that disclosure may differentially affect the visibility of larger vs. smaller options. The size variable is measured as the lagged fraction of plan assets invested in the fund. We also control for Plan-by-Year or Plan-Style-Year fixed effects, which make the comparison of flows and fees strictly across options within the same plan and year (and fund style).

In some regressions, we also include Fund Management Company-by-Year fixed effects to account for possible time variation in flows and fees specific to a particular fund company. Such time variation could be driven by omitted variables or events at the fund company level such as marketing or media coverage. On the other hand, the reason we do not always include this control by default is that some families may systematically have cheaper funds (e.g., Vanguard tends to offer funds that are cheaper on average). It is therefore possible that the Fund Company-by-Year fixed effects could drive our results towards zero if there is not sufficient variation in fees across funds that are offered by the same management company.

The standard errors are two-way clustered throughout our analyses by fund management company and plan. Table 2 reports results.

[Insert Table 2 about here]

Panel A shows the results for our full sample of mutual fund investment options across all fund styles. In columns (1)–(2), we find that flows (normalized by the sum of lagged assets across all options) become significantly more sensitive to fees after the disclosure reform. The coefficient estimates imply that a fund that has a one-standard-deviation higher expense ratio (i.e., 0.36 percentage points) is predicted to have around a 0.20 percentage-point lower flow after the reform when measured as a fraction of the lagged sum of money invested across all options. This magnitude is larger than the mean flow of 0.117% in our sample.

The coefficient on the expense ratio itself is slightly positive, although insignificantly so. However, because the regressions include Plan-by-Fund fixed effects, this coefficient is not meaningful on its own, as it merely captures the sensitivity of flows to variation in fees *within fund*. In other words, the time-series variation in flows that is correlated with the same fund changing its fees over time (this variation in fees over time for the same option is also quite small).[8]

Column (2) further shows that this relation is robust and remains similar in magnitude when controlling for the management company of the fund.

In columns (3)–(4), we instead use flows normalized by the lagged option size as the dependent variable. Even though this is a potentially noisier measure of fund allocation, we nevertheless find very similar results. Regarding the economic magnitude, the estimates indicate that a fund with a one-standard-deviation higher expense ratio (i.e., 0.36 percentage points) is predicted to receive around 2.2 percentage points lower flows after the reform.

These regressions, which use continuous dependent variables, show that funds with higher fees receive relatively lower flows after the reform. We next ask whether this is driven by participants merely allocating more of their investments to cheaper funds, or whether participants also are more likely to take money away from more expensive funds. This is important because if our findings are merely driven by the former, then the change in fee sensitivities may not come from participants' heightened awareness of investment costs.

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[8]Table A.2 in the Appendix reports results without Plan-by-Fund fixed effects and shows that the sensitivity of flows to fees across funds is indeed negative before the reform, but that this sensitivity more than doubles in magnitude after the reform.

Instead, it is possible that the change is driven by plan providers, who select the menu of investment options for the plan. For example, these providers may designate the cheapest fund on the menu as the new default option around the reform, which could generate our results.

To test whether more expensive funds are more likely to experience negative flows after the reform, columns (5)–(6) use an indicator of negative flow as the dependent variable. The results are consistent with investors withdrawing money from more expensive funds after the reform. Specifically, a one-standard-deviation-point higher fee predicts around a seven percentage-points greater probability that a fund will experience negative flows. This is an economically sizeable effect compared to an average probability of having negative flows of 46%. Another feature of using an indicator for negative flows is that this measure is not affected by the choice of scaling—whether flows are normalized by the sum lagged assets across all mutual funds in the plan (as in columns 1–2) or by lagged option size (columns 3–4).

In Panel B of Table 2, we re-estimate these results within the subset of domestic equity funds. Domestic equity funds correspond to a more homogeneous group of mutual funds, which may facilitate the interpretation of the results. The previous results in Panel A include Plan-Style-Year fixed effects to control for the fact that different styles of funds can have systematically different fees and may also see correlated flows. For example, fixed income or international funds may be more popular in some years than others, and different styles of funds also have different fees on average. However, there remains much heterogeneity across the options when analyzing all funds simultaneously, which in turn affects how we should interpret these results. For robustness, we therefore focus on only domestic equity funds to see if these results continue to hold when we hold the broad investment objective constant. We choose to focus specifically on domestic equity because this is the fund style that has by far the highest number of options, especially non-target options. As Panel C of Table 1 shows, 98% of all plan-years have at least one domestic equity fund, and on average these plans offer 9 (median 8) different domestic equity funds. By contrast, the number of possible choices within the other fund styles is often more limited.

Panel B shows that the results are generally stronger for domestic equity funds. In this subsample, a one-standard-deviation change in the expense ratio predicts 0.21–0.24 percentage point higher flows when normalized by the lagged sum of all mutual fund options, or 2.6–3.1 percentage-points when normalized by lagged option size. A domestic equity fund with a one-standard-deviation higher expense ratio also becomes around 8-9% more likely to

experience negative flows in the two years after the reform compared to the years before the reform.

Figure 1 illustrates the changing fee-sensitivities of flows in these defined contribution plans. The figure plots in dark bars the average value-weighted flow to funds with fees that are below the median (across all funds within a plan-year), and in light bars the average value-weighted flow to funds that are above the median. The figure shows that in the years before the 2012 reform, the light bars are higher than the dark bars. This means that before the reform, more expensive funds on average receive higher flows than cheaper funds. We then observe a drastic shift in 2012, where the lower-fee funds now receive more flows than the more expensive funds, and this trend continues to hold in 2013.

[Insert Figure 1 about here]

In sum, these results show that flows from plan participants become significantly more sensitive to fund expenses after the defined contribution disclosure reform of 2012.

4.2 Placebo periods

The previous section shows that flows become more sensitive to fees after the disclosure reform. It is possible however that this result could happen by chance or because of a secular movement over time whereby flows tend to become ever more sensitive to fees year-after-year. Therefore we now test how significant this effect is historically, and whether the changes in earlier years are greater than we have observed in the recent past.

To examine these questions, we rerun our baseline model using a series of 'placebo periods.' In other words, instead of using the actual experiment which compares flows in a pre-period that consists of the years 2010 and 2011 compared to a post-period of 2012 and 2013, we extend our sample backward in time and run the same regression over alternative four-year periods, but where we know there was no similar reform in the middle of the period. Other than using different sample years, the empirical specification in these models is identical to that in Table 2.[9] The results of these tests are reported in Table 3. Panel A shows results for all funds, while Panel B tabulates the results for the domestic equity subsample.

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[9]Note that our sample of plans is slightly smaller in the earliest years, though having a smaller set of plans does not directly affect the fee-sensitivity estimates within plans.

[Insert Table 3 about here]

Table 3 confirms that the 2010–2013 period is a significant outlier in the distribution of fee-sensitivities. This result holds both across all funds (Panel A) and among domestic equity funds (Panel B). The only other period that has a significant effect is the period 2001–2004, where it appears as if the sensitivities to expense ratios also got stronger. This difference is nevertheless much noisier and not significant when we focus on domestic equity funds in Panel B. In summary, these analyses show that the baseline results in Table 2 are substantial—not only in absolute economic magnitude—but also when compared to other recent periods.

4.3   Heterogeneity in fee-flow sensitivities across plan participants

Although the disclosure reform affected all 401(k) plans in the United States equally, we may expect that participant responses to these disclosures are different depending on systematic differences in the characteristics of the participants across plans. This section studies two such possibilities: plans with participants who have large accounts, and plans that belong to firms with collective bargaining (unionized companies).

First, participants with larger accounts have a stronger reason to care about fees, so we may expect their fee-sensitivities to be stronger. While we only observe aggregate plan-fund-level information, but not individual balances, if the average participant in a plan has a large account, we would expect the average fee-sensitivity to be stronger in the plan.

Though we expect participants with larger account balances to care more about fees, this does not necessarily mean that they respond more to the change in disclosure. This is because these participants have a stronger incentive to learn about fees and performance not just from but *before* the new disclosures as well. New disclosures will only benefit these participants if they are not able to acquire sufficient information on these plan features before the reform. In contrast, the new summary disclosures may be very beneficial to people with smaller accounts who lack prior information about the funds. In sum, the prediction of whether we expect plans with large vs. small average accounts to respond more to the disclosure is ambiguous, and thus this is ultimately an empirical question.

In Panel A of Table 4, we study the heterogeneous effects across small vs. large accounts by further interacting *ExpenseRatio*Post* with *Large accounts* in Equation 1. We define

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Large accounts as plan-years that have an above-median average account size ($56,300) before the reform (measured as of 2010).

In column (1), the coefficient on the triple-interaction *ExpenseRatio*Post*Large accounts* is negative and significant. This implies that the disclosure has a stronger effect on flow-fee-sensitivities for larger accounts. In terms of economic magnitudes, the effect is around 50% stronger for large accounts compared to small accounts; specifically, the effect is -0.463 for small accounts vs. -0.463+(-0.202)=-0.665 for large accounts. Column (2) shows that this difference is stronger once we focus on domestic equity funds. These findings suggest that the new summary disclosures provide useful information to even those participants who are perhaps more likely to look for information on these funds before the reform.

[Insert Table 4 about here]

We next examine whether the effect is stronger for plans that cater mostly to 'blue-collar' vs. 'white-collar' participants. However, as is the case with large account sizes, it is not obvious ex-ante whether the disclosure reform is more helpful to white-collar participants, given that they may have a stronger incentive to pay attention to the characteristics of plan options even before the reform.

In Panel B of Table 4, we measure blue-collar dominated professions with an indicator for whether the defined contribution plan is subject to collective bargaining, that is, whether the employees are unionized. The results show that plans in non-unionized companies tend to see stronger effects from the disclosure reform compared to unionized companies. The base effect of fee-sensitivities, which measures the effect of the reform for plans in non-unionized companies (*ExpenseRatio*Post*), is -0.607, and thus stronger than the baseline effect in Table 2. By contrast, the results show that this fee-sensitivity for unionized companies by around a third weaker. However, the difference is statistically significant only at the 10% level. The economic magnitude of this difference becomes stronger once we focus on domestic equity funds.

4.4 Heterogeneity in fee sensitivities: Target vs. non-target funds

Our previous results focus on non-target funds by excluding target-date funds from our data. The reason is that target funds tend to be default options, and flows to target funds are thus

possibly confounded by plan sponsor choices concerning what to designate as the default option. That is, flows to these funds are not exclusively driven by active participant choices.

In this section, we compare whether the disclosure reform has a differential effect on fee-flow sensitivities for target vs. non-target funds. We hypothesize that target funds experience a smaller impact from the disclosure reform. First, as mentioned above, these funds are often a default choice, and thus should be less affected by the new disclosures. Another reason is that if a participant wants to invest in a target-date fund, the choice of the specific fund (e.g., whether it is the Target 2030 or the Target 2040) is less likely to be affected by differences in fees between these funds than by other factors such as the intended retirement horizon and the desired risk level.

Table 5 reports results on differences in fee-sensitivities between the target and non-target funds. We report results for all funds, and include plan-by-style-by-year fixed effects throughout to control for any differences across fund styles. Table 1 shows that target-date funds mainly exist within the "balanced" and "domestic equity" styles.

[Insert Table 5 about here]

Panel A shows that sensitivities of flows to fees are indeed affected significantly less for target-date funds compared to non-target funds. The coefficient on the triple-interaction is positive and significant, which is offsetting the stronger fee-sensitivity for the non-target funds. We also test whether the fee-sensitivity for target funds is different from zero after the disclosure reform, and we cannot reject that fee-sensitivity for target funds is zero.[10] The coefficient on *Post*Target* shows that target funds on average receive more flows after the reform, even though which specific target fund investors choose does not appear to be affected by fees.

The results in Panel A show that target funds see a smaller impact on fee-flow sensitivities than non-target funds. This result is consistent with the argument that participants choose a particular target-date fund not based on its fee, but rather on the expected retirement horizon or the fund's risk profile. Therefore, learning more about fees has a smaller effect on participant choices among these funds.

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[10]It is worth noting that the coefficient on *Expense Ratio*Target* is negative and significant. We nevertheless do not want to put much stock into this coefficient on its own because Plan-by-Fund fixed effects subsume almost all the variation in the fees of a specific investment option, and any coefficient is driven by small within-fund changes in fees over time.

The previous analysis focuses on fee-sensitivities and the choice of a particular target fund. However, it is also interesting to ask whether participants' propensity to choose a target-date option versus a non-target date option changes after the reform. This choice could still depend on whether the target funds, *on average*, are more or less expensive compared to non-target funds.

In Panel B of Table 5, we study whether the allocation between target- and non-target-date funds depends on the average fees of the options in these categories. To do so, we collapse our data from the Plan-Fund-Year level to the Plan-Year level. We then regress the fraction of assets invested in target funds on the difference in average fees between target funds and non-target funds. The idea is that when the target funds are more expensive than the non-target options, we expect investors to allocate more funds to the latter group.

Our regressions control for plan fixed effects and year fixed effects and cluster the standard errors at the plan level. Target funds tend to be slightly cheaper than non-target funds in the same plan. The average difference across these types of funds is 2.5 basis points, but there is still significant variation: the standard deviation of this difference is 22 basis points, and the interquartile range lies between target funds being 20 basis points cheaper and nine basis points more expensive compared to the average non-target option.

Panel B shows that when target funds are more expensive than non-target funds, investors allocate more of their assets towards non-target funds after the reform. A difference in the average fees between the target and non-target options of one standard deviation (22 basis points) predicts a change in the fraction of assets dedicated to target funds of 0.64 percentage-points (0.22*0.029) in the post period. This change in allocation is nevertheless only weakly statistically significant.

4.5 Reallocation to affiliated options and employer stock

In this section, we perform analyses similar to those in Panel B of Table 5 by examining, at the plan level, how the reform affects investment allocations across broad types of assets, depending on the average fees of those assets.

The first broad allocation choice we examine is that between affiliated and non-affiliated options. Affiliated funds are those that are offered by the financial intermediary that administers the plan (Pool, Sialm, and Stefanescu (2016)). These intermediaries often offer investment guidance and other services to plan participants and may have an incentive to promote their own funds. While such promotion efforts may make affiliated funds attractive

to participants prior to the reform, as fee disclosures increase participant awareness and thus level the playing field between affiliated and non-affiliated options, they may prompt participants to reallocate assets towards unaffiliated funds, when those charge lower expense ratios.

While affiliated options, like target funds, are often cheaper—the mean (median) difference between non-affiliated and affiliated options is 10 (11) basis points—many plans have affiliated options that are more expensive. The standard deviation and interquartile range in average fees between affiliated and non-affiliated funds are 33 basis points and 42 basis points, respectively. The average fraction of plan assets in affiliated funds, conditional on having both affiliated and non-affiliated options, is 52%.

To examine whether the fee disclosures do level the playing field for inexpensive non-affiliated funds, we regress the fraction of plan assets invested in affiliated funds vs. non-affiliated funds on the average fee difference between the affiliated and non-affiliated options. Table 6 (Panel A) reports the results.[11]

[Insert Table 6 about here]

Panel A shows that the fraction of plan assets that participants allocate to affiliated funds after the disclosure reform becomes more strongly associated with the average fee difference between affiliated and non-affiliated options. A one-standard-deviation difference in average fees between these funds predicts a reallocation of 33bp*0.049 = 1.6% of assets towards the relatively cheaper type of option, implying that the disclosure reform evens the playing field between affiliated and non-affiliated options.[12]

In Panel B of Table 6, we look at the choice between mutual fund options and employer stock. On average, participants allocate 10% of plan assets towards employer stock. The mean allocation is 15% if we limit the sample to those plans that offer the employer stock as an investment choice on the menu. Investing in employer stock is typically a zero-fee option to participants. This investment, however, is fraught with high idiosyncratic risk and it also limits participants' ability to diversify their labor income.

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[11]The sample is slightly smaller here than in previous tables. In addition to collapsing the data to the plan-year level we require a plan to have both affiliated and non-affiliated funds to be included in the regression.

[12]Similar to our analysis for target funds, Table A.6 in the Appendix presents results on whether sensitivity to fees changes differentially for affiliated and non-affiliated options after the reform. These results show that affiliated funds do not see any stronger sensitivity to fees compared to non-affiliated funds: both sensitivities increase after the reform.

We hypothesize that if a plan's mutual fund options are relatively more expensive, then participants may shift more assets toward employer stock when they acquire better information about these fees through the new disclosures. The results in Panel B of Table 6 show that they indeed do so.

In this table, we regress the fraction of plan assets invested in employer stock on the average fee of a plan's mutual fund options. The average fee (first equal-weighted across funds within a plan and then across plan-years) is 57 basis points with a standard deviation of 20bp. The coefficient of 0.004 in the table thus means that, after the reform, plans with a one-standard-deviation higher average fee experience around a 0.1 percentage-point larger change in assets invested in employer stock. While this magnitude is economically small, it nevertheless shows that investors can be incentivized to put more money into employer stock by being presented with expensive mutual fund options.[13] This reallocation toward company stock appears to be an unintended consequence of the fee disclosure.

4.6 Return-flow sensitivities around the 2012 disclosures

The 2012 disclosures not only provide plan participants with a new way of comparing fees across plans but also offer participants comparative information about past performance. Specifically, the new disclosure format requires plan fiduciaries to tabulate one-, five-, and ten-year returns for all fund options whenever those return horizons are available.[14]

To the extent that plan investors chase performance, we may expect return-flow sensitivities to increase around the disclosure reform. On the other hand, while chasing low fees produces lower fees, chasing high past performance does not produce higher future returns with certainty due to relatively low performance persistence in the mutual fund industry (Carhart (1997)). Therefore, it is not clear whether investors will react at all to the performance information, or indeed, whether investors *should* even do anything with the new performance information that they acquire through these disclosures. Additionally, it is also likely that participants do not pay attention to the same performance horizon uniformly, which may obscure the true sensitivity of their investment allocations to fund performance.

In Table 7, we examine whether fund flows become more sensitive to returns after the disclosure reform. In these regressions, we add one-, five-, and ten-year returns (measured

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[13]Indeed, the average mutual fund fee is higher for plans that offer investments in employer stock (59bp) when compared to plans that do not offer such an option (54bp).

[14]The average mutual fund offered as part of defined contribution plans is quite old, so over 90% of the options in our sample have return information that includes the ten-year horizon.

up until the start of the plan's fiscal year) and their interactions with our *Post* indicator to our baseline model in Equation 1. The expense ratio and the expense ratio interacted with *Post* control for spurious estimates that could arise from a possible correlation between fees and past performance. As in Table 2, we further control for Plan-by-Fund fixed effects, size controls by year, Plan-by-Year or Plan-Style-Year fixed effects, and Fund Company-Year fixed effects.

[Insert Table 7 about here]

The results in the table show that sensitivity to one-year returns becomes stronger after the reform. However, for the five- and ten-year returns, the results suggest that investors do not engage in increased 'return-chasing' because of the new disclosures. Therefore, evidence on whether sensitivity to performance changes around the reform is mixed.[15]

To summarize, while we find that investors react strongly to differences in expenses after the changes in disclosure requirements, we find weaker evidence that investors react to differences in past returns.

4.7   Robustness: Deleted funds and default options

Our interpretation of the previous results is that participants respond to the new disclosures by allocating more flows to cheaper funds, and to some extent also to funds with higher one-year performance.

An alternative hypothesis for these findings is that plan sponsor or providers are nudging participants to allocate flows to cheaper funds by changing the menu. One such possibility is that the sponsor may change the default option around the reform. Several arguments speak against this hypothesis. First, it is unlikely that the majority of sponsors change default options at the same time, and precisely in 2012.[16] Second, as shown in Table 2, we observe strong evidence of more negative flows for expensive funds—a result that cannot be explained by sponsors merely changing where new money goes.

Nonetheless, we now further investigate the possibility that sponsors change the default options around the reform. When the default is deleted, assets from this fund will then be

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[15]In Table A.3 in the appendix we repeat this analysis with the flow normalized by lagged option size as the dependent variable—the results are very similar.

[16]This regulatory reform has been in the works for many years before plan participants received their first disclosures, giving plan sponsor several years to make changes to plans in the light of the pending reforms.

moved to the new default option, unless participants actively allocate their investments to a different fund. Such re-allocation could influence our results if 1) the money is reinvested in a cheaper option, and 2) the trend towards using cheaper replacement options increases precisely in 2012.

[Insert Figure 2 about here]

To examine whether default reinvestments could drive our results, we re-estimate our analyses by excluding all plan-years where any option was dropped. Figure 2 shows that fund deletions are relatively common—around 60% of plan-years see at least one option being dropped, and on average around 10–15% of options are replaced in any given year.

In an alternative, and slightly less conservative approach, we exclude any funds where at least one option within that fund-style was dropped from the plan. We do so because when a fund is dropped, the default replacement is generally within the same style. Because the probability of deleting at least one option is higher when there are more options in a plan, the number of plan-fund-year observations drops by more than 60%.

Table 8 reports the results. We find that the estimates are remarkably similar in economic magnitude even in this significantly limited sample. These findings suggest that our baseline results are not an artifact of plan sponsors changing their behavior around the reform.

[Insert Table 8 about here]

Finally, another possibility is that plan sponsors more aggressively remove particularly expensive options in 2012, which would result in participants having no choice but to direct money towards cheaper funds. This story cannot drive our baseline results, which employ Plan-by-Fund fixed effects and thus control for the composition of funds in a plan. Further, as Figure 2 shows, deletions were not particularly common right around 2012 compared to other years.

However, the question is interesting on its own as it asks whether the reform may also affect sponsor incentives. To test this, Table A.4 in the Appendix regresses an indicator for an option being deleted on the fee of the option interacted with *Post*, as well as several plan- and fund-level control variables. We find that the coefficient on the expense ratio itself is positive, which means that on average more expensive funds are more likely to be deleted, but the sensitivity of deletions to fees does not become *stronger* after the disclosure reform.

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5   Fund-level evidence of the effects on flows

In the previous sections, we study the effects of the new disclosures on the allocation of flows across the set of options within each plan. Efficient allocation of flows is important for individual participants, and our evidence suggests that the disclosures have a significant effect on fee-sensitivities within these defined contribution plans.

In this section, we bring the analysis to a more aggregate level and ask if the reform also has an effect on fee-sensitivities for total mutual fund flows.

Table 9 reports our analysis, which is based on fund-year level data from the CRSP mutual fund database for the 2010–2013 period. Our test is a triple-difference test where we examine how funds' fee-sensitivities change from the pre- to the post-reform period, interacted with each fund's measure of *exposure* to the disclosure reform. We use two different measures of exposure: 1) the natural logarithm of the number of 401(k) plans in our sample that include the fund plus one, and 2) the fraction of fund net assets that can be attributed to these 401(k) plans.

[Insert Table 9 about here]

Summary statistics in Panel A of Table 9 show that only about a quarter of all funds are included in any plan, and conditional on being included, the number of plans that a fund belongs to is two (in our sample that tilts towards the very largest plans). Moreover, for those funds, the fraction of a fund's total net asset value that is made up of 401(k) assets from these plans is 11%.

Of course, it is important to emphasize that these numbers are only a proxy for the total exposure to DC flows, because by construction our data only contains a subsample of all DC funds. However, we have no reason to believe that our measure is biased in the cross-section; in other words, we believe that funds that are more exposed to the plans in our sample also are likely to have at least as much exposure as other funds to DC plans that are not captured in our sample.

Panel B reports results on fee-sensitivities. We regress fund-year level flows on expense ratios, with interactions with *Post* and *DC Intensity*. The primary variable of interest is the triple-interaction *Expense ratio*Post*DC exposure*. This variable captures whether funds with more exposure to DC plans experience stronger increases in fee-sensitivities after the reform than other funds. In all regressions, we include separate size controls by year (size is

measured as the log of fund net asset value), fund fixed effects, fund style-by-year fixed effects, as well as index fund by year, and target-date fund by year fixed effects. *DC exposure* is measured as of the year immediately before the reform, and held constant during our sample period; the non-interacted variable of exposure is thus subsumed by the fund fixed effects.

The results in Panel B show that DC exposure predicts a stronger change in fee-sensitivity of fund flows after the DC disclosure reform. This result shows that the disclosure reform has a measurable effect at the fund-level as well. These findings hold both when measuring DC exposure based on the number of plans, or when measured as a fraction of fund assets. While this evidence is directionally consistent with our hypothesis, we caution about interpreting the exact economic magnitude of these estimates as the measures of exposures are a *lower bound* of the actual amounts of DC exposure.

In Panel C, we show results using a similar methodology for return-sensitivities of flows. As in our earlier plan-fund level results, the coefficient estimates are quite mixed. We find some evidence of stronger five-year sensitivities when we measure exposure using the number of plans, but none of the return-sensitivity results are consistent across both measures of DC exposure. Thus the increase in the one-year sensitivities we document in the previous section is not robust to our fund-level analyses.

In addition to showing that these disclosures affect the aggregate mutual fund market, the fact that these tests compare funds based on their level of 401(k) exposure also helps address a possible alternative hypothesis to our main results whereby fee-sensitivities may have increased for all funds in 2012.

6   Conclusion

Participants in DC pension plans have been shown to be inert and to rarely change their investment allocations (Madrian and Shea (2001), Agnew et al. (2003), or Sialm, Starks, and Zhang (2015)). Our paper argues that this inertia can be mitigated by providing relevant fee and investment performance information to plan participants.

Using a hand-collected dataset on investment menus for a large sample of 401(k) plans, we study a 2012 regulatory reform that provides plan participants data on the expense ratios and the prior performance of the investment options in their DC pension plans. We find that participants become significantly more attentive to expense ratios and short-term prior performance after the reform. Our results show that such disclosures can facilitate portfolio allocations by plan participants by bringing relevant decision criteria within sight.

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Figure 1 **Fee-sensitivity of flows**
This figure plots flows to low-fee (dark blue bars) vs. high-fee (light blue bars) funds by year around the disclosure reform. Flows to low-fee funds are calculated as the sum of all flows to below-median (within a plan, year, and style) funds, divided by the lagged sum of holdings in those funds. Flows to high-fee funds is similarly defined as flows to funds that have a fee that is above-median. Quantile flows are winsorized at the 1% level before averaging across all plans in a year. We limit the sample to plan-years that have between 3 and 100 options and exclude target funds and funds that were added or deleted during the year. Panel A shows results for all funds, and Panel B for domestic equity funds only.

A. All funds
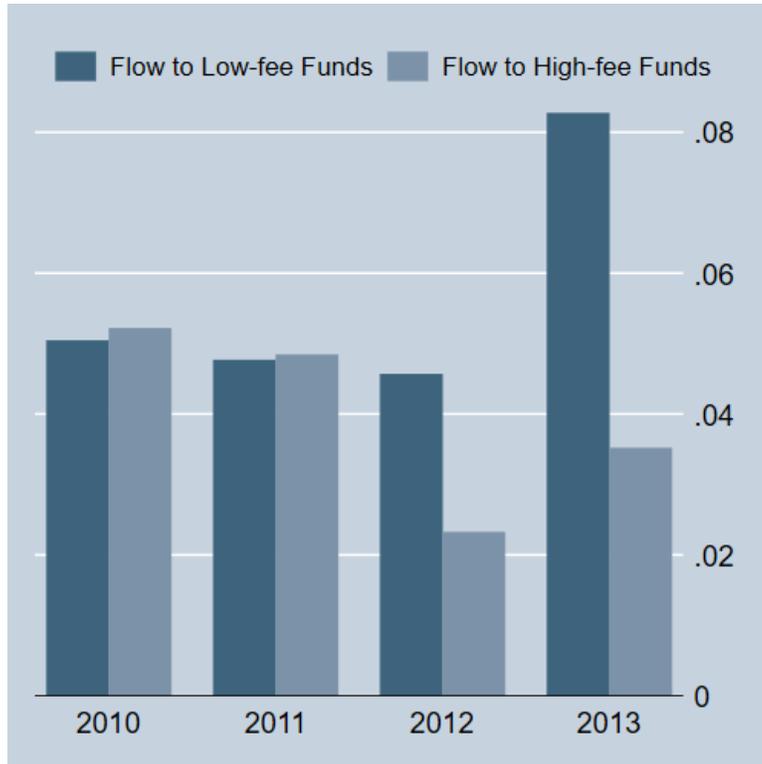
B. Domestic equity only
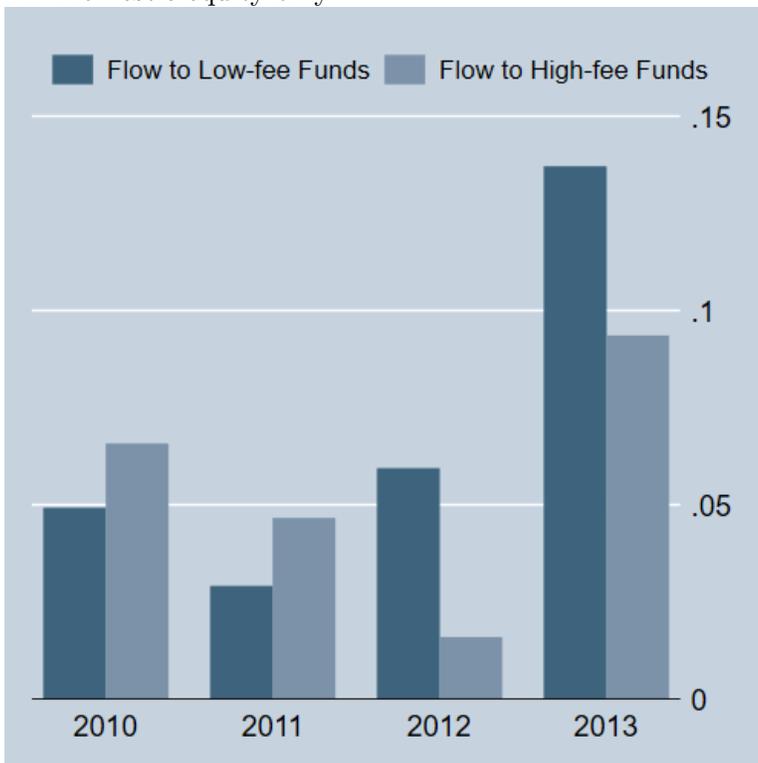
Figure 2 **Reshuffling of plan options**
This figure plots the fraction of plans that have any additions or deletions to the options within the plan (top panel), as well as the number of additions and deletions scaled by the lagged number of available options (bottom panel). We limit the sample to plan-years that have between 3 and 100 options.
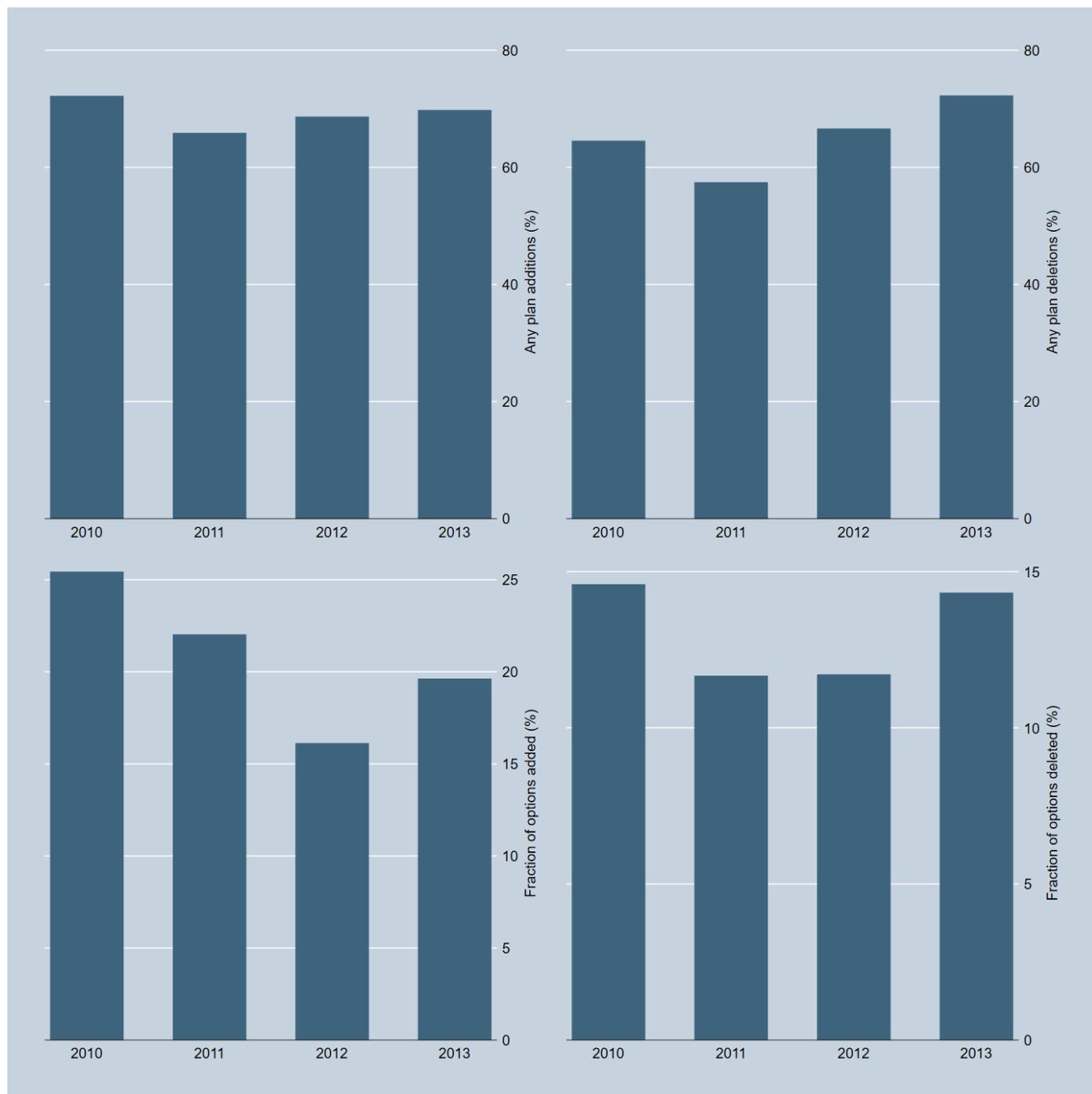
Table 1 **Descriptive statistics**
This table reports sample summary statistics for variables used in this paper. The sample period is 2010-2013, and we only include continuing funds (*i.e.*, newly added or deleted options are deleted), and for plan-years that have between 3 and 100 options. In Panel A, the observations are at the option-plan-year level, and we further limit the sample to non-target date funds. *Flow (to lag sum of options)* is the annual dollar flow to an option in a plan divided by the lagged sum of all the identified mutual fund options in a plan; *Flow (to lag option size)* is the dollar flow to an option divided by the average of the starting and ending total option value. *Option value* is the dollar value of each option in a fund, *Option plan share* is the "market share" of an option within a plan. *Expense ratio* is measured as the expense ratio of the specific fund share class in the plan, or as the minimum fee of the fund if the share class information is not available. Returns are annualized returns. In Panel B, the observations are the plan-year level. *#Options in plan* is the number of options available in a plan. *Fee dispersion* is the difference in expense ratio between the 10th and 90th percentile option in a plan-year. Panel C describes the distribution of the number of options available within various fund styles. We group our sample into the following fund styles: balanced funds (B), domestic equity funds (ED), foreign equity funds (EF), domestic fixed income (FID), foreign fixed income (FIF), and other (O), by mapping Lipper fund styles into these broader categories.

A. Summary statistics (option-plan-year level variables, continued non-target funds)

	mean	sd	p1	p25	p50	p75	p99	N
Flow (to lag sum of options) (%)	0.117	1.708	-4.459	-0.355	0.023	0.430	7.89	60,957
Flow (to lag option size) (%)	6.624	26.682	-41.692	-7.078	1.086	13.197	90.44	60,957
Negative flow (indicator)	0.463	0.499	0	0	0	1	1	60,957
Option value ($1,000)	25,821	75,439	2	1,037	6,050	23,737	299,173	64,995
Option plan share (%)	0.040	0.039	0.000	0.011	0.029	0.057	0.170	64,559
Expense ratio (%)	0.60	0.36	0.04	0.32	0.62	0.85	1.39	64,483
Return 1-year	0.14	0.15	-0.16	0.04	0.14	0.23	0.57	64,881
Return 5-year	0.03	0.03	-0.05	0.01	0.03	0.05	0.12	63,438
Return 10-year	0.06	0.04	-0.02	0.04	0.06	0.08	0.16	59,543

B. Summary statistics (plan-year level variables)

	mean	Sd	p1	p25	p50	p75	p99	N
# Options in plan (incl. newly added)	20.57	10.07	4	14	20	25	62	5,577
# Options in plan (continued funds)	17.63	9.17	1	11	18	23	46	5,577
# Options in plan, (continued non-target)	13.82	8.52	2	10	12	16	54	5,577
# Options in plan, (continued target)	6.74	5.05	0	0	8	12	13	5,577
Collective bargaining plan (indicator)	0.16	0.36	0	0	0	0	1	5,577
Fee dispersion within plan (%)	0.776	0.243	0.090	0.640	0.800	0.940	1.290	5,566
# Plan participants	11,682	34,971	122	1,129	3,915	10,646	131,691	5,073
Assets per participant ($m)	0.073	0.059	0.002	0.033	0.059	0.098	0.285	5,073

Table 1, cont.

C. Option choice sets

	Option-Plan-Year level				Plan-year level				
	Total options	Non-Target options	Target options	Avg. exp. ratio (%)	% of plan-years with at least one option	#options if>=1	p10	p50	p90
Balanced	18,525	3,596	14,929	0.545	77%	4.32	1	4	11
Domestic Equity	50,461	36,737	13,724	0.583	98%	9.38	4	8	15
Domestic Fixed Income	17,187	13,584	3,603	0.390	94%	2.16	1	3	6
Foreign Equity	10,653	10,653	0	0.703	92%	3.35	1	2	3
Foreign Fixed Income	530	530	0	0.743	8%	1.28	1	1	2
Other	973	973	0	0.804	13%	1.55	1	1	2

Table 2 **Fee-flow sensitivities and the disclosure reform**

This table reports results on the change in fee-flow sensitivities following the 2012 disclosure reform. The observations are at the option-plan-year level. The sample includes only continuing funds, *i.e.* we exclude options that were newly added and options that were deleted in a year, and thus for which the flow measures are not driven by participant choices. Panel A describes results for all fund styles, and Panel B for domestic equity funds only. The sample period is 2010-2013, two years before and after the reform. *Expense ratio* is the expense ratio of the fund option, which is adjusted by subtracting by the average fee of all options within the same fund-style in the plan. *Post* are plan years 2012 and 2013; or more specifically, any plan fiscal year that ends after December 1, 2012. The size control is measured as the lagged option "market share" within the plan (option size/plan size). Plan*Fund fixed effects, Plan*Year fixed effects, Plan*Fundstyle*Year fixed effects, and Fund Management Company*Year fixed effects are included where indicated. *t*-statistics based on standard errors that are robust to heteroskedasticity and two-way clustered by fund management company and plan are reported in parentheses below the coefficient estimates. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

A: All Fund Styles

	Flow (to sum of lagged options)		Flow (to lagged option size)		I[Negative flow]	
	(1)	(2)	(3)	(4)	(5)	(6)
Expense ratio * Post	-0.561***	-0.559***	-6.046***	-6.573***	0.196***	0.230***
	(-10.14)	(-5.86)	(-5.32)	(-4.73)	(8.31)	(9.33)
Expense ratio	0.186	0.204	2.518	5.663**	-0.097*	-0.183***
	(1.47)	(1.64)	(1.05)	(2.42)	(-1.71)	(-3.20)
Plan*Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Size*Year controls	Yes	Yes	Yes	Yes	Yes	Yes
Plan*Style*Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Fund Company*Year FE	No	Yes	No	Yes	No	Yes
R^2	0.812	0.821	0.745	0.758	0.688	0.702
N	47,829	47,623	47,829	47,623	47,829	47,623

B: Domestic equity only

	Flow (to sum of lagged options)		Flow (to lagged option size)		I[Negative flow]	
	(1)	(2)	(3)	(4)	(5)	(6)
Expense ratio * Post	-0.672***	-0.586***	-8.640***	-7.309***	0.242***	0.229***
	(-11.64)	(-6.40)	(-9.37)	(-5.40)	(10.79)	(7.94)
Expense ratio	0.128	0.179	3.679	8.531***	-0.123*	-0.204***
	(0.62)	(0.92)	(1.11)	(2.69)	(-1.67)	(-2.72)
Plan*Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Size*Year controls	Yes	Yes	Yes	Yes	Yes	Yes
Plan*Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Fund Company*Year FE	No	Yes	No	Yes	No	Yes
R^2	0.805	0.815	0.738	0.753	0.673	0.690
N	29,677	29,528	29,677	29,528	29,677	29,528

Table 3 **Placebo periods**

This table replicates the tests in Table 2 but measured over all consecutive four-year periods between 2000 and 2013. *t*-statistics based on standard errors that are robust to heteroskedasticity and two-way clustered by fund management company and plan are reported in parentheses below the coefficient estimates. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

A. All funds

Period:	2000-2003	2001-2004	2002-2005	2003-2006	2004-2007	2005-2008	2006-2009	2007-2010	2008-2011
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Expense ratio * Post	0.022	-0.441**	-0.163	0.011	0.124	-0.128	-0.130	0.144	0.030
	(0.11)	(-2.02)	(-1.03)	(0.09)	(1.15)	(-1.10)	(-1.34)	(1.08)	(0.29)
Expense ratio	0.094	0.502	0.472	0.354	0.383	0.552*	0.482**	0.114	-0.073
	(0.26)	(1.06)	(1.06)	(1.22)	(1.19)	(1.73)	(2.11)	(0.45)	(-0.38)
Plan*Fund FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size*Year controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Plan*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund Company *Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.838	0.840	0.830	0.822	0.824	0.814	0.784	0.791	0.803
N	12,965	18,158	22,445	25,719	26,821	27,396	27,756	28,150	37,233

B. Domestic equity funds only

Period:	2000-2003	2001-2004	2002-2005	2003-2006	2004-2007	2005-2008	2006-2009	2007-2010	2008-2011
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Expense ratio * Post	0.062	-0.400	-0.218	-0.034	0.092	-0.108	-0.046	0.223	0.186
	(0.23)	(-1.42)	(-1.22)	(-0.29)	(0.82)	(-0.82)	(-0.30)	(1.12)	(1.45)
Expense ratio	-0.492	0.237	0.508	0.299	0.591	0.441	-0.013	-0.324	-0.385
	(-1.29)	(0.34)	(0.80)	(0.78)	(1.50)	(1.24)	(-0.03)	(-0.83)	(-1.40)
Plan*Fund FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size*Year controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Plan*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund Company *Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.833	0.843	0.835	0.832	0.835	0.825	0.788	0.796	0.803
N	8,730	12,347	15,389	17,687	18,604	19,079	19,334	19,582	24,885

Table 4 **Who reacts to fees?**

This table reports results on how the changes to fee-flow sensitivities around the disclosure reform differed across companies with different participant characteristics. In Panel A, we focus on the differences between companies with above vs. below-median account size (measured as a plan that has above median plan assets divided by plan participants as of 2010). In Panel B, we focus on the differences between companies with unionized vs non-unionized employees. t-statistics based on standard errors that are robust to heteroskedasticity and two-way clustered by fund management company and plan are reported in parentheses below the coefficient estimates. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

A. Large accounts and fee-flow sensitives

	All fund styles	Domestic equity
	(1)	(2)
Expense ratio (plan-style adj.)	0.315*	0.209
	(1.80)	(0.98)
Expense ratio * Post	-0.463***	-0.471***
	(-3.68)	(-3.62)
Expense ratio * Large accounts	-0.278	-0.109
	(-1.28)	(-0.47)
*Expense ratio * Post * Large accounts*	-0.202**	-0.264**
	(-2.26)	(-2.38)
Plan*Fund FE	Yes	Yes
Size*Year controls	Yes	Yes
Plan*Year FE	No	Yes
Plan*Style*Year FE	Yes	No
Fund Company*Year FE	Yes	Yes
R^2	0.821	0.815
N	46,934	29,118

B. Unionized companies and fee-flow sensitives

	All fund styles	Domestic equity
	(1)	(2)
Expense ratio (plan-style adj.)	0.251**	0.245
	(2.01)	(1.30)
Expense ratio * Post	-0.607***	-0.637***
	(-6.23)	(-6.44)
Expense ratio * Unionized company	-0.108	-0.225
	(-0.46)	(-0.72)
*Expense ratio * Post * Unionized company*	*0.239**	*0.273**
	(1.82)	*(1.66)*
Plan*Fund FE	Yes	Yes
Size*Year controls	Yes	Yes
Plan*Year FE	No	Yes
Plan*Style*Year FE	Yes	No
Fund Company*Year FE	Yes	Yes
R^2	0.821	0.815
N	47,623	29,528

Table 5 **Target vs. non-target funds**
This table reports results on how the changes to fee-flow sensitivities around the disclosure reform differed between target vs. non-target funds (Panel A; the observations are at the plan-fund-year level). Target funds tend to be default options and the choice of which target fund to pick tends to happen due to reasons other than fees, and we thus expect participants to respond less to their fees as compared to non-target funds. Panel B reports plan-year level results on flows into target funds depending on the average fee difference between target and non-target funds; the explanatory variable is the difference in average fees between target and non-target options. t-statistics are reported in parentheses below the coefficient estimates. The standard errors are robust to heteroskedasticity and two-way clustered by fund management company and plan in Panel A, and clustered by plan in Panel B. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

A. Fee-flow sensitivities and target vs. non-target funds

	(1)	(2)
Expense ratio (plan-style adj.)	0.197*	0.190*
	(1.83)	(1.82)
Expense ratio * Post	-0.554***	-0.447***
	(-11.40)	(-5.94)
Expense ratio * Target fund	-0.666**	-0.641**
	(-2.58)	(-2.54)
Post * Target fund	0.294***	0.259***
	(6.01)	(4.13)
*Expense ratio * Post * Target fund*	*1.140**	1.024**
	(2.32)	*(2.26)*
Plan*Fund FE	Yes	Yes
Size*Year controls	Yes	Yes
Plan*Style*Year FE	Yes	Yes
Fund Company*Year FE	No	Yes
R^2	0.816	0.783
N	76,019	75,814

B. Plan-level reallocation between target and non-target funds
Dependent variable: Percent of fund assets in target funds

	(1)
Expense ratio [Target – Non-target funds] * Post	-0.029*
	(-1.84)
Expense ratio [Target – Non-target funds]	-0.003
	(-0.09)
Plan FE	Yes
Year FE	Yes
R^2	0.873
N	3,680

Table 6 **Plan-level reallocation: Affiliated vs non-affiliated funds; Employer stock vs mutual funds**
This table reports results on how investments in affiliated funds was affected by the fee disclosure, depending on the fee difference of affiliated vs. non-affiliated funds (Panel A); and how investments in employer stock was affected by the fee disclosure, depending on the fees of mutual fund options (Panel B). The dependent variable is the percent of assets that are invested in affiliated funds (as a fraction of assets invested in all funds), or the percent of assets in employer stock (as fraction of total plan assets). The explanatory variable in Panel A is the difference in average fees between affiliated options and the average fee of non-affiliated options, and in Panel B it is the average fee of mutual fund options. t-statistics based on standard errors that are robust to heteroskedasticity and clustered by plan are reported in parentheses below the coefficient estimates. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

A. Plan-level reallocation between affiliated and non-affiliated funds
  Dependent variable: Percent of fund assets in affiliated funds

Expense ratio [Aff – Non-aff funds] * Post	-0.049***
	(-4.57)
Expense ratio [Aff – Non-aff funds]	-0.065*
	(-1.87)
Plan FE	Yes
Year FE	Yes
R^2	0.937
N	2,806

B. Plan-level reallocation between mutual fund options and employer stock
  Dependent variable: Percent of fund assets in employer stock

Expense ratio (plan average) * Post	0.004*
	(1.65)
Expense ratio	-0.005*
	(-1.70)
Plan FE	Yes
Year FE	Yes
R^2	0.976
N	3,616

Table 7 **Return-flow sensitivities and the disclosure reform**
This table reports results on the change in return-flow sensitivities following the 2012 disclosure reform. *Return* is the return of the fund, measured over 1, 5, and 10 years. We measure these returns as of the start of the plan's fiscal year; e.g., the 1-year returns for a fund-year that starts in January 2012 is the annualized return between January 2011 and December 2011. All other measures and controls are the same as in Table 2. t-statistics based on standard errors that are robust to heteroskedasticity and two-way clustered by fund management company and plan are reported in parentheses below the coefficient estimates. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

	All funds		Domestic equity only	
	(1)	(2)	(3)	(4)
Return 1-year * Post	1.465***	2.008***	1.836***	0.860**
	(3.30)	(4.23)	(4.16)	(2.41)
Return 5-year * Post	1.436	2.659***	-0.852	0.892
	(1.18)	(2.87)	(-0.68)	(1.17)
Return 10-year * Post	0.074	-1.043	-1.228	-1.500*
	(0.07)	(-0.81)	(-1.12)	(-1.82)
Expense ratio * Post	-0.459***	-0.512***	-0.446***	-0.235***
	(-8.90)	(-5.34)	(-7.90)	(-4.26)
Return 1-year	0.445***	0.442***	0.587***	0.458***
	(3.35)	(3.52)	(2.82)	(3.18)
Return 5-year	1.455	-0.281	4.263**	0.595
	(0.90)	(-0.18)	(2.45)	(0.54)
Return 10-year	3.934***	3.720***	3.811***	1.825***
	(4.27)	(4.10)	(4.44)	(3.22)
Expense ratio	0.047	0.156	-0.027	0.127
	(0.39)	(1.19)	(-0.14)	(1.04)
Plan*Fund FE	Yes	Yes	Yes	Yes
Size*Year controls	Yes	Yes	Yes	Yes
Plan*Year FE	No	No	Yes	Yes
Plan*Style*Year FE	Yes	Yes	No	No
Fund Company*Year FE	No	Yes	No	Yes
R^2	0.818	0.826	0.812	0.802
N	43,486	43,343	27,499	27,390

Table 8 **Robustness: Excluding plans that had any deleted options**

This table replicates Table 2 but excludes any plan-years that saw any funds being deleted during the year. The observations are at the plan-fund-year level. In columns (1)-(2), we delete all observations where there are deletions of any kind in the plan-year. In columns (3)-(4), we only delete observations where a deletion took place in the same fund style (defined as in Table 1) as the observation.

A. All funds

	No deleted funds in plan		No deleted funds within style	
	(1)	(2)	(3)	(4)
Expense ratio * Post	-0.595***	-0.699***	-0.407***	-0.548***
	(-6.61)	(-4.20)	(-6.12)	(-3.89)
Expense ratio	0.167	0.125	0.017	0.110
	(0.50)	(0.46)	(0.10)	(0.62)
Plan*Fund FE	Yes	Yes	Yes	Yes
Size*Year controls	Yes	Yes	Yes	Yes
Plan*Style*Year FE	Yes	Yes	Yes	Yes
Fund Company*Year FE	No	Yes	No	Yes
R^2	0.859	0.872	0.842	0.853
N	11,236	11,058	25,646	25,423

B. Domestic equity only

	No deleted funds in plan		No deleted funds within style	
	(1)	(2)	(3)	(4)
Expense ratio * Post	-0.607***	-0.695***	-0.530***	-0.601***
	(-7.23)	(-6.13)	(-7.63)	(-4.96)
Expense ratio	0.427	0.286	0.155	0.168
	(1.12)	(0.94)	(0.56)	(0.63)
Plan*Fund FE	Yes	Yes	Yes	Yes
Size*Year controls	Yes	Yes	Yes	Yes
Plan*Year FE	Yes	Yes	Yes	Yes
Fund Company*Year FE	No	Yes	No	Yes
R^2	0.863	0.878	0.850	0.862
N	7,186	7,045	12,410	12,253

Table 9 **Fund-level effects of the reform**

This table reports fund-level results on whether the disclosure reform had effects that could be traced to the aggregate fund level. The data are at the fund-year level (we aggregate across all share classes within a fund), and the sample period is 2010-2013, of which the reform years are 2012 and 2013. Panel A reports summary statistics for these fund-year level variables. In Panels B and C respectively, we study whether the flow-sensitivities to fees and returns see differential changes around the reform between funds that are more exposed to flows from defined contribution plans, compared to funds that are less exposed to defined contribution plans. Flows are measured using the average monthly flows over the year. Expense ratio is measured as the minimum expense ratio across a fund's share classes. *Number of plans with fund* is the number of defined contribution plans in our sample that use the fund as of 2011, and the *Percent of fund assets in plan* is the fraction of a fund's TNA that can be attributed to options in these DC plans; these are two measures of exposure to defined contribution flows. t-statistics based on standard errors that are robust to heteroskedasticity and two-way clustered by fund and plan are reported in parentheses below the coefficient estimates. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

A. Summary statistics

	mean	sd	p1	p25	p50	p75	p99	N
Flow, monthly average (%)	1.791	8.014	-7.289	-1.137	-0.070	1.768	54.305	39,768
Expense ratio (%)	0.853	0.449	0.090	0.540	0.820	1.100	2.250	31,174
Return, 1-year (%)	0.119	0.160	-0.257	0.011	0.110	0.193	0.642	38,747
Return, 5-year (%)	0.022	0.039	-0.097	0.004	0.024	0.043	0.117	22,721
Return, 10-year (%)	0.046	0.037	-0.049	0.022	0.044	0.064	0.154	16,414
Log(Total Net Assets)	5.205	2.016	0.588	3.818	5.284	6.601	9.736	40,955
Fund is option in any plan	0.24	0.43	0	0	0	0	1	42,479
Percent of fund assets in plans (%)	2.3	10.7	0	0	0	0	64.0	42,479
Number of plans with fund	2.58	16.90	0	0	0	0	55	42,479
Percent of fund assets in plans | >0 (%)	9.581	19.855	0.000	0.210	1.759	8.840	100.000	10,174
Number of plans with fund | >0	10.76	33.23	1	1	2	6	165	10,174

B. Fund-level evidence of fee-sensitivities around the reform

Dependent variable: Fund flow	Measure of DC exposure:	
	Log(number of plans with fund+1)	Percent of fund assets in plans
	(1)	(2)
Expense ratio (lagged, style adj.)	0.6362	0.6619
	(1.24)	(1.30)
Expense ratio * Post	-0.4380*	-0.6055***
	(-1.81)	(-2.63)
Expense ratio * DC exposure	-0.2729	-2.7090
	(-0.39)	(-0.59)
Post * DC exposure	-0.1964**	-1.0675
	(-2.36)	(-1.20)
*Expense ratio * Post * DC exposure*	*-0.5705****	*-3.3401***
	(-3.65)	*(-2.04)*
Log fund value * Year controls	Yes	Yes
Fund FE	Yes	Yes
Fundstyle * Year FE	Yes	Yes
Indexfund * Year FE	Yes	Yes
Targetfund * Year FE	Yes	Yes
R^2	0.510	0.510
N	28,201	28,201

Table 9, cont.

C. Fund-level evidence of fee- and return-sensitivities around the reform

	Measure of DC exposure:	
	Log(number of plans with fund+1)	Percent of fund assets in plans
	(1)	(2)
Expense ratio (lagged, style adj.)	0.3971	0.3590
	(0.54)	(0.48)
Return (1-year, style adj., lagged)	1.5301	1.6961*
	(1.36)	(1.93)
Return (5-year, style adj., lagged)	15.6074***	15.1056***
	(2.61)	(3.13)
Return (10-year, style adj., lagged)	8.3319*	12.6741***
	(1.83)	(3.38)
Post * DC exposure	-0.2696***	-2.1975*
	(-2.81)	(-1.73)
Expense ratio * Post	-0.3242	-0.5575**
	(-1.17)	(-2.15)
Return 1-year * Post	3.4616	4.1137**
	(1.48)	(2.22)
Return 5-year * Post	-2.5548	0.6625
	(-0.49)	(0.15)
Return 10-year * Post	14.5681***	14.3993***
	(2.80)	(3.56)
Expense ratio * DC exposure	0.0551	3.0250
	(0.06)	(0.48)
Return 1-year * DC exposure	0.2960	3.9950
	(0.35)	(0.41)
Return 5-year * DC exposure	1.4080	76.5986
	(0.40)	(1.11)
Return 10-year * DC exposure	2.7893	-56.5130*
	(1.02)	(-1.72)
*Expense ratio*Post*DC exposure*	*-0.6096***	*-5.8764**
	(-2.92)	*(-2.21)*
*Return 1-year*Post*DC exposure*	*-0.1441*	*-49.2055*
	(-0.10)	*(-1.67)*
*Return 5-year*Post*DC exposure*	*7.0984**	*47.4008*
	(2.30)	*(1.11)*
*Return 10-year*Post*DC exposure*	*1.8906*	*13.5998*
	(0.62)	*(0.36)*
Log fund value * Year controls	Yes	Yes
Fund FE	Yes	Yes
Fundstyle * Year FE	Yes	Yes
Indexfund * Year FE	Yes	Yes
Targetfund * Year FE	Yes	Yes
R^2	0.425	0.425
N	15,081	15,081

APPENDIX

Figure A.1 **Fee-sensitivity of flows over a longer sample period**

This figure replicates Figure 1 over a longer sample period corresponding to the placebo period tests in Table 3. Because of a data collection method change, the sample of covered plans is slightly different in the pre- and post-2009 period. Before 2009, the data corresponds to the sample in Pool et al (2016), and starting in 2009, the sample is further complemented with the 1,000 largest plans to the extent those plans were not already in the sample.

A. All funds

B. Domestic equity only

41
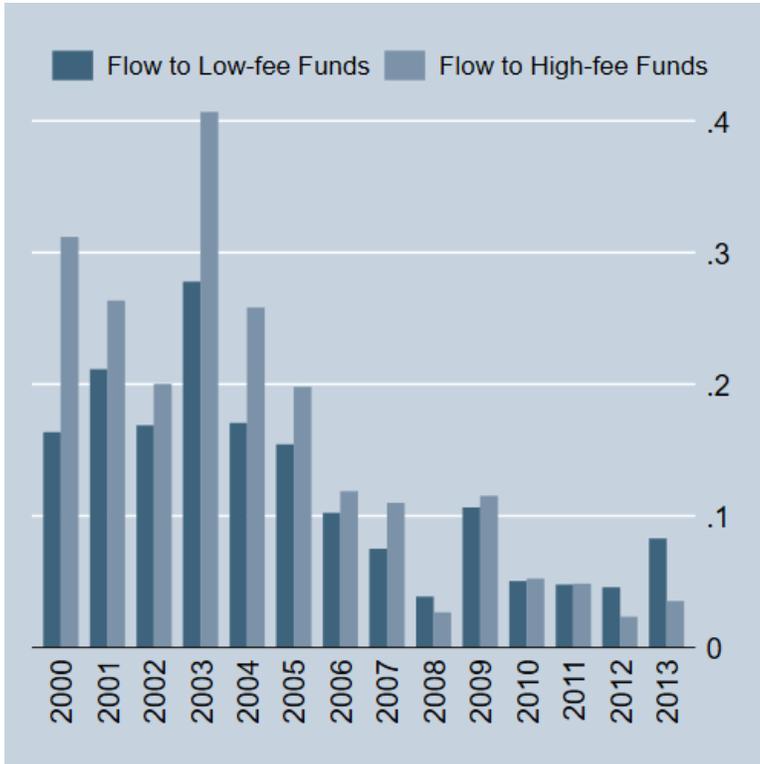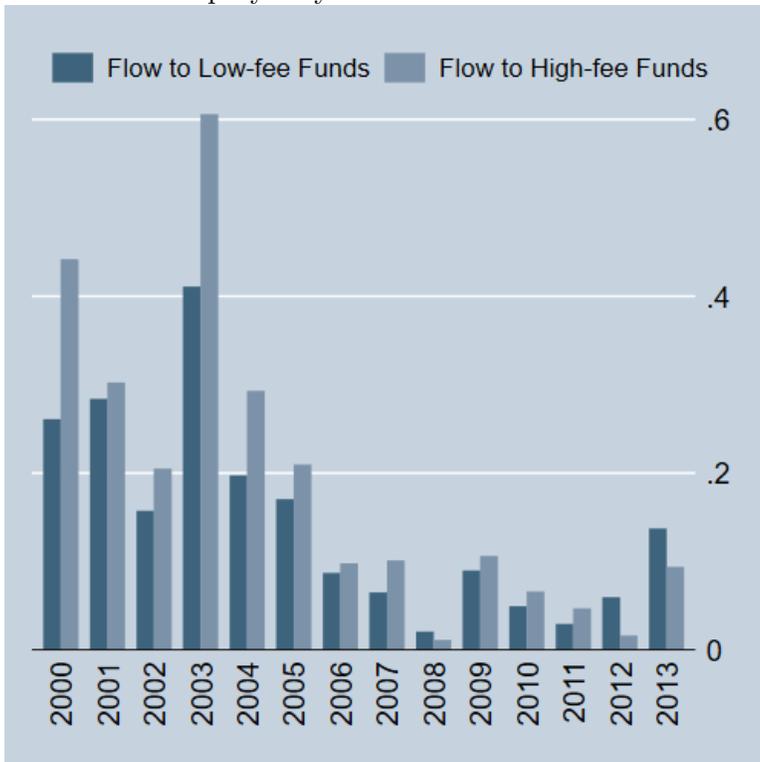
Table A.1 **Summary statistics for target funds**

This table describes summary statistics similar to Panel A of Table 1, but for continued target date options, which were not included in Table 1.

	mean	sd	p1	p25	p50	p75	p99	N
Flow (to lag sum of options) (%)	0.42	1.38	-2.54	0.01	0.20	0.55	7.89	30,731
Flow (to lag option size) (%)	21.07	31.87	-41.69	1.53	15.58	36.14	94.36	30,731
Negative flow (indicator)	0.226	0.418	0	0	0	1	1	30,731
Option value ($1,000)	11,713	30,885	2	633	2,852	9,931	142,161	32,256
Option plan share (%)	0.02	0.02	0.00	0.00	0.01	0.02	0.11	32,097
Expense ratio (%)	0.49	0.27	0.16	0.18	0.57	0.73	1.07	31,405
Return 1-year	0.13	0.11	-0.05	0.05	0.14	0.17	0.39	31,596
Return 5-year	0.02	0.01	-0.01	0.01	0.02	0.03	0.05	22,477
Return 10-year	0.04	0.02	0.00	0.03	0.04	0.06	0.08	4,633

Table A.2 **Fees and Fund flows, without Plan*Fund fixed effects**
This table replicates the tests in columns (1) of in Table 2, but without Plan*Fund fixed effects.

	All funds (1)	Domestic equity only (2)
Expense ratio * Post	-0.289***	-0.385***
	(-7.70)	(-8.09)
Expense ratio	-0.196***	-0.199***
	(-3.75)	(-2.94)
Size*Year controls	Yes	Yes
Plan*Year FE	No	Yes
Plan*Style*Year FE	Yes	No
R^2	0.596	0.597
N	53,675	33,109

Table A.3 **Robustness: Return-flow sensitivity, flows normalized by option size**

This table replicates the tests in Table 8, but where the dependent variable instead is defined as dollar flows normalized by the lagged option size.

	Dependent variable: Flow (to lagged option size)			
	All funds		Domestic equity only	
	(1)	(2)	(3)	(4)
Return 1-year * Post	46.730***	51.788***	64.866***	56.802***
	(4.04)	(3.39)	(5.50)	(3.58)
Return 5-year * Post	8.387	19.258	-20.450	33.939
	(0.27)	(0.63)	(-0.78)	(1.06)
Return 10-year * Post	-49.505	-66.058	-65.165**	-74.629*
	(-1.43)	(-1.60)	(-2.60)	(-1.97)
Expense ratio * Post	-2.919***	-3.492**	-4.441***	-4.440**
	(-2.71)	(-2.19)	(-3.98)	(-2.27)
Return 1-year	4.624	4.812	0.602	5.448
	(1.39)	(1.53)	(0.12)	(1.02)
Return 5-year	-26.117	-46.582	-16.997	-50.561
	(-0.52)	(-0.85)	(-0.49)	(-1.20)
Return 10-year	34.338***	23.476**	30.317**	20.513*
	(2.76)	(2.00)	(2.58)	(1.84)
Expense ratio	2.079	5.073**	1.499	7.424**
	(0.89)	(2.31)	(0.44)	(2.23)
Plan*Fund FE	Yes	Yes	Yes	Yes
Size*Year controls	Yes	Yes	Yes	Yes
Plan*Year FE	No	No	Yes	Yes
Plan*Style*Year FE	Yes	Yes	No	No
Fund Company*Year FE	No	Yes	No	Yes
R^2	0.754	0.765	0.750	0.763
N	43,486	43,343	27,499	27,390

Table A.4 **Sensitivity of deletions to fees around disclosure reform**
This table shows results for sensitivity of plan deletions to expenses. The dependent variable is an indicator
for whether a fund option is deleted from a plan (i.e., the option disappeared between the end of the last fiscal
year and the current fiscal year). The explanatory variable is the fund's lagged expense ratio, interacted with
Post (the years after the reform). The estimates are based on a linear regression model. Controls include both
a the TNA of the underlying fund, the fraction of plan assets invested in the fund, target fund fixed effects
interacted with year, and plan*style*year or plan*year fixed effects.

Dependent variable: Option deleted (indicator)	All funds	Domestic equity
	(1)	(2)
Expense ratio * Post	0.001	-0.023
	(0.07)	(-0.43)
Expense ratio	-0.016	-0.065*
	(-0.92)	(-1.75)
Log (Total Net Assets of Fund)	-0.041***	-0.039***
	(-16.05)	(-8.43)
Pct of Plan Assets Invested in Fund (lagged)	-0.018***	-0.018***
	(-5.43)	(-4.53)
Target Fund*Year FE	Yes	Yes
Plan*Style*Year FE	Yes	No
Plan*Year FE	No	Yes
R^2	0.372	0.405
N	70,611	39,276

Table A.5 **Affiliated funds**

This table shows the expense- and return-sensitivities of flows around the disclosure reform for affiliated vs. non-affiliated funds. Panel A shows results for all funds, and Panel B for domestic equity funds only.

A. All funds

Dependent variable: Flows to sum of lagged options

	(1)	(2)	(3)	(4)	(5)
*Expense ratio * Post * Affiliated*	*0.065*				*-0.048*
	(0.39)				*(-0.24)*
*Return 1-year * Post * Affiliated*		*3.025****			*1.431*
		(3.80)			*(1.50)*
*Return 5-year * Post * Affiliated*			*5.575****		*2.519*
			(3.45)		*(1.53)*
*Return 10-year * Post * Affiliated*				*5.489****	*3.240**
				(2.78)	*(1.88)*
Expense ratio * Post	-0.593***				-0.503***
	(-4.92)				(-3.94)
Return 1-year * Post		1.553***			1.509***
		(4.06)			(3.96)
Return 5-year * Post			-2.149*		1.572
			(-1.68)		(1.40)
Return 10-year * Post				-2.504*	-2.156
				(-1.85)	(-1.22)
Expense ratio * Affiliated	-0.233				-0.180
	(-1.06)				(-0.57)
Return 1-year * Affiliated		-0.954***			-0.299
		(-2.94)			(-0.88)
Return 5-year * Affiliated			-1.323		-0.543
			(-0.83)		(-0.31)
Return 10-year * Affiliated				2.661	1.860
				(1.29)	(0.78)
Expense ratio	0.215				0.152
	(1.46)				(0.85)
Return 1-year		0.747***			0.581***
		(3.18)			(2.82)
Return 5-year			4.637***		-0.052
			(4.73)		(-0.03)
Return 10-year				4.148***	3.067***
				(3.70)	(3.10)
Post * Affiliated	0.005	0.015	0.029	0.037	0.005
	(0.07)	(0.20)	(0.40)	(0.56)	(0.07)
Affiliated fund	0.112	0.131	0.124	0.080	0.050
	(0.50)	(0.59)	(0.55)	(0.34)	(0.22)
Plan*Fund FE	Yes	Yes	Yes	Yes	Yes
Size*Year controls	Yes	Yes	Yes	Yes	Yes
Plan*Style*Year FE	Yes	Yes	Yes	Yes	Yes
Fund Company*Year FE	Yes	Yes	Yes	Yes	Yes
R^2	0.823	0.824	0.824	0.828	0.829
N	44,882	45,096	44,067	40,809	40,793

B. Domestic equity only

Dependent variable: Flows to sum of lagged options

	(1)	(2)	(3)	(4)	(5)
*Expense ratio * Post * Affiliated*	*0.127*				*0.017*
	(0.69)				*(0.08)*
*Return 1-year * Post * Affiliated*		*2.918****			*1.562**
		(2.72)			*(1.67)*
*Return 5-year * Post * Affiliated*			*6.085****		*3.288*
			(3.33)		*(1.49)*
*Return 10-year * Post * Affiliated*				*6.554****	*5.054****
				(4.44)	*(3.10)*
Expense ratio * Post	-0.665***				-0.496***
	(-4.00)				(-2.83)
Return 1-year * Post		0.920*			1.084**
		(1.81)			(2.22)
Return 5-year * Post			-5.437***		0.712
			(-3.53)		(0.55)
Return 10-year * Post				-5.796***	-4.233***
				(-3.54)	(-2.70)
Expense ratio * Affiliated	-0.413				-0.247
	(-1.13)				(-0.51)
Return 1-year * Affiliated		-1.190***			-0.344
		(-3.05)			(-0.92)
Return 5-year * Affiliated			-2.131		-0.027
			(-0.81)		(-0.01)
Return 10-year * Affiliated				2.582	2.435
				(1.32)	(1.27)
Expense ratio	0.287				0.226
	(1.46)				(0.96)
Return 1-year		1.355***			0.985***
		(4.08)			(2.91)
Return 5-year			7.298***		1.054
			(5.64)		(0.57)
Return 10-year				3.387***	2.652***
				(3.69)	(3.21)
Post * Affiliated	-0.042	-0.074	-0.052	-0.033	-0.090
	(-0.54)	(-0.82)	(-0.70)	(-0.45)	(-1.23)
Affiliated fund	0.071	0.114	0.117	0.087	0.065
	(0.25)	(0.39)	(0.40)	(0.28)	(0.21)
Plan*Fund FE	Yes	Yes	Yes	Yes	Yes
Size*Year controls	Yes	Yes	Yes	Yes	Yes
Plan*Year FE	Yes	Yes	Yes	Yes	Yes
Fund Company*Year FE	Yes	Yes	Yes	Yes	Yes
R^2	0.817	0.818	0.817	0.820	0.822
N	27,852	27,993	27,561	25,804	25,796