

I Can See Clearly Now: The Impact of Disclosure Requirements on 401K Fees.

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Abstract

In 2012, the Department of Labor (DOL) imposed new disclosure requirements concerning the indirect fees earned by 401(k) retirement plan service providers through revenue sharing agreements with mutual funds. This paper examines the impact of these fee disclosure requirements on the level and structure of fees paid by retirement plans. We argue that when revenue sharing is not disclosed in a prominent way, revenue sharing provides a way for service providers to price discriminate between larger, better informed plan sponsors and smaller less sophisticated sponsors. Consistent with this argument, we find that disclosure requirement designed to increase the transparency of indirect fees are associated with a substitution of direct fees for indirect fees and a reduction in total fees paid by smaller retirement plans. We also find that mutual fund providers responded to increased revenue sharing disclosure requirements by introducing retirement fund share classes with lower 12b-1 fees. Finally, we find that disclosure changes are associated with an increase in low-cost mutual funds offered as investment options offered by small plans.

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I. Introduction

Consumers often pay for the advisory services of financial intermediaries indirectly in the form of contingent commissions or rebates that are paid by firms offering investment products or other services to intermediaries such as brokers, financial advisors, and record keepers. Indirect compensation arrangements raise concerns about conflicts of interest, since they may lead financial intermediaries to select service providers based on the amount of the commissions paid rather than on the quality of services provided or the overall cost to consumers. Moreover, if indirect compensation arrangements are not disclosed to consumers or such disclosures are not sufficiently prominent, intermediaries may use indirect compensation as a form of price discrimination. Price discrimination, in turn, can lead to naïve or less well-informed consumers paying more for financial services than consumers who recognize that indirect compensation might bias the advice provided by financial intermediaries.

In this paper, we study how disclosure requirements concerning indirect compensation affect the level and structure of compensation paid to financial intermediaries as well as their ability to engage in price discrimination. We examine these issues through the effect of disclosure requirements, imposed by the Department of Labor (DOL), on the compensation paid to intermediaries that provide services to sponsors of defined contribution retirement plans (i.e. 401 (k) retirement plans).

Our empirical analysis is motivated by an extensive theoretical literature that examines the effects of price complexity and information shrouding on the formation of prices in the market for financial services. For example, Carlin (2009) analyzes how price complexity, in the form of indirect surcharges, add-ons and complex disclosures can, in equilibrium, lead to poorly informed consumers paying more for financial services. Gabaix and Laibson (2006) examine how information shrouding, in which product add-ons or indirect fees are used to obscure the true price of consumer products, can facilitate price discrimination. In a related study, Inderst and Ottaviani (2012a, 2012b) show how indirect fees and rebates paid to financial advisors by investment product providers can result in price discrimination because some consumers fail to account for how indirect fees affect the quality of recommendations made by financial advisors. A common theme of these models is that, in equilibrium, complex pricing and the resulting price discrimination can persist because a portion of the consumer population behaves myopically or naïvely, either because of behaviorally biases or because fee information is not disclosed in an easily understood or prominent way.

There has been a long-standing concern, by the DOL, regarding the transparency of the pricing of investments and services offered to 401(k) plan participants. Firms sponsoring 401(k) plans on behalf of

their employees are responsible for choosing the menu of investment options offered by the plan. However, in practice, plan sponsors typically rely on service providers, such as advisors and record keepers, to construct and manage the menu of investment options and to administer the daily operations of their plans.¹ Service providers to 401(k) plans are generally paid through a combination of direct and indirect fees. The primary form of indirect compensation comes from revenue sharing arrangements in which investment product providers, such as mutual funds, share some of the fees they charge plan participants with the record keeper or advisor to the 401(k) plan. A concern with revenue sharing is that the practice may facilitate the shrouding of fees and lead plan advisors to recommend investment products with higher cost. In response to such concerns the DOL mandated new fee disclosure requirements in 2012 (Rules 408(b) (2) and 404 (a) (5)) with the specific intention to make direct and indirect fees earned by service providers more transparent and comparable for plan sponsors and participants.

The disclosure requirements mandated by the DOL in 2012 provide an ideal opportunity to investigate the impact of complex or shrouded prices on the cost of advisory services for two reasons. First, we are able to obtain information on direct and indirect fees paid by 401(k) plans to their service providers *both* before and after the implementation of these regulatory changes. Plan sponsors have been required (with certain exceptions, as discussed later) since 2009 to disclose to the DOL (but not to plan participants) the amount of indirect and direct compensation paid by plan participants. Despite these existing disclosure requirements, survey evidence suggests that many plan sponsors were unaware of whether their service providers had revenue sharing arrangements with investment providers (see GAO (2011)).² Second, because the DOL data cover the majority of private 401(k) plans in the U.S. there is substantial variation in plan size as measured by total assets. This allows us to use plan size as a proxy for plan sponsor sophistication, under the assumption that larger plans are likely to be better informed of the potential incentive conflicts associated with indirect compensation arrangements. As a result, we are able to use these regulatory changes as a quasi-natural experiment to examine the impact of disclosure requirements on the pricing of services to 401 (k) plans.

If prior to the regulatory changes in 2012, competition among service providers combined with plan sponsor sophistication lead to an equilibrium in which the fees charged by service providers to 401(k)

¹ As discussed later, most record keepers are “bundled” service providers that provide both record keeping and advisory services.

² One explanation for the lack of awareness of revenue sharing by plan sponsors is that they delegate to service providers the task of reporting this information to the DOL.

plans were close to competitive levels, then we expect the disclosure requirements to have little impact on the level and structure of their compensation. Alternatively, if revenue sharing facilitated price discrimination prior to the regulatory changes and the new disclosure requirements resulted in greater transparency and increased plan sponsors' awareness of indirect compensation arrangements, we expect *both* a substitution of direct for indirect fees *and* a reduction of total fees charged after 2012. Moreover, if plan size is a proxy plan sponsor sophistication, we expect the impact of the disclosure requirements on service provider compensation to be greatest among smaller retirement plans.

Our empirical analysis consists of three parts. In the first part, we use data on direct and indirect compensation paid to third party service providers reported on Schedule C of Form 5500 filed annually by plan sponsors with DOL. Our sample consists of 39,519 401(k) plans that filed Form 5500 from 2010 through 2014. Using these data, we examine changes in the level of direct and indirect compensation around the 2012 regulatory changes. We use plan size measured by total assets as a proxy for plan sponsor sophistication or naïveté.

Overall, we find a dramatic shift away from indirect compensation and towards direct compensation for plan services across all plan sizes after 2012. Specifically, we document that total indirect compensation relative to total assets declined after 2012 by 36% relative to the mean (significant at the 1%-level). We also find a decrease in the proportion of indirect compensation to total compensation. Our findings are robust to controlling for plan fixed effects to address concerns regarding unobservable differences between plans. Consistent with revenue sharing enhancing the ability of plan advisors and mutual funds to price discriminate, we find a significant decrease in the overall compensation of service providers only among smaller plans.

While our results based on plan level compensation are consistent with the argument that disclosures reduced price discrimination, the short time series of compensation data available from the DOL makes it difficult to control for potential confounding factors that may affect service provider compensation. In the second part of our analysis, we address this concern by examining the shift in investor demand for mutual funds that are less likely to engage in revenue sharing with plan advisors around the 2012 regulatory changes. Specifically, we analyze the introduction and movement of fund flows into mutual fund share classes that target 401(k) retirement plans and that charge low 12b-1 fees. We base this analysis on a large sample of mutual funds from the monthly CRSP mutual fund database between 2008 and 2015.

The second part of our analysis is motivated by the fact that a common form of revenue sharing involves mutual fund providers on a plans' menus charging 12b-1 fees and then rebating some or all of

these fees back to the record keeper or plan advisor.³ Since plan sponsors are responsible for selecting the investment options offered to participants, they can add additional mutual funds to the menu or negotiate with advisors and mutual fund providers to change the share classes of funds already on the menu. Therefore, if changes in disclosure requirements cause a substitution of direct for indirect compensation, then we expect to find an increase in the demand for retirement fund share classes (so called R share classes) with lower 12b-1 fees and thus an increase in the number of lower cost retirement fund share classes after 2012. By adding a new R share class with lower 12b-1 fees to an existing fund, a fund which is already on a plan's menu can remain on the menu while satisfying the plan sponsor's demand for less revenue sharing and more transparent compensation. The advantage of this strategy for identifying the impact of regulation is that we can use retail mutual fund share classes, which should be unaffected by the regulatory changes, as a control group in our empirical tests. Moreover, the longer time series information on mutual fund flows (from 2008 through 2015) allows us to conduct placebo tests to identify whether 2012 is the year in which a structural break occurs.

Overall, we find that mutual funds add a substantial number of new retirement share classes with low 12b-1 fees to their existing line up after the new disclosure requirement are implemented. In contrast, we find no such increase in the number of new retail share classes that are added to existing mutual funds. Controlling for fund performance and other factors, we further document that, relative to retail share classes, retirement share classes with high (low) 12b-1 fees experience significant outflows (inflows) after 2012.

The third part of our empirical analysis directly tests whether the new disclosure requirements affect plan menus in terms of the mutual funds available to plan participants. Unlike the data used in the first two parts of our analysis, the data on the investment options offered by individual 401(k) plans are not available in a machine-readable format. Therefore, we examine changes in plan menus using a hand-collected sample of mutual fund holdings for a random sample of 400 plans around the regulatory changes.

For small plans, we find that after 2012, new funds added to their menus have significantly lower 12b-1 fees than existing funds on the menus. In contrast, for the largest plans we find no increase in the propensity of plans to add lower 12-1 fee funds to the menu. Thus, the disclosure requirements appear to have prompted smaller plan sponsors to include lower cost funds on their plan menus.

³ For discussion of revenue sharing arrangements involving 12b-1 fees in 401(k) plans see ICI Research Perspective (2016).

Our study contributes to several strands of the literature on the prominence of price disclosures, the effect of complexity on the pricing of financial services, and the potential incentive conflicts that may arise between 401(k) service providers and plan participants. First, previous empirical studies on the impact of the prominence of price disclosures have focused primarily on the impact of the salience of taxes on consumer choice. For example, Finkelstein (2009) finds that the way in which highway tolls are collected (i.e. electronically versus cash collection) affects driver awareness of tolls and the elasticity of driving with respect to tolls. Other studies on how taxes are collected find that the prominence of information disclosures concerning taxes significantly effects on how consumers react to tax changes and the amount of taxes paid.⁴ These studies argue that the prominence of disclosures has an impact because consumers are often biased in that they rely too heavily on information that is most prominent while ignoring information that may be of equal or greater importance in decision making but is not as conspicuous. We add to this literature by providing empirical evidence that shows that the way that fees are disclosed affects the structure of fees and more importantly the cost of services paid by retirement plan participants.

Second, we provide evidence consistent with the predictions of theoretical models of price complexity and competition for advisory services by Carlin (2009) Gabaix and Laibson (2006) and Inderst and Ottaviani (2012a, 2012b). These models predict that naïve or myopic consumers will be exploited, with benefits accruing to either sophisticated consumers or to service providers with some monopoly power. Our results suggest that requiring plan sponsors to assess all indirect and direct fees paid relative to the value of services received and requiring this information be disclosed to plan participants in summary form increases the transparency and leads to a reduction in administrative costs paid by participants of smaller plans.

Third, and more broadly, our paper contributes to the literature regarding the effectiveness of disclosure requirements on the fees paid by consumers of financial services. Generally, this literature finds that mandatory disclosures have little impact on consumer choices and fees paid.⁵ We show that disclosures of the impact of fees on the cost paid by plan participants leads to a reduction in fees paid for plans with the least sophisticated sponsors.

⁴ For a summary of this literature see Schenk (2011).

⁵ For example, disclosure requirements associated with credit cards and mortgages have arguably met with only limited success (see for example Ausubel (1991), Agarwal et al (2015)). Similarly, Bertrand and Morse (2011) find limited effects on the borrowing behavior of borrowers using payday loans when provided with more disclosure about the cost of payday loans relative to other financing options. One potential explanation for the limited effect of disclosure requirements in consumer loan markets is that consumers are credit constrained.

The remainder of the paper is organized as follows. Section II provides a summary of the institutional background and disclosure requirements of defined contribution plans and also describes a framework for evaluating the effect of revenue sharing on plan expenses. In Section III we describe our data sources. Section IV analyzes the impact of disclosure requirements on the compensation to plan service providers. Section V provides evidence that disclosures of the expected costs of indirect fees increased the demand for mutual funds that provide less revenue sharing. Section VI examines how the disclosure requirements affected the investment options offered on plan menus. Section VII provides a summary and concludes.

II. Background and Hypothesis Development

In this section we provide a summary of the institutional background of 401(k) plans and the new disclosure rules mandated by the DOL. We also discuss and develop four testable hypotheses that guide our empirical analysis in Sections IV through VI. We keep our discussion of the institutional background surrounding 401(k) plans to a relevant minimum and provide an in-depth discussion of all the disclosure requirements regarding service provider compensation in the Internet Appendix.

A. Summary of the institutional background and fee disclosure requirements

Sponsors of 401(k) plans, especially of small plans, often delegate the design and operation of the plan to an intermediary that serves as a bundled service provider. A bundled service provider is typically affiliated with investment product providers and provides record keeping, advisory, and investment management services, and may contract with other providers to provide additional services.⁶ There are two ways in which these plan service providers are compensated out of plan assets. The first is direct compensation paid by plan participants either in the form of a fee per dollar of assets in the plan or a combination of an asset-based fee plus a fixed fee per participant. The second is indirect compensation in the form of revenue sharing agreements with investment product providers. A typical revenue sharing agreement involves a mutual fund on the plan menu sharing a portion or all of the 12b-1 fees or account servicing fee paid by plan participants who invest in the fund.⁷ One justification for revenue sharing is that the plan service provider will provide certain services to participants that the mutual fund company would

⁶ For a description of the structure of service provider arrangements and the role of various service providers, see GAO (2012). For a study that examines the affiliations of bundled service provider, see ICI Research Perspective (2016).

⁷ Revenue sharing agreements are not limited to mutual funds, and mutual funds may also use sub-agency fees or shareholder fees for revenue sharing (GAO 2011). We focus on mutual funds and 12b-1 fees for two reasons. First over our sample period mutual funds are the most common form of investment option on 401(k) plan menus, with the average (median) plan investing about 63% (80%) of assets in mutual funds. Second, while CRSP reports 12b-1 fees it does not report sub-agency or shareholder fees.

otherwise directly provide to individual investors. For example, a service provider acting as a record keeper may combine participants' investments in a mutual fund in an omnibus account and track individual account contributions, withdrawals, and returns. As a result, certain non-advisory fund expenses are incurred by the service provider and revenue sharing is a way to reimburse the service provider for these expenses. Inderst and Ottaviani (2012a, 2012b), argue that revenue sharing may persist, even when clearly disclosed, because it incents advisors to exert effort to become informed about the right investment options for the plan and to negotiate rebates for services that record keepers perform on behalf of plan participants.

Regulatory concern has focused on the potential for indirect compensation to lead service providers to recommend that high-cost investment options be include on plan menus (see, for example, Ayres and Curtis (2015) and GAO (2011)). In a first response to these concerns, the DOL began in 2009 to require that sponsors of plans with more than 100 participants disclose the amount of both direct compensation paid to third party providers and indirect compensation received by third party service providers that was used to offset plan related expenses on Schedule C of Form 5500, filed annually with the DOL, if the total compensation service providers received exceeded \$5,000.

In 2012, the DOL implemented several additional regulatory changes designed to improve the transparency and prominence of indirect fees to plan sponsors and participants. The first, rule 408(b)(2), requires that plan sponsors receive from third party service providers (referred to as "covered service providers" or CSPs) estimates of all the indirect and direct compensation they expect to be paid from plan assets.⁸ Unlike the requirements under Schedule C, Rule 408(b)(2) also subjects service providers to substantial penalties if they fail to provide estimates of their expected compensation (Wagner (2014)). Importantly, rule 408(b)(2) also requires plan sponsors to consider the prospective compensation when assessing the reasonableness of the service provider's compensation.

The second regulatory change made in 2012 was rule 404(a)(5), which required for the first time that plan sponsors disclose to participants the *aggregate* compensation received by plan service providers (both direct and all indirect compensation), the past performance and annual expense (including investment management expenses and 12b-1 fees) associated with each of the investment options on the plan menu, and a comparison of the performance of each investment option to a peer or index based benchmark return. Before 2012, most of the information required to be disclosed under 404(a)(5) was

⁸ For an example of a 408(b)(2) disclosure see https://www.fi360.com/fa/help/Report_Samples/408b2-fee-disclosure.pdf

only available to plan participants through mutual fund prospectuses and Statements of Additional Information. The goal of 404(a)(5) was to require plan sponsors to pull together performance and expense information for participants in a way that allowed participants to evaluate the performance of each investment option available on the plan menu.⁹

To summarize, in addition to the existing disclosure requirements under Schedule C, beginning in 2012, service providers were required to disclose to plan sponsors the annual amount of direct and indirect compensation they *expected* to earn from their contracts. To make these disclosures “eye opening”, plan sponsors were required to use the disclosed information in their evaluation of the reasonableness of service provider fees, and they were further required to disclose to plan participants the direct and indirect compensation they paid to service providers.¹⁰

B. The potential effects of revenue sharing practices on plan expenses

How are the regulatory changes implemented in 2012 expected to affect the structure and level of fees paid to service providers of 401(k) plans? As discussed in the introduction, price complexity and information shrouding are mechanisms that can facilitate price discrimination by enabling firms to exploit behavioral biases or information gaps among a subset of consumers. Within the literature on price complexity, the framework developed by Inderst and Ottaviani (2012a and 2012b) to examine the effect of indirect contingent compensation paid to financial advisors is most closely related to this question. In their model, advisors serve to match consumers with investment options that are most suitable given consumers’ preferences. Their main insights are that the equilibrium fee structure, the level of fees charged, and the impact of fee disclosures will depend on whether consumers are wary or naïve. Wary, or sophisticated, individuals behave like Bayesians, in that they rationally update their beliefs about advisor bias based on the indirect contingent compensation advisors receive. In contrast, naïve, or less sophisticated, consumers are consumers who assume that indirect contingent commissions do not influence advisor recommendations. Again, consumers may behave as though they are naïve because they are poorly informed about the compensation advisors receive.

Because plan sponsors are fiduciaries, we assume that they select investment options for the plan that they believe, based on the recommendations they receive, are in the best interest of plan

⁹ See DOL fact sheet at <https://www.dol.gov/agencies/ebsa/about-ebsa/our-activities/resource-center/fact-sheets/direct-final-rule-provides-flexibility-for-the-timing-of-annual-disclosures-to-workers-in-401k-type-retirement-plan>.

¹⁰ See Department of Labor Fact Sheets at: <https://www.dol.gov/sites/default/files/ebsa/about-ebsa/our-activities/resource-center/fact-sheets/final-regulation-service-provider-disclosures-under-408b2.pdf>.

participants. In other words, we assume that there is no agency conflict between plan sponsors and participants. As a result, advisors influence plan investments options through the advice they provide plan sponsors. We assume, that because of switching costs or other frictions plan advisors have some market power. Given these assumptions, the model by Inderst and Ottaviani (2012a and 2012b) predicts that the equilibrium contract for wary sponsors is one that provides the advisor only with a fixed fee paid by sponsors and no contingent indirect payments by investment providers. Intuitively, wary sponsors assume that contingent commissions incent advisors to provide biased advice, which reduces the price that wary consumers are willing to pay for the advice and the investment options recommended by the advisors. Consequently, the optimal incentive structure is one which leads to advice that is most informative, which occurs when the advisor only receives fixed direct compensation from the sponsor.

The optimal compensation contract when sponsors are naïve is very different. Even when advisors receive indirect contingent commissions from investment providers, naïve plan sponsors do not update their beliefs concerning the quality of advice and thus do not adjust the price they are willing to pay for advice or the recommended products. As a result, contingent commissions enable advisors to extract higher rents than fixed fees. The optimal contract with naïve sponsors therefore involves compensation solely through indirect fees. If some sponsors are wary and others naïve and advisors are able to price discriminate, then wary sponsors will pay their service providers directly, whereas service providers of naïve sponsors will receive indirect compensation through the investment products they recommend to naïve sponsors. Ultimately, the overall expenses that participants in plans offered through naïve sponsors face will be higher than for the participants in plans offered by wary sponsors, because they end up paying more for the investment products that are offered through their plan.

If fund providers offer share classes with and without indirect compensation (in the form of 12b-1 fees) to service providers and if indirect compensation is not disclosed, then all else equal, the model in Inderst and Ottaviani (2012a and 2012b) predicts that wary sponsors will select the share classes that do not charge a 12b-1 fee. In contrast, naïve sponsors will be directed to invest in share classes with 12b-1 fees. If fund providers offer only retirement share classes with 12b-1 fees, then wary sponsors may invest in share classes with 12b-1 fees if the disclosure of indirect fees is salient to them, so long as there is a dollar for dollar offset of direct for indirect fees.

While sponsors may vary in terms of their sophistication, their bargaining power, and their cost of monitoring service providers, we assume that it is costlier, per dollar of plan assets, for the sponsors of small plans (as measured by total assets) to conduct due diligence or monitor expenses on an ongoing basis. This will be the case if there is a fixed component to monitoring and contracting costs. Thus,

sponsors of small plans may not devote sufficient resources to fully understand alternative investment options or the incentives of bundled service providers. As a result, these sponsors may behave as if they are naïve because the disclosures of indirect fees paid are not sufficiently transparent or prominent. In contrast, sponsors of large plans (by assets) are more likely to have in-house benefit specialists that devote more time and resources to negotiating and monitoring their service provider contracts and thus are more likely to behave like wary sponsors. Moreover, large plans may also be exposed to greater litigation risk, leading sponsors to behave like wary consumers.¹¹

The base line model abstracts from other factors that may influence the compensation contract. As discussed earlier, indirect contingent fees may also affect the effort of service providers in becoming informed about specialized investment products or in negotiating with nonaffiliated investment providers. As a result, contingent fees may provide incentives to investigate the suitability and quality of specialized products or the fees charged by investment advisors. For example, indirect fees may facilitate the ability of investment fund providers to charge different prices to different plans (reflecting potential economies of scale associated with servicing larger plans or potential price discrimination) leading to indirect fees even when plan sponsors are wary. Indeed, if some plan sponsors monitor the indirect fees paid to service providers more closely, they may prefer to pay some indirect compensation in order to get more favorable pricing from fund service providers.¹²

The above discussion leads to several testable hypotheses regarding the level and composition of fees prior to 2012 as well as how the regulatory changes in 2012 are expected to affect compensation arrangements. First, if indirect compensation practices facilitated price discrimination between naïve and wary plan sponsors prior to 2012, then the likely relationship between plan size and sponsor naiveté leads to the following hypothesis:

Hypothesis 1: If the proportion of plan sponsors that are wary is increasing in plan size, then prior to 2012, large plans will pay a lower portion of total compensation in the form of indirect fees than small plans.

If more comprehensive disclosures make it easier for plan sponsors to identify potential agency problems arising from indirect compensation practices, as well as instances of excessive indirect

¹¹ See, for instance, *Lorenz v. Safeway, Inc.*, No. 4:16-cv-04903, *Krikorian v. Empower Retirement*, No. 1:16-cv-00094-MJW, *Tussey v ABB Inc.*, No. 2:06-cv-04305-NKL and others.

¹² Moreover, even if plan service providers are able to price discriminate between naïve and wary plan sponsors, sophisticated *plan participants* of larger plans with more extensive investment menus, might be able to undo part of the price discrimination by directing their contributions to the least costly investment options offered as part of plan, or by challenging the costs and fees paid by the plan and participants in court.

compensation, we would expect plan sponsors to push for arrangements that rely more heavily on direct forms of compensation over indirect forms of compensation. This leads to the following two hypotheses:

Hypothesis 2: If rule 408(b)(2) and 404(a)(5) disclosures increase the transparency and prominence of indirect fees for naïve sponsors, then there will be a shift away from indirect compensation towards direct compensation after 2012 and the shift will be greater for smaller plans than for larger plans.

Hypothesis 3: If indirect fees facilitate price discrimination, then after 2012 the average decline in total compensation paid will be greater for small plans than for large plans. In other words, the difference between the absolute value of decline in indirect compensations and the increase in direct compensation will be greater for small plans than for large plans.

Finally, because indirect forms of compensation are frequently paid out of fees associated with the investment options offered, such as 12b-1 fees in the case of mutual funds, we also expect a shift away from indirect compensation to be related to changes in the menu of investment options offered under the plans. For plans that primarily offer mutual funds, this would likely imply an increased demand for mutual funds retirement share classes with lower 12b-1 fees that should be less likely to engage in revenue sharing with service providers, which leads to the following hypothesis:

Hypothesis 4: If more transparent disclosure of indirect fees leads to a substitution of direct for indirect fees, then plan sponsors' demand for mutual fund retirement share classes with lower 12b-1 fees will increase after 2012. As a result, the likelihood of mutual funds introducing retirement share classes with low 12b-1 fees will increase after 2012. Moreover, retirement share classes with low 12b-1 fees should see an increase in fund flows after 2012.

The discussion so far assumes that the primary channel through which the disclosure of indirect fees operates is through plan sponsors' decisions concerning how compensation is to be paid and the choice of investment options included on the plan menu. Given the disclosures under rule 404(a)(5), it is certainly possible that fee disclosures may also impact plan participants' choices of investment options on the plan menu, and thus, the level of direct and indirect compensation paid by the plan. We believe however, that at least part of the impact of disclosure changes is through sponsor-initiated changes in the plan menu. There are several reasons for this belief: First, as discussed earlier, investment level revenue sharing payments are not part of the 404(a)(5) disclosure to plan participants. Second, if the shift towards direct fees is solely due to changes in participant investment choices and not due to sponsor-initiated

changes in the plan menus, then we would not expect to see an increase in the creation of retirement share classes with low 12b-1 fees after 2012. However, to provide further evidence that the new disclosure requirements lead to sponsor-initiated changes in plans' menus we also examine how the 12b-1 fees of new funds added to plan menus after 2012 compare to the 12b-1 fees of funds previously on plan menus for a random sample of 400 plans.

III. Data Sources

The data used in this paper come from a variety of different sources. We obtain information on pension plan characteristics, service provider compensation, and the investments offered on plan menus from Form 5500 and the relevant accompanying schedules from the department of Labor's website. The data on service provider compensation and basic plan characteristics are machine readable, but unfortunately, the data on the investments offered on plan menus are not. Therefore, we limit our analysis of plan menu investments to a hand-collected random sample of 400 plans. The data on mutual fund share class introductions, flows, and mutual fund fees are obtained from the CRSP mutual fund database. We provide descriptions of the data and the sample construction at the beginning of each section.

IV. The Impact of Disclosure Requirements on Service Provider Compensation

In this section we examine how the structure of compensation varies with plan size as well as the impact of disclosure requirements on the composition of service provider compensation. Specifically, we test Hypotheses 1 through 3.

A. Pension plan data and service provider compensation

Our data on pension plan characteristics and service provider compensation are from Form 5500 filings and are downloaded directly from the DOL's website for the plan years of 2010 through 2014.¹³ While some plan service provider compensation data are available for the 2009 plan year, we begin our analysis in 2010 because the DOL granted some plan sponsors a grace period for full compliance until the 2010 plan year. Because we are interested in assessing the impact of disclosure regulations that were implemented between March and August of 2012, we require that each plan in our sample has at least

¹³Our download of the data is as of July 2017. Note that the DOL updates the data from plan years 2009 and onwards on a monthly basis and provides the latest most correct filings for plans on its website. The data are available in text form from <https://www.dol.gov/agencies/ebsa/about-ebsa/our-activities/public-disclosure/foia/form-5500-datasets>.

one observation prior to 2012 and at least one after 2012 and we exclude filings by plans whose plan year ends in 2012 or whose plan year includes more than six months in 2012. Additionally, we only include defined contribution plans, defined as 401(k) plans, in our sample and require that they have filed both Schedule C and Schedule H together with Form 5500.¹⁴ We require that plans have at least 100 participants at the beginning of the plan year, because only these plans are required to file Schedule C, and further require them to have active participants.¹⁵ To make our analysis of service provider compensation comparable across plans, we further eliminate plans that report a short plan year.¹⁶

To assess the composition of service provider compensation our preferred measures rely on data reported on Schedule C of Form 5500. As discussed in Section II, Schedule C provides a breakdown of the total direct and indirect compensation received by each service provider that received \$5,000 or more in total compensation (direct and indirect) from the retirement plan. It is important to note that the regulatory reporting requirements for Schedule C did not change after rules 408(b)(2) and 404(a)(5) were implemented, and therefore Schedule C allows us to make comparisons regarding service provider compensation arrangements before *and* after the new disclosure requirements became effective. We separately aggregate all direct and indirect payments made to service providers at the plan level and scale them by the average of total plan assets between the beginning and end of the plan year, which we obtain from Schedule H of Form 5500.

While Schedule C provides a detailed breakdown of both direct and indirect compensation received by service providers, there are two potential concerns with relying solely on Schedule C data. First, only service providers that receive at least \$5,000 of total compensation are listed on Schedule C. Second, while direct compensation is required to be reported in a dollar amount, indirect compensation that service providers receive does not need to be reported in dollars. Instead, service providers may provide plan sponsors with a formula for how indirect compensation is calculated and indicate that a formula was used on Schedule C. For example, a service provider may report that they receive 15bps of total assets invested with certain mutual funds in the form of revenue sharing agreements. Providing sponsors with

¹⁴ We identify 401(k) plans through pension benefit codes “2J”. We exclude all 403(b) plans, identified through pension benefit codes “2L” and “2M”.

¹⁵ Active participants are individuals that are currently employed by the plan sponsor and are eligible to participate in the plan.

¹⁶ A short plan year can occur when a plan is established or terminated, merged or consolidated with another plan, or when the annual date on which the plan year begins is changed. (See 29 CFR 2520.104-50). We identify short plan years based on Form 5500 data and whenever a plan reports for less than 12 months.

only a formula as to how indirect compensation is calculated may serve to shroud indirect compensation and reduce the prominence of indirect fees for plan sponsors.

The threshold reporting requirement for direct fees and the potential use of a formula is likely to result in an underreporting of total compensation on Schedule C. We address this potential for the underreporting of compensation in several ways. First, we include plan fixed effects in our regression models. As a result, our coefficient estimates are solely identified by within-plan variation in direct or indirect compensation. Second, because direct compensation is likely left-censored we also estimate Tobit models of direct compensation in the Internet Appendix to mitigate concerns that the coefficient estimates are overestimated. Last, in the Internet Appendix, we conduct robustness tests using a proxy for our measure of direct compensation that does not suffer from left censoring: total administrative expenses scaled by average total assets. Administrative expenses are reported on Schedule H and capture all direct expenses paid from plan assets and therefore include direct expenses paid to service providers.¹⁷ Furthermore, the two measures are highly correlated.

In all our regression models, we include several plan characteristics as control variables that might be associated with the amount or the type of compensation that service providers receive. Specifically, we control for plan size (measured as the natural logarithm of average total plan assets over a plan year) as well as for the number of participants with account balances (measured as the natural logarithm). Given the potential economies of scale associated with managing larger retirement plans, larger plans may be more likely to pay lower overall compensation relative to total assets than smaller plans. Moreover, larger plans may find it easier to devote resources to monitoring and contracting and, as a result, we expect that they will be more likely to behave like sophisticated or wary customers. Similarly, plans with more experience (as measured by the natural logarithm of plan age), and plans that are more attractive to participants (as measured by the proportion of contributions made by the employer and the overall plan participation rate) may be more likely to monitor service providers, conduct comparative shopping for investment products, or devote more resources to structuring the plan.¹⁸ Additionally, to control for the fact that some retirement plans might rely more heavily on direct stock investments or separated

¹⁷ Administrative costs from Schedule H can differ from total direct costs from Schedule C due to differences in the accrual basis used for each Schedule. Specifically, plans have discretion on whether to use cash accounting or accrual accounting on each Schedule.

¹⁸ For example, Ayres and Curtis (2015) document that plans with greater employer contributions include more index funds and generally reduce losses to plan participants associated with excessive fees on investment products. They also find that plans with higher costs tend to have lower participation rates.

accounts, we also include the proportion of plan assets invested in mutual funds as a control variable in all empirical models.

B. Summary statistics and univariate analysis of disclosure requirements

Our sample consists of 144,316 plan years by 39,519 individual 401(k) plans. Table 1 presents summary statistics for our sample. While the average plan in our sample has around 58 million dollars in average assets, the median plan in our sample is relatively small with only about 8 million dollars in average assets.¹⁹ The average plan in our sample has around 895 participants with accounts, and an overall participation rate of 70%. Additionally, over 60% of plan assets are invested in mutual funds. As shown in Table 1, plans pay on average about 22 basis points in direct compensation relative to average total assets and about 8 basis points in indirect compensation relative to average total assets. Also note that the use of indirect compensation is widespread, with 69% of plans reporting that service providers also receive some form of indirect compensation.

As shown in Table 1 about 40% of the plans report indirect compensation using only a formula. Use of a formula complicates the comparison between indirect and direct compensation. Because of this we define the percentage of indirect to total compensation in two ways. The first definition is simply the total dollar amount of indirect compensation divided by the total dollar amount of direct plus indirect compensation. Defining the percentage of indirect compensation in this way understates the indirect compensation relative to total compensation. The second definition is the same as the first except that we set the percentage equal to missing if direct compensation is greater than zero and indirect is only reported using a formula, and we set the percentage equal to 100 if direct compensation is zero and indirect is greater than zero or reported as a formula. As shown depending on the definition used, the mean proportion of indirect compensation relative to total compensation is between 16 and 29 percent over our sample period.

As discussed earlier, we assume that plan sponsor sophistication varies with plan size. The idea behind using plan size as a proxy for sponsor sophistication is that large plans are more likely to have the resources to conduct due diligence and monitor service providers. To investigate how compensation varies with plan size, we partitioned the plans in our sample by asset size quartiles. To ensure that we are

¹⁹ The average size of plans in our sample is much smaller than the average plan size reported in Cohen and Schmidt (2009) or Pool, Sialm, and Stefanescu (2016). The difference arises because these studies focus on plans offered by publicly traded firms.

comparing the same plans across the two time periods, we calculate the average total assets of each plan for the pre-2012 period and divide the sample into quartiles based on that value.

As shown in Table 2, we find substantial differences in plan characteristics and service provider compensation across the different size quartiles. Larger plans tend to be older, have higher participation rates, and include larger contributions by employers. Most important, larger plans have both substantially lower indirect and direct compensation costs per dollar of assets. For example, the smallest plans in our sample pay on average about 36 basis points relative to total assets in direct compensation to service providers. In contrast, the largest plans only pay about 12 basis points. Both average direct and indirect compensation relative to plan assets are monotonically decreasing across the size quartiles (the differences between size quartiles are significant at the 1% level). This pattern is consistent with economies of scale in plan administration.

If larger plans are more likely to be wary of indirect fees, then larger plans are expected to compensate service providers more through direct fees rather than indirect fees. Consistent with the prediction of Hypothesis 1, we find that the percentage indirect to total compensation is significantly greater for the three smallest size quartiles compared to the largest quartile (the differences are significant at the 1% level). For example, using the first measure, indirect compensation to total compensation is 20.32% for plans in the smallest size quartile compared to 12.36% for plans in the largest size quartile during the pre-2012 period (the difference is significant at the 1% level). Moreover, the percentage of indirect compensation declines significantly as plan size increases. Except for the third quartile, we find a similar pattern using the second measure of the percentage of indirect to total compensation.

To assess the effect of the 2012 disclosure requirements on service provider compensation, we examine changes in direct and indirect compensation as well as total compensation around 2012. As shown in Table 2, for the full sample we find no difference in the level of direct compensation between the pre and post 2012 time periods. In contrast, indirect compensation relative to total assets falls after 2012 (from 9 basis points to 6 basis points which is significant at the 1% level). More importantly, we find that the decrease in indirect compensation is greater for smaller plans than for the largest plans. For example, indirect compensation relative to assets declines by 4 basis points (from 13 basis points to 9 basis points) for plans in the smallest size quartile compared to about a 2 basis point decline for the plans in the largest size quartile. Since we find very little change in direct expenses, the decrease in indirect compensation results in an overall decrease in total compensation after 2012 for the full sample. Moreover, consistent with prediction of Hypothesis 3, we find that the decrease in total compensation is

greater for smaller plans. For example, total compensation declines 6 basis points for plans in the smallest quartile (a relative decrease of 12%), compared to a 1 basis point decline (a relative decrease of 7%) for the plans in the largest quartile. The difference in percentage decline is significant at the 1% level.

As shown in Table 2, plans are slightly more likely to have indirect compensation arrangements with service providers after 2012. At first glance, this might appear inconsistent with our hypotheses and the other univariate results presented in Table 2. However, given the fixed dollar threshold requirement for service provider compensation to be reported on Schedule C and the fact that revenue sharing arrangements are often based on a fixed percentage of assets invested, the increase in the incidence of indirect compensation reporting may simply reflect the effect of asset growth and the reporting threshold. Consistent with this explanation, as shown in Table IA.1 of the Internet Appendix, we find no increase in the propensity of plans to report indirect compensation after 2012 once we control for plan size and other plan characteristics.

C. Multivariate analysis of changes in disclosure requirements

To examine the effect of disclosure requirements on structure of service provider compensation we employ a multivariate regression analysis with controls for plan characteristics and for time-invariant plan fixed effects. In addition to comparing the impact of changes in disclosure requirements by plan size quartiles we also divide plans into two groups based on whether plan assets are below or above the median pre-2012 plan size and conduct a difference-in-difference analysis. Assuming that plan size is a proxy for sponsor sophistication, we expect the impact of disclosure requirements to be greatest among smaller plans.

We begin by analyzing the impact of disclosure requirements on the level of indirect expenses to total assets. As mentioned above, measuring the amount of indirect compensation that service providers receive is difficult because some service providers do not report a dollar amount for Schedule C reporting purposes, but disclose indirect compensation through formulas instead. To address this concern, we include plan fixed effects in our regression models. As a result, identification of the coefficients will primarily be through within-plan changes in the dollar amount of indirect compensation reported on Schedule C, and plans whose service providers only provide disclosure through formulas will not contribute to the identification. Furthermore, we also include an indicator variable for whether a plan reports receiving disclosure through formulas on Schedule C. This mitigates concerns that changes in the reported indirect compensation might be mechanically related to changes in the way service providers disclose indirect compensation.

The results of this analysis are in Table 3. As shown, we find that the level of indirect compensation decreases across all plans in our sample, regardless of size, and the decline is significant at the 1% level. Consistent with Hypothesis 2, we find a significantly larger decline for smaller plans. In particular, as shown in column (2), we find that indirect compensation declines significantly in more post 2012 for smaller plans than for larger plans. The magnitude of this decline is substantial. Small plans' indirect compensation is reduced by 4.5 basis points after 2012 (significant at the 1% level), which represents a 38% decline relative to the mean from small plans prior to 2012. Similarly, in columns (3) through (5) we document that indirect compensation declines significantly more for plans that are relatively small prior to 2012. Moreover, as shown in our robustness tests in Table IA.2 of the Internet Appendix, we find a similar pattern for a subsample of plans that excludes plans that report indirect compensation only by formula.

Consistent with a substitution of direct for indirect fees, we also document an overall increase in the level of direct fees after 2012. As shown in Table 4, and as predicted by Hypothesis 2, direct fees increase significantly after 2012 for all but the smallest size plans. Not surprisingly, given the decrease in indirect fees across all plan sizes and the results in Table 4 we also find an increase in the proportion of direct compensation to total compensation across all plan sizes.²⁰

As discussed earlier, if indirect fees facilitate price discrimination and disclosure reduces ability to price discriminate then, as Hypothesis 3 predicts, we expect a greater decline in total compensation for small plans after 2012. Table 5 provides evidence consistent with this hypothesis. The dependent variable in the regressions reported in Table 5 is the percentage of total compensation to average plan assets. In cases in which indirect compensation is only reported through a formula, total compensation consists only of direct expenses.²¹ Overall, we find a significant decrease in total compensation for all plan size quartiles, with the exception of plans in the largest size quartile. As shown, the coefficient on the *Post* indicator variable decreases in absolute value as plan size increases. For the plans in the two smallest size quartiles total compensation declines by an average of 4.3 basis points (a decline of about 10% relative to the pre-2012 level of total compensation for smaller plan). In contrast, we find no change in the total level of compensation for plans in the largest size quartile.

²⁰ This result can be found in Table IA.5 of the Internet Appendix. As shown in Table IA.4 of the Internet Appendix, we find similar results when using administrative expenses to total assets as a measure for direct compensation. Moreover, as shown in Table IA.3 of the Internet Appendix, we document an increase in direct compensation across all plan sizes when estimating Tobit models, but find the increase to be significantly lower for small plans.

²¹ As a robustness check we also estimated the regressions using a subsample of plans that report the dollar amount of indirect expenses. The results are similar to those reported in Table 5 and are reported in the Internet Appendix.

V. The Impact of Disclosure Requirements on the Demand for Low Revenue Sharing Mutual Funds

The analysis in Section IV suggests a significant shift in the composition of service provider compensation after 2012. Hypothesis 4 predicts that the more transparent disclosure of indirect fees results in an increase in the demand from plan sponsors for mutual funds with lower 12b-1 fees. Indeed, anecdotal evidence from industry publications and disclosures by mutual fund providers suggest that after 2012 mutual fund providers introduced new R share classes with low 12b-1 fees in response to clients' demand for increased transparency.²²

In this section, we test the predictions of Hypothesis 4 by examining the introduction of new retirement share classes with low 12b-1 fees before and after the change in disclosure requirements as well as changes in mutual fund flows into retirement share classes with low 12b-1 fees around the regulatory changes. For our analysis of mutual fund flows, we use changes in the flows of retail share classes (defined below) as a control group in a triple difference-in-difference framework to establish whether the increased disclosure requirements are associated with an increased demand for low-cost retirement share classes. Moreover, the longer time series of flows, relative to the time series of Schedule C data, also allow us to conduct a series of placebo tests to identify whether 2012 is the most likely year in which a structural break occurs.

A. Mutual fund data

To investigate a shift in investor demand for low cost mutual funds, we rely upon the Center for Research in Security Prices (CRSP) survivorship bias free mutual fund database from 2008 to 2015 as well as MFLinks table produced by Wharton Research Data services.²³ Using these data, we construct two

²² For example, as *Plan Sponsor*, an industry publication, explained: "A focus on fairness and fiduciary fitness is driving many investment product providers to implement R6 share classes and other institutional offerings with zero revenue sharing." <https://www.plansponsor.com/share-class-offerings-shift-with-fiduciary-focus>. In March 2013, Neuberger Berman announced R6 share classes for seven of their mutual funds and explained: "In response to client demands for increased transparency and flexibility...Neuberger Berman Group LLC is pleased to introduce retirement share classes...without front-end sales charges, contingent deferred sales charges, or 12b-1 fees." See <https://www.nb.com/pages/public/global/insights/press-new-retirement-share-class-r6-for-seven-mutual-funds.aspx>. Wells Fargo released a similar statement regarding their introduction of R6 share classes. See <https://www.wellsfargofunds.com/assets/edocs/communications/20161101-productalert-2.pdf>.

²³ We start our sample in 2008 in order to conduct placebo tests. Our sample period ends in 2015 because our copy of the MFLinks database ends in 2015.

datasets for our analysis that incorporate information on mutual fund fees, flows, and monthly performance, both at the share class and fund level.

The first dataset consists of all new share class introductions to existing mutual funds. We identify new share class introductions through the offering date in CRSP and by whether mutual fund had other share classes outstanding in the prior month. We use the “WFICN” identifier from the MFLinks database to identify mutual fund share classes of the same fund as it assigns all share classes that hold the same portfolio of assets the same fund identifier. In cases where MFLinks can not be linked with CRSP we use the “CRSP_CL_GRP” identifier from CRSP to identify share classes of the same mutual fund outstanding in the prior month.²⁴ For each new share class we obtain information on expense ratios and 12b-1 fees of the new share class from CRSP. In cases where CRSP does not provide fee information at the time of introduction we use the first observed fee information available. We classify a new share class as having low 12b-1 fees if its 12b-1 fee is less than or equal to the average 12b-1 fee of the existing share classes of the same mutual fund outstanding in the prior month.

We restrict our sample to introductions of new retirement and retail share classes of existing funds because retirement share classes are specifically targeted towards 401(k) plans and because the demand for retail share classes should be unaffected by the new disclosure requirements. To identify retirement share classes, we use Regular Expression to capture patterns in fund names. Specifically, we identify share class names containing patterns such as “Class R Shares”, “R-1”, “R1”, “Retirement Shares”, or “R Cl” as retirement share classes. We classify all remaining share classes as retail if CRSP does not classify them as institutional. Finally, because FINRA limits the total 12b-1 fees charged to 1% of funds’ assets, we exclude a small number of monthly observations where 12-b fees exceed 1%.²⁵

Our second dataset is a monthly panel of fund flows for individual mutual fund share classes. As before we restrict the sample to retirement and retail share classes and obtain information on 12b-1 fees, expense ratios, total assets, and monthly returns from CRSP. We calculate share flows in the same way as in Sirri and Tufano (1998)) and define the monthly flow percentage measure as:

$$FlowPercentage_t = 100 \times \frac{TotalNetAssets_t - (TotalNetAssets_{t-1} \times Return_t)}{TotalNetAssets_{t-1}} \quad (1)$$

²⁴ The “CRSP_CL_GRP” identifier fulfills a similar purpose than the MFLinks identifier but it is based on name parsing and can vary over time. Our findings are not sensitive to restricting the sample only to funds that can be matched with MFLinks.

²⁵ See Mahoney (2004) and <http://www.finra.org/investors/funds-and-fees>.

B. Introduction of new mutual fund share classes

Our final sample consists of 3,403 new mutual fund share classes being added to 2,484 existing mutual funds. Out of the new share classes are 1,692 retirement share classes and 1,711 are retail share classes. Figure 1 displays the number of new retirement share classes added each year. As shown, the number of new retirement share classes added to the lineup of existing funds remains relatively stable between 2009 and 2011 but then increases sharply in 2012 and remains higher after 2012 than the years before 2012. Indeed, the number of new retirement share classes added almost triples between 2011 and 2012. Moreover, as shown in Figure 1 and consistent with the prediction of Hypothesis 4, this increase is mostly driven by the introduction of retirement share classes with relatively lower 12b-1 fees compared to the average 12b-1 fees of the outstanding share classes of the same mutual fund.

An alternative explanation for the finding in Figure 1 could be that investors in general were simply more aware of 12b-1 fees after 2012, for reasons other than the DOL's new disclosure rules, and that as a result the overall demand for share classes with low 12b-1 fees increased after 2012. If this were the case, we would also expect that the demand for retail share classes with low 12b-1 fees increased after 2012. However, as shown in Figure 2, we find no substantial change in the number of new retail share classes with low 12b-1 fees around 2012.

To test whether mutual funds are more likely to introduce new retirement share classes with low 12b-1 fees than new retail share classes with low 12b-1 fees we perform a multinomial logit test of new share class introductions in Table A1 of the Appendix to this paper.²⁶ As shown, we document an increase of about 28% in the likelihood that a new share class introduced following the new disclosure requirements is a retirement share class and has lower 12b-1 fees than the average 12b-1 fees of the already existing share classes of the same fund (significant at the 1% level). In contrast, we find no significant change in the likelihood of retail share class introductions with low 12b-1 fees after following the new disclosure requirements.

C. Multivariate analysis of changes in fund flows

If plan sponsors are more aware of revenue sharing after 2012 and switch to retirement share classes with relatively low 12b-1 fees we expect to see an increase in flow of funds into low 12b-1 fees after 2012. We test this prediction of Hypothesis 4 in a triple-difference setting, which allows us to measure the change in flow of funds between for retirement share classes with different 12b-1 fees before

²⁶ This test is similar to the one by Nanda, Wang, and Zheng (2009), who analyze factors associated with new share class creations.

and after disclosure, relative to the corresponding change in flows for retail share classes. The triple-difference specification also allows us to make a stronger claim of causality than our earlier analyses, as the longer time series of the mutual flow data allows us to conduct a series of placebo tests to identify whether 2012 is the most likely year in which a structural break occurs.

Table 6 presents our triple-difference specifications for the monthly flows of individual mutual fund share classes. In these models we restrict the sample period to 2010 through 2014 in order to be consistent with our analysis of plan service provider compensation in Section IV. Furthermore, because the regulatory changes take place over several months in 2012, we exclude 2012 from our sample. The dependent variable in each model is the flow percentage in each month as defined in Equation (1), winsorized at the 0.5% and 99.5% levels to reduce the influence of outliers, while the independent variables are an indicator variable indicating whether the observation is from the post 2012 time period, a measure of 12b-1 fees as the proxy for revenue sharing, an indicator variable for retirement share classes, and interactions of the 12b-1 measure and the retirement share class indicator. We include the lagged monthly percentage return and depending on the specification, CRSP objective, or fund fixed effects to control for other determinants of fund flows.

In columns (1) and (2) of Table 6, the fee variable is an indicator variable whether the share class includes a high 12b-1 fee, as measured by the actual 12b-1 fee being greater than or equal to the sample median. The coefficient of interest in the regressions is the coefficient on the triple interaction term “*Post × Fee × R Class*” which is designed to measure any difference in the change in flows into share classes with high 12b-1 fees after 2012 between retirement and retail funds. Since the disclosure requirements only apply to retirement funds, we expect the coefficient on the triple interaction variable be negative if 401(k) plans shift to share classes with lower 12b-1 fees. As shown in column (1) the coefficient on the triple interaction term is negative and significant at the 1% level. The coefficient estimate indicates that, relative to the movement of flows among retail share classes, monthly flows into high 12b-1 fee bearing retirement share classes fell by around 1.23% after the new disclosure requirements. In column (2) we control for fund fixed effects in the model.²⁷ Note that by including fund fixed effects, identification is achieved solely through mutual funds for which there are both retirement and retail share classes outstanding. As shown in column (2), our results are robust to the inclusion of fund-level fixed effects. In columns (3) through (4), we conduct the same analysis using the percentage level of 12b-1 fees. As shown,

²⁷ Fund fixed effects are based the MFLinks table provided by Wharton Research Data Services. The sample size is smaller when we include fund fixed effects because the MFLinks table does not cover all mutual funds in CRSP.

we find that for each 1%-point increase in the 12b-1 fees charged by a retirement share class flows decline by around 2.2% in the post disclosure period, relative to the flows among retail share classes (significant at the 1% level).

Our empirical analysis thus far is reliant upon the usage of 2012 as a breakpoint. We assume that heightened disclosure resulting from 408(b)(2) and 404(a)(5) caused a shift in the structure of service provider compensation, which in turn affected in mutual fund flows into retirement share classes with low 12b-1 fees that are less likely to be associated with revenue sharing agreements. However, a potential concern with our analysis is that our regression models are merely capturing a time trend and therefore the relationships we have discussed are not causal, but merely associative. While the triple difference-in-difference framework and the short time period over which the models are estimated mitigates these concerns, we next conduct a series of placebo tests to address this concern.

We conduct three additional placebo tests that assume the counterfactual breakpoint occurs in 2010, 2011, and 2013, respectively. For each of these placebo breakpoints we estimate the same triple-difference specifications as in Table 6 using a time period of two years centered on the placebo breakpoint and excluding the placebo year. When conducting these placebo tests we have to balance the need for a longer time series with the need for keeping the placebo breakpoints relatively close to the year of the regulatory changes in order to avoid picking up any other confounding effects that might affect the demand for low-cost retirement share classes.

Table 7 presents the findings from these placebo tests. For brevity only the coefficient estimates for the triple interaction term are displayed. Consistent with 2012 being the most likely breakpoint we find that the coefficient estimates on the triple interaction term are either statistically insignificant, or of substantially lower magnitude and statistical significance than the estimates in Table 6. Specifically, the relevant coefficient estimates are insignificant for the placebo year 2010, and depending on the specification, between 5% and 60% lower for the years 2011 and 2013 compared to the estimates in Table 6.

VI. The Impact of Disclosure Requirements on the Investment Options Offered by 401(k) Plans

Recall that the 2012 rule changes affected disclosures to both plan sponsors and plan participants. As a result, our findings of a substitution of direct for indirect compensation and an increase in the flows of funds into R share classes with low 12-1 fees after 2012, may result from sponsors changing the menu of investment options offered by plans or from plan participants shifting to lower cost investment options on plan menus. To assess whether the changes in compensation are, at least in part, due to sponsor-

initiated changes, we test whether the new disclosure requirements had a direct effect plan on menus in terms of the mutual funds available to plan participants in this section.

A. Plan menu data and summary statistics

Information on the identity of mutual funds offered on plan menus is available from the “Schedule of Assets” to Schedule H of Form 5500 . The “Schedule of Assets” can be downloaded along with the entire Form 5500 filing from the DOL’s website. There are two challenges with using changes in the Schedule of Assets to track changes in plan menus. First, unlike most of the data reported on Form 5500, the Schedule of Assets is not available to researchers in machine-readable form. Second, while the Schedule of Assets provides a description of the investment and the identity of the issuer there is no standardized format across different plans and the schedule generally does not provide any standardized investment identifiers (i.e. CUSIP or tickers) that would allow matching the investments with other commercial databases.

Given these challenges, we examine the impact of the disclosure requirements on the investments offered by plans for a hand collected random sample of 401(k) plans. Specifically, using the same sample as in Section IV we randomly select 100 plans from each size quartile (based on pre 2012 assets) and then hand-collect each plan’s Schedules of Assets from 2010 through 2014. The only additional constraint we place on the selection of plans for this analysis is that they have at least 50% of their assets invested in mutual funds in any given year over our sample period. We impose this constraint in order to avoid sampling from plans that rely primarily on separated accounts or common collective trust, for which fee information is not publicly available.

For our random sample of 400 plans we obtain all mutual fund investments from their respective Schedule of Assets and matched each mutual fund to the CRSP mutual fund database through a name search. We restrict the sample to mutual funds for which CRSP has information on expense ratios and 12b-1 fees. Unfortunately, most plan sponsors in our sample do not report the share classes of their plans’ mutual fund investments, and even if they do they often times do not report the share classes of all their mutual funds nor are they always consistent in their reporting across time. Indeed, only about 40% of the mutual funds we are able to match with CRSP indicate a share class on the Schedule of Assets. As a result, in our main analysis we use the average 12b-1 fees and expense ratios across all outstanding share classes of a mutual fund as a proxy for the costs associated with a mutual funds on a plan’s menu.

Our final sample consists of all mutual funds holdings for each of the 400 plans between 2010 and 2014, which amounts to almost 44,000 observations. We present summary statistics in Table 8. As shown

in column (1) of Panel A , the average plan in our sample tends to be slightly smaller and tends to invest a greater percentage of its assets in mutual funds than the average plan in our full sample from Section IV. The difference in size is driven by plans in the largest size quartile and the difference in the percentage of assets invested in mutual funds is the result of our sampling protocol.

The summary statistics in Table 8 further indicate that even the smallest plans offer, on average, a substantial number of mutual funds on their menus. However, the summary statistics are also consistent with our assumption that smaller plans are more likely to have less sophisticated sponsors. For example, smaller plans tend to offer funds by fewer providers than larger plans and are more likely to only offer funds from a single mutual fund company. Indeed, about 13% of the smallest plans only offer mutual funds by the same company compared to only 2% of the largest plans. Moreover, while almost all of the plans in the largest size quartile offer index funds, only about half of small plans offer an index funds as an investment option to their participants. Finally, as shown in Panel B of Table 8, the mutual funds offered by small plans tend to have higher expense ratios and higher 12b-1 fees than the mutual funds offered by larger plans. While differences in economies of scale between large and small plans are one possible explanation for the differences in fees and expense ratios, note that because we measure fund fees and expenses at the mutual fund and not the share class level, a more likely explanation is that larger plans tend to offer more mutual funds that have, on average, lower fees, such as index funds.

B. Multivariate analysis of changes in plan menus

Because mutual fund share classes are typically not reported on the Schedule of Assets, we focus our analysis on the fee structure of new funds that are added to a plan's menu. If the disclosure requirements by the DOL prompted plan sponsors to demand less revenue sharing we expect that new mutual funds added to an existing plan after 2012 will have lower 12b-1 fees, on average, than the mutual funds already offered by the plan. Moreover, assuming that plan size is a proxy for plan sponsor sophistication, we expect this effect to be stronger for smaller plans in our random sample than for larger plans.

We examine this issue using a multivariate regression framework that allows us to control for mutual fund as well as for plan characteristics. We identify newly added mutual funds as funds that are added to a plan's menu between two consecutive years. Note that for a given plan the earliest a newly added fund can be in our sample is during the plan's second year. We include the same plan-level controls from Tables 3 through 5, as well as CRSP objective code fixed effects, and depending on the specification, plan size quartile fixed effects in our regression models.

Table 9 presents our results. As shown in column (1), we find that for the full random sample newly added funds have, on average, 12b-1 fees that are about 3.5 basis points lower than the existing mutual funds (significant at the 1% level). Moreover, newly added funds after 2012 have about 5.6 basis points lower 12b-1 fees (the difference to funds added before 2012 is significant at the 10% level). However, as shown in columns (2) through (6) and consistent with our expectations, there are significant differences between the funds added by small plans and those added by large plans. Specifically, for small plans we find that newly added funds have significantly lower 12b-1 fees after 2012. In contrast, we find no significant difference in the 12b-1 fees of newly added funds to large plans between the two time periods.

VII. Conclusion

In this paper we study the effect of fee disclosure requirements on the compensation structure of service providers to retirement plans. Overall, we find that disclosure requirements intended to make indirect fees more transparent and fund expenses more comparable, are associated with a substitution of indirect compensation for direct compensation and a reduction in indirect compensation, especially among smaller plans. We also present evidence that mutual fund providers responded to the disclosure requirements by offering share classes with lower 12-1 fees, and that the sponsors of smaller plans responded to the changes in fee disclosures by adding mutual funds with lower fees on to plan menus. Overall, we interpret these findings as consistent with disclosure requirements reducing price complexity and lowering the cost of administrative services to smaller plans with less sophisticated sponsors.

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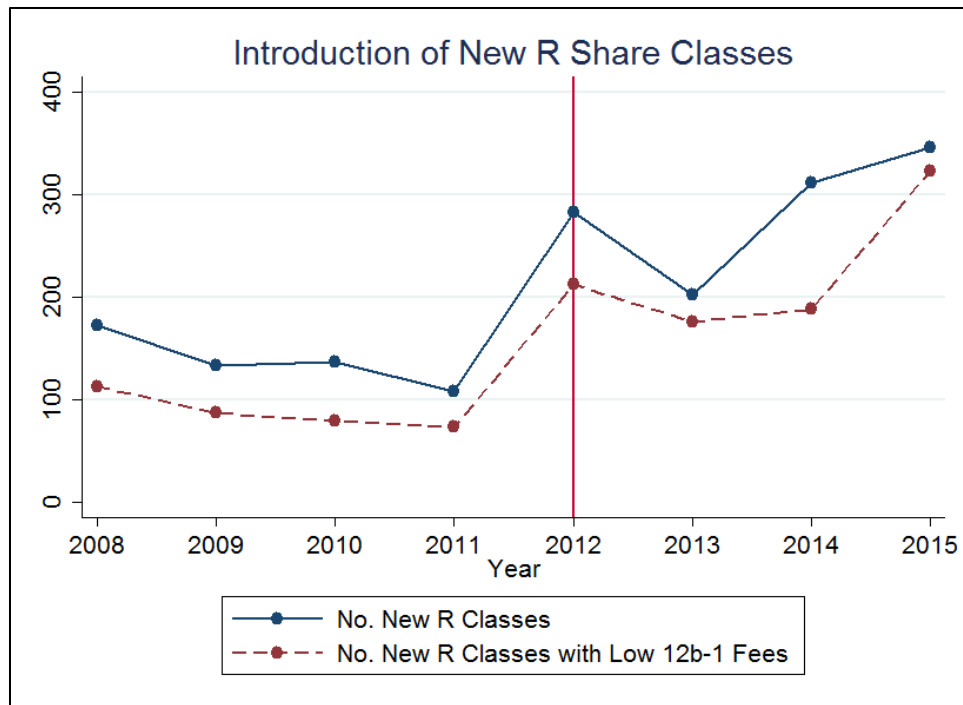


Figure 1: Introduction of new R share classes to existing mutual funds. This figure presents the annual number of new retirement share classes (R share classes) added to the lineup of existing mutual funds between 2008 and 2015. A new R share class is defined as having low 12b-1 fees if its 12b-1 fees are less than or equal to the average 12b-1 fee across all other share classes of the mutual fund. The average 12b-1 fee of the mutual fund is measured in the month preceding the introduction of the new R share class.

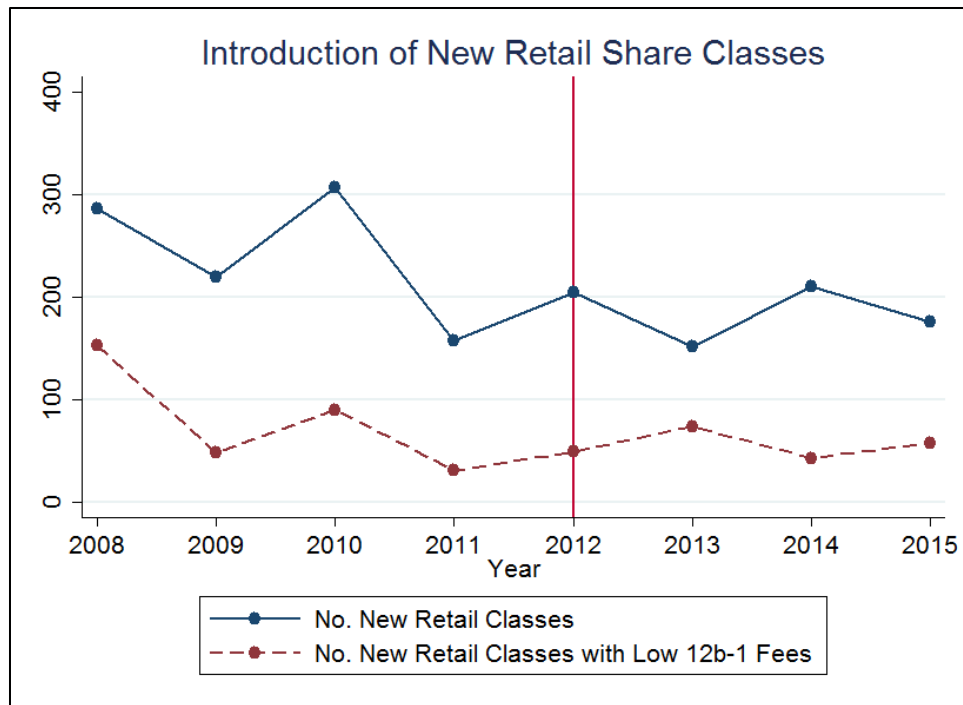


Figure 2: Introduction of new retail share classes to existing mutual funds. This figure presents the annual number of new retail share classes added to the lineup of existing mutual funds between 2008 and 2015. A new retail share class is defined as having low 12b-1 fees if its 12b-1 fees are less than or equal to the average 12b-1 fee across all other share classes of the mutual fund. The average 12b-1 fee of the mutual fund is measured in the month preceding the introduction of the new retail share class.

Table 1: Summary Statistics of Pension Plan Characteristics and Compensation Paid

This table presents summary statistics for the pension plans in our sample based on annual Form 5500 data obtained from the DOL. The sample period is from 2010 to 2014 and excludes 2012. *Avg. Assets* is the average total plan assets of the plan year. *No. Participants* is the number of participants with account balances. *Employer Contr.* is the percentage of total contributions made by the employer. *Participation Rate* is the percentage of current employees participating in the plan relative to eligible employees. *Mutual Funds* is the percentage of end-of-year plan assets invested in registered investment companies. *Plan Age* is the number of years from the effective date of the plan. *Admin Exp. To Assets* is the percentage of annual administrative expenses to average plan assets. *Total Comp. to Assets* is the percentage of total direct and indirect compensation to average plan assets. *Direct (Indirect) Comp. to Assets* is the percentage of total direct (indirect) compensation to average plan assets. *Indirect Comp. Paid* is an indicator variable that takes a value of one if a plan paid any indirect compensation to service providers. *Indirect Comp. Formula Only* is an indicator variable that takes a value of one if indirect compensation was paid but only reported through a formula on Schedule C. We define percentage of indirect to total compensation in two ways. Definition 1 is simply $100 \times \text{indirect} / (\text{direct} + \text{indirect})$ and definition 2 is the same as definition (1) except we set the percentage equal to missing if direct compensation is greater than zero and indirect is only reported through a formula. Additionally, for definition (2), we set the percentage equal to 100 if direct is zero and indirect is positive or indirect is reported as a formula.

	Mean	p25	p50	p75	Min	Max	N
Avg. Assets (in \$mn)	58.71	3.58	8.23	20.90	0.00	49244.97	144316
No. Participants	895.52	121.00	198.00	425.00	1.00	1052751.00	144316
Employer Contr. (in %)	24.59	10.74	24.16	35.79	0.00	100.00	144316
Participation Rate (in %)	70.38	52.32	77.37	92.69	0.01	100.00	144316
Mutual Funds (in %)	62.80	33.17	80.27	90.93	0.00	100.00	144316
Plan Age (in Years)	20.93	13.58	19.00	26.42	0.16	99.00	144316
Admin Exp. to Assets (in %)	0.24	0.03	0.10	0.33	0.00	2.38	144316
Total Comp. to Assets (in %)	0.29	0.03	0.14	0.41	0.00	2.81	144316
Direct Comp. to Assets (in %)	0.22	0.02	0.08	0.29	0.00	2.27	144316
Indirect Comp. to Assets (in %)	0.08	0.00	0.00	0.01	0.00	1.63	144316
Indirect Comp. Paid	0.69	0.00	1.00	1.00	0.00	1.00	144316
Indirect Comp. Formula Only	0.40	0.00	0.00	1.00	0.00	1.00	144316
Indirect to Total Comp. (in %) (1)	16.18	0.00	0.00	11.01	0.00	100.00	133726
Indirect to Total Comp. (in %) (2)	29.94	0.00	1.80	64.01	0.00	100.00	80838

Table 2: Univariate Analysis of Disclosure Requirements

This table presents summary statistics for the pension plans in our sample based on Form 5500 data obtained from the DOL. Columns (1) and (2) report the mean values for the full sample prior to 2012 and post 2012, respectively. The remaining columns report the mean values by size quartile. For each plan, we calculate the average total assets across the years 2010 and 2012, we then sort plans into quartiles based on their average total assets during the pre-2012 period. The difference in means between the two time periods is based on a *t*-test assuming unequal variances. Variable definitions are provided in Table 1. We use ***, **, and * to denote that the difference between the pre and post period is significantly different from zero at the 1%, 5%, and 10% level, respectively.

	Full Sample		Size Q1		Size Q2		Size Q3		Size Q4						
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post					
Avg. Assets (in \$mn)	49.73	67.31	***	1.63	2.61	***	4.60	6.86	***	10.66	15.47	***	175.79	243.17	***
No. Participants	858.60	930.83	**	115.16	140.30	***	182.72	212.24	***	294.57	343.24	***	2746.83	3013.77	**
Employer Contr. (in %)	24.15	25.02	***	17.85	18.98	***	21.02	22.18	***	25.36	26.47	***	31.74	32.30	***
Participation Rate (in %)	70.09	70.66	***	48.50	49.42	***	68.77	69.14		78.43	79.32	***	82.94	84.25	***
Mutual Funds (in %)	60.73	64.78	***	55.08	58.73	***	59.78	64.41	***	64.27	68.87	***	63.35	66.96	***
Plan Age (in Years)	19.47	22.32	***	13.14	15.89	***	18.54	21.45	***	21.54	24.59	***	24.15	27.20	***
Admin Exp. to Assets (in %)	0.25	0.24	***	0.42	0.39	***	0.27	0.25	***	0.19	0.19		0.12	0.12	***
Total Comp. to Assets (in %)	0.31	0.28	***	0.49	0.43	***	0.36	0.31	***	0.26	0.23	***	0.15	0.14	***
Direct Comp. to Assets (in %)	0.22	0.22		0.36	0.34	***	0.25	0.24	***	0.17	0.18	**	0.11	0.12	***
Indirect Comp. to Assets (in %)	0.09	0.06	***	0.13	0.09	***	0.11	0.07	***	0.09	0.05	***	0.04	0.02	***
Indirect Comp. Paid	0.67	0.70	***	0.62	0.62		0.66	0.68	***	0.69	0.73	***	0.72	0.75	***
Indirect Comp. Formula Only	0.40	0.41	***	0.32	0.31	**	0.36	0.37	***	0.41	0.43	***	0.50	0.51	***
Indirect to Total Comp. (in %) (1)	17.38	15.04	***	20.32	15.96	***	18.99	16.25	***	18.54	17.26	***	12.36	10.86	***
Indirect to Total Comp. (in %) (2)	32.13	27.82	***	34.63	26.57	***	32.27	28.06	***	34.03	32.00	***	26.96	24.19	***
No. Plan Years	70553	73763		16748	18119		17546	18473		18006	18658		18253	18513	
No. Plans	39519	39519		9880	9880		9880	9880		9880	9880		9879	9879	

Table 3: Change in Indirect Compensation

This table presents linear models where the dependent variable is the total indirect compensation paid scaled by average plan assets (measured in percent). The models all control for plan fixed effects. Columns (1) and (2) estimate the model for the full sample, and columns (3) through (6) partition the sample by pre 2012 size quartiles. *Post* is an indicator variable that takes a value of one for years after 2012, and zero otherwise. *Ind. Formula* is an indicator variable for whether indirect compensation is reported as a formula. *Small Plan* is an indicator variable that takes a value of one if the plan has average assets below the sample median prior to 2012. The remaining control variables are as defined in Table 1. Absolute values of *t*-statistics are in parentheses below coefficient estimates and standard errors are clustered by plan. Statistical significance is indicated by *, **, and *** at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Full Sample	Full Sample	Size Q1	Size Q2	Size Q3	Size Q4
Post	-0.033*** (15.96)	-0.026*** (12.00)	-0.050*** (9.99)	-0.043*** (9.53)	-0.029*** (6.31)	-0.016*** (6.74)
Post x Small Plan		-0.019*** (6.92)				
Ind. Formula	-0.013*** (4.22)	-0.013*** (4.38)	-0.013* (1.69)	-0.015** (2.44)	-0.015** (2.57)	-0.011*** (2.88)
Log(Avg. Assets (in \$mn))	-0.014*** (2.62)	-0.013** (2.35)	-0.006 (0.54)	-0.032*** (2.74)	-0.020 (1.64)	-0.006 (1.09)
Log(No. Participants)	0.004 (1.00)	0.004 (0.96)	0.003 (0.36)	0.016* (1.68)	0.008 (0.89)	-0.002 (0.42)
Employer Contr. (in %)	-0.000 (1.39)	-0.000 (1.35)	-0.000 (1.39)	-0.000 (0.62)	0.000 (0.09)	-0.000 (0.83)
Participation Rate (in %)	0.000* (1.93)	0.000* (1.71)	-0.000 (0.94)	0.000 (1.34)	0.000** (2.14)	0.000* (1.76)
Log(Plan Age)	0.003 (0.48)	0.009 (1.38)	0.018 (1.19)	0.024* (1.65)	-0.011 (0.85)	-0.001 (0.09)
Mutual Funds (in %)	0.000*** (3.06)	0.000*** (3.05)	0.000*** (3.86)	0.000** (2.10)	-0.000 (0.73)	-0.000 (1.20)
Plan FEs	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.517	0.518	0.572	0.455	0.471	0.490
N	144316	144316	34867	36019	36664	36766

Table 4: Change in Direct Compensation

This table presents linear models where the dependent variable is the total direct compensation paid scaled by average plan assets (measured in percent). The models all control for plan fixed effects. Columns (1) and (2) estimate the model for the full sample, and columns (3) through (6) partition the sample by pre 2012 size quartiles. *Post* is an indicator variable that takes a value of one for years after 2012, and zero otherwise. *Small Plan* is an indicator variable that takes a value of one if the plan has average assets below the sample median prior to 2012. The remaining control variables are as defined in Table 1. Absolute values of *t*-statistics are in parentheses below coefficient estimates and standard errors are clustered by plan. Statistical significance is indicated by *, **, and *** at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Full Sample	Full Sample	Size Q1	Size Q2	Size Q3	Size Q4
Post	0.011*** (4.77)	0.017*** (7.62)	-0.000 (0.01)	0.011** (2.38)	0.015*** (4.24)	0.012*** (4.79)
Post x Small Plan		-0.016*** (6.07)				
Log(Avg. Assets (in \$mn))	-0.041*** (6.41)	-0.040*** (6.23)	-0.035** (2.51)	-0.062*** (4.98)	-0.048*** (4.70)	-0.017** (2.17)
Log(No. Participants)	0.020*** (3.50)	0.020*** (3.47)	0.017 (1.37)	0.024** (1.99)	0.028*** (2.81)	0.011 (1.58)
Employer Contr. (in %)	-0.000 (0.82)	-0.000 (0.79)	-0.000 (0.53)	-0.000 (0.53)	-0.000 (1.10)	0.000 (0.98)
Participation Rate (in %)	0.000** (2.55)	0.000** (2.40)	0.000 (1.25)	0.000** (2.08)	0.000 (1.20)	0.000 (0.08)
Log(Plan Age)	-0.002 (0.24)	0.003 (0.36)	0.002 (0.10)	-0.004 (0.21)	0.019* (1.70)	0.000 (0.03)
Mutual Funds (in %)	0.000** (2.22)	0.000** (2.20)	0.000 (1.05)	0.000 (0.57)	0.000** (2.37)	0.000** (2.08)
Plan FEs	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.762	0.762	0.725	0.753	0.765	0.770
N	144316	144316	34867	36019	36664	36766

Table 5: Change in Total Compensation

This table presents linear models where the dependent variable is the total compensation paid scaled by average plan assets (measured in percent). The models all control for plan fixed effects. Columns (1) and (2) estimate the model for the full sample, and columns (3) through (6) partition the sample by pre 2012 size quartiles. *Post* is an indicator variable that takes a value of one for years after 2012, and zero otherwise. *Ind. Formula* is an indicator variable for whether indirect compensation is reported as a formula. *Small Plan* is an indicator variable that takes a value of one if the plan has average assets below the sample median prior to 2012. The remaining control variables are as defined in Table 1. Absolute values of *t*-statistics are in parentheses below coefficient estimates and standard errors are clustered by plan. Statistical significance is indicated by *, **, and *** at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Full Sample	Full Sample	Size Q1	Size Q2	Size Q3	Size Q4
Post	-0.022*** (7.19)	-0.008*** (2.61)	-0.051*** (6.56)	-0.031*** (4.82)	-0.013** (2.37)	-0.003 (1.01)
Post x Small Plan		-0.035*** (9.63)				
Ind. Formula	-0.053*** (11.13)	-0.054*** (11.32)	-0.081*** (6.24)	-0.070*** (7.39)	-0.043*** (5.51)	-0.016*** (3.09)
Log(Avg. Assets (in \$mn))	-0.055*** (6.62)	-0.052*** (6.28)	-0.040** (2.31)	-0.093*** (5.58)	-0.067*** (4.19)	-0.023** (2.37)
Log(No. Participants)	0.024*** (3.33)	0.024*** (3.29)	0.020 (1.35)	0.039*** (2.59)	0.036*** (2.62)	0.009 (0.91)
Employer Contr. (in %)	-0.000 (1.51)	-0.000 (1.47)	-0.000 (1.21)	-0.000 (0.84)	-0.000 (0.65)	0.000 (0.16)
Participation Rate (in %)	0.000*** (3.27)	0.000*** (3.00)	0.000 (0.40)	0.001*** (2.60)	0.001** (2.37)	0.000 (1.30)
Log(Plan Age)	0.001 (0.07)	0.012 (1.18)	0.019 (0.85)	0.020 (0.85)	0.008 (0.44)	-0.000 (0.02)
Mutual Funds (in %)	0.000*** (4.66)	0.000*** (4.66)	0.001*** (3.93)	0.000*** (2.75)	0.000 (1.26)	0.000 (0.66)
Plan FEs	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.700	0.701	0.686	0.650	0.655	0.681
N	144316	144316	34867	36019	36664	36766

Table 6: Monthly Mutual Fund Flows in a Triple-Difference Setting

This table presents ordinary least squares regressions of mutual fund flows in a triple-difference setting at the mutual fund share class level. The dependent variable is the monthly net flow to a given share class expressed in percent, as defined in Equation (1), and winsorized at the 0.5% and 99.5% levels to reduce the impact of extreme outliers. The *Post* indicator variable is defined as 0 for months taking place prior to 2012 and 1 for months taking place after 2012. The sample period is from 2010 through 2014 and excludes 2012. *R Class* is an indicator variable that takes a value of one if the mutual fund share class is a retirement share class, and zero if it is a retail share class. *Fee* is a measure of 12b-1 fees as indicated by the column labels. In columns (1) and (2), *Fee* is defined as an indicator variable if the share class has a 12b-1 fee greater or equal to the sample median, while in columns (3) and (4) *Fee* is defined as the actual percentage 12b-1 fee. *Lag Return* is the monthly percentage return of the mutual fund share class lagged by one month. The specifications in columns (2) and (3) include fund fixed effects for share classes of the same fund, identified through the MFLinks database. Standard errors are clustered by fund share class. Absolute values of *t*-statistics are presented in parentheses and statistical significance is indicated by *, **, and *** at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)
	High 12b-1 Fee		Continuous 12b-1 Fee	
Post	-0.164** (2.11)	-0.543*** (5.82)	-0.236*** (3.31)	-0.725*** (10.09)
Fee	-0.349*** (4.25)	-0.290** (2.50)	-1.386*** (14.20)	-1.178*** (13.43)
R Class	1.329*** (7.94)	2.287*** (11.31)	0.867*** (5.68)	1.913*** (11.54)
Post x Fee	0.305*** (3.06)	-0.019 (0.18)	0.607*** (4.90)	0.328*** (3.07)
Post x R Class	-0.116 (0.56)	0.000 (0.00)	-0.135 (0.71)	0.027 (0.13)
Fee x R Class	0.148 (0.74)	0.174 (0.78)	1.169*** (3.37)	0.790** (2.26)
Post x Fee x R Class	-1.235*** (4.97)	-1.113*** (4.02)	-2.204*** (5.16)	-2.191*** (4.55)
Lag Return	0.106*** (24.78)	0.078*** (18.80)	0.106*** (24.65)	0.077*** (18.69)
Obj. Code FEs	Yes	No	Yes	No
Fund FEs	No	Yes	No	Yes
Adj. R^2	0.01	0.06	0.01	0.06
N	763618	517189	763618	517189

Table 7: Placebo Tests in Triple Difference Setting

This table presents the same regression models as in Table 6 but assuming different years as the year of the actual breakpoint. Each panel presents regression models using a time period of two years centered on the placebo breakpoint and excluding the placebo year. For brevity only the coefficient estimates on the triple interaction term are displayed. Standard errors are clustered by fund share class. Absolute values of *t*-statistics are presented in parentheses and statistical significance is indicated by *, **, and *** at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)
	High 12b-1 Fee		Continuous 12b-1 Fee	
Panel A: Placebo Year 2010				
Post x Fee x R Class	0.376 (1.30)	0.274 (0.95)	0.267 (0.53)	0.110 (0.22)
Obj. Code FEs	Yes	No	Yes	No
Fund FEs	No	Yes	No	Yes
Adj. R^2	0.01	0.06	0.01	0.07
N	754954	553915	754954	553915
Panel B: Placebo Year 2011				
Post x Fee x R Class	-0.494* (1.78)	-0.838*** (2.91)	-1.122** (2.32)	-1.656*** (3.19)
Obj. Code FEs	Yes	No	Yes	No
Fund FEs	No	Yes	No	Yes
Adj. R^2	0.01	0.07	0.01	0.07
N	753998	532351	753998	532351
Panel C: Placebo Year 2013				
Post x Fee x R Class	-0.750*** (3.29)	-1.059*** (4.15)	-1.637*** (4.33)	-1.752*** (4.18)
Obj. Code FEs	Yes	No	Yes	No
Fund FEs	No	Yes	No	Yes
Adj. R^2	0.01	0.05	0.01	0.05
N	780040	504329	780040	504329

Table 8: Summary Statistics for the Random Sample

This table presents summary statistics for the random sample of 400 plans for which investments were hand-collected from their Schedule of Assets. Panel A presents summary statistics of general plan characteristics and Panel B presents summary statistics for the individual mutual funds held by different plans. Column (1) presents the mean values for the full random sample, and columns (2) through (5) present mean values where the random sample is partitioned by pre 2012 size quartiles. In Panel A, *No. of Mutual Funds on Menu* is the number of mutual funds reported on the Schedule of Assets. *No. of Mutual Fund Providers* is the number of different mutual fund companies that offer funds on the plan's menu. *Single Provider* is an indicator that takes a value of one if the plan only offers mutual funds by one mutual fund company. *Plan offers Index Fund* is an indicator variable that takes a value of one if a plan offers at least one index fund on its menu. The remaining variables are defined as in Table 1. In Panel B, *Avg. Expense Ratio (12b-1 Fee)* are the average expense ratio (12b-1 fee) across all share classes of the mutual fund outstanding at the time, measured in percent.

	(1)	(2)	(3)	(4)	(5)
	Full Sample	Size Q1	Size Q2	Size Q3	Size Q4
Panel A: Plan-level Characteristics					
Avg. Assets (in \$mn)	33.96	2.03	5.32	12.57	113.06
No. Participants	634.33	127.93	180.71	292.57	1890.63
Employer Contr. (in %)	23.59	19.18	16.73	25.36	32.60
Participation Rate (in %)	68.50	47.07	67.18	76.03	82.48
Mutual Funds (in %)	85.43	88.12	86.60	85.80	81.39
Plan Age (in Years)	20.47	12.90	19.22	24.59	24.68
No. of Mutual Funds on Menu	23.99	22.38	23.52	25.54	24.42
No. of Mutual Fund Providers	9.21	8.38	8.97	9.54	9.92
Single Provider	0.07	0.13	0.09	0.05	0.02
Plan offers Index Fund	0.73	0.53	0.64	0.78	0.93
No. Plan Years	1832	443	451	469	469
No. of Plans	400	100	100	100	100
Panel B: Characteristics of individual mutual funds on the plan menu					
Avg. Expense Ratio (in %)	0.89	0.96	0.93	0.91	0.79
Avg. 12b-1 Fee (in %)	0.31	0.34	0.35	0.32	0.25
N	43951	9913	10607	11980	11451

Table 9: Fees of New Mutual Funds Added to Plan Menus

This table presents linear models where the dependent variable is the 12b-1 fee (in percent) of the mutual fund averaged across all share classes of the same mutual fund. The sample is a panel dataset of the annual mutual fund holdings for our random sample of 400 plans between 2011 and 2014. *New Fund* is an indicator variable that takes a value of one if a mutual fund is listed for the first time on a plans' menu during the corresponding plan year, and zero otherwise. By definition *New Fund* is undefined for the first plan-year and thus the sample is smaller than the one in Panel B of Table 8. *Post* is an indicator variable that takes a value of one for plan-years after 2012, and zero otherwise. *Small Plan* is an indicator variable that takes a value of one if the plan has average assets below the sample median prior to 2012. Columns (1) and (2) estimate the model for the full random sample, and columns (3) through (6) partition the random sample by pre 2012 size quartiles. The remaining control variables are as defined in Table 1. Absolute values of *t*-statistics are in parentheses below coefficient estimates and standard errors are clustered by plan. Statistical significance is indicated by *, **, and *** at the 10%, 5%, and 1% level, respectively.

	(1) Full Sample	(2) Full Sample	(3) Size Q1	(4) Size Q2	(5) Size Q3	(6) Size Q4
New Fund	-0.035*** (4.13)	-0.061*** (4.99)	-0.008 (0.55)	-0.008 (0.51)	-0.052*** (4.18)	-0.069*** (3.93)
New Fund x Post	-0.021* (1.71)	0.008 (0.45)	-0.055** (2.19)	-0.048** (2.55)	-0.022 (1.06)	0.040 (1.55)
New Fund x Small Plan x Post		-0.062** (2.57)				
Small Plan x Post		0.013* (1.84)				
New Fund x Small Plan		0.054*** (3.27)				
Small Plan		-0.010 (0.66)				
Post	-0.027*** (5.60)	-0.031*** (4.50)	-0.020*** (2.67)	-0.033*** (3.91)	-0.029*** (4.07)	-0.029** (2.40)
Log(Avg. Assets (in \$mn))	-0.009 (0.97)	-0.018** (2.26)	-0.006 (0.41)	0.017 (0.63)	-0.018 (0.66)	-0.030* (1.78)
Log(No. Participants)	-0.002 (0.25)	-0.003 (0.45)	-0.015 (0.82)	-0.019 (1.03)	0.001 (0.08)	0.017 (1.33)
Employer Contr. (in %)	-0.001** (2.06)	-0.001** (2.58)	-0.001 (1.58)	-0.001* (1.72)	0.001 (1.15)	-0.001 (1.42)
Participation Rate (in %)	-0.001*** (3.46)	-0.000*** (2.65)	-0.000 (1.03)	-0.001** (2.32)	-0.001*** (2.96)	0.000 (0.38)
Log(Plan Age)	-0.004 (0.52)	-0.000 (0.01)	-0.004 (0.32)	0.019 (1.11)	0.011 (0.78)	-0.037* (1.82)
Mutual Funds (in %)	0.000 (0.28)	0.000 (0.60)	0.001 (1.36)	0.001 (1.51)	-0.000 (0.24)	-0.001 (1.45)
Size Quartile FEs	Yes	No	No	No	No	No
Obj. Code FEs	Yes	Yes	Yes	Yes	Yes	Yes
N	33522	33522	7500	8193	9132	8697
Adj. R ²	0.18	0.18	0.17	0.20	0.20	0.13

A. Appendix – Introduction of New Mutual Fund Share Classes

Table A1: Multinomial Logit Model of New Share Class Introductions

This table presents a multinomial logit model of new share class introductions existing mutual funds. The sample period is from 2008 through 2015. There are outcomes for the multinomial logit model that depend on whether a mutual fund added a retail or retirement share class and whether the new share class had higher or lower 12b-1 fees than the average 12b-1 fee across all other share classes of the same mutual fund. The average 12b-1 fee of the mutual fund is measured in the month preceding the introduction of the new share class. Panel A presents the coefficient estimates of the model and Panel B presents the relevant marginal effects, with the control variables evaluated at their sample means. *Post* is an indicator variable that takes a value of one if the year the new share class is introduced is 2012 or afterwards, and zero otherwise. Absolute values of *t*-statistics are in parentheses below coefficient estimates. Statistical significance is indicated by *, **, and *** at the 10%, 5%, and 1% level, respectively.

	(1) Retail & higher 12b-1	(2) Retail & lower 12b-1	(3) R Class & higher 12b-1	(4) R Class & lower 12b-1
Panel A: Multinomial logit model				
Post	0.00 (.)	0.63*** (3.58)	0.47*** (2.68)	1.61*** (9.63)
Lag Flow (%)	0.00 (.)	0.00 (0.06)	0.00*** (2.72)	-0.00 (-0.61)
Lag Return (%)	0.00 (.)	-0.04* (-1.84)	-0.01 (-0.30)	-0.02 (-0.90)
Lag 12b-1 Fee (%)	0.00 (.)	8.25*** (14.31)	5.46*** (9.36)	10.69*** (19.01)
Lag Expense Ratio (%)	0.00 (.)	-0.84*** (-4.01)	-0.49** (-2.39)	-0.72*** (-3.73)
N	1549			
Pseudo <i>R</i> ²	0.21			
Log Likelihood	-1575.99			
Panel B: marginal effects				
Post	-0.22*** (7.77)	-0.02 (0.77)	-0.04* (1.79)	0.28*** (10.38)