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

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Abstract

We examine the effects of a 2012 regulatory reform that mandated fee and performance disclosures for the investment options in 401(k) plans. We show that participants became significantly more attentive to expense ratios and short-term performance after the reform. The disclosure effects are stronger among plans with large average contributions per participant and weaker for plans with many investment options. Additionally, these results are not driven by secular changes in investor behavior or sponsor-initiated changes to the investment menus. Our findings suggest that providing salient fee and performance information can mitigate participants' inertia in retirement plans.

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, employees have the responsibility to decide how much to save and how to allocate their savings across different investment options. However, many retirement savers may not be sufficiently aware of all relevant information to make optimal financial decisions. Individual investors often ignore information that is "out of sight" and react to salient attention-grabbing information, as discussed by Barber, Odean, and Zheng (2005).

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 rule 404(a)(5) requires fiduciaries to provide expense- and performance-related summary statements directly to participants. While the information contained in these disclosures was publicly available before the reform, it was often buried in long fund prospectuses or regulatory filings. Hence, the new rule increased the salience of fees and prior performance and brought this information more "in sight."

To investigate whether participants became more attentive to fund fees and investment performance after the regulatory reform, we hand-collect information on the menu of options offered in a large sample of 401(k) plans using plan-level annual filings from 2010 to 2013, along with participants' allocations to each of these options. We augment these plan-option-year-level data with information on plan- and fund-level characteristics. Based on the timing of the regulation, the pre-reform observations in our experiment are 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. Menus offer a different set of investment options, as sponsors and plan providers select different choices for participants in each plan. In addition, some mutual funds are not included in 401(k) plans, allowing us to contrast the impact of the new disclosures on funds that appear on our 401(k) menus to those that do not. These data features guide our identification strategy.

We begin by examining whether investors become more attentive to fund fees in their allocation decisions after the disclosure reform. There are several reasons why one may expect

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[1]As of October 2018, Americans held $5.6 trillion dollars in 401(k) assets according to the ICI (https://www.ici.org/pdf/).

to see no change in allocations following the new disclosures. Participants may already be aware of the fees and performance of their investment options since this information is publicly available. Alternatively, they may not read the new disclosures or may be overwhelmed by this information. A tepid response to the new regulation would be consistent with prior studies that show that retirement savers are often passive and rarely change their investment allocations (Madrian and Shea (2001), Agnew et al. (2003), and Sialm, Starks, and Zhang (2015)).

Remarkably, we find that participants' sensitivity to fees increases significantly after the reform: Funds with a one-standard-deviation higher expense ratio (i.e., 0.36 percentage points) experience a reduction in annual flows of around 2.2 percentage points (measured as a fraction of the value of an investment option) after the regulatory change. This magnitude is economically significant relative to the average annual flow of 6.7% 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 the funds that are more expensive. We find that investors actively move money away from expensive funds: a one-standard-deviation increase in the expense ratio is associated with an eight percentage points higher probability that a fund experiences negative flows after the reform.

To better understand the effect of the reform on fee-sensitivities, we examine whether the disclosure makes the cheapest and the most expensive options more salient, thus helping participants to identify these 'extreme-fee' options in the plan. Consistent with the rank effect of Hartzmark (2015), we find that the impact of the reform is non-linear: participants become especially sensitive to the lowest- and highest-fee funds. These extreme funds receive abnormally high and low flows, respectively, after the regulatory change, beyond what can be explained by the linear expense ratio.

One concern is that our results may not be unique to the 2012 regulatory reform and may instead be driven by secular movements in participants' sensitivity to fees. To address this issue, we re-run our analysis using a series of placebo periods, where we counterfactually assume that the regulatory reform occurred in different years. We do not find a discontinuous relation between fees and changes to flows around these placebo years. To further confirm that changes in investor attentiveness to fees are not driven by other confounding factors, we also use fund-level data from CRSP and show that the sensitivity of flows to fees increases significantly for mutual funds that are primarily held in DC pension plans relative to the control group of funds not exposed to DC clients.

Index funds may benefit disproportionately from the reform, as these funds tend to be among the cheapest options in many plans. Thus, at least part of the heightened fee sensitivity in our baseline results may be a result of investors switching from more expensive active funds toward cheaper passive funds. We indeed confirm that investors allocate significantly more flows toward index funds after the reform. Yet, we find that flows become more sensitive to fees within the set of actively managed funds as well. Taken together, these results suggest that the regulation implicitly promotes passively-managed funds and thus contributes to the popularity of indexing.

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 fee information. In particular, we look at two specific plan-level characteristics that may influence how participants respond to disclosures, namely participants' average contribution rate and the number of available choices. Participants with larger contributions may be financially more sophisticated, or they may pay more attention because they have more money on the line. If the reform provides new information, these investors may react more strongly. On the other hand, highly-sophisticated investors could already be aware of the fees and thus not react to the disclosures. We find that participant-directed investment allocations in plans where average participant contributions are larger experience a stronger increase in their sensitivities to fund fees after the reform, compared to other plans. Additionally, plans with a very large number of options may overwhelm participants with too much information, making relative comparisons more difficult, as discussed by Cronqvist and Thaler (2004), Carroll et al. (2009), and Keim and Mitchell (2018). Consistent with this argument, we find that the post-reform increase in fee sensitivities is larger in plans that offer fewer options.

Finally, we examine changes in participant investments in affiliated funds and in company stock, respectively. Affiliated funds, defined as those offered by the financial intermediary that administers the plan, may benefit from additional marketing efforts by the provider. If this is the case, fee disclosures can increase participant awareness and level the playing field between affiliated and non-affiliated options, prompting participants to reallocate assets toward unaffiliated funds when these are relatively cheaper. Our results provide support for this reallocation hypothesis. We perform a similar test for allocations to the employer's stock. Many plans have the option to invest either in diversified mutual funds or, alternatively, allocate money to the employer's stock, which has a zero expense ratio. We find that when a plan's mutual fund investment options are particularly expensive, participants shift more assets toward the employer's stock once they acquire better information about these fees

through the disclosures. This reallocation toward company stock is 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 also provide participants with comparative information about the historical performance of the plan's investment options. Specifically, the rule requires that they tabulate the one-, five-, and ten-year returns for all fund options in the plan, whenever return information at those horizons is available. To the extent that plan investors chase performance, we expect return-flow sensitivities to increase around the disclosure reform. Whereas there is strong evidence that high-fee funds on average exhibit inferior long-term net performance (e.g., Gil-Bazo and Ruiz-Verdu (2009)), evidence on whether there is persistence in fund performance is more mixed (e.g., Grinblatt and Titman (1992), Hendricks, Patel, and Zeckhauser (1993) Carhart (1997), Bollen and Busse (2005), and Berk and van Binsbergen (2015)).

We find that participant-directed flows become significantly more sensitive to one-year returns after the reform, but the results on changes in flow sensitivity to five- and ten-year performance are generally not significant. Higher sensitivity to one-year performance may occur since one-year performance is typically displayed more prominently in the first column of the disclosed data table.

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 evidence that pension participants are passive and do not react to new information, 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 prior short-term fund performance. 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.

As such, our paper contributes to the literature on how information affects households' behavior. Papers in this area span a large number of fields and topics. For example, in the context of consumer financial decisions, Bertrand and Morse (2011) study whether information affects the behavior of payday borrowers, Agarwal et al. (2015) study the effect of disclosing interest savings associated with making larger-than-minimum payments for credit cards, and Gao and Huang (2017) show that individual investors execute more informed trades after the introduction of the EDGAR system. In a similar spirit, Figlio and Lucas (2016) examine whether publicly disseminating information on school quality affects the real estate market in

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the area and Dranove et al. (2003) ask how health outcomes change after the introduction of hospital report cards.

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, on the allocation choices of pension participants, and on the effectiveness of additional disclosures to individual mutual fund 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), 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)).[2]

To break the well-documented inertia of 401(k) pension participants, a number of studies examine the effectiveness of behavioral nudges in encouraging retirement savings in DC plans. Early work by Madrian and Shea (2001) and Choi et al. (2004a, 2005b) shows 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. Yet, 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 et al. (2010) use an experiment to estimate the effect of a disclosure intervention that provides experimental subjects with an SEC's Summary Prospectus that 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. Duarte and Hastings (2012) show that government nudges affect the behavior of workers enrolled in the Mexican Social Security system, and Hong (2019) studies the decisions of pension plans and participants following a pension reform in Hong Kong that broadened the available investment options.

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' menus. Sections 4 and 5 discuss our results. Section 6 concludes.

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[2]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), Chalmers et al. (2013), Goldreich and Halaburda (2013), and Dvorak (2015).

2   Institutional Background

Individual retirement plan participants are responsible for making investment decisions in DC 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 their plans, especially concerning plan costs. This paper focuses on the participant-level disclosure reform, rule 404(a)(5), which requires plan fiduciaries to disclose information about plan fees, expenses, and performance to participants. Figure 1 shows an example of fee and performance disclosures to participants following the 2012 regulation from the Department of Labor.

[Insert Figure 1 about here]

This regulation had a relatively long legislative history. In particular, as a first step in developing the disclosure rule, the DOL published a 2007 Request for Information in the Federal Register. 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 2008 Federal Register, 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.

In addition to the participant-level disclosure rule, the DOL simultaneously developed 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 services rendered to the plan.[3] 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 if 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

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[3]Badoer et al. (2018) examine the effect of this law on the prevalance of direct vs. indirect compensation arrangements in 401(k) plans.

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 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 the fiduciary-level disclosures.

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 were aware of the pending rule changes. Accordingly, they may have made changes to their menu design by adding and deleting investment options long before the final effective disclosure date. In contrast, the change in plan participants' information environment occurred at a specific point in time. Thus, rule 404(a)(5) provides a shock for participant reallocation decisions. For this reason, we focus on whether participants reallocate their 401(k) savings across options after the reform's effective date. We also provide some discussion however on whether investment options were adjusted around the disclosure reform.

3   Data and Summary Statistics

This section describes our data collection and the properties of the 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 2010 and 2011 as the pre-reform period and the plan-years 2012 and 2013 as the post-reform period.[4]

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 that original set of plans with information on the 1000 largest plans in the U.S. 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

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

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, which only covers plans offering the employer's stock as an investment option, Form 5500 is filed by all pension benefit plans covered by the Employee Retirement Income Security Act (ERISA).[5]

From Form 5500 filings, we collect the table that describes the 'Schedule of Assets,' which is typically included on the last pages of the forms. In most cases, the table reports the complete set of investment options offered by the plan, including the employers' stock, mutual funds, separate accounts, stable value funds, and guaranteed investment contracts. We supplement our menu information with various plan characteristics such as total plan size and the number of participants, downloaded from various schedules of Form 5500.

Studying choices between options in defined contribution plans is arguably an ideal setting to evaluate the effect of fund characteristics on flows. This is because participants' choice sets are limited, and we know from which options each participant can select. Plans typically include around 20 options, which makes a comparison of options feasible.

To obtain information on the mutual funds included in DC plans, we match our menu data to the CRSP Survivorship Bias-Free U.S. Mutual Fund database by fund name. We further match to the exact share class of a fund whenever possible. Share class information comes from several sources. First, for a subsample of plans, share class information is obtained from the 'Schedule of Assets' table. Second, in some of the cases, the 'Schedule of Assets' table 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 on Form 5500 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, yet there is substantial heterogeneity across plans, as we can identify the actual share class of every fund in some plans but have no share class information 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 for most

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[5]Our baseline results are nevertheless similar across these two samples, as summarized in the Internet Appendix.

funds in a plan, we instead use the minimum expense ratio across the funds' share classes.[6] While we acknowledge that this means that we cannot perfectly measure the fees of all the options in our sample, any fee mismeasurement should attenuate our results. 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 ratio charged by the portfolio funds.

Because many of our tests will compare funds within the same broad "style," we manually classify each mutual fund into the following six style groups: balanced funds, domestic equity funds, foreign equity funds, domestic fixed income, foreign fixed income, and other, by mapping Lipper fund styles into these broader categories. We create separate indicator variables for money market, target-date, and index funds. We manually group funds into target-date funds based on a fund's name. To identify index funds we utilize the fund's name along with the CRSP flags for index funds.

3.2   Sample description

Panel A of Table 1 provides summary statistics for our sample at the plan-year level. 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 between 2010 and 2013. Throughout our analysis, all non-binary variables are winsorized at the 1% level.

The average plan size is $799 million. The average plan has 13,000 participants. Participants in our sample have, on average, approximately $77,200 in their 401(k) accounts, and contribute on average $4,600 per year to their plan.[7] Although our sample only contains, on average, 1,395 plans per year, it covers $1.3 trillion in retirement assets in 2013 and approximately 18 million participants. This represents roughly a third of the total 401(k) assets in the U.S.

[Insert Table 1 about here]

Plans offer on average 21 investment options to participants, where 18 of these options have been on the menu for at least two consecutive years, while the rest are funds that

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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. For robustness, we show in the Internet Appendix that the results are very similar if we ignore all share class information and instead use the value-weighted fee across all share classes of a fund as our proxy for an option's expense ratio.

[7]Note that these are not participant-level statistics, but rather plan-level statistics where contributions are defined as total plan contributions divided by the number of participants.

have been added in the current year. In this paper, we focus on participants' investment decisions; therefore, we exclude newly added funds as well as deleted funds in our analyses. We further drop target-date funds from the sample in most of our analyses, as they are often chosen as default investment options.[8] On average the plans in our sample offer a total of 12 non-target-date fund options that have not been newly added to the plan.

Panel B of Table 1 further describes the set of options across different styles that are available to participants. Around half of the fund options in our sample are domestic equity funds (50,469 plan-fund-year observations), 17% are domestic fixed income funds, and 19% are balanced funds. The sample of balanced funds is dominated by target-date funds. Panel B also reports the average expense ratio of these different fund styles and how often a plan-year has at least one fund of a certain style. For example, 98% of plans have at least one domestic equity fund, whereas only 8% have a foreign fixed income fund. Because most plans will have on average about 9 domestic equity funds, we will often perform our analyses separately for only this style of funds.

We use three different proxies of fund flows, which are all based on estimated dollar flows: $V_{p,f,t} - V_{p,f,t-1}(1 + R_{f,t})$, where $V_{p,f,t}$ is the value of the investments in mutual fund f held in 401(k) plan p at time t and $R_{f,t}$ is the total return of fund f at time t. The flows are computed at an annual frequency. The first measure $Flow^1$ normalizes dollar flows by the lagged value of all mutual fund investment options in plan p. The second measure $Flow^2$ normalizes the dollar flow by the average of the initial and the final value of an investment option. The third measure $Flow^3$ is simply an indicator variable for whether the dollar flows are positive.

$$Flow^1_{p,f,t} = \frac{V_{p,f,t} - V_{p,f,t-1}(1 + R_{f,t})}{\sum_f V_{p,f,t-1}} \tag{1}$$

$$Flow^2_{p,f,t} = \frac{V_{p,f,t} - V_{p,f,t-1}(1 + R_{f,t})}{(V_{p,f,t-1} + V_{p,f,t})/2} \tag{2}$$

$$Flow^3_{p,f,t} = I(V_{p,f,t} - V_{p,f,t-1}(1 + R_{f,t}) > 0) \tag{3}$$

The first measure gives the same weight to a dollar flow regardless of whether it flows into a small or a large option in a plan. The second measure gives more weight to a dollar that flows to a smaller option since it captures the effect of flows on the change in the relative size

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

of a given option. We divide by the average of the contemporaneous and lagged size to reduce the impact of outliers, as some of the lagged option sizes tend to be very small. The third measure allows us to separate investment options that receive inflows from those that receive outflows. Outflows for contributing plan participants require an active decision to rebalance their investment options, whereas inflows may be driven by automated contributions.

Table 2 presents plan-fund-year-level descriptive statistics for the non-target date funds in our sample.[9] Participants invest approximately $26 million in the average mutual fund on the menu, representing 4% of the total invested capital across all mutual funds, and participants pay, on average, around 60 basis points in the form of mutual fund expense ratios. Flows are on average 6.7% of an option's value.

[Insert Table 2 about here]

4   Results

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

4.1   Fee information and fund flows

To illustrate the relation between fees and flows around the time of the disclosure reform, we begin by describing the changing fee-sensitivities of flows in these DC plans. Figure 2 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 above the median. The figure shows that before the 2012 reform, the light bars are slightly higher than the dark bars, which means that more expensive funds on average received larger 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. After the reform, the percentage flows of low-fee funds are around double those of high-fee funds.

[Insert Figure 2 about here]

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[9]Table A.1 in the Internet Appendix reports similar statistics for target-date funds.

To investigate this relation more formally, we next estimate the following baseline regression model:

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\begin{aligned}
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},
\end{aligned}
\tag{4}
$$

where $Flow_{p,f,t}$ is one of our three measures of flows for fund f included in plan p in year t, $ExpRatio_{p,f,t-t}$ is the lagged expense ratio of fund f in plan p, and $Post$ is an indicator that takes the value of one for either of the two fiscal years following the reform, and zero for the two years before the reform. $\mathbf{Controls}_{p,f,t-1}$ is a vector of relevant control variables.[10]

We include several types of fixed effects and additional controls to absorb variation in flows and fees unrelated to the reform. Plan-by-fund fixed effects allow for a *within-investment-option* comparison of fees and flows and further control for possible compositional changes in a plan's menu. Additionally, we also control for plan-by-style-by-year fixed effects,[11] which make the comparison of flows and fees across options to be within the same plan, 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. We do not always include this control since 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 toward zero if there is not sufficient variation in fees across funds offered by the same management company.

We also include size-by-year controls since large options may have systematically different flows than small options. The size variable is measured as the lagged fraction of a plan's assets invested in the fund, and we allow its relation with flows to vary by year, which helps to control for the fact that the disclosure reform may differentially affect the visibility of larger relative to smaller options. The standard errors are two-way clustered throughout our analyses by fund management company and plan.

[Insert Table 3 about here]

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[10] Note that the expense ratio of a fund can differ across 401(k) plans if plans choose different share classes. This explains why the expense ratio has subscripts p, f, and t.

[11] These are equivalent to plan-by-year fixed effects in specifications where we analyze the results within domestic equity funds only.

Panel A of Table 3 reports the results for our full sample of mutual fund investment options across all fund styles.[12] 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 estimate of -0.56 implies that a fund with a one-standard-deviation higher expense ratio (i.e., 0.36 percentage points) experiences a 0.20 percentage-point lower flow (i.e., $0.56 * 0.36 = 0.20$) after the reform when measured as a fraction of the lagged sum of money invested across all options. Economically, this magnitude is larger than the mean flow of 0.117% in our sample. Column (2) further shows that this relation is robust and remains similar in magnitude when we control for fund management company-by-year fixed effects.

Columns (3)–(4) of Table 3 use flows normalized by the average of the lagged and current option size as the dependent variable, with similar results. These estimates indicate that a fund with a one-standard-deviation higher expense ratio (i.e., 0.36 percentage points) is predicted to receive around 2.1 percentage points lower flows after the reform. This difference is also economically significant compared to the mean flow of 6.7% in our sample.

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

To test whether more expensive funds are more likely to experience negative flows after the reform, columns (5)–(6) use an indicator for whether the sign of flows is positive as the dependent variable. The results are consistent with participants withdrawing money from more expensive funds after the reform. Specifically, a one-standard-deviation higher fee is associated with an eight percentage point (i.e., 0.36*0.23=0.0828) greater probability that a fund experiences 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 variable for the sign of flows is that this measure is not affected by the choice of scaling, that

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[12]Table A.2 in the Internet Appendix shows that our baseline results are similar across the two data sources—11-K filers and the largest plans in Form 5500—that we use to construct our sample.

is, whether flows are normalized by the sum of lagged assets across all mutual funds in the plan (as in columns (1)–(2)) or by the average of the lagged and current option size (as in columns (3)–(4)).

The 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 these fund styles also have different fees on average. Yet, there remains much heterogeneity across the options when analyzing all funds simultaneously. To address this concern, we re-estimate the results using only domestic equity funds, which correspond to a more homogeneous group of mutual funds. This may facilitate the interpretation and help ensure the robustness of our results. We choose to focus specifically on domestic equity funds because this fund style has by far the highest number of options. As Panel B of Table 1 shows, 98% of all plan-years have at least one domestic equity fund, and on average these plans offer nine different domestic equity funds. By contrast, the number of possible choices within the other fund styles is typically more limited.

Panel B of Table 3 shows that the results are generally stronger among only the domestic equity funds than across the full sample. 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 sum of all mutual fund options, or 2.3–3.3 percentage-points when normalized by fund size. A domestic equity fund with a one-standard-deviation higher expense ratio also becomes around 8–9 percentage points more likely to experience negative flows in the two years after the reform as compared to the years before the reform. 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.

Our baseline specification compares fund flows during the two-year post-period with those in the two-year pre-period. In Table A.3 in the Internet Appendix, we compare flows in the year after the reform (2012) with those in the year before the reform (2011). This allows us to focus on the immediate impact of the reform. The results are similar to the results of our baseline event window of 2010-2013.

The coefficient on the uninteracted expense ratio in Table 3 is slightly positive, although usually not significantly so. However, because these regressions include plan-by-fund fixed effects, this coefficient merely captures the *within-fund* sensitivity of flows to how a particular fund changes its fees over time. This variation in fees over time for the same option is generally quite small. Panel A of Table A.4 in the Internet Appendix reports results with

fewer controls, and notably without plan-by-fund fixed effects, and shows that the sensitivity of flows to fees across funds is indeed either insignificant or negative before the reform, but that this sensitivity becomes much stronger after the reform. In Panel B of Table A.4, we use fees that are "fixed" over the sample period. Specifically, in this panel, we measure each fund's expense ratio as of 2009 instead of using the one-year-lagged expense ratio. This allows us to abstract from changes in fees that could contaminate our results. Because this fee is held constant over the sample period, it is fully subsumed by the plan-by-fund fixed effects. The results in this panel are consistent with those in Table 3. Finally, in Panel C of Table A.4, we re-estimate our baseline model by using the value-weighted expense ratio across the share classes of a fund as the proxy for each option's expense ratio. We find that these results are very similar to our results in Table 3.

4.2   Extreme fees

One feature of the disclosure reform is that it may facilitate identifying and thus choosing the cheapest fund in a plan. In Table 4, we examine the extent to which flows respond differently to funds that have the most "extreme" expenses (defined as the cheapest or most expensive option in the plan) around the reform. In columns (1)–(3), we examine all funds, and in columns (4)–(6) we further focus on the set of domestic equity funds.[13]

[Insert Table 4 about here]

Table 4 shows that after the reform, the cheapest funds receive significantly more flows. The coefficient of 0.529% on the indicator variable for the cheapest fund in column (1) is also large compared to the mean flow (normalized by the lagged sum across all funds) of 0.117%. Column (2) further shows that the most expensive funds also receive significantly lower flows after the reform. In column (3), we further control for the linear relation with expenses and show that the "extreme" lowest- and highest-expense funds receive abnormally high and low flows, respectively, after the reform *beyond* what can be explained by their continuously measured expense ratio. In other words, the reform has a differential effect on the options with the most extreme expenses, consistent with the rank effect of Hartzmark (2015).

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[13]In the regressions that only use domestic equity funds, the cheapest and most expensive funds are defined within domestic equity.

We find broadly similar results in columns (4)–(6) where we only focus on domestic equity funds. The cheapest option receives more flows than what can be explained by the continuously measured expense ratios also in this subsample. However, the coefficient on $MaximumFee * Post$ is no longer statistically significant after controlling for the linear relation with fees among just the domestic equity funds.

4.3   Subsample analysis: Active vs. index funds

We next investigate to what extent the reform resulted in reallocations from active funds to index funds, and whether participants also become more sensitive to fees *within* the available set of active funds, as well as within the set of index funds.

Index funds on average tend to be significantly cheaper options than actively managed funds. Therefore, at least part of the heightened sensitivity to fees that we observe is likely to result from participants allocating more flows toward index funds. We test this in Panel A of Table 5, where we interact *Post* with whether the option is an index fund or not. The results show that DC plan participants indeed allocate significantly more flows toward index funds after the reform.

In columns (2) and (4) we further see that the coefficient on $ExpenseRatio * Post$ remains significant after controlling for index funds and minimum fees, which shows that stronger fee-sensitivity is not a phenomenon that exclusively benefits index funds or those funds that are at the extreme of the fee spectrum. In column (4), the coefficient on $IndexFund * Post$ becomes statistically insignificant, which suggests that the main reason why domestic equity index funds experience more flows after the reform is that they tend to be among the cheapest options.

A second possible effect of the increased fee sensitivity could be a reallocation from the relatively more expensive active funds toward the relatively cheaper active funds in a plan and, similarly, reallocations within the set of index funds. In Panel B of Table 5, we split the sample into active funds (columns (1)–(2)) and index funds (columns (3)–(4)). Columns (1)–(2) show that participants become more sensitive to fees within their choice set of active funds after the reform, and this continues to hold when we focus on active domestic equity funds. However, the coefficient estimates on the interaction effect decrease (when compared to those in Table 3) from -0.561 to -0.250 for the whole sample and from -0.672 to -0.405 for domestic equity funds. Thus, the impact of the disclosure is more muted for actively-managed

funds, indicating that the reallocation from active funds to index funds partially contributes to the overall effects.

[Insert Table 5 about here]

In columns (3)–(4), we consider fee sensitivities within the sample of index funds. We find that the relatively cheaper index funds in a plan receive more flows after the reform compared to the more expensive index funds in the same plan. The point estimates are larger than that for active funds, although the statistical significance is weak. The power of the tests is low in this subsample because 401(k) plans typically only include a small number of index options. Furthermore, the differences in fees between index fund options in a plan are also generally small. Both the small sample and the small dispersion in index fund fees contribute toward making it difficult to precisely estimate any differences in the sensitivities of flows to the expense ratios of index funds.

Taken together, the results in Table 5 provide some insights on the interaction between the regulatory change and the popularity of indexing. In particular, they suggest that the regulation implicitly promotes passively-managed funds and thus it contributes to the recent shift towards indexing.

4.4   Target-date funds

In the previous tests, we focus specifically on the sample of non-target-date funds. The reason is that target-date funds tend to be default options, and their flows are thus more likely to be confounded by plan sponsor choices. Furthermore, 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. Therefore, we hypothesize that the disclosure reform has a smaller impact among target-date funds.

Table A.5 in the Internet Appendix tabulates results on the effect of the regulatory change on fee-sensitivities for target-date funds. We report the results for all fund styles and include plan-by-style-by-year fixed effects throughout to control for any differences across fund styles.[14] The results confirm the hypothesis that target-date funds are less affected by the reform. While the point estimate for the coefficient on $ExpenseRatio * Post$ among the

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[14]Table 1 shows that target-date funds mainly exist within the "balanced" and "domestic equity" styles.

target-date funds is negative, it is smaller than that for non-target-date funds in Table 3, and statistically, we cannot reject that the effect of the reform is zero for target-date 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 target-date funds.

4.5   Counterfactual placebo events

The previous sections show that flows become more sensitive to fees after the disclosure reform. It is possible, however, that this result could be confounded by a secular movement over time whereby flows become increasingly more sensitive to fees year-after-year. In this section, we therefore examine how significant the measured effect around the reform is in a historical context, and whether there is a trend toward ever greater fee-sensitivities in the years leading up to the reform.

To examine these questions, we rerun our baseline model using a series of 'placebo periods.' In other words, instead of using the actual experiment with pre-period 2010-2011 and post-period 2012-2013, we extend our sample backward in time and run the same regression over alternative rolling four-year periods before the passage of the 404(a)(5) DOL rule. Other than using different sample years, the empirical specification in these models is identical to that in Table 3.[15]

Table 6 confirms that the 2010–2013 period is a significant outlier in the distribution of fee-sensitivities. All coefficients on the interaction effect for the placebo events are smaller in absolute terms than the corresponding estimates reported in Table 3. In fact, five out of nine coefficient estimates in the overall sample are (insignificantly) positive. More importantly, there is no trend of ever-increasing fee-sensitivities in the years immediately before the reform that could confound our baseline results. This result holds both across all funds (Panel A) and among domestic equity funds (Panel B).

[Insert Table 6 about here]

The only period with a significant effect of strengthening fee sensitivity is the period 2001–2004. This difference is nevertheless noisier and not significant when we focus on

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[15]Note that our sample of plans is slightly smaller in the earlier years.

domestic equity funds in Panel B. Possible drivers may be the 2004 reform that improved mutual fund disclosures involving fund fees, portfolio investments, and past performance,[16] the increased scrutiny of mutual funds in the early 2000s due to the Enron bankruptcy in 2001, or the mutual fund scandal of 2003.[17]

In summary, these analyses show that the baseline results in Table 3 are substantial—not only in absolute economic magnitude—but also when compared to other recent periods, and are not driven by an increasing trend in fee-sensitivities in the years leading up to the reform.

4.6   Heterogeneity in fee-flow sensitivities across plan participants

Although the disclosure reform affects all 401(k) plans in the United States, we may expect that participant responses to these disclosures vary depending on the characteristics of plans. This section studies two such possibilities: we investigate whether participants who make large annual contributions to their retirement accounts and whether participants in plans that have more investment options on the menu react differently to the regulatory change.

Participants who contribute more money to their plan have a stronger reason to pay attention to the underlying investment fees, so we may expect their fee-sensitivities to be stronger. A limitation of our data is that we only observe aggregate plan-fund-level information, but not individual contributions or balances. Yet, we do know the total contributions across all participants in a plan, and the number of participants, which allows us to exploit heterogeneity across plans in the *average* dollar contributions per participant.

While we expect participants who make larger contributions to care more about fees, this does not necessarily mean that they will respond more to the change in disclosures. This is because these participants may have a stronger incentive to learn about fees and performance even *before* the reform. Therefore, new disclosures will only benefit these participants if they did not acquire sufficient information on these plan features before the reform.

In Panel A of Table 7, we study the heterogeneous effects across plans of average participant contributions by interacting $ExpenseRatio * Post$ with $Largecontributions$ in equation (4), where $Largecontributions$ is an indicator variable based on whether the annual

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[16]See https://www.sec.gov/rules/final/33-8393.htm.

[17]The mutual fund sector experienced a significant scandal in the early 2000s, as discussed by Houge and Wellman (2005), Zitzewitz (2006), and Sialm and Tham (2016). Karpoff, Lee, and Martin (2008) show that the reputation penalties imposed by the market following corporate scandals are significant. Poterba (2003) discusses the impact of these corporate scandals on 401(k) participants, who were frequently heavily invested in their company's stock.

dollar contribution per participant is above the sample median in 2009 (the year immediately before the start of our main period of analysis).

In column (1), the coefficient on the triple-interaction *ExpenseRatio*Post*Large contributions* is negative and significant. This implies that the disclosure has a stronger effect on flow-fee-sensitivities in plans where participants contribute more money to the plan. In terms of economic magnitudes, the effect is almost 50% larger for plans where the average contribution rate by participants is high; specifically, the effect is -0.454 for low-contribution plans vs. -0.662 (i.e., -0.454+(-0.208)=-0.662) for high-contribution plans. Column (2) shows that this difference is even larger when we focus on allocations within the set of domestic equity funds. These findings suggest that the new disclosures provide useful information to even those participants who are more likely to be motivated to minimize fees and thus seek information on their 401(k) funds before the reform.

[Insert Table 7 about here]

In Panel B of Table 7, we study whether the reform differentially affects participants in plans with many options compared to those participants who have relatively fewer options. The number of choices can have an ambiguous effect on allocations around the reform. On the one hand, the disclosure could make fee sensitivity stronger among plans with many choices if the reform simplifies comparisons among the investment options. On the other hand, the reform could have a larger effect in plans with fewer choices as these disclosures may be easier to process. This latter hypothesis is related to Cronqvist and Thaler (2004), Carroll et al. (2009), and Keim and Mitchell (2018), who find that retirement savers are often overwhelmed when facing a larger number of investment options.

To study this question, we interact *ExpenseRatio*Post* with *Number of choices* in equation (4). The triple-interaction term is positive, which means that participants in plans with many choices react *less* to the new information. This effect is larger within the set of domestic equity funds (column (2)). The coefficient of 0.008, when combined with the baseline effect of -0.847 for *ExpenseRatio*Post*, means that a plan with 20 options experiences a change in the sensitivity to fees after the reform of -0.687 (i.e., -0.847+20*0.008=-0.687), whereas the predicted effect is essentially zero for plans with 100 options.

4.7 Plan-level reallocation toward affiliated options and employer stock

Our results in the previous sections analyze choices between different fund options within a plan. In this section we change the analysis to be at the overall plan level, where we ask if the disclosure reform had effects on the broad allocation patterns across different classes of investments, depending on the average fees of those investments.

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, as discussed by Pool, Sialm, and Stefanescu (2016). These intermediaries often provide investment guidance and other services to plan participants and thus may have an incentive to promote their own funds. Such promotion efforts may make affiliated funds attractive to participants before the reform but fee disclosures could increase participant awareness and level the playing field between affiliated and non-affiliated options. Thus, the new information could prompt participants to reallocate assets toward unaffiliated funds if those charge lower expense ratios.

While affiliated options are often cheaper—the mean difference between non-affiliated and affiliated options is ten 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 51%.

To examine whether the fee disclosures do level the playing field between affiliated and non-affiliated funds, we regress the fraction of a plan's mutual fund assets that are invested in affiliated funds on the average fee difference between the affiliated and non-affiliated options. Table 8 (Panel A) reports the results.[18]

[Insert Table 8 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

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[18]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.

fees between these funds predicts a reallocation of 0.9% (=33bp*0.026) of assets toward the relatively cheaper type of funds.

We next look at the choice between investing in mutual funds, compared to the alternative of investing in employer stock.[19] In the 66% of plans in our sample that have the option to invest in employer stock, participants on average allocate 15.4% of the plan's assets toward employer stock. Investing in employer stock is typically a zero-fee option to participants. It is, however, fraught with high idiosyncratic risk and limits participants' ability to diversify their labor income.

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. To address this question, we regress the fraction of plan assets invested in employer stock on the average fee of a plan's mutual fund options. The results are tabulated in Panel B of Table 8.

The table shows that plan participants reallocate toward employer stock after the reform when the investment options in a plan are relatively expensive. As reported in Table 1, the average fee across all funds in a plan is 57 basis points with a standard deviation of 19 basis points. The regression coefficient of 0.013 in Table 8 thus means that, after the reform, plans with a one-standard-deviation higher average fee experience an approximately 0.3 percentage-point larger change in assets allocated to employer stock. While this magnitude is economically and statistically small, it nevertheless shows that participants can be incentivized to increase their investments in employer stock by being presented with more expensive mutual fund options in their 401(k) plans. This reallocation toward company stock thus is a potential unintended consequence of the fee disclosure.

4.8 Return-flow sensitivities around the 2012 disclosures

The 2012 disclosures provide plan participants with a new way of comparing fees across plans. However, the new disclosures 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.[20]

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[19]See Benartzi (2002), Poterba (2003), Huberman and Sengmueller (2004), Benartzi et al. (2007), and Brown, Liang, and Weisbenner (2007) for discussions on the optimality of employer stock as an investment option in 401(k) plans.

[20]The typical 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.

To the extent that plan participants chase performance, we may expect return-flow sensitivities to increase after the disclosure reform. While chasing low fees will predictably result in lower fees, chasing high past performance may not necessarily produce higher future returns due to the relatively low persistence of performance in the mutual fund industry (Carhart (1997)). Therefore, it is unclear whether participants might react at all to the performance information.

In Table 9, we examine whether fund flows become more sensitive to returns after the regulatory change. In these regressions, we add one-, five-, and ten-year returns (measured up until the start of the plan's fiscal year) and their interactions with our *Post* indicator to our baseline model in equation (4). We also control for the expense ratio and the expense ratio interacted with the *Post* indicator variable to avoid spurious estimates that could arise from a possible correlation between fees and past performance. As in Table 3, we further control for plan-by-fund fixed effects, plan-by-style-by-year fixed effects, fund company-by-year fixed effects, and size controls by year.

The results in Table 9 show that flow sensitivity to one-year returns becomes stronger after the reform. The economic magnitude of the one-year performance effect is similar to the magnitude of the expense effect. For example, a one-standard-deviation change in the one-year performance of 15% is associated with a 0.22 to 0.30 percentage point increase in flows (i.e., 0.15*1.465=0.22 or 0.15*2.008=0.30). Yet, the results suggest that participants do not engage in increased 'return-chasing' based on the five- and ten-year performance horizons.[21]

Higher sensitivity to one-year performance may occur since the one-year performance is typically displayed more prominently in the first column of the disclosed data table. This heightened sensitivity to short-term performance may be justified since empirical evidence indicates that there is more performance persistence in the short term (e.g., Hendricks, Patel, and Zeckhauser (1993), Carhart (1997), and Bollen and Busse (2005)). In Table A.7 in the Internet Appendix, we further test whether the stronger return sensitivity to the one-year performance is driven by instances of 'extreme' performance. We find little evidence that it is the most extreme-return funds that receive the highest flows. The higher flow sensitivity appears to be mostly related to the continuously measured return variable.

[Insert Table 9 about here]

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[21]In Table A.6 in the Internet Appendix we repeat this analysis with the flow normalized by the average of the lagged and current option size as the dependent variable—the results are similar.

Finally, we note that the one-year sensitivity results have to be interpreted with caution. It is possible that the new disclosures do not increase participants' sensitivity to performance. Instead, participants might have been just as sensitive to short-term performance before the reform, but their short-horizon return information varied based on when they accessed this information. After the disclosure reform, participants update their information sets about the one-year returns based on the same data at the same time, allowing the econometrician to identify the sensitivity. Naturally, longer-horizon return metrics are less sensitive to this 'timing' effect.

4.9   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. A potential alternative explanation of these findings is that plan sponsors or providers are mapping participants to cheaper funds by changing the menus. 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.[22] Second, as shown in Table 3, we observe strong evidence of more negative flows for relatively more expensive funds after the reform—a result that cannot be explained by sponsors merely changing where new money goes.

Nonetheless, we further investigate the possibility that sponsors change the investment options around the time of the reform. When a mutual fund option in a plan is deleted, assets from this fund will typically be moved to a new default option, unless participants actively allocate their investments to a different fund. Such reallocations could influence our results if the money is reinvested in a cheaper option and if the trend toward using cheaper replacement options increases precisely in 2012.

To examine whether reinvestments could drive our results, we re-estimate our analyses but where we exclude all plan-years where any option is dropped. Fund deletions are relatively common—around 60% of plan-years have at least one option dropped, and on average around 10–15% of options are replaced in any given year. As an alternative and slightly less conservative approach, we exclude any funds where at least one option within that fund-style is dropped from the plan. We do so because, when a fund is dropped, the default replacement

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[22]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 light of the pending reforms.

is generally in 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 A.8 in the Internet Appendix reports these results. We find that the estimates are remarkably similar in economic magnitude even in this more limited sample. These findings suggest that our baseline results are not an artifact of plan sponsors changing their behavior around the reform.

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 toward cheaper funds. This hypothesis 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 A.1 in the Internet Appendix shows, deletions are not particularly common right around 2012 compared to other years.

The question of whether the reform makes plan sponsors more likely to delete relatively expensive options to make the plan look better to participants is nevertheless an interesting one on its own. In other words, did the disclosure reform to participants also affect sponsor incentives? To test this, Table A.9 in the Internet 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 this sensitivity of deletions to fees does not become stronger after the disclosure reform.

5   Fund-level evidence of the effects on flows

The previous sections study the effects of the new disclosures on the allocation of flows across the set of options within 401(k) plans. Efficient allocation of flows is important for individual participants, and our evidence suggests that the reform significantly affects fee sensitivities. In this section, we bring the analysis to a more aggregate level and ask whether the reform also affects fee-sensitivities for overall mutual fund flows.

Table 10 reports our analysis, which is based on fund-year level data from the CRSP mutual fund database for the 2010–2013 period. Using a triple-difference test, we examine how funds' fee-sensitivities change from the pre- to the post-reform period, interacted with a measure of each fund's *exposure* to flows from DC participants and the new disclosure requirement. We use three different measures of exposure, which we will refer to as *"DC intensity"*: (1) whether the fund is included in any of the plans in our sample, (2) the natural

logarithm of one plus the number of 401(k) plans in our sample that include the fund, and (3) the fraction of a fund's net assets that can be attributed to the 401(k) plans in our sample.

[Insert Table 10 about here]

The summary statistics in Panel A of Table 10 show that 28% of all funds in CRSP are included in one of the 401(k) plans in our sample, and conditional on being included in at least one plan, the average number of plans that a fund belongs to is eight. Moreover, for those funds, the fraction of a fund's total net asset value made up of 401(k) assets from these plans is 9%.

It is important to emphasize that these numbers are only a proxy for DC intensity because our data only contain a subsample of all DC plans. However, we have no reason to believe that our measure is biased in the cross-section in terms of capturing funds' relative degrees of exposure to flows to and from DC plans; in other words, we believe that funds with higher DC intensity based on our sample are also likely to have higher exposure to those DC plans that are not captured in our sample.

Panel B reports the 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 intensity*. This variable captures whether funds with higher DC intensity 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 total net assets), fund fixed effects, fund style-by-year fixed effects, as well as index fund-by-year fixed effects. *DC intensity* is measured as of 2009 (the year immediately before our sample period), and held constant during our sample period; the non-interacted variable DC intensity is thus subsumed by fund fixed effects. As in our previous analysis, target-date funds are excluded from the data, although results are essentially unchanged if we do include them.[23]

The results in Panel B show that DC intensity predicts a stronger change in the fee-sensitivity of fund flows after the disclosure reform. This result shows that the disclosure reform has a measurable effect at the fund-level as well. These findings hold when measuring DC intensity based on whether a fund is included in any plan at all, when based on the number of plans a fund is a part of, or when measured as the fraction of a fund's assets that comes from the DC plans in our sample. While this evidence is directionally consistent

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[23]At the fund-level across all funds in CRSP, less than 5% of funds are target-date funds.

with our hypothesis, we caution about interpreting the exact economic magnitude of these estimates as the measures of DC intensity are a *lower bound* of the actual amounts of assets in DC plans.

Finally, in Table A.10 in the Internet Appendix, we show results using a similar methodology for return-sensitivities of flows. As in our earlier plan-fund ('option') level results, the coefficient estimates are quite mixed. We find some evidence of stronger five-year sensitivities when we measure DC intensity using the number of plans, but none of the return-sensitivity results are consistent across the different measures of DC intensity. Thus the increase in the one-year sensitivities we document in the previous section is not sufficiently strong to carry over to aggregate fund-level flows.

In addition to showing that the reform affects the aggregate mutual fund market, the fact that these tests compare funds based on their 401(k) exposures also helps to address a possible alternative hypothesis that fee-sensitivities are driven by other confounding factors and therefore 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, as discussed by Madrian and Shea (2001), Agnew et al. (2003), and Sialm, Starks, and Zhang (2015). Our paper argues that this inertia can be mitigated by providing more salient fee and 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 plans. We find that participants become significantly more attentive to expense ratios after the reform. We also find some evidence that investor flows become more sensitive to short-term prior performance. 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 **Example of the new disclosure format**
This figure shows an example of the fee and performance disclosure following the reform. Panel A shows an example of the fee disclosure table format, and Panel B shows an example of the performance disclosure format. Source: Department of Labor at https://www.dol.gov/sites/default/files/ebsa/about-ebsa/our-activities/resource-center/publications/providing-information-in-participant-directed-plans-model-chart.pdf

A. Fee disclosure example

Fees and Expenses			
Name / Type of Option	Total Annual Operating Expenses		Shareholder-Type Fees
	As a %	Per $1000	
Equity Funds			
S&P 500 Index Fund	0.18%	$1.80	$20 annual service charge subtracted from investments held in this option if valued at less than $10,000.
Large Cap Fund	2.45%	$24.50	2.25% deferred sales charge subtracted from amounts withdrawn within 12 months of purchase.
Int'l Stock Fund	0.79%	$7.90	5.75% sales charge subtracted from amounts invested.
Bond Funds			
Bond Index Fund	0.50%	$5.00	N/A
Other			
Stable Value Fund	0.65%	$6.50	Amounts withdrawn may not be transferred to a competing option for 90 days after withdrawal.
Target Date 2020 Fund	1.50%	$15.00	Excessive trading restricts additional purchases (other than contributions and loan repayments) for 85 days.

B. Performance disclosure example

Performance Information – Variable Return Investments								
Name/ Type of Option	Average Annual Total Return as of 12/31/12				Benchmark			
	1yr.	5yr.	10yr.	Since Inception	1yr.	5yr.	10yr.	Since Inception
Equity Funds								
S&P 500 Index Fund	26.5%	.34%	-1.03%	9.25%	26.46%	.42%	-.95%	9.30%
							S&P 500	
Large Cap Fund	27.6%	.99%	N/A	2.26%	27.80%	1.02%	N/A	2.77%
						US Prime Market 750 Index		
Int'l Stock Fund	36.73%	5.26%	2.29%	9.37%	40.40%	5.40%	2.40%	12.09%
						MSCI EAFE		
Bond Funds								
Bond Index Fund	6.45%	4.43%	6.08%	7.08%	5.93%	4.97%	6.33%	7.01%
						Barclays Cap. Aggr. Bd.		
Other								
Stable Value Fund	4.36%	4.64%	5.07%	3.75%	1.8%	3.1%	3.3%	4.99%
						3-month US T-Bill Index		
Target Date 2020 Fund	27.94%	N/A	N/A	2.45%	26.46%	N/A	N/A	3.09%
						S&P 500		
					23.95%	N/A	N/A	3.74%
						Generations 2020 Composite Index		

Figure 2 **Fee sensitivity of flows**

These figures plot flows to low-fee (darker bars) vs. high-fee (lighter 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 assets in those funds. Flows to high-fee funds are 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 funds and exclude target-date 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 funds
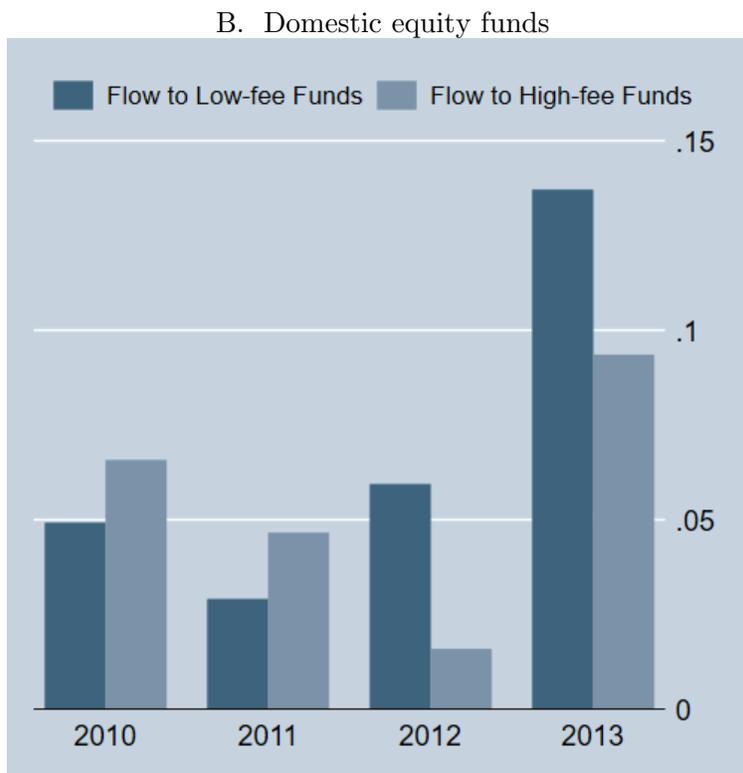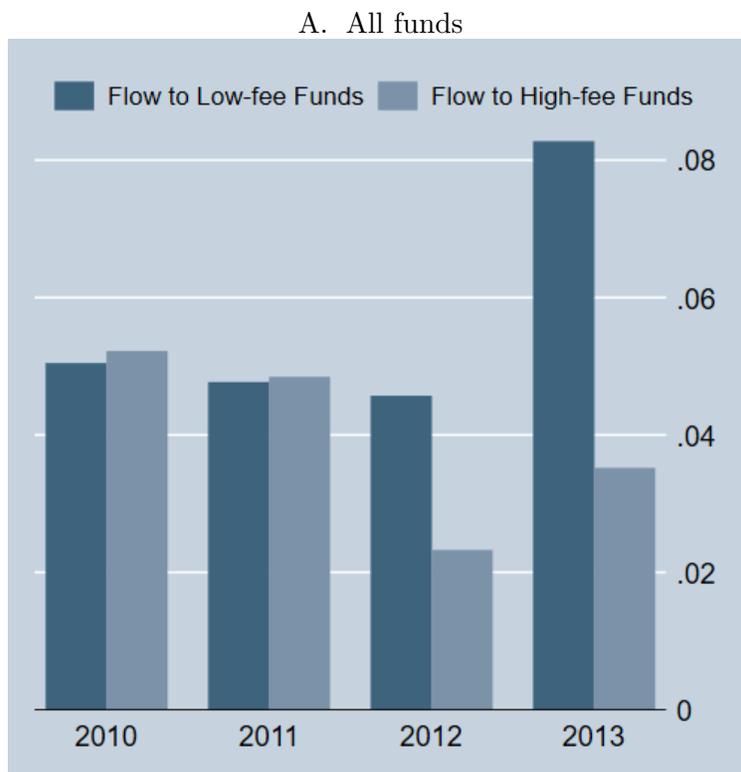
Table 1 **Descriptive statistics: Plan-level variables**
This table reports sample summary statistics for variables used in this paper. The sample covers plans that have between 3 and 100 funds as investment options, from 2010 to 2013. Panel A shows statistics of variables at the plan-year level. *#Funds in plan* is the number of fund options available in a plan. *Fee dispersion* is the difference in expense ratio between the 10th and 90th percentile fund in a plan-year. The table reports indicators of whether a plan includes employer stock, target-date funds, index funds, and affiliated funds, and the fraction of plan assets (in the case of employer stock) or the fraction of mutual fund assets that are invested in these options conditional on having that option. Panel B shows the number of funds available across various fund styles. We group our sample into the following six fund styles: balanced funds, domestic equity funds, foreign equity funds, domestic fixed income, foreign fixed income, and other, by mapping Lipper codes into these broader categories.

A. Summary statistics (plan-year level variables)

	mean	sd	p1	p25	p50	p75	p99	N
Plan size ($m)	799	2,004	2	67	322	747	8,536	5,577
# Plan participants ('000)	13.0	41.9	0.1	1.3	4.4	11.5	139.4	5,576
Contributions per participant ($)	4,586	2,448	601	2,650	4,274	6,470	8,794	5,492
Assets per participant ($ '000)	77.2	62.7	2.1	34.6	61.9	102.1	301.5	5,576
# Funds in plan (incl. newly added)	20.57	10.07	4	14	20	25	62	5,577
# Funds in plan (continued)	17.63	9.17	1	11	18	23	46	5,577
# Funds in plan, (cont. non-target date)	11.85	7.23	1	8	11	14	41	5,577
# Funds in plan, (cont. target date)	5.78	5.09	0	0	6	11	13	5,577
Average fee across all funds in plan (%)	0.57	0.19	0.16	0.44	0.61	0.69	1.05	5,575
Fee dispersion within plan (%)	0.70	0.25	0.10	0.54	0.71	0.86	1.29	5,575
Any employer stock in plan	0.66	0.47	0	0	1	1	1	5,577
Pct. of assets in employer stock	15.4%	16.4%	0.0%	4.3%	10.5%	20.7%	80.5%	3,693
Any target-date fund in plan	0.72	0.45	0	0	1	1	1	5,577
Pct. in target-date funds	25.5%	18.0%	0.0%	13.2%	21.5%	33.5%	84.7%	3,986
Any index fund in plan	0.92	0.27	0	1	1	1	1	5,575
Pct. in index funds	26.3%	23.0%	0.0%	8.7%	18.6%	39.5%	94.1%	5,111
Any affiliated funds in plan	0.62	0.49	0	0	1	1	1	5,263
Pct. in affiliated funds	51.0%	29.6%	0.0%	25.2%	55.0%	76.4%	99.4%	3,096

B. Fund choice sets

	Fund-Plan-Year level					Plan-year level				
	Total funds	% of all funds	Non-Target-date funds	Target-date funds	Avg. exp. ratio (%)	% of plan-years with at least one fund	#funds	p10	p50	p90
							(if at least one)			
Balanced	18,525	18.8%	3,596	14,929	0.545	77%	4.32	1	4	11
Domestic Equity	50,469	51.3%	36,745	13,724	0.583	98%	9.38	4	8	15
Domestic Fixed Income	17,188	17.5%	13,585	3,603	0.390	94%	2.16	1	3	6
Foreign Equity	10,646	10.8%	10,646	0	0.703	92%	3.35	1	2	3
Foreign Fixed Income	530	0.5%	530	0	0.743	8%	1.28	1	1	2
Other	971	1.0%	971	0	0.804	13%	1.55	1	1	2

Table 2 **Descriptive statistics: Investment option-level variables**
This table reports sample summary statistics for fund-by-plan level variables used in this paper. The sample covers plans that have between 3 and 100 funds as investment options, from 2010 to 2013. The observations are at the fund-plan-year level. We only include continuing funds (i.e., newly added or deleted funds are not included), and we further limit the sample to non-target-date funds. *Fund value* is the dollar value invested in fund in a plan, *Fund plan share* is the "market share" of a fund 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. *Flow (to | sum of fund assets)* is the annual dollar flow to a fund in a plan divided by the lagged sum of assets across all mutual funds in the plan; *Flow (to fund size)* is the dollar flow to a fund divided by the average of the starting and ending total fund value. Returns are annualized returns.

Summary statistics (fund-plan-year level variables, continued non-target-date funds)

	mean	sd	p1	p25	p50	p75	p99	N
Fund value ($1,000)	25,821	75,439	2	1,037	6,050	23,737	299,173	64,995
Fund plan share (%)	4.0	3.9	0.0	1.1	2.9	5.7	17.0	64,559
Expense ratio (%)	0.60	0.36	0.04	0.32	0.62	0.85	1.39	64,483
Flow ($1,000)	213	5,308	-16,453	-435	9	539	25,368	60,957
Flow (to sum of fund assets) (%)	0.117	1.708	-4.459	-0.355	0.023	0.430	7.89	60,957
Flow (to fund size) (%)	6.69	37.79	-100	-7.08	1.09	13.20	171.48	60,957
Positive flow (indicator)	0.537	0.499	0	0	1	1	1	60,957
Return 1-year (%)	14.5	15.0	-16.0	4.0	13.8	23.0	57.4	64,881
Return 5-year (%)	3.1	3.3	-4.6	1.1	3.0	5.3	11.8	63,438
Return 10-year (%)	6.1	3.6	-1.9	3.6	6.2	8.2	15.6	59,543

Table 3 **Fee-flow sensitivities around the disclosure reform**
This table reports results on the change in fee-flow sensitivities following the 2012 disclosure reform. The observations are at the fund-plan-year level. The sample period is 2010-2013, two years before and two years after the reform. The sample includes only continuing funds, i.e., we exclude funds that were newly added and funds that were deleted during the year, and thus for which flows are not driven by participant choices. Panel A describes results for all fund styles, and Panel B for domestic equity funds only. *Expense ratio* is the expense ratio of the fund (for the exact share class in the plan when available, or otherwise the minimum expense ratio across a fund's share classes). *Post* is an indicator for plans' fiscal years that end after December 1, 2012. The size control is measured as the lagged fund "market share" within the plan, interacted with year indicators. 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 mutual fund assets)		Flow (to fund size)		I[Positive flow]	
	(1)	(2)	(3)	(4)	(5)	(6)
Expense ratio * Post	-0.561***	-0.559***	-5.900***	-5.882***	-0.196***	-0.230***
	(-10.14)	(-5.86)	(-4.39)	(-3.07)	(-8.31)	(-9.33)
Expense ratio	0.186	0.204	3.355	5.739*	0.097*	0.183***
	(1.47)	(1.64)	(1.11)	(1.78)	(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	47,840	47,634	47,840	47,634	47,840	47,634

B. Domestic equity only

	Flow (to sum of mutual fund assets)		Flow (to fund size)		I[Positive flow]	
	(1)	(2)	(3)	(4)	(5)	(6)
Expense ratio * Post	-0.672***	-0.586***	-9.109***	-6.517***	-0.242***	-0.229***
	(-11.64)	(-6.40)	(-8.15)	(-3.34)	(-10.79)	(-7.94)
Expense ratio	0.128	0.179	4.165	9.463**	0.123*	0.204***
	(0.62)	(0.92)	(1.02)	(2.37)	(1.69)	(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	29,692	29,545	29,692	29,545	29,692	29,545

Table 4 **Extreme fees**

This table reports results on the change in the flow sensitivities to extreme fees (defined as the maximum or minimum fee within the plan-year) following the 2012 disclosure reform. The observations are at the fund-plan-year level. The sample, control variables, and fixed effects are defined in the same way as in Table 3. Columns (1)-(3) report results using the full sample (all fund styles), and columns (4)-(6) limit the sample to domestic equity funds only. *Minimum fee* and *Maximum fee* are indicators for whether the fund is the lowest- or highest-fee option in the plan (columns (1)-(3)), or within the set of domestic equity funds (columns (4)-(6)). *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.

Dependent variable: Flow (to sum of mutual fund assets)						
	All fund styles			Domestic equity only		
	(1)	(2)	(3)	(4)	(5)	(6)
Minimum fee * Post	0.529***	0.515***	0.317***	0.595***	0.565***	0.356***
	(9.21)	(8.97)	(3.97)	(10.03)	(9.93)	(5.19)
Minimum fee	-0.290***	-0.209***	-0.018	-0.283**	-0.211***	-0.038
	(-3.85)	(-4.55)	(-0.34)	(-2.50)	(-4.70)	(-0.80)
Maximum fee * Post		-0.280***	-0.163***		-0.263**	-0.136
		(-3.77)	(-2.63)		(-2.34)	(-1.18)
Maximum fee		0.048	-0.042		0.061	-0.009
		(1.11)	(-0.94)		(1.49)	(-0.22)
Expense ratio * Post			-0.406***			-0.435***
			(-5.47)			(-5.78)
Expense ratio			0.152			0.078
			(1.06)			(0.33)
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
R^2	0.812	0.812	0.812	0.805	0.806	0.806
N	47,840	47,840	47,840	29,692	29,692	29,692

Table 5 **Active vs. Index funds**

Panel A reports results on the effects of the disclosure reform on flows to index funds. Panel B reports results on the change in the fee-flow sensitivities in separate subsamples for active funds (columns (1)-(2)) and index funds (columns (3)-(4)), respectively. The observations are at the fund-plan-year level. The sample, control variables, and fixed effects are defined as in Tables 3 and 4. 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. Effect on indexing

Dependent variable: Flow (to sum of mutual fund assets)

	All fund styles		Domestic equity only	
	(1)	(2)	(3)	(4)
Index Fund * Post	0.434***	0.203***	0.498***	0.107
	(9.63)	(4.52)	(9.01)	(1.59)
Minimum fee * Post		0.237***		0.336***
		(2.61)		(3.61)
Maximum fee * Post		-0.061		-0.035
		(-1.06)		(-0.59)
Expense ratio * Post		-0.243***		-0.389***
		(-2.64)		(-4.77)
Minimum fee		-0.115*		-0.164**
		(-1.79)		(-2.22)
Maximum fee		-0.022		-0.028
		(-0.50)		(-0.62)
Expense ratio		0.101		0.072
		(0.70)		(0.31)
Plan*Fund FE	Yes	Yes	Yes	Yes
Size*Year controls	Yes	Yes	Yes	Yes
Plan*Style*Year FE	Yes	Yes	Yes	Yes
R^2	0.812	0.812	0.805	0.806
N	48,198	47,840	29,905	29,692

B. Fee-flow sensitivities in subsamples of active funds and index funds

Dependent variable: Flow (to sum of mutual fund assets)

	Only active funds		Only index funds	
	(1)	(2)	(3)	(4)
Expense ratio * Post	-0.250***	-0.405***	-0.605*	-0.661
	(-2.89)	(-4.49)	(-1.77)	(-1.64)
Expense ratio	0.032	-0.039	-0.293	0.056
	(0.21)	(-0.18)	(-0.39)	(0.06)
Sample	All fund styles	Domestic equity only	All fund styles	Domestic equity only
Plan*Fund FE	Yes	Yes	Yes	Yes
Size*Year controls	Yes	Yes	Yes	Yes
Plan*Style*Year FE	Yes	Yes	Yes	Yes
R^2	0.831	0.833	0.840	0.847
N	36,591	22,539	5,759	5,157

Table 6 **Placebo periods**

This table replicates the tests in Table 3 but for different four-year rolling windows between 2000 and 2011. 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

Dependent variable: Flow (to sum of mutual fund assets)

Period:	2000-2003 (1)	2001-2004 (2)	2002-2005 (3)	2003-2006 (4)	2004-2007 (5)	2005-2008 (6)	2006-2009 (7)	2007-2010 (8)	2008-2011 (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*Style*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

Dependent variable: Flow (to sum of mutual fund assets)

Period:	2000-2003 (1)	2001-2004 (2)	2002-2005 (3)	2003-2006 (4)	2004-2007 (5)	2005-2008 (6)	2006-2009 (7)	2007-2010 (8)	2008-2011 (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 7 **Who reacts to fees? Heterogenous effects based on participant and plan characteristics**
This table reports results on how changes to fee-flow sensitivities around the disclosure reform differ depending on the contribution rate of plan participants (Panel A) and the number of choices in the plan (Panel B). We adjust the expense measure by subtracting the average expense ratio in the plan-year. *Large contributions* is an indicator variable based on whether the annual dollar contribution per participant is above the sample median. *Number of choices* is the total number of mutual fund options available in a plan. Both of these interaction variables are measured as of 2009. *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. Participant contribution rate and fee-flow sensitivities

	All fund styles	Domestic equity
	(1)	(2)
Expense ratio (plan-year adj.)	0.145	0.155
	(0.77)	(0.61)
Expense ratio * Post	-0.454***	-0.526***
	(-5.43)	(-5.60)
Expense ratio * Large contributions	0.056	-0.095
	(0.25)	(-0.39)
Expense ratio * Post * Large contributions	-0.208**	-0.274**
	(-2.12)	(-2.51)
Plan*Fund FE	Yes	Yes
Size*Year controls	Yes	Yes
Plan*Style*Year FE	Yes	Yes
R^2	0.813	0.806
N	46,187	28,664

B. Number of choices and fee-flow sensitivities

	All fund styles	Domestic equity
	(1)	(2)
Expense ratio (plan-year adj.)	0.480**	0.434
	(2.19)	(1.50)
Expense ratio * Post	-0.699***	-0.847***
	(-6.34)	(-7.22)
Expense ratio * Number of choices	-0.011***	-0.012*
	(-3.18)	(-1.77)
Expense ratio * Post * Number of choices	0.006*	0.008**
	(1.75)	(2.16)
Plan*Fund FE	Yes	Yes
Size*Year controls	Yes	Yes
Plan*Style*Year FE	Yes	Yes
R^2	0.812	0.805
N	46,636	28,930

Table 8 **Plan-level reallocation: Affiliated vs. non-affiliated funds and mutual funds vs. employer stock**

Panel A reports results on how allocations to affiliated vs. non-affiliated funds are affected by the fee disclosure reform, depending on the average fee difference between affiliated vs. non-affiliated funds in a plan. Panel B reports results on how allocations to employer stock were affected by the fee disclosure, depending on the average fees of the available mutual funds in the plan. The dependent variable in Panel A is the fraction of assets that are invested in affiliated funds to total assets invested across all mutual funds, and in Panel B, the fraction of assets in employer stock to total plan assets. The explanatory variable of interest in Panel A is the difference between the average fee of affiliated funds and the average fee of non-affiliated funds, and in Panel B it is the average fee of the available mutual funds. We limit the sample to plans that have both some affiliated and non-affiliated options in Panel A, and to plans that include an option to invest in both employer stock and mutual funds in Panel B. The regressions include plan fixed effects and time fixed effects based on the fiscal year-end month of the plan. *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 mutual fund assets in affiliated funds

Expense ratio difference [Aff – Non-aff funds] * Post	-0.026***
	(-2.79)
Expense ratio difference [Aff – Non-aff funds]	-0.008
	(-0.23)
Plan FE	Yes
Time FE	Yes
R^2	0.950
N	2,567

B. Plan-level reallocation between mutual funds vs. employer stock

Dependent variable: Percent of total plan assets in employer stock

Expense ratio (plan average) * Post	0.013*
	(1.74)
Expense ratio (plan average)	-0.020*
	(-1.77)
Plan FE	Yes
Time FE	Yes
R^2	0.969
N	3,415

Table 9 **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 one, five, and ten years. We measure these past returns as of the start of the plan's fiscal year; e.g., the one-year returns for a plan-year that starts in January 2012 are the annualized returns of the mutual fund options between January 2011 and December 2011. All other measures and controls are the same as in Table 3. 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.

Dependent variable: Flow (to sum of mutual fund assets)				
	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*Style*Year FE	Yes	Yes	Yes	Yes
Fund Company*Year FE	No	Yes	No	Yes
R²	0.818	0.826	0.812	0.802
N	43,486	43,343	27,499	27,390

Table 10 **Fund-level effects of the reform**
This table reports fund-level results on the effects of the disclosure reform, excluding target-date funds. The data are at the fund-year level (we aggregate across all share classes within a fund), and the sample period is 2010-2013. *Post*-reform years are 2012 and 2013. Panel A reports summary statistics; the variables are at the fund-year level. In Panel B, we test whether the flow-sensitivities to fees experience differential changes around the reform for funds that are more vs. less exposed to flows from defined contribution plans. Flows are measured using the average monthly flows over the fund-year. Expense ratio is measured as the minimum expense ratio across a fund's share classes, and adjusted by subtracting the average expense ratio in the same fund-style and year. The measures of exposure to DC plans, called *DC intensity*, are based on 1) whether the fund is part of any plan in our sample, 2) Log(*Number of plans with fund+1*) which is the natural logarithm of one plus the number of defined contribution plans in our sample that include the fund, and 3) *Percent of fund assets in plans,* which is the fraction of a fund's TNA that can be attributed to these DC plans. All of these DC intensity measures are measured as of 2009, the year immediately before the sample period. We control for size (log TNA), interacted with year indicators, fund fixed effects, fund-style-by-year fixed effects, and index fund by year fixed effects as indicated. *t*-statistics based on standard errors that are robust to heteroskedasticity and clustered by fund 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 (%)	1.67	7.91	-7.42	-1.17	-0.13	1.62	54.30	37,934
Expense ratio (%)	0.86	0.45	0.09	0.54	0.83	1.11	2.25	29,630
Return, 1-year (%)	11.88	16.24	-25.70	1.05	10.85	19.41	65.32	36,975
Return, 5-year (%)	2.17	3.90	-9.76	0.40	2.42	4.41	11.80	22,084
Return, 10-year (%)	4.59	3.71	-5.01	2.17	4.37	6.44	15.36	16,294
Log(Total Net Assets)	5.25	1.99	0.69	3.88	5.32	6.62	9.74	39,081
Fund included in any plan	0.28	0.45	0.00	0.00	0.00	1.00	1.00	35,838
Percent of fund assets in plans (%)	2.53	11.38	0.00	0.00	0.00	0.01	78.68	35,838
Number of plans with fund	2.20	13.96	0	0	0	1	43	35,838
Percent of fund assets in plans | >0 (%)	8.77	19.40	0.00	0.15	1.52	7.44	100.00	9,944
Number of plans with fund | >0	7.93	25.63	1	1	2	5	101	9,944

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

Dependent variable: Fund flow	Measure of DC intensity:					
	Fund in any plan		Log(Number of plans with fund+1)		Percent of fund assets in plans	
	(1)	(2)	(3)	(4)	(5)	(6)
Expense ratio (lagged, style adj.)	0.801	0.728	0.906*	0.837*	0.768	0.676
	(1.55)	(1.39)	(1.81)	(1.65)	(1.59)	(1.37)
Expense ratio * Post	-0.391	-0.294	-0.329	-0.246	-0.545**	-0.421
	(-1.57)	(-1.00)	(-1.38)	(-0.86)	(-2.54)	(-1.56)
Expense ratio * DC intensity	0.095	0.054	-0.399	-0.417	3.394	3.438
	(0.08)	(0.05)	(-0.69)	(-0.72)	(0.47)	(0.48)
Post * DC intensity	-0.479***	-0.463***	-0.374***	-0.360***	-0.699	-0.640
	(-2.99)	(-2.88)	(-4.32)	(-4.16)	(-0.77)	(-0.71)
Expense ratio * Post * DC intensity	-0.797**	-0.749**	-0.731***	-0.699***	-3.805**	-3.662**
	(-2.10)	(-1.99)	(-3.87)	(-3.76)	(-2.31)	(-2.23)
Size*Year control	Yes	Yes	Yes	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Fund-style * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Index fund * Year FE	No	Yes	No	Yes	No	Yes
R^2	0.489	0.489	0.489	0.489	0.489	0.489
N	26,635	26,635	26,635	26,635	26,635	26,635

Figure A.1 **Reshuffling of funds within plans**
This figure plots the fraction of plans that have any additions or deletions of funds (top panel), as well as the number of additions and deletions scaled by the lagged number of available funds (bottom panel). We limit the sample to plan-years that have between 3 and 100 funds.
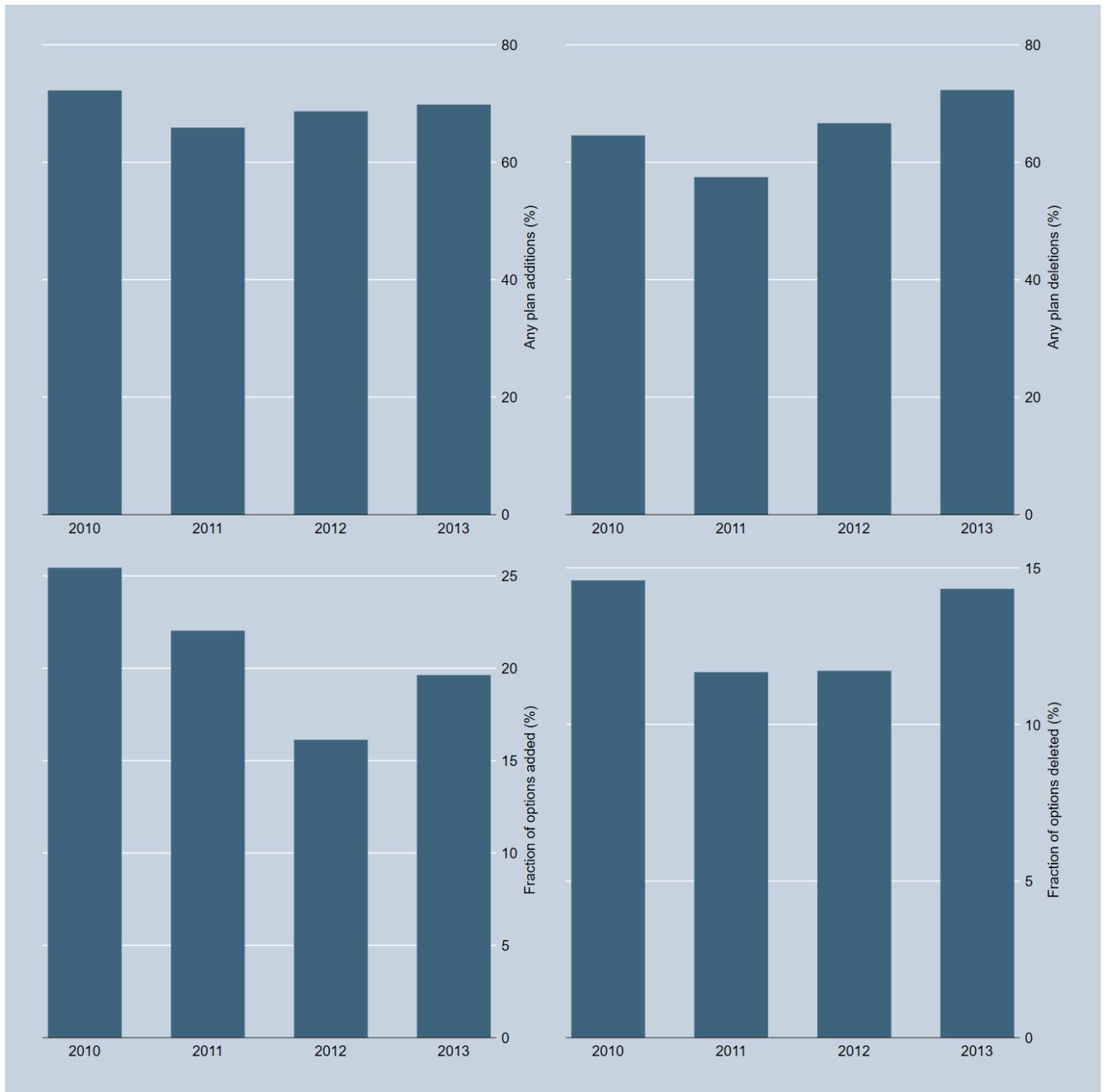
Table A.1 **Summary statistics for target-date funds**
This table describes summary statistics like those in Table 2, but for target-date funds, which were not included in Table 2.

	mean	sd	p1	p25	p50	p75	p99	N
Fund value ($1,000)	11,713	30,885	2	633	2,852	9,931	142,161	32,256
Fund plan share	1.88	2.34	0.00	0.37	1.07	2.50	11.47	32,097
Expense ratio (%)	0.49	0.27	0.16	0.18	0.57	0.73	1.07	31,405
Flow ($1,000)	1,186	4,065	-6,378	5	259	1,254	21,487	30,731
Flow (to sum of fund assets) (%)	0.42	1.38	-2.54	0.01	0.20	0.55	7.89	30,731
Flow (to fund size) (%)	23.07	45.89	-100	1.53	15.58	36.14	188.44	30,731
Positive flow (indicator)	0.774	0.418	0	0	1	1	1	30,731
Return 1-year (%)	13.1	10.8	-5.0	5.2	13.9	16.7	39.0	31,596
Return 5-year (%)	2.3	1.4	-0.9	1.3	2.5	3.4	5.0	22,477
Return 10-year (%)	4.4	2.2	0.0	2.7	3.7	6.5	8.4	4,633

Table A.2 **Fees and fund flows, 11-K vs. top-1000 samples**
This table is similar to Panel A of Table 3, but limited to the sample based on form 11-K filers (Panel A) or top 1000 largest plans from Form 5500 (Panel B), respectively. These samples overlap for around 15% of plans.

A. 11-K sample only

	Flow (to sum of mutual fund assets)		Flow (to fund size)		I[Positive flow]	
	(1)	(2)	(3)	(4)	(5)	(6)
Expense ratio * Post	-0.552***	-0.572***	-5.309***	-4.434*	-0.179***	-0.202***
	(-8.30)	(-5.87)	(-3.21)	(-1.91)	(-6.93)	(-6.80)
Expense ratio	0.248	0.313**	3.429	5.517*	0.111*	0.188***
	(1.57)	(1.99)	(1.05)	(1.68)	(1.76)	(3.23)
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	0.812	0.821	0.766	0.775	0.691	0.705
N	31,007	30,801	31,007	30,801	31,007	30,801

B. Top-1000 sample only

	Flow (to sum of mutual fund assets)		Flow (to fund size)		I[Positive flow]	
	(1)	(2)	(3)	(4)	(5)	(6)
Expense ratio * Post	-0.633***	-0.604***	-7.047***	-8.749***	-0.250***	-0.304***
	(-8.58)	(-3.52)	(-4.76)	(-2.65)	(-7.82)	(-7.26)
Expense ratio	0.213	0.207	-7.047***	-8.749***	0.113	0.227**
	(1.25)	(1.28)	(-4.76)	(-2.65)	(1.39)	(2.47)
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	0.813	0.827	0.745	0.762	0.689	0.711
N	24,199	24,001	24,199	24,001	24,199	24,001

Table A.3 **Fees and fund flows, shorter window (2011-2012)**
This table is similar to Table 3, but limited to the 2011-2012 sample period.

A. All fund styles

	Flow (to sum of mutual fund assets)		Flow (to fund size)		I[Positive flow]	
	(1)	(2)	(3)	(4)	(5)	(6)
Expense ratio * Post	-0.412***	-0.490***	-4.438***	-4.749**	-0.175***	-0.209***
	(-5.40)	(-6.44)	(-2.86)	(-2.00)	(-5.61)	(-6.17)
Expense ratio	0.540*	0.526**	10.367**	12.687**	0.052	0.152
	(1.73)	(2.24)	(1.99)	(2.45)	(0.45)	(1.47)
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	0.874	0.883	0.811	0.823	0.773	0.786
N	22,304	22,198	22,304	22,198	22,304	22,198

B. Domestic equity only

	Flow (to sum of mutual fund assets)		Flow (to fund size)		I[Positive flow]	
	(1)	(2)	(3)	(4)	(5)	(6)
Expense ratio * Post	-0.618***	-0.561***	-9.853***	-7.931***	-0.258***	-0.246***
	(-11.26)	(-5.24)	(-9.04)	(-3.24)	(-10.50)	(-6.25)
Expense ratio	0.179	0.562**	8.400	15.100***	-0.109	0.099
	(0.55)	(2.15)	(1.34)	(2.88)	(-0.81)	(0.85)
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	0.877	0.883	0.819	0.830	0.764	0.776
N	13,800	13,722	13,800	13,722	13,800	13,722

Table A.4 **Fees and fund flows, alternative specifications**
This table is similar to Table 3. In Panel A we show results with fewer fixed effects and controls. In Panels B and C we replace the expense ratio with the fund's fee in 2009 and the value-weighted fee across all share classes of a fund, respectively.

A. Fewer controls

Dependent variable: Flow (to sum of mutual fund assets)

	All funds		Domestic equity only	
	(1)	(2)	(3)	(4)
Expense ratio * Post	-0.290***	-0.289***	-0.372***	-0.385***
	(-7.37)	(-7.71)	(-7.84)	(-8.09)
Expense ratio	-0.060	-0.196***	0.007	-0.199***
	(-0.86)	(-3.75)	(0.09)	(-2.94)
Size*Year controls	No	Yes	No	Yes
Fund * Plan FE	No	No	No	No
Plan*Style*Year FE	Yes	Yes	Yes	Yes
R^2	0.566	0.596	0.555	0.597
N	54,091	53,676	33,366	33,117

B. Fees measured as of 2009

Dependent variable: Flow (to sum of mutual fund assets)

	All funds	Domestic equity only
	(1)	(2)
Expense ratio (2009) * Post	-0.521***	-0.598***
	(-10.56)	(-10.24)
Plan*Fund FE	Yes	Yes
Size*Year controls	Yes	Yes
Plan*Style*Year FE	Yes	Yes
R^2	0.812	0.805
N	47,661	29,628

Table A.4, continued

C. Value-weighted fee for the fund
Dependent variable: Flow (to sum of mutual fund assets)

	All funds (1)	Domestic equity only (2)
Expense ratio (value-weighted across share classes) * Post	-0.520***	-0.653***
	(-10.37)	(-12.75)
Expense ratio (value-weighted across share classes)	0.382*	0.001
	(1.74)	(0.00)
Plan*Fund FE	Yes	Yes
Size*Year controls	Yes	Yes
Plan*Style*Year FE	Yes	Yes
R^2	0.812	0.806
N	47,833	29,692

Table A.5 **Fee-flow sensitivities of target-date funds around the reform**
This table reports results on fee-flow sensitivities around the disclosure reform for target-date funds. Target-date funds tend to be default choices and the choice of which target-date fund is likely driven by reasons other than fees. We thus expect participants to respond less to target-date funds' fees compared to those of non-target-date funds that were analyzed in the previous tables. The regression setup is similar to that in Table 3, but the sample includes target-date funds only. 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. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)
Dependent variable: Flow (to sum of mutual fund assets)		
Expense ratio * Post	-0.122	-0.111
	(-0.40)	(-0.35)
Expense ratio	1.834***	1.897***
	(4.27)	(4.37)
Plan*Fund FE	Yes	Yes
Size*Year controls	Yes	Yes
Plan*Style*Year FE	Yes	Yes
Fund Company*Year FE	No	Yes
R^2	0.751	0.751
N	28,021	28,019

Table A.6 **Robustness: Return-flow sensitivity, flows normalized by fund size**
This table replicates the tests in Table 9, replacing the dependent variable with dollar flows normalized by the average of the lagged and current fund size (equation (2)).

Dependent variable: Flow (to fund size)

	All funds		Domestic equity only	
	(1)	(2)	(3)	(4)
Return 1-year * Post	51.195***	56.618***	73.219***	67.049***
	(3.88)	(3.36)	(5.28)	(3.82)
Return 5-year * Post	9.223	18.331	-21.130	33.913
	(0.26)	(0.54)	(-0.69)	(0.94)
Return 10-year * Post	-44.327	-62.910	-63.734**	-74.026
	(-1.07)	(-1.27)	(-2.17)	(-1.64)
Expense ratio * Post	-2.645*	-2.743	-4.348***	-3.523
	(-1.96)	(-1.41)	(-3.47)	(-1.51)
Return 1-year	4.577	4.619	2.564	7.129
	(1.21)	(1.28)	(0.44)	(1.22)
Return 5-year	-10.574	-30.219	-11.808	-41.078
	(-0.19)	(-0.52)	(-0.31)	(-0.96)
Return 10-year	39.661***	27.994**	35.065**	26.819**
	(2.76)	(2.22)	(2.53)	(2.08)
Expense ratio	3.187	5.008*	2.048	8.207*
	(1.09)	(1.66)	(0.49)	(1.96)
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	0.766	0.775	0.775	0.785
N	43,487	43,344	27,504	27,395

Table A.7 **Extreme performance**

This table reports results on the change in the flow sensitivities to extreme performance (defined as the maximum or minimum one-year return within the plan-year) following the 2012 disclosure reform. The observations are at the fund-plan-year level. The sample, control variables, and fixed effects are defined in the same way as in Table 9. Columns (1)-(3) describe results for all fund styles, and columns (4)-(6) for domestic equity funds only. *Maximum return* and *Minimum return* are indicators for whether the fund has the highest or lowest one-year return across all funds in the plan (columns (1)-(3)), or within the set of domestic equity funds (columns (4)-(6)). 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.

Dependent variable: Flow (to sum of mutual fund assets)

	All funds			Domestic equity only		
Maximum return * Post	0.004	-0.016	-0.148**	0.052	0.041	-0.075
	(0.05)	(-0.24)	(-2.03)	(1.00)	(0.77)	(-1.14)
Maximum return	0.170***	0.176***	0.082*	0.168***	0.135***	0.067
	(4.41)	(4.57)	(1.75)	(4.27)	(3.56)	(1.31)
Minimum return * Post		-0.197***	-0.001		-0.106*	0.030
		(-3.08)	(-0.02)		(-1.69)	(0.57)
Minimum return		0.344***	0.340***		-0.137***	-0.091**
		(5.08)	(4.82)		(-3.25)	(-2.42)
Return 1-year * Post			2.661***			2.741***
			(6.03)			(5.13)
Return 1-year			0.551**			0.576*
			(2.52)			(1.85)
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
R^2	0.811	0.811	0.812	0.804	0.804	0.805
N	48,082	48,082	48,082	29,859	29,859	29,859

Table A.8 **Robustness: Excluding plans with fund deletions**
This table replicates Table 3 but excludes any plan-years that had any funds that were 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 takes place in the same fund style (where styles are defined as described in Table 1).

A. All funds

| | Sample: | | | |
| | 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

| | Sample: | | | |
| | 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 A.9 **Sensitivity of deletions to fees around disclosure reform**
This table shows results for the sensitivity of plan deletions to expenses. The dependent variable is an indicator
for whether a fund is deleted from a plan (i.e., the fund 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 an OLS regression model. Controls include the natural
logarithm of the dollars invested in the fund, and the fraction of plan assets invested in the fund, target-date
fund fixed effects interacted with year, and plan*style*year fixed effects.

Dependent variable: Fund 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 (Dollars Invested in Fund, lagged)	-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 Date Fund*Year FE	Yes	Yes
Plan*Style*Year FE	Yes	Yes
R^2	0.372	0.405
N	70,611	39,276

Table A.10 **Fund-level evidence of fee- and return-sensitivities around the reform**
This table adds return sensitivities to Panel B of Table 10.

	Measure of DC intensity:		
	Fund in any plan	Log(number of plans with fund+1) (1)	Percent of fund assets in plans (2)
Expense ratio (lagged, style adj.)	0.6386	0.9339	0.6053
	(0.96)	(1.42)	(0.94)
Return (1-year, style adj., lagged)	2.1609	1.9448	1.3956
	(1.54)	(1.63)	(1.61)
Return (5-year, style adj., lagged)	13.7936*	15.4919**	15.1405***
	(1.76)	(2.41)	(3.21)
Return (10-year, style adj., lagged)	3.4436	5.4876	10.0348***
	(0.70)	(1.21)	(2.69)
Post * DC intensity	-0.3473*	-0.3083***	0.4809
	(-1.76)	(-3.12)	(0.37)
Expense ratio * Post	0.0157	0.0026	-0.2071
	(0.05)	(0.01)	(-0.68)
Return 1-year * Post	3.3138	3.2908	4.0393**
	(1.12)	(1.34)	(2.25)
Return 5-year * Post	-4.3248	-3.5601	0.1372
	(-0.71)	(-0.67)	(0.03)
Return 10-year * Post	17.4206***	16.1881***	13.5170***
	(2.69)	(2.98)	(3.33)
Expense ratio * DC intensity	0.3447	-0.5687	4.1410
	(0.22)	(-0.89)	(0.51)
Return 1-year * DC intensity	-0.9463	-0.3864	19.2646*
	(-0.57)	(-0.48)	(1.74)
Return 5-year * DC intensity	7.2920	3.1313	64.7688
	(0.81)	(0.88)	(1.25)
Return 10-year * DC intensity	10.4534	3.8080	-1.9573
	(1.54)	(1.43)	(-0.06)
Expense ratio*Post*DC intensity	-1.0267**	-0.7052***	-3.8090
	(-2.20)	(-3.31)	(-1.61)
Return 1-year*Post*DC intensity	0.1466	0.2487	-34.7280*
	(0.04)	(0.18)	(-1.82)
Return 5-year*Post*DC intensity	10.3115	5.1340*	40.6472
	(1.37)	(1.72)	(0.93)
Return 10-year*Post*DC intensity	-2.6946	0.7698	26.4900
	(-0.36)	(0.25)	(0.57)
Size*Year control	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes
Fund-style * Year FE	Yes	Yes	Yes
Index fund * Year FE	Yes	Yes	Yes
R^2	0.433	0.433	0.433
N	15,577	15,577	15,577